

Queensland Mothers and Babies 2014 and 2015

Report of the Queensland Maternal and Perinatal Quality Council 2017



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For more information contact:

Queensland Maternal and Perinatal Quality Council
Patient Safety and Quality Improvement Service
Clinical Excellence Division
Queensland Health
Level 2, 15 Butterfield Street, HERSTON QLD 4029
PO Box 2368
FORTITUDE VALLEY BC, QLD 4006
Email: QMPQC@health.qld.gov.au

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Foreword



A healthy start to life is essential for the general health and wellbeing of mothers and their babies. Improved outcomes for pregnancy and birth in highly developed countries have usually been attributed to better pregnancy care (both antenatal and intrapartum) as well as an improvement in the overall health status of women entering pregnancy. However, it is still the case that little attention is paid to pre-pregnancy care by both women and the health professionals with whom they interact before they conceive. Some of this may be due to the unplanned nature of a proportion of pregnancies, but in those that are planned there are many missed opportunities to optimise maternal health.

In this report, which has sections on significant adverse outcomes of pregnancy such as maternal and perinatal mortality and congenital anomalies, there are insights into these missed opportunities. Indirect maternal deaths, in which a pre-existing medical condition is exacerbated by the physiological changes of pregnancy, remain a significant cause of loss of life. Ensuring that a woman's health is as good as it can be before embarking on pregnancy is one way to mitigate this, as well as ensuring that all involved in her care are able to have input into advising her about pregnancy care. Indeed, there may be some cases in which pregnancy is ill advised, although these are relatively uncommon.

Unfortunately, suicide remains a central cause of late maternal death. Much has been achieved with screening for mental health conditions in identifying women who may be at risk of mental illness in pregnancy and the postpartum. Efforts to maximise support for women in the first postpartum year may assist in identification and appropriate management for women at risk of mental health problems, by virtue of their mental health history and/or psychosocial adversity.

In relation to the baby, there are many aspects of maternal health that can make a real difference. The message about peri-conceptional folate is becoming well known, but may not be reaching all parts of our population. Smoking cessation programs are actively promoted in pregnancy but it would be so much better if the numbers who smoked at the beginning of pregnancy were reduced by pre-pregnancy intervention. Weight loss through healthy eating and exercise could be a significant modifier of pregnancy outcome as overweight and obesity are now very important risk factors for a wide range of adverse maternal and perinatal outcomes. While alcohol consumption during pregnancy has been discouraged for some time, many may be unaware that it can affect fertility in both men and women and increase the time it takes to get pregnant. Similarly, consumption of illegal drugs is dangerous for both the baby and the mother and may result in miscarriage, low birth weight, preterm labour, placental abruption, fetal death and even maternal death.

Much has been done to improve pregnancy outcomes through interventions in pregnancy. Perhaps the time has come to shift some of these resources into the pre-pregnancy period and focus on what can be done, through public health campaigns or by opportunistic individual measures in primary care, to ensure that future mothers are well informed and that their babies have the healthiest possible start to life. Equally, a focus on the importance of pre-pregnancy and better early antenatal care may also help Aboriginal and Torres Strait Islander women to have the best possible chance of a good pregnancy outcome to assist in closing the gap.

Professor David Ellwood
Chair
Queensland Maternal and Perinatal Quality Council

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Abbreviations

AIHW	Australian Institute of Health and Welfare
AKI	acute kidney injury
Apgar	appearance, pulse, grimace response to foot stimulation, activity and respiration
APMAT	Australian Perinatal Mortality Audit Tool
ART	assisted reproductive technology
BMI	body mass index
CALF	Congenital Anomaly Linked File
cfDNA	cell-free DNA
CFTS	combined first trimester screening
DFM	decreased fetal movements
EPDS	Edinburgh Postnatal Depression Score
HELLP	Haemolysis, elevated liver enzymes, low platelet count
ICD-10	International Classification of Diseases, version 10
ICU	intensive care unit
IMPROVE	IMproving Perinatal Review and Outcomes Via Education
LOS	length of stay
MMR	Maternal mortality ratio
NDC	Neonatal Death Classification
NHMRC	National Health and Medical Research Council
NTD	Neural tube defects
OECD	Organisation for Economic Co-operation and Development
PDC	Perinatal Data Collection
PSANZ	Perinatal Society of Australia and New Zealand
PSANZ-NDC	Perinatal Society of Australia and New Zealand Neonatal Death Classification
PSANZ-PDC	Perinatal Society of Australia and New Zealand Perinatal Death Classification
PSQIS	Queensland Department of Health Patient Safety and Quality Improvement Service
QHAPDC	Queensland Hospital Admitted Patient Data Collection
Q-MEWT	Queensland Maternity Early Warning Tool
QMPQC	Queensland Maternal and Perinatal Quality Council or the (Council)
RANZCOG	Royal Australian and New Zealand College of Obstetricians and Gynaecologists
RCA	root cause analysis
SAMM	Severe acute maternal morbidity
SEIFA	Socio-Economic Indexes For Areas
SGA	small for gestational age
SMNCN	Statewide Maternity and Neonatal Clinical Network
Stillbirth CRE	(NHMRC) Stillbirth Centre for Research Excellence
TGCS	Robson Ten Group Classification System
WHO	World Health Organization

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Executive summary

This report focuses primarily on the 123,753 mothers who gave birth to 125,726 babies in Queensland in 2014 and 2015. This includes the 7,862 women who identified as Aboriginal and/or Torres Strait Islander and their 7,959 babies.

Unless otherwise mentioned, all data relate to the years 2014 and 2015.

Mothers and pregnancy

The proportion of mothers aged 35 and over increased between 2006 and 2015, while the proportion of mothers aged under 20 decreased during this time.

Multiple pregnancies represented 1.6 per cent of all pregnancies, almost all (98.0 per cent) being twins. Just over a quarter (26.0 per cent) of multiple pregnancies occurred where assisted conception techniques had been used.

In Queensland higher rates of antenatal care during the first trimester were found among women who gave birth in private facilities (91.1 per cent) than among women who gave birth at home (64.5 per cent) or in public facilities (63.2 per cent). Indigenous women and mothers less than 20 years of age were less likely to attend the minimum number of antenatal care visits (5).

Smoking during pregnancy is more common among women in Queensland than nationally, particularly during the first 20 weeks of pregnancy. Women who stop smoking during pregnancy can reduce the risk of adverse outcomes, and in Queensland 18.2 per cent of women who smoked in the first 20 weeks did not continue to smoke after 20 weeks gestation.

The proportion of women giving birth in private hospitals has not changed substantially over the last decade, with 72.1 per cent of women in Queensland giving birth in a public hospital and 26.9 per cent giving birth in a private hospital.

The proportion of women with spontaneous labour has reduced slightly over the last decade and in 2014 and 2015, women in public hospitals were much more likely to have a spontaneous onset of labour than women in private hospitals, were less likely to be induced and much less likely to have no labour. The overall rate of caesarean section deliveries in private facilities is much higher than the rate in public facilities.

Babies and birth

Gestational age is an important determinant of perinatal outcome with 9.1 per cent of babies born preterm (37 weeks gestation or earlier) and 0.4 per cent born post-term (42 weeks and over). There has been little change in these proportions over the past decade.

The percentage of babies born with low birthweight (less than 2500g) has not changed substantially over the past 10 years.

19.9 per cent of liveborn babies were admitted to a special care or intensive care nursery, often due to being born preterm or due to a congenital anomaly (and sometimes both).

Some women and babies require transfer of care from one facility to another to enable access to a higher level of medical service. 7.4 per cent of mothers who did not attend the minimum expected number of antenatal visits were transferred, compared to 4.0 per cent of mothers who had the minimum expected number of antenatal visits. There was a higher perinatal mortality rate for all types of transfers than for the overall population, which reflects the higher rates of complications and medical conditions for babies where transfer was required.

Congenital anomalies

In Queensland, rates of neural tube defects (NTDs) among babies born to Indigenous mothers have declined over the past two decades and rates of NTDs for babies born to Indigenous compared to non-Indigenous women have reduced from 2.98 times higher in 1994 to 1997 to 1.21 times higher in 2010 to 2014. This substantial decrease in the gap can largely be attributed to the introduction of mandatory fortification of bread-making flour with folic acid throughout Australia in 2010.

Maternal mortality

There were 57 maternal deaths either during pregnancy or up to one year after the end of pregnancy. Nine of these deaths are classed as direct or indirect and contributed to a Maternal Mortality Ratio (MMR) of 7.3 per 100,000 births, which is not significantly different from the national figure. Ten deaths occurred by suicide, which is a public health issue of concern that requires urgent attention. Six women died from murder and/or domestic violence, and deaths by suicide and/or domestic violence have been a consistent feature of previous Council reports.

Perinatal mortality

There were 1,228 perinatal deaths, giving a perinatal mortality rate of 9.8 per 1,000 births (stillbirth rate 6.7 per 1,000 births, and neonatal mortality rate 3.1 per 1,000 live births). The overall rate of stillbirths and neonatal deaths has not changed significantly in Queensland over the decade 2006 to 2015.

In addition to classification of perinatal deaths according to causes, the Perinatal Mortality sub-committee has begun a pilot project to look at contributory factors in potentially preventable perinatal deaths. Based on this, it appears that up to half of later perinatal deaths may have some identifiable contributory factors, of which a proportion is significant, implying that these deaths may be preventable.

Certain groups have higher rates of perinatal deaths. Babies born to Indigenous mothers were 1.4 times as likely to die during the perinatal period compared to babies born to non-Indigenous mothers. Twins and other multiples had a perinatal death rate that was 4.5 times that of singletons. Babies born to women who are very young (under 20 years) or older than 35, also had a higher risk of perinatal death.

The leading cause of stillbirths in Queensland was congenital anomaly, accounting for one-third of all stillbirths (including termination of pregnancy for major anomalies). This proportion is much higher than in many international reports. Over one-quarter (26.5 per cent) of stillbirths were classified as unexplained. While the majority of stillbirths are due to antepartum fetal death, attention to intrapartum deaths is important due to the potential for prevention, particularly in late gestation.

The leading cause of neonatal deaths was spontaneous preterm birth, which led to complications in the neonatal period causing the death.

Recommendations

- ! That the Therapeutic Goods Administration consider reviewing the conditions for authorising medical practitioners to prescribe ovulation induction agents, so as to ensure that techniques are used to minimise the incidence of multiple pregnancy, and that the Royal Australian and New Zealand College of Obstetricians and Gynaecologists consider promoting education programs for its Fellows and Diplomates regarding the safe and appropriate use of ovulation induction agents. ([see page 12](#))
- ! That the Queensland Department of Health develop and implement a public health campaign to encourage women to attend antenatal care in the first trimester (prior to 14 weeks gestation) to enable pre-existing and potential pregnancy-related conditions to be detected early and managed throughout the pregnancy. ([see page 13](#))
- ! That all cases of congenital syphilis are to be consistently identified, reported and then investigated to identify factors for improvement at both clinical and system levels and mechanisms are made available to implement recommended changes to practice. ([see page 31](#))
- ! That Queensland Health consider placing within current healthy lifestyle initiatives, a stronger emphasis on the link between good pregnancy outcomes and preconception care/healthy pregnancy, including a reduction in congenital anomalies. ([see page 32](#))
- ! That the Queensland Department of Health, Mental Health Alcohol and Other Drugs Branch explore how communication between mental health services, primary health practitioners and termination of pregnancy providers could be enhanced to ensure women are appropriately supported after a termination of pregnancy. ([see page 37](#))
- ! That an autopsy, and where appropriate and available, molecular investigations, be performed in all cases of maternal mortality; and consideration given to amending the *Queensland Coroners Act* to include investigation of all maternal deaths, that is, women who die in pregnancy and within the first twelve months postpartum, except where there is a known metastatic malignancy which is believed to be the cause of death. ([see page 40](#))

- ! That the Queensland Department of Health participate in a national public awareness campaign initiated by the Stillbirth Centre for Research Excellence on the importance of timely reporting of decreased fetal movements (DFM). [\(see page 47\)](#)
- ! That the PSANZ/Stillbirth CRE Guidelines on detection and management of women with fetal growth restriction (FGR) and detection and management of women with decreased fetal movements (DFM) be implemented by all maternity services and all staff encouraged to complete the FGR and DFM eLearning programs. [\(see page 47\)](#)
- ! That all maternity hospitals have effective systems in place to ensure all stillbirths and neonatal deaths are appropriately investigated, reviewed, classified and reported to the Queensland Department of Health according to the PSANZ national guidelines. [\(see page 56\)](#)
- ! That the option of a high-quality autopsy examination be offered to all parents following a perinatal death, with counselling on the procedure provided by a senior clinician. [\(see page 56\)](#)
- ! That in addition to the offer of autopsy, as a minimum for all stillbirths, a comprehensive maternal and pregnancy history plus placental histopathology; testing for feto-maternal haemorrhage; cytogenetics, molecular and other investigations as indicated according to the PSANZ Guidelines, be performed. [\(see page 56\)](#)



**Only 1 in 3
stillborn babies
and 1 in 6
neonatal deaths
have an autopsy**

Good practice points

- ✓ Due to the risk of adverse perinatal outcomes in multiple pregnancies, the same attention to technique monitoring and quality improvement should be provided regardless of whether extracorporeal techniques or ovulation induction are used to improve fertility. [\(see page 12\)](#)
- ✓ Smoking cessation programs as part of routine antenatal care reduce fetal exposure to cigarette smoke, low birthweight and preterm birth, and should form part of routine antenatal care. [\(see page 14\)](#)
- ✓ Specialised programs to assist Indigenous women and other high risk groups to stop smoking before and during pregnancy should be prioritized. [\(see page 14\)](#)
- ✓ Extra care and support should be provided to women who have received a poor diagnosis in pregnancy. Wherever possible, they should be offered continuity of midwifery care in addition to obstetric care. [\(see page 21\)](#)
- ✓ Extra care and support should be provided to women whose baby has died. It is particularly important that prior to discharge from a non-local Hospital and Health Service facility, arrangements are made for women to receive appropriate bereavement and postnatal care at a facility within their local area. [\(see page 21\)](#)
- ✓ It is important for antenatal care providers to clearly and comprehensively explain the purpose and benefits of the 20 week morphology scan, so that women and their partners are able to make an informed decision about whether to have the scan. [\(see page 21\)](#)
- ✓ Repeat caesarean section without labour and induction of labour before 39 weeks of gestation are common, yet are associated with respiratory and other adverse neonatal outcomes. Elective intervention in pregnancy before 39 weeks of gestation should be avoided unless medically indicated. [\(see page 23\)](#)

- ✓ Clinicians should adhere to guidelines for antenatal syphilis screening and perinatal syphilis management, including the National Antenatal Care Guidelines, or regional antenatal screening guidelines recommending increased testing frequency, and the Australasian Society for Infectious Diseases (ASID) Management of Perinatal Infections. *(see page 31)*
- ✓ Clinicians should seek access to specialist support services for the management of women who are identified with syphilis infection during pregnancy. *(see page 31)*
- ✓ Clinicians should be supported to participate in investigations of cases of congenital syphilis and contribute to improvements in local responses and system wide recommendations. *(see page 31)*
- ✓ All pregnant women should be provided with information about possible chromosomal anomalies, and offered the opportunity to discuss available prenatal screening and diagnostic tests early in the first trimester. *(see page 31)*
- ✓ Given the increasing rates of older maternal age and obesity in pregnant women, it remains very important to consider malignancy in the differential diagnosis in a range of symptoms presenting in pregnancy. *(see page 37)*
- ✓ Women with a history of serious mental illness (e.g. schizophrenia, bipolar affective disorder, schizoaffective disorder) should routinely be offered mental health follow-up for at least the first twelve months postpartum. *(see page 38)*
- ✓ Mental health screening is performed almost universally in the public sector but less so in the private sector. Use of the Edinburgh Postnatal Depression Scale, psychosocial screening and screening for past mental health conditions in the private sector, may help to identify women who warrant further follow-up in the setting of identified referral pathways. *(see page 38)*
- ✓ Detailed counselling regarding contraception should be provided to all women who have had a termination of pregnancy. *(see page 38)*
- ✓ All postnatal women should be provided with advice regarding contraception before they leave their maternity care facility. Women who have had complicated pregnancies and who have additional risk factors need particular care and skilled senior clinician involvement in contraception decisions. Women who require one, should be provided with an appropriate contraception plan early in the postpartum period. *(see page 39)*
- ✓ All clinical staff should be regularly reminded about performing and recording basic observations and to seek appropriate medical assessment when those observations are outside acceptable parameters. In all acute settings involving pregnant or immediately postpartum women, an observation chart such as the Queensland Maternity Early Warning Tool (Q-MEWT) should be used. *(see page 39)*
- ✓ Healthcare providers should remind their pregnant and postpartum patients that they must wear a seat belt while driving or as a passenger during their pregnancy. *(see page 40)*
- ✓ For women who are anticoagulated, the peripartum period for which anticoagulation is ceased, should be as short as possible and appropriate expertise in managing it should be sought. *(see page 40)*
- ✓ Unexpected and/or sudden death in women of child bearing age has a broad differential diagnosis which should be considered in all cases. In several cases included in this report the cause of death was based on a clinical diagnosis but on review, the Council felt that the diagnosis was uncertain. *(see page 40)*
- ✓ Prior good outcomes in women with chronic medical conditions should not be taken as a reason to reduce surveillance levels. *(see page 43)*



**Approximately
1 in 6 maternal deaths
are due to suicide**



Mothers and pregnancy

Births in Queensland

In 2014 and 2015, 123,753 mothers gave birth to 125,726 babies. The number of mothers giving birth and the number of babies born each year for the last 10 years are shown in Table 1.

Table 1: Number of mothers and babies, Queensland, 2006 to 2015

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Mothers	55,719	59,228	60,327	61,022	61,027	61,125	62,667	62,182	62,811	60,942
Babies	56,708	60,244	61,401	62,050	62,032	62,181	63,727	63,171	63,823	61,903

Maternal age

The proportion of mothers aged 35 and over increased from 18.6 per cent in 2006 to 19.4 per cent in 2015, while the proportion of mothers aged under 20 decreased from 5.5 per cent to 3.9 per cent. Indigenous mothers were approximately five times as likely to be aged less than 20 years compared to non-Indigenous mothers (16.6 per cent vs 3.3 per cent) and were approximately half as likely to be 35 years and older (9.0 per cent vs 20.0 per cent) (see Table 2).

Older maternal age is associated with a higher risk of complications and adverse outcomes. For example, mothers 35 years and older had increased rates of medical conditions such as diabetes and gestational hypertension. They also had higher rates of adverse outcomes including antepartum haemorrhage, babies with a chromosomal congenital anomaly, preterm birth and stillbirth, even after adjustment for parity (where applicable) compared with women aged 20-34 years. Further details about rates of complications and adverse outcomes in older mothers compared with those observed for women aged 20-34 years are available in www.health.qld.gov.au/__data/assets/pdf_file/0031/692860/statbite75.pdf

Table 2: Frequency and rate ratios of maternal characteristics for mothers aged 35+ years vs mothers aged 20-34 years, singleton births, Queensland, 2014 and 2015

Condition/Outcome	Frequency 20-34 years	Frequency 35+ years	Rate Ratio, unadjusted (95% CI)	Rate Ratio, adjusted for parity (95% CI)
Total mothers and births	93,422	23,336	-	-
Indigenous	5,771	698	0.48 (0.45, 0.52)	0.43 (0.39, 0.46)
Primiparous ¹	40,111	5,938	0.59 (0.58, 0.61)	-
Underweight (BMI < 18.5)	5,405	891	0.69 (0.64, 0.74)	0.69 (0.64, 0.74)
Healthy weight (BMI 18.5-24.9)	47,976	11,910	-	-
Overweight (BMI 25-29.9)	20,815	5,545	1.05 (1.02, 1.08)	1.01 (0.98, 1.04)
Obese class I (BMI 30-34.9)	10,387	2,662	1.03 (0.98, 1.07)	0.96 (0.92, 1.00)
Obese class II (BMI 35-39.9)	4,634	1,211	1.05 (0.98, 1.12)	0.96 (0.90, 1.02)
Obese class III (BMI 40+)	2,787	770	1.11 (1.02, 1.20)	1.00 (0.92, 1.08)
Unknown BMI	1,418	347	0.99 (0.88, 1.11)	0.90 (0.80, 1.01)

Younger mothers (those less than 20 years of age) also have increased risks including being underweight, smoking during pregnancy and a higher risk of preterm birth than women aged 20-34 years and are less likely to attend the minimum number of antenatal visits. Models of antenatal care that promote continuity of care by the same provider could have a very important role in reducing these risks for a range of socially disadvantaged women.

Multiple pregnancies

In 2014 and 2015 multiple pregnancies represented 1.6 per cent of all pregnancies. Almost all multiple pregnancies (98.0 per cent) were twins. Assisted conception techniques were used in 26 per cent of all multiple pregnancies.

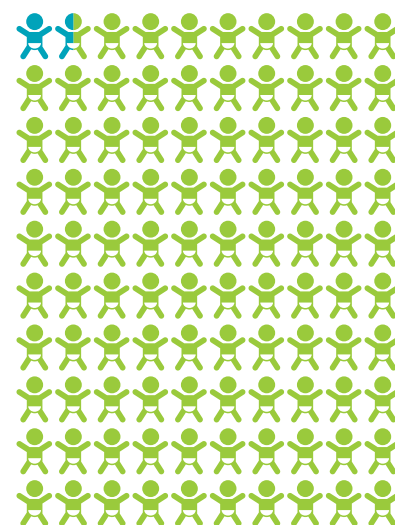
Women 35 years and older were more than three times as likely to have a multiple pregnancy as women less than 20 years, and 1.6 times as likely as women aged 20-34. However, as 11.4 per cent of pregnancies among mothers 35 and older were a result of assisted conception techniques (compared with 3.6 per cent for mothers under 35 years), it is important to distinguish between these effects. Among women who did not conceive with an assisted reproductive technology (ART), multiple pregnancies were 1.9 times as likely in women 35 years and older than in women less than 20 years and 1.2 times as likely than in women aged 20-34, suggesting an independent effect of age.

Babies of multiple pregnancies have a higher risk of being born prior to full term (37 weeks gestation): 66.3 per cent of multiple pregnancies ended prior to term compared with 7.2 per cent of singleton pregnancies. Preterm birth carries a number of risks, including a higher risk of perinatal mortality.

In Queensland

98% of multiple pregnancies were twins.

Assisted conception techniques were used in 26% of all multiple pregnancies.



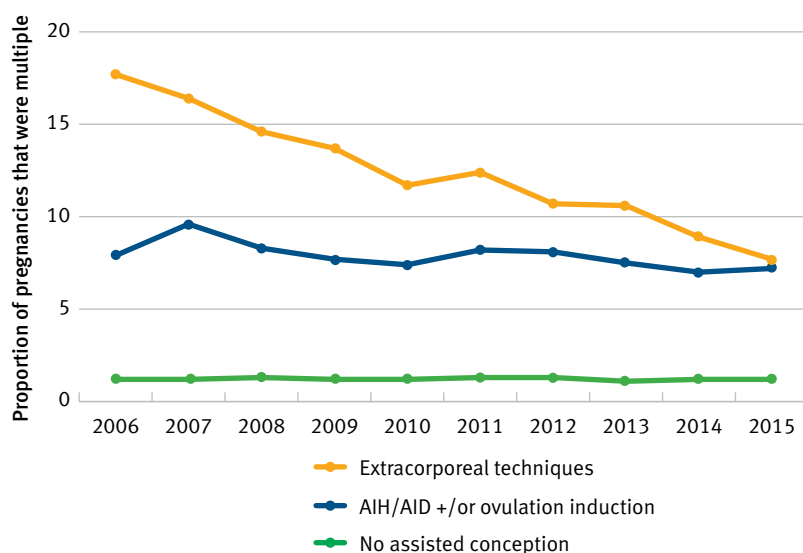
In 2014 and 2015 only 1.6% of pregnancies were multiple

¹ Primiparous means women giving or having given birth for the first time

Assisted conception

There has been a steady decline in the proportion of pregnancies conceived with extracorporeal techniques (in-vitro fertilisation, gamete intra-fallopian transfer, intracytoplasmic sperm injection, embryo transfer or related techniques) that are multiple over the past 10 years (Figure 1) due to improvements in available techniques and clinical practice. There has been no change in the proportion of pregnancies conceived with ovulation induction and/or artificial insemination that are multiple.

Figure 1: Proportion of pregnancies that were multiple, by assisted conception technique, Queensland, 2006 to 2015



Pregnancies that utilised multiple assisted conception techniques are counted under each technique. As a result, categories are not mutually exclusive and cannot be summed.

AIH/AID/ovulation induction/donor egg/embryo transfer: artificial insemination and/or ovulation induction processes and/or donor egg and/or embryo transfer.

Extracorporeal techniques: in-vitro fertilisation, gamete intra-fallopian transfer, intracytoplasmic sperm injection, embryo transfer or related techniques.

Other/unknown/not stated assisted conception techniques are not graphed.

Further information regarding assisted conception and pregnancy outcomes can be found in Statbites 34 (Characteristics of women in Queensland who gave birth following conception by ART, 1998 to 2008)² and 39 (Trends in caesarean section rates amongst women giving birth following conception by ART in Queensland, 1998 to 2008)³.



The proportion of babies conceived with an assisted conception technique increased with increasing age of mothers

✓ Good practice point

Due to the risk of adverse perinatal outcomes in multiple pregnancies, the same attention to technique monitoring and quality improvement should be provided regardless of whether extracorporeal techniques or ovulation induction techniques are used to improve fertility.

! Recommendation

That the Therapeutic Goods Administration consider reviewing the conditions for authorising medical practitioners to prescribe ovulation induction agents, so as to ensure that techniques are used to minimise the incidence of multiple pregnancy, and that the Royal Australian and New Zealand College of Obstetricians and Gynaecologists consider promoting education programs for its Fellows and Diplomates regarding the safe and appropriate use of ovulation induction agents.

² Howell S, Johnston T, Cornes S. Characteristics of women in Queensland who gave birth following conception by Assisted Reproductive Technology (ART), 1998 to 2008. Statbite #34, Health Statistics Centre, Queensland Health. www.health.qld.gov.au/hstu/pdf/statbite/statbite34.pdf

³ Howell S, Johnston T, Cornes S. Trends in caesarean section rates amongst women giving birth following conception by Assisted Reproductive Technology (ART) in Queensland, 1998 to 2008. Statbite #39, Health Statistics Centre, Queensland Health. www.health.qld.gov.au/hstu/pdf/statbite/statbite39.pdf

Antenatal care

Attending less than the recommended number of antenatal visits is associated with increased risks of adverse pregnancy outcomes including preterm birth, stillbirth and neonatal deaths and maternal deaths. It is recommended that women have a minimum of five antenatal care visits during their pregnancy. This level of care was achieved by 95.4 per cent (based on women who gave birth at 32 weeks or more gestation), up from 92.9 per cent in 2006. However, the rate among Indigenous women was lower than for non-Indigenous women at only 86.3 per cent. The proportion of Indigenous women with minimum antenatal care has increased in the last ten years from a rate of 76.3 per cent in 2006.

Younger mothers (less than 20 years of age) were less likely to attend the minimum number of antenatal care visits than older mothers (90.6 per cent and 95.6 per cent respectively; Table 3). This difference in antenatal care visits between younger and older mothers was evident for non-Indigenous mothers (91.6 per cent and 96.1 per cent) but not for Indigenous mothers (87.5 per cent and 86.1 per cent).

Table 3: Women who gave birth at 32 weeks or more gestation, who attended five or more antenatal visits, by Indigenous status of mother and maternal age, Queensland, 2014 and 2015

Indigenous status of mother	Age	5+ visits	No. Mothers	% 5+ visits
Indigenous	< 20	1,111	1,270	87.5
	20+	5,503	6,392	86.1
Non-Indigenous	< 20	3,397	3,708	91.6
	20+	106,124	110,380	96.1
Total	< 20	4,508	4,978	90.6
	20+	111,627	116,772	95.6

Women who attended an unknown or unspecified number of antenatal visits or gave birth at less than 32 weeks gestation are excluded.

Women with an Indigenous status of 'not stated' are included in non Indigenous counts.

It is recommended that women attend antenatal care in the first trimester (prior to 12 weeks gestation) to enable the early detection and management of pregnancy-related conditions. The QMPQC acknowledges the important role of primary care at this stage, particularly that of general practitioners. Higher rates of antenatal care during the first trimester were found among women who gave birth in private facilities (91.1 per cent) than among women who gave birth at home (64.5 per cent) or in public facilities (63.2 per cent).

! Recommendation

That the Queensland Department of Health develop and implement a public health campaign to encourage women to attend antenatal care in the first trimester (prior to 14 weeks gestation) to enable pre-existing and potential pregnancy-related conditions to be detected early and managed throughout the pregnancy.

Percent of mothers who attended antenatal care during the first 14 weeks of pregnancy in 2014 and 2015



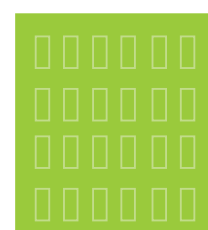
91.1%

Private facilities



64.5%

Home births



63.2%

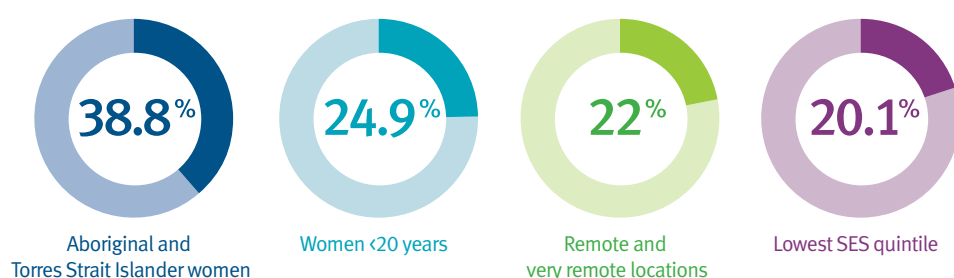
Public facilities

Smoking during pregnancy

Smoking during pregnancy is associated with poorer perinatal outcomes, including low birth weight, being small for gestational age, pre-term birth and perinatal death⁴. In 2014 and 2015, 12.8 per cent of women in Queensland smoked at any time during pregnancy. This was higher than the national rate for 2014 (11 per cent). Rates were higher in the first 20 weeks of pregnancy, where 12.7 per cent of mothers smoked compared with 10.2 per cent who smoked at or after 20 weeks gestation. Women who stop smoking during pregnancy can reduce the risk of adverse outcomes and 18.2 per cent of women who smoked in the first 20 weeks did not continue to smoke after 20 weeks gestation.

An analysis of the impact of smoking at various times during pregnancy on adverse outcomes found that the most influential risk factor was smoking at or after 20 weeks. Smoking after 20 weeks of pregnancy was associated with a 1.4 times higher risk of preterm births, even after other risk factors were accounted for⁶. There has been a steady decline in the proportion of women who reported smoking after 20 weeks gestation since 2010 when 14.1 per cent of women smoked after 20 weeks. Higher rates of smoking after 20 weeks gestation persist among some groups:

- 38.8 per cent of Aboriginal and Torres Strait women smoked after 20 weeks gestation (down from 46.7 per cent in 2010)
- 24.9 per cent of younger women (those aged under 20 years) smoked after 20 weeks gestation compared to 10.3 per cent of women aged 20-34 and 6.9 per cent of women aged 35 and older
- 22.0 per cent of women who lived in remote or very remote areas smoked after 20 weeks gestation compared to 7.8 per cent in metropolitan areas
- 20.1 per cent of women living in areas with the lowest SES quintile smoked after 20 weeks gestation compared to 3.0 per cent in the highest SES quintile
- There is variation in the percentage of women who smoke after 20 weeks gestation by Hospital and Health Service of usual residence⁷.



Higher rates of smoking after 20 weeks gestation occur among some groups

✓ Good practice point

Smoking cessation programs as part of routine antenatal care, reduce fetal exposure to cigarette smoke, low birthweight and preterm birth, and should form part of routine antenatal care⁵.

✓ Good practice point

Specialised programs to assist Indigenous women and other high risk groups to stop smoking before and during pregnancy should be prioritised.

4 AIHW 2016. Australia's mothers and babies 2014—in brief. Perinatal statistics series no. 32. Cat. no. PER 87. Canberra: AIHW.

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

6 A multivariate approach to the disparity in perinatal outcomes between Indigenous and non-Indigenous women, Queensland. Utz M, Johnston T, Zarate D and Humphrey M. Health Statistics Branch, Queensland Health. 2014. www.health.qld.gov.au/hsu/peri/indigenous-peridisparity.pdf

7 Queensland Health, Rate of perinatal mortality and selected perinatal risk factors, 2010–12p., and post-neonatal death, 2008–10p., by Hospital and Health Service of usual residence, compared with Queensland. www.health.qld.gov.au/hsu/peri/HHS_peri_scorecard.pdf

Maternal weight

Among women who gave birth in Queensland in 2014 and 2015:

- 19.3 per cent were classified as obese (body mass index (BMI) of 30.0 or more)
- 22.8 per cent were overweight (BMI of 25.0 to 29.9)
- 52.1 per cent were in the normal weight range (BMI of 18.5-24.9)
- 5.8 per cent were underweight (BMI of less than 18.5)

Maternal BMI is a risk factor for pregnancy and birth complications. For example, higher pre-pregnancy BMI has been linked to a greater risk of gestational diabetes and hypertension, pre-eclampsia, caesarean section, thromboembolism, postpartum haemorrhage and wound infections. Babies of obese mothers have a higher risk of macrosomia, some congenital anomalies, stillbirth and neonatal death^{8, 9, 10, 11}. Higher rates of maternal overweight and obesity were observed in older mothers (see Table 4) so maternal age may also contribute to the higher complication rates observed in births to overweight and obese mothers. However, a higher rate of many of these complications was observed among births to overweight and obese women even after adjusting for maternal age (Tables 4 and 5).

Figure 2: Distribution of BMI for women who gave birth, Queensland, 2014 and 2015

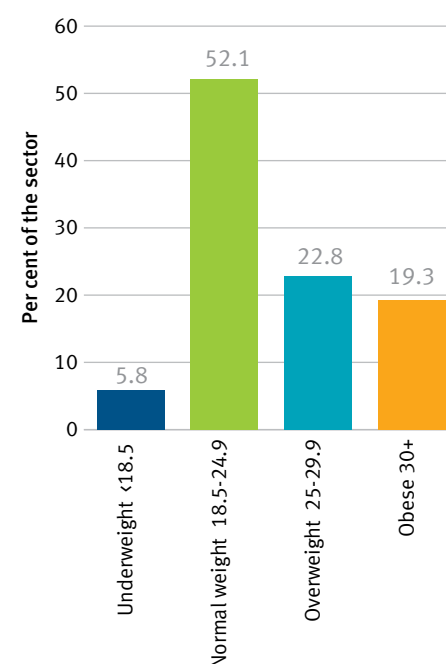


Table 4: Frequency and rate ratios of selected complications for obese/overweight mothers vs normal/underweight mothers, singleton births to primiparous women, Queensland, 2014 and 2015

Complication	Frequency normal/ underweight (BMI < 25)	Frequency overweight/ obese (BMI 25+)	Rate Ratio, unadjusted (95% CI)	Rate Ratio, adjusted for maternal age (95% CI)
Total mothers	31,570	17,884	-	-
Gestational diabetes (ICD-10-AM: O24.4)	2,291	2,784	2.15 (2.03, 2.27)	2.11 (2.00, 2.24)
Gestational hypertension (ICD-10-AM: O13)	1,095	1,627	2.62 (2.43, 2.83)	2.62 (2.42, 2.82)
Pre-eclampsia (ICD-10-AM: O14)	1,217	1,393	2.02 (1.87, 2.18)	2.03 (1.88, 2.19)
Caesarean section	9,346	7,068	1.33 (1.29, 1.38)	1.31 (1.27, 1.36)
Postpartum haemorrhage (Blood loss of ≥ 500mL)	2,277	1,663	1.28 (1.21, 1.37)	1.28 (1.21, 1.37)
Wound infection (ICD-10-AM: O86.0)	172	135	1.39 (1.11, 1.74)	1.36 (1.09, 1.71)

Source: Perinatal Data Collection, Queensland Hospital Admitted Patient Data Collection, Statistical Services Branch Master Linkage File
Excludes mothers of unknown BMI

Table 5: Frequency and rate ratios of selected complications/outcomes for babies born to obese/overweight mothers vs babies born to normal/underweight mothers, singleton births to primiparous women, Queensland, 2014 and 2015

Complication	Frequency normal/ underweight (BMI < 25)	Frequency overweight/ obese (BMI 25+)	Rate Ratio, unadjusted (95% CI)	Rate Ratio, adjusted for maternal age (95% CI)
Macrosomia (> 4000g) †	2,401	2,273	1.67 (1.58, 1.77)	1.67 (1.58, 1.77)
Fetal death	174	125	1.26 (1.01, 1.60)	1.26 (1.00, 1.59)
Neonatal death	60	50	1.47 (1.01, 2.14)	1.49 (1.03, 2.17)

Source: Perinatal Data Collection. Excludes babies born to mothers of unknown BMI. † Excludes births of missing birthweight

- Baeten JM, Bukusi EA, Lambe, M. Pregnancy complications and outcomes among overweight and obese nulliparous women. *Am J Pub Health*, 2001; 91: 436-440
- CMACE & RCOG (Centre for Maternal and Child Enquiries & Royal College of Obstetricians and Gynaecologists) 2010. Management of women with obesity in pregnancy. CMACE/RCOG Joint Guideline. www.rcog.org.uk/globalassets/documents/guidelines/cmacercojointguidelinemanagementwomenobesitypregnancya.pdf
- A multivariate approach to the disparity in perinatal outcomes between Indigenous and non-Indigenous women, Queensland. Utz M, Johnston T, Zarate D and Humphrey M. Health Statistics Branch, Queensland Health. 2014. www.health.qld.gov.au/hsu/peri/indigenous-peridisparity.pdf
- Watson M, MacLeod SL, Cornes S, Howell S. Maternal obesity and selected pregnancy risks and outcomes in nulliparous mothers in Queensland, 2008. *Statbite 27 Health Statistics Centre*, Queensland Health. www.health.qld.gov.au/_data/assets/pdf_file/0031/361687/statbite27.pdf

Place of birth

The majority of women (97.2 per cent) gave birth in a hospital, with only 1.8 per cent giving birth in a birthing centre, 0.2 per cent (n=213) at home and 0.8 per cent (n=931) in other locations, including those where the birth occurred before arrival at hospital. For 72.1 per cent of women the birth occurred in a public hospital and for 26.9 per cent in a private hospital. This is comparable to national rates where 73 per cent of women gave birth in a public hospital¹². The proportion of women giving birth in private hospitals has not changed substantially over the last decade.

Women giving birth in public hospitals tend to have higher risk pregnancies. In 2014 and 2015:

- 21.5 per cent who gave birth in public facilities were obese compared with 13.7 per cent who birthed in private hospitals
- 13.7 per cent who gave birth in public facilities smoked after 20 weeks compared with 0.8 per cent who birthed in private hospitals
- 94.0 per cent of women who gave birth in public facilities completed the recommended number of antenatal visits compared with 99.3 per cent who birthed in private hospitals
- Very few Indigenous women (1.9 per cent) gave birth in a private hospital compared with 28.6 per cent of non-Indigenous women.

Women giving birth in private hospitals tended to be older than women who gave birth in public hospitals (29.2 per cent 35 years and older compared to 15.6 per cent, respectively) and were more likely to have an assisted conception. Public hospitals had a higher proportion of younger women (under 20 years of age) (5.6 per cent) than private hospitals (0.2 per cent).

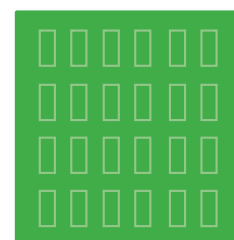
In Queensland

97% of births took place in hospital
(72.1% in public and 26.9% in private)

1.8% in birthing centres

0.2% at home

0.8% in other locations
(including before arrival at hospital)



97%
births occurred
in hospital

Onset of labour

The onset of labour may be either spontaneous or induced. When a birth is categorised as ‘no labour’ this means it occurred by caesarean section. The subset of caesarean sections that occur with no labour should not be confused with ‘elective or planned caesarean sections’. While most ‘no labour’ caesarean sections are planned, some are unplanned and are done in an emergency situation.

Just over half (53.0 per cent) of women had a spontaneous onset of labour, a quarter (25.9 per cent) of women had their labour induced and 21.1 per cent had no labour. The proportion of women with spontaneous labour has reduced slightly over the last decade from 56.1 per cent in 2006 to 51.9 per cent in 2015. Over this period there was an increase in the proportion of women who were induced from 23.4 per cent in 2006 to 26.9 per cent in 2015 and a small increase in the proportion with no labour (from 20.5 per cent in 2006 to 21.2 per cent in 2015).

Indigenous women had slightly higher rates of spontaneous onset of labour (61.9 per cent) and slightly lower rates of induction (23.0 per cent) and no labour (15.0 per cent) than non-Indigenous women and the rates observed in the public sector overall.

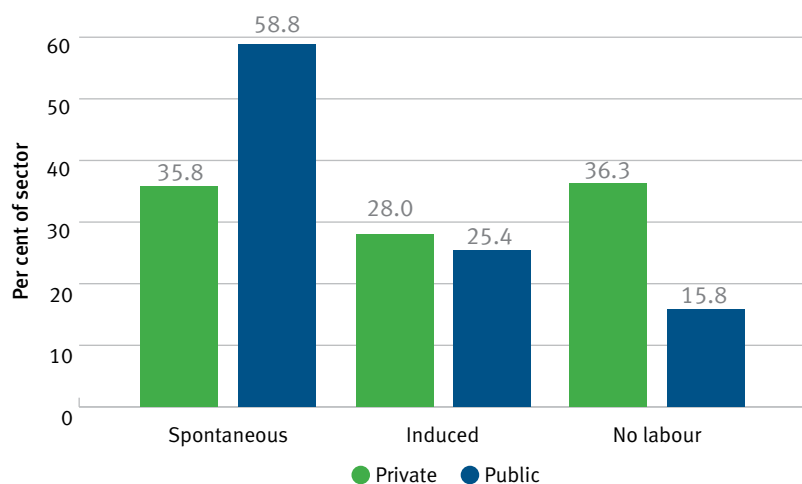
In Queensland

Just over half (53%) of women had a spontaneous onset of labour, a quarter (25.9%) of women had their labour induced and 21.1% had no labour.

12 AIHW 2016. Australia's mothers and babies 2014—in brief. Perinatal statistics series no. 32. Cat. no. PER 87. Canberra: AIHW.

Labour onset varies by sector (Figure 3): women in public hospitals were much more likely to have a spontaneous onset of labour (58.8 per cent) than women in private hospitals (35.8 per cent), were less likely to be induced (25.4 per cent versus 28.0 per cent) and were much less likely to have no labour (15.8 per cent versus 36.3 per cent). Rates of induction of labour in selected primigravida (first time mothers) and in all women in Queensland by hospital are shown in www.health.qld.gov.au/hsu/dashboards/ncmi_funnel.xlsm

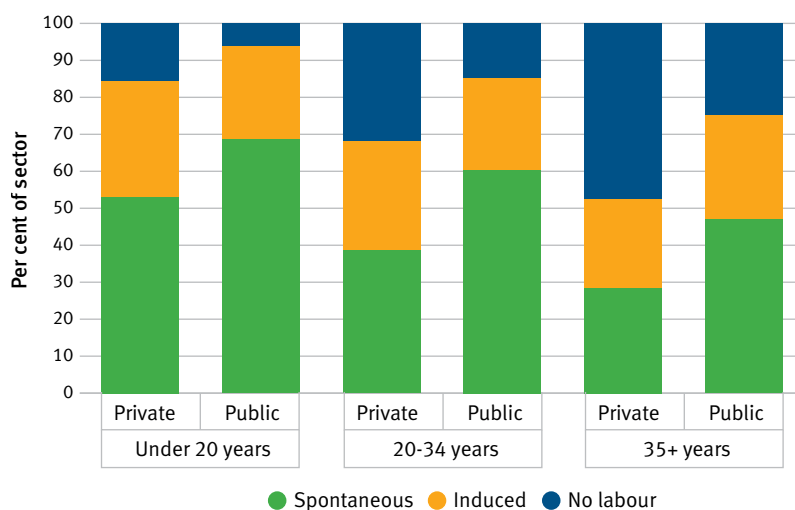
Figure 3: Labour onset distribution, by facility sector, Queensland, 2014 and 2015



For multiple births, mother was categorised by the facility/labour onset of the first baby.

The rate of induction of labour varied with gestational age with a high proportion of births over 42 weeks the result of induction. For term births (37-41 weeks) the induction rate was higher in private (29.1 per cent) than in public hospitals (25.5 per cent), and there was a correspondingly higher spontaneous labour rate in public hospitals. For babies born prior to term (32-36 weeks) almost half of births in private hospitals were by caesarean section (no labour) (48.2 per cent) compared with just over a quarter in public hospitals (27.6 per cent).

Figure 4: Labour onset distribution, by maternal age and facility sector, Queensland, 2014 and 2015



For multiple births, mother was categorised by the facility/labour onset of the first baby.

Figure 4 shows that older women had a higher rate of caesarean section births without labour in both public and private hospitals. However, within each age group, the proportion of no labour caesarean sections was higher in private hospitals.

In Queensland

The rate of induction of labour varied with gestational age with a high proportion of births over 42 weeks the result of induction.

For babies born prior to term (32-36 weeks) almost half of births in private hospitals were by caesarean section compared with just over a quarter in public hospitals.

In Queensland

Older women had a higher rate of caesarean section births without labour in both public and private hospitals.

Within each age group, the proportion of no labour caesarean sections was higher in private hospitals.

Method of birth

Method of birth includes spontaneous vaginal, forceps, vacuum extraction and caesarean section. In 2014 and 2015 vaginal non-instrumental births were the most common (56.5 per cent) followed by caesarean section (33.3 per cent), vacuum extraction (7.4 per cent) and forceps (2.8 per cent). In the last decade there has been a decrease in vaginal non-instrumental births and a slight increase in caesarean section and vacuum extraction assisted births in both public and private facilities (see Figures 5 and 6).

The overall rate of caesarean section births in private facilities is much higher than the rate in public facilities. This has also been observed elsewhere in Australia and in other Organisation for Economic Co-operation and Development (OECD) countries^{13,14}.

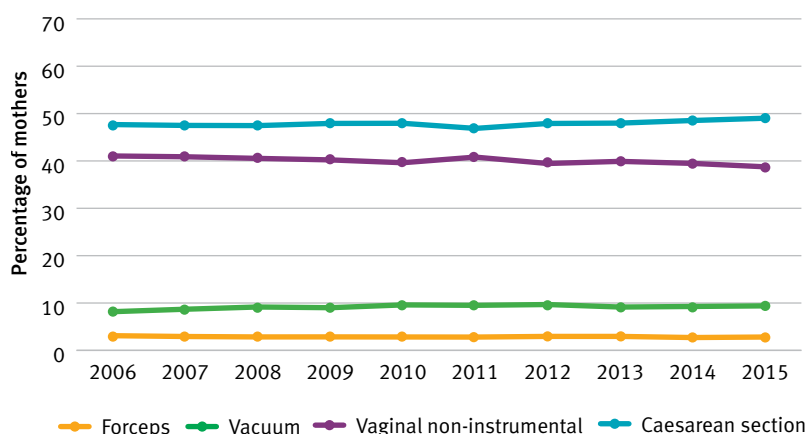
In 2014 and 2015, women birthing in a private hospital were more likely to have a caesarean section than women in public hospitals (48.8 per cent compared with 27.9 per cent) and to have labour induced (28.0 per cent compared with 25.4 per cent).

In Queensland

In the last decade there has been a decrease in vaginal non-instrumental births and a slight increase in caesarean section and vacuum extraction assisted births in both public and private facilities.

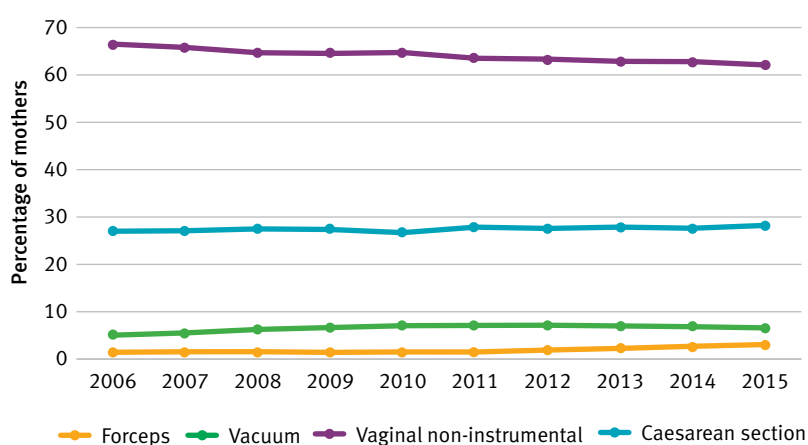
In 2014 and 2015, women birthing in a private hospital were almost 1.8 times as likely to have a caesarean section compared to women in public hospitals.

Figure 5: Method of birth of women who gave birth in private facilities, Queensland, 2006 to 2015



For multiple births, mother was categorised by the facility/birth method of the first baby.

Figure 6: Method of birth of women who gave birth in public facilities, Queensland, 2006 to 2015



For multiple births, mother was categorised by the facility/birth method of the first baby.



13 AIHW 2016. Australia's mothers and babies 2014—in brief. Perinatal statistics series no. 32. Cat. no. PER 87. Canberra: AIHW.

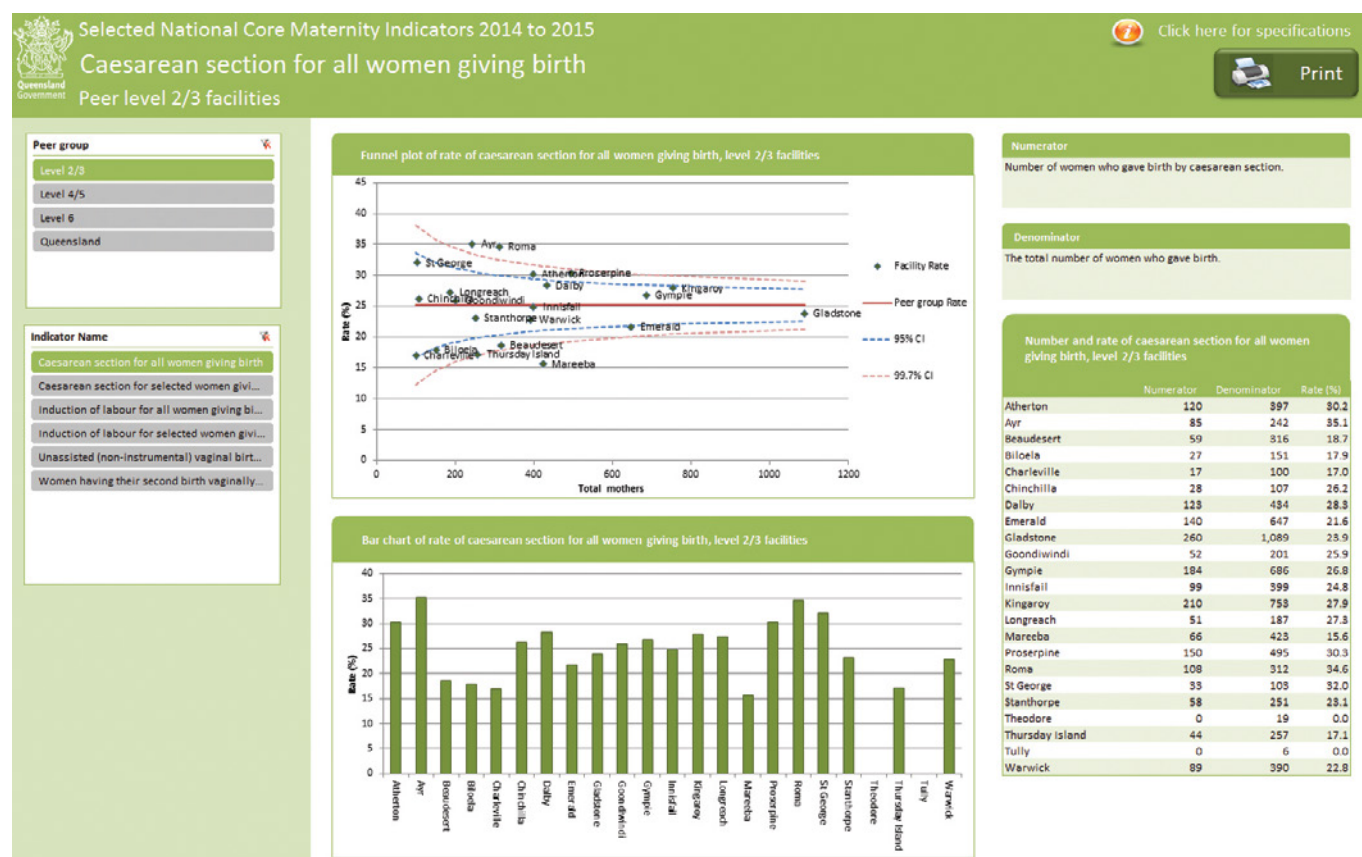
14 OECD (Organisation for Economic Co-operation and Development) 2015. Health at a glance 2015: OECD indicators. Paris: OECD Publishing. Viewed 7 July 2017, http://dx.doi.org/10.1787/health_glance-2015-en.

To better understand factors impacting on caesarean section rates over time and between sectors, the Robson Ten Group Classification System (TGCS) was applied to Queensland data. The TGCS allows examination of caesarean section rates among births with similar clinical characteristics between settings and time periods to facilitate understanding of groups and settings contributing to higher or changing caesarean section rates. Details of this analysis can be seen in www.health.qld.gov.au/_data/assets/pdf_file/0039/692859/statbite74.pdf. Overall the analyses showed the caesarean section rate was higher in mothers giving birth in private hospitals than in public hospitals for all categories. The caesarean section rate in most categories has remained relatively stable in both public and private facilities over the past ten years, whereas in the ten years prior to this (1997 to 2006) an increase was observed in most categories¹⁵ which suggests there has been some effort to stem the increase. The overall increase in caesarean section rates observed is likely to be due to repeat caesarean sections for women with previous caesarean sections which made up 20 per cent of births in private facilities and 13 per cent of births in public facilities.

Rates of caesarean section and unassisted vaginal births in selected primigravida and all women in Queensland by hospital are shown at www.health.qld.gov.au/hsu/dashboards/ncmi_funnel.xlsm.

In Queensland

The overall increase in caesarean section rates observed is likely to be due to repeat caesarean sections for women with previous caesarean sections which made up 20% of births in private facilities and 13% of births in public facilities.



Screenshot of Dashboard

15 Howell S, Khor S-L, Johnston T. Determinants of caesarean section in Queensland 1997-2006. Statbite #9, Health Statistics Centre, Queensland Health. www.health.qld.gov.au/hsu/pdf/statbite/statbite9.pdf.

Aboriginal and Torres Strait Islander mothers

Cultural capability is an essential quality of maternity services and lack of awareness of this is a real barrier to accessing care. 7,862 women giving birth identified as Aboriginal and/or Torres Strait Islander. This represented 6.4 per cent of women who gave birth in Queensland, and compared to 4.2 per cent nationally in 2014¹⁶.

Indigenous women gave birth to 7,959 babies. 97.3 per cent of these babies were identified as Indigenous based on the baby Indigenous status field. The majority of health indicators use the Indigenous status of the mother to define Indigenous status for the birth event because these indicators largely relate to maternal risk behaviours. For further information about risk indicators for Indigenous mothers and babies please see Statbite 67¹⁷.

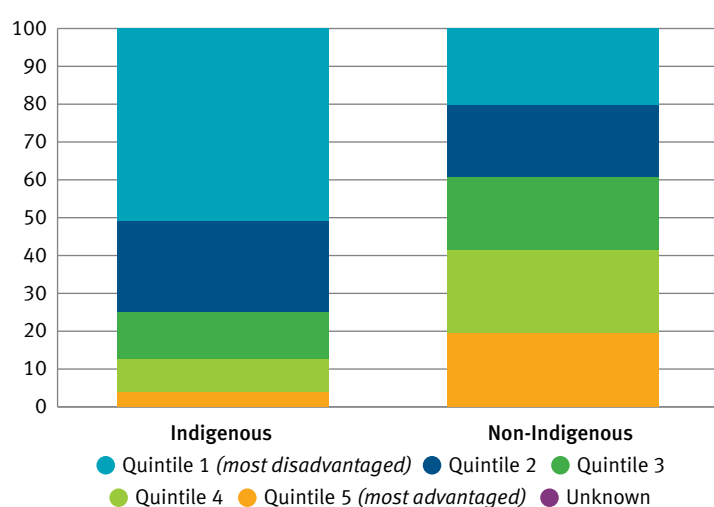
Indigenous women giving birth in Queensland have higher rates of disadvantage (Figure 7), and higher rates of risk factors and adverse outcomes than non-Indigenous women. Issues highlighted in earlier sections of this report that relate to Aboriginal and Torres Strait Islander women and their babies include:

- Indigenous women are over five times as likely to have babies when aged less than 20 years which carries a higher risk of complications and adverse outcomes
- though improvement has occurred over the last ten years, in 2014 and 2015, Indigenous women were less likely than non-Indigenous women to have the recommended number of antenatal visits
- Indigenous women had much higher rates of smoking during pregnancy than non-Indigenous women
- Indigenous women had higher rates of obesity, gestational diabetes, pre-existing diabetes, and chronic hypertension than non-Indigenous women¹⁸
- Indigenous women were very unlikely to give birth in a private hospital and had lower rates of intervention such as induction of labour.

In Queensland

6.4% of women who gave birth in 2014 identified as Aboriginal and/or Torres Strait Islander – compared to 4.2% nationally.

Figure 7: SEIFA quintile distribution of women who gave birth, by Indigenous status of mother, Queensland, 2014 and 2015



Excludes non-Queensland residents.

16 AIHW 2016. Australia's mothers and babies 2014—in brief. Perinatal statistics series no. 32. Cat. no. PER 87. Canberra: AIHW.

17 Identification of Indigenous status for measurement of perinatal risk factors and outcomes: Insights gained through use of both mother and baby status. Health Statistics Branch, Queensland Health. June 2015. www.health.qld.gov.au/_data/assets/pdf_file/0021/144750/statbite67.pdf

18 A multivariate approach to the disparity in perinatal outcomes between Indigenous and non-Indigenous women, Queensland. Utz M, Johnston T, Zarate D and Humphrey M. Health Statistics Branch, Queensland Health. 2014. www.health.qld.gov.au/hsu/peri/indigenous-peridisparity.pdf

Consumer guidance

The Council is fortunate to have two consumer representatives as part of its membership. Their contribution to discussions is highly valued and issues from the perspective of mothers and families are often raised for the Council's consideration and/or advice, for example:

1. The importance of providing additional support to women and their families who are at high risk of losing their baby or who have experienced a perinatal death.

Parents who are at high risk of losing their baby or who have chosen to continue with a pregnancy after being advised their baby will die during the pregnancy, or who have recently lost a baby post-birth, require additional clinical and bereavement care, even after discharge from hospital. When compared with a low-risk pregnancy, these women and their families face significantly greater daily challenges, causing ongoing stress and grief. The woman's experience in particular, emotionally and physically, during a high risk pregnancy cannot be likened to that of a 'normal' or low-risk pregnancy. Examples of stressors include what might seem like a friendly enquiry from a smiling stranger or unaware friend, for example *'Oh... what are you hoping for?'* or *'When are you due?'* or *'How are you and your new baby?'*

✓ Good practice point

Extra care and support should be provided to women who have received a poor diagnosis in pregnancy. Wherever possible, they should be offered continuity of midwifery care in addition to obstetric care.

2. Bereavement care for families whose baby dies should be given a high priority, including memory making for families, such as hands and foot prints, a lock of baby's hair and photographs. Postnatal continuity of care for women who lose a baby should occur whenever possible.

✓ Good practice point

Extra care and support should be provided to women whose baby has died. It is particularly important that prior to discharge from a non-local Hospital and Health Service facility, arrangements are made for women to receive appropriate bereavement and postnatal care at a facility within their local area.

3. The need to promote informed decision-making in relation to the 20-week morphology scan.

Feedback from consumers who access social media indicates that there may be a trend in the numbers of women who miss the 20-week morphology scan. Reasons for not having the scan include affordability and limited knowledge regarding the benefits of potential diagnosis. Many women regard the scan as a generic test to ascertain the gender of their baby and it is being referred to as 'the 20-week gender test'. Detailed explanation by antenatal care providers of the purpose and benefits of the scan would help to address this misunderstanding and allow women to make an informed decision about whether to proceed with it or not.

✓ Good practice point

It is important for antenatal care providers to clearly and comprehensively explain the purpose and benefits of the 20 weeks morphology scan, so that women and their partners are able to make an informed decision about whether to have the scan.



Babies and birth

Gestational age

Gestational age is the duration of pregnancy in completed weeks and is an important determinant of pregnancy outcome. For example, preterm births (prior to 37 weeks gestation) accounted for 82.4 per cent of perinatal deaths occurring during this time period.

In 2014 and 2015, 9.1 per cent of babies were born preterm and 0.4 per cent were born post-term (42 weeks and over). There has been little change in these proportions over the past decade, although the decrease in the post-term group is statistically significant with a decrease from 0.6 per cent of births in 2006 to 0.4 per cent of births in 2015.

Factors that increase the risk for preterm birth include multiple pregnancy, maternal underweight, smoking during pregnancy, pre-existing or gestational diabetes, pre-existing or gestational hypertension and older maternal age (35 years and older). Other factors, such as having a congenital anomaly, a previous stillbirth, a previous caesarean section and having pre-eclampsia, also resulted in the earlier birth of babies.

A higher proportion of babies whose mothers are Indigenous or who live in remote locations or who are more socioeconomically disadvantaged are born at earlier gestations. A multivariate analysis¹⁹ of risk factors for preterm birth found that mother's Indigenous status, remoteness and socioeconomic status are not strongly associated with preterm birth once other risk factors are taken into account. This suggests higher preterm rates in these groups are due to higher rates of other risk factors such as smoking, access to recommended levels of antenatal care, and other complications such as gestational diabetes that may occur in these groups (see Table 6).

19 A multivariate approach to the disparity in perinatal outcomes between Indigenous and non-Indigenous women, Queensland. Utz M, Johnston T, Zarate D and Humphrey M. Health Statistics Branch, Queensland Health. 2014. www.health.qld.gov.au/hsu/peri/indigenous-peridisparity.pdf

Table 6: Rate of selected perinatal risk factors, by Indigenous status of mother, SEIFA quintile and remoteness, Queensland, 2014 and 2015

	< 5 antenatal visits (a)	smoking after 20 weeks (b)	obesity (c)
Indigenous	13.7	38.8	27.0
Non-Indigenous	4.0	8.4	18.8
Quintile 1 (most disadvantaged)	7.5	20.1	26.6
Quintile 2	5.4	13.3	22.6
Quintile 3	3.8	7.7	17.3
Quintile 4	3.7	6.2	16.8
Quintile 5 (most advantaged)	2.3	3.0	12.3
Unknown/Interstate	4.6	5.9	16.4
Major City	4.4	7.8	17.3
Inner Regional	4.4	14.5	24.1
Regional	5.7	13.1	20.4
Remote/Very Remote	4.1	22.0	25.3
Interstate	4.6	5.7	16.5

(a) Rate per 100 mothers. Excludes mothers with unknown number of antenatal visits and births at less than 32 weeks gestation.

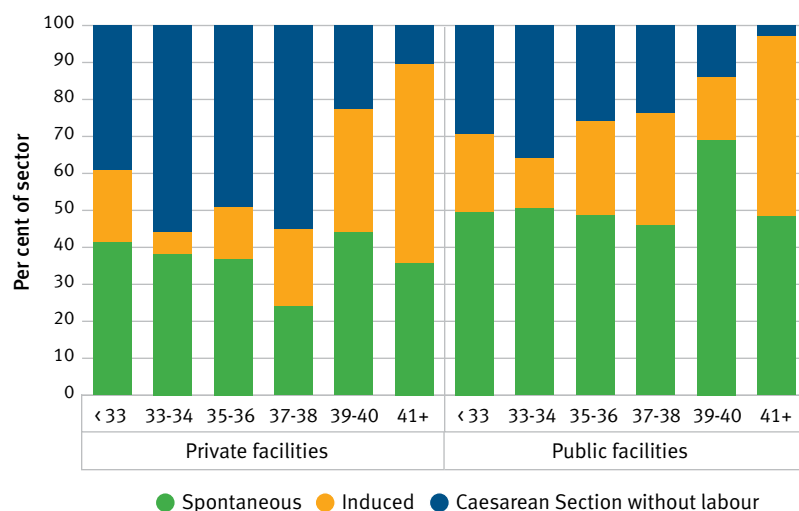
(b) Rate per 100 mothers. Excludes mothers of unknown smoking status after 20 weeks.

(c) Rate per 100 mothers. Excludes mothers of unknown BMI.

Improved access to antenatal care and screening could assist in closing the gap for Indigenous women.

The rate of preterm birth is similar in public and private facilities. However, it is worth noting that there is a higher rate of caesarean section without labour in private facilities at earlier gestations than in public facilities (Figure 8).

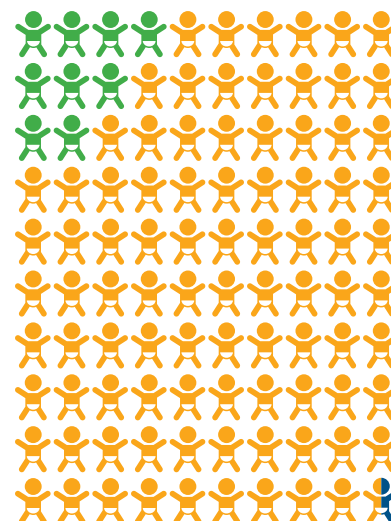
Figure 8: Labour onset distribution, by gestational age and facility sector, Queensland, 2014 and 2015



For multiple births, mother was categorised by the facility/labour onset of the first baby.

✓ Good practice point

Repeat caesarean section without labour and induction of labour before 39 weeks of gestation are common, yet are associated with respiratory and other adverse neonatal outcomes. Elective intervention in pregnancy before 39 weeks of gestation should be avoided unless medically indicated.



Proportion of births occurring

pre-term (< 37 weeks)

at term

post-term (42 weeks +)

Birthweight

In 2014 and 2015, 6.5 per cent of babies born were low birthweight (less than 2500g) and this rate has not changed substantially over the past 10 years.

While for the majority of babies, low birthweight is strongly related to gestation (that is, babies born earlier are smaller), a subgroup of babies have weight-related complications or adverse outcomes that are independent of gestation. These babies are referred to as being small for their gestational age (SGA). SGA babies are commonly defined as the lowest ten per cent of weights within a group defined by gestational age and sex according to national birthweight percentiles. Of particular clinical interest are babies who are SGA at or near term as this can be the result of fetal growth restriction caused by placental dysfunction and can lead to adverse outcomes such as perinatal asphyxia and stillbirth. Improved detection of fetal growth restriction and earlier delivery may help to reduce both mortality and morbidity.

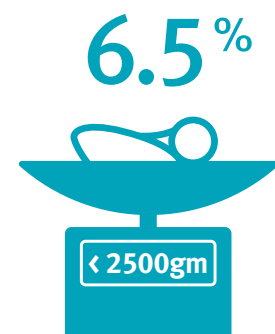
Some characteristics of mothers are linked to an increased risk of giving birth to a SGA baby:

- 13.0 per cent of babies of Indigenous mothers were SGA compared with 8.4 per cent of babies of non-Indigenous mothers
- 12.2 per cent of babies of mothers aged less than 20 years were SGA compared with 8.6 per cent of babies of mothers aged 20-34 years
- 16.5 per cent of babies of mothers who were underweight were SGA compared with 9.4 per cent of babies whose mothers were in the normal weight range
- 16.0 per cent of babies whose mothers smoked during pregnancy were SGA compared with 7.6 per cent of babies whose mothers did not smoke.

In Queensland

13% of babies of Indigenous mothers were small for gestational age compared with 8.4% of babies of non-Indigenous mothers.

16% of babies whose mothers smoked during pregnancy were small for gestational age compared with 7.6% of babies whose mothers did not smoke.



Neonatal morbidity

Neonatal morbidity is a term used to describe illness or injury in babies during the first 28 days of life. Monitoring neonatal morbidity is important to enable a better understanding of perinatal service requirements and to assist with monitoring of quality of care.

Apgar score

The Apgar score is a clinical scale used to describe a baby's condition at one minute and five minutes after birth based on apppearance, pulse, grimace response to foot stimulation, activity and respiration (Apgar). It is used as an indicator of the health of the baby, which decides the need for, and adequacy of, resuscitation. An Apgar score of seven or more at five minutes indicates that the baby is adapting well to life outside the uterus. An Apgar score of less than seven at five minutes is an indication of either poor adaptation or perinatal asphyxia.

In this period, 98.0 per cent of liveborn babies had an Apgar score of seven or more at five minutes and 2.0 per cent had a score that was less than seven. Higher rates of Apgar score less than seven occurred for babies born at lower gestations (Figure 9).

In Queensland

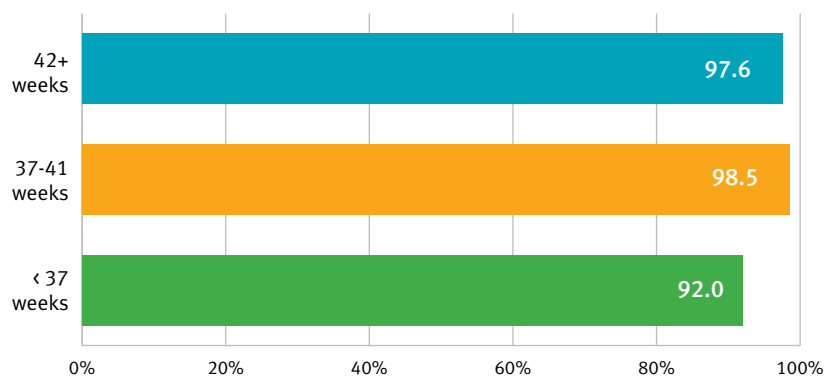
98.0% of liveborn babies have an Apgar score of 7 or more at 5 minutes.

12.2% of liveborn babies required some form of resuscitation immediately after birth. The majority of these involved only a minor intervention.

The median length of stay for babies born in hospital was 3 days.

19.9% of liveborn babies were admitted to a special care or intensive care nursery.

Figure 9: Proportion of liveborn babies with an Apgar score greater than or equal to seven at five minutes, by gestational age, Queensland, 2014 and 2015

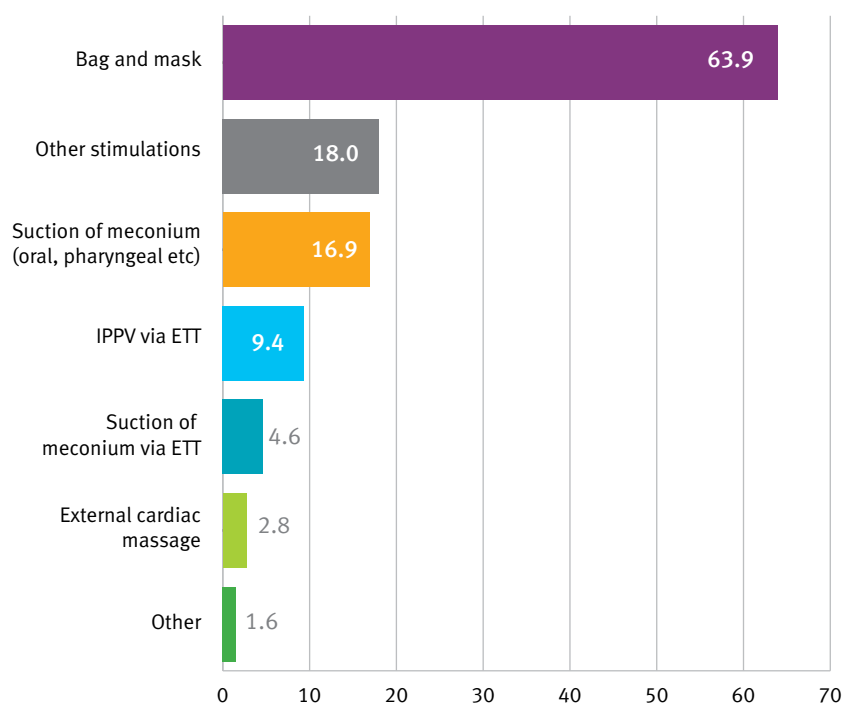


Excludes babies of unknown Apgar score at 5 minutes and/or unknown gestational age

Resuscitation

12.2 per cent of liveborn babies required some form of active resuscitation immediately after birth (excluding suction and facial oxygen). The majority of these involved a minor intervention, with only a small proportion requiring more extreme resuscitation measures (Figure 10).

Figure 10: Proportion of liveborn babies that received active resuscitation*, by resuscitation measure, Queensland, 2014 and 2015



*A single baby could receive multiple resuscitation measures.
Categories are not mutually exclusive.*

**Excluding suction and facial oxygen.*

12.2%
of liveborn babies
required some
form of active
resuscitation

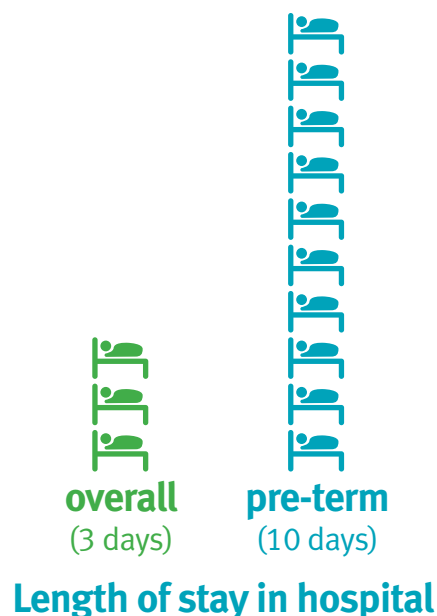


Length of stay in hospital

Among babies who were born in hospital, the median length of stay (LOS), including babies who were transferred but excluding babies who died, was 3 days. Factors impacting on length of stay include gestational age, birthweight, method of birth and sector. Complications of pregnancy, birth and other medical conditions affecting the mother or baby can also result in a longer stay in hospital. LOS has been reducing around the world in recent decades, and interpretation of changes needs to be undertaken with caution, as conditions affecting either mother or baby can affect LOS in the other. However, LOS is often used as a surrogate marker of morbidity:

- for babies born preterm, the median LOS was 10 days
- for babies born at term who were SGA, the median LOS was three days
- babies born by caesarean section in public hospitals had a median LOS of three days compared with a median LOS of two days for babies born vaginally
- in private facilities the median LOS for caesarean births was five days and four days for vaginal deliveries.

LOS in hospital needs to be examined in light of breast feeding rates, peripartum mental health and parenting skills.



Admission to special care and intensive care nursery

When there are complications or medical conditions affecting the baby, these babies are often admitted to the special care or intensive care nursery, and 19.9 per cent of liveborn babies (24,864 babies) were admitted to a nursery. Of these, 8,828 were preterm and 5,025 had a congenital anomaly (note that these categories can overlap). 13,051 babies who were admitted to a special care or intensive care nursery were born at term and did not have a coded congenital anomaly.

Transfer between hospitals

Some women and babies require transfer of care from one facility to another to enable access to a higher level of clinical service. Where possible, potential complications or medical conditions affecting the mother or baby will be identified before birth, and mothers will be booked into a hospital with an appropriate level of service capability. This is one reason why attending a minimum of five antenatal visits is important. In other cases, mothers will require transfer just prior to, or during labour, or babies will require transfer after birth. This transfer may be required for emerging issues or for complications that were not detected during antenatal care or where adequate antenatal care was not obtained.

3.2 per cent of women who gave birth were transferred prior to the onset of labour, 1.0 per cent were transferred during labour and 2.2 per cent of babies were transferred to another hospital after birth.

There was an association between attending the minimum expected number of antenatal visits (adjusted for length of gestation) and antenatal transfer. 7.4 per cent of mothers who did not attend the minimum expected number of antenatal visits were transferred, compared with 4.0 per cent who had at least the minimum expected number of antenatal visits. The ten most commonly recorded reasons for antenatal transfer are shown in Table 7.

Table 7: Top ten reasons for antenatal transfer and percentage of transferred mothers, Queensland, 2014 and 2015

Transfer Reason Description (ICD-10-AM)		Frequency	Per cent of transferred mothers
Unavailability and inaccessibility of health-care facilities	Z753	1,067	20.6
Persons encountering health services in other specified circumstances	Z768	851	16.4
Premature rupture of membranes, onset of labour between 1-7 days later	O4211	236	4.6
Maternal care for poor fetal growth	O365	188	3.6
Other problems related to medical facilities and other health care	Z758	186	3.6
Maternal care for other (suspected) fetal abnormality and damage	O358	181	3.5
Obesity, unspecified	E669	147	2.8
False labour before 37 completed weeks of gestation	O470	142	2.7
Labour and birth complicated by meconium in amniotic fluid	O681	132	2.6
Premature rupture of membranes, onset of labour within 24 hours	O420	130	2.5

*There can be multiple reasons for transfer for an individual woman.
Categories are not mutually exclusive.*

87.7 per cent of babies who were transferred after birth were admitted to a special care or intensive care nursery. The median length of stay for babies who were transferred after birth (excluding babies who died) was 16 days.

There was a higher perinatal mortality rate for all types of transfers than for the overall population (see Table 8), which reflects the higher rates of complications and medical conditions for babies where transfer was required.

Table 8: Perinatal mortality rate by transfer status of the baby/mother, excluding babies with any congenital anomaly, Queensland, 2014 and 2015

Time of transfer	Perinatal Mortality Rate/1000
Mother transferred prior to labour	27.1
Mother transferred during labour	13.8
Baby transferred after birth	10.4
Not transferred	5.6



Congenital anomalies

In previous Council reports, congenital anomalies have been reported based on the Queensland Perinatal Data Collection. In this and future Council reports, rates will be reported based on a linked data resource, the Congenital Anomaly Linked File (CALF) which combines records from the Queensland Perinatal Data Collection, the Queensland Hospital Admitted Patient Data Collection (QHAPDC) (including terminations of pregnancy prior to 20 weeks gestation), Australian Bureau of Statistics Cause of Death and Queensland Death Registration Data where a congenital anomaly has been recorded.

All recorded congenital anomalies are included in the CALF for children up to the age of five years. This allows congenital anomalies that were not detected during the period covered by the Perinatal Data Collection (~20 weeks gestation to 28 days after birth) to be included in reporting. As the data collections have been linked at the person level, the reported rates do not include duplicates where a congenital anomaly is reported in more than one data collection. As the CALF includes congenital anomalies identified from a larger number of sources and over a longer time period, the rates reported using CALF are not comparable to those in previous reports.

This tool enables improved surveillance of congenital anomalies in Queensland. For example, reports from the system on babies who are diagnosed with microcephaly have been used by the Queensland Department of Health, Communicable Diseases Branch to support surveillance of a possible Zika virus risk.

Rates of congenital anomalies are reported in categories that are based on those used in the Western Australian Register of Developmental Anomalies (Table 9). Additional information on the number and rate of congenital anomalies over time and for selected subgroups is available at www.health.qld.gov.au/hsu/dashboards/calf.xlsm

Table 9: Cases of congenital anomalies, Queensland, 2014 and 2015

Congenital anomaly	Count	Congenital anomaly	Count
Nervous system defects*	536	Urogenital defects	2,531
Neural tube defects (NTD)**	157	Undescended Testis (treated)	996
Anencephalus	60	Hypospadias	490
Spina Bifida	81	Renal agenesis or dysgenesis	155
Encephalocoele	11	Cystic Kidney disease	32
Microcephaly	67	Obstructive defects renal pelvis	443
Congenital hydrocephalus (excl. those with NTD)	63	Vesico-ureteric reflux	30
		Other anomalies of ureter	79
Congenital anomalies of eye	210	Musculo-skeletal defects	5,322
Anophthalmia	2	Developmental dysplasia of hip	434
Microphthalmia	11	Talipes	2262
Congenital cataract and lens anomalies	32	Polydactyly	170
		Syndactyly	136
Congenital anomalies of ear, face and neck	413	Reduction deformities Upper and/or lower limbs	80
Anotia, microtia	36	Craniosynostosis	127
Branchial Remnants	41	Diaphragmatic hernia	37
		Exomphalos	29
Cardiovascular defects	2,434	Gastroschisis	78
Transposition of great vessels	83	Congenital anomalies of integument	2,820
Tetralogy of Fallot	48	Birth marks, naevus	1559
Ventricular Septal Defect	592	Chromosomal & genetic anomalies	579
Atrial Septal Defects	788	Down syndrome	249
Hypoplastic Left Heart Syndrome	56	Trisomy 13	22
Patent Ductus Arteriosus	881	Trisomy 18	66
Coarctation of Aorta	77	Turner syndrome	27
		Congenital hypothyroidism	27
Respiratory system defects	721	Adrenogenital syndrome	10
Choanal Atresia	37	Disorders of amino acid transport and metabolism	33
		Disorders of carbohydrate transport and metabolism	14
Gastro-intestinal defects	4,714	Phenylketonuria	2
Cleft Palate/Cleft lip	250	Cystic fibrosis	15
Tracheo-oesophageal fistula, oesophageal atresia/s	42	G6PD deficiency	13
Pyloric Stenosis	151	Thalassaemias	3
Stenosis/atresia small intestine	38	Haemophilia	15
Stenosis/atresia anus	58	Muscular dystrophies/myopathies	8
Hirschprung's disease	27	Fetal Alcohol Syndrome/FASD	8

Source: Congenital Anomaly Linked File, Statistical Services Branch, Queensland Department of Health.

Prepared by: Statistical Analysis and Linkage Unit, Statistical Services Branch, Queensland Department of Health.

The table includes cases where the birth was recorded in Queensland or the termination of pregnancy was conducted at a facility in Queensland.

* Categories within nervous system defects are not mutually exclusive as anencephalus, spina bifida and encephalocoele are all sub-categories of neural tube defects. ** Please note - this list does not encompass the full set of neural tube defects.

Data are preliminary and subject to change. Subsequent reports are likely to show additional cases of congenital anomalies, as further morbidity details are determined in the 5 years following an individual's birth.

Examination of data over time and by subgroup www.health.qld.gov.au/hsu/dashboards/calf.xlsm suggests:

- Over the eight year period for which data are available (2008 to 2015) there was an increase in cardiovascular congenital anomalies (from 15.1 to 19.9 per 1,000 births), respiratory system defects (from 3.6 to 5.5 per 1,000 births), gastro-intestinal defects (from 19.8 to 39.5 per 1,000 births) and musculo-skeletal defects (from 32.2 to 40.7 per 1,000 births). At least some of these increases may be due to improved detection through advances in ultrasound diagnosis or increases in the ease with which hospitals are able to report congenital anomalies due to the introduction of on-line reporting systems to replace or supplement forms-based reporting.²⁰
- Babies of mothers older than 40 years had higher rates of chromosomal anomalies and cardiovascular defects (particularly septal defects and patent ductus arteriosus); babies of mothers younger than 20 years had higher rates of gastroschisis (see Statbite#57²¹ for further details about rates of this congenital anomaly in Queensland).

20 Endo T, Johnston T, Ellerington J. Data quality issues to be aware of when using the Queensland Perinatal Data Collection to estimate the prevalence of congenital anomalies at birth in Queensland. Technical Report #13, Health Statistics Centre, Queensland Health, 2014. www.health.qld.gov.au/__data/assets/pdf_file/0027/145494/techreport_13.pdf

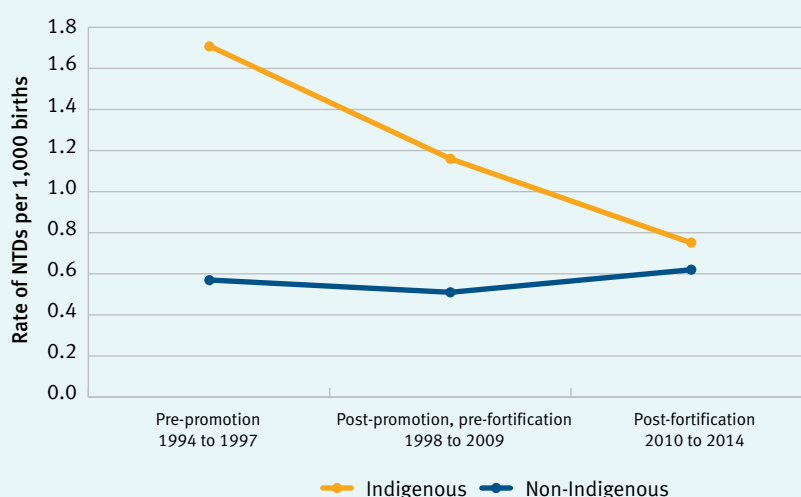
21 Endo T, Johnston T, Ellerington J, Donovan T. Gastroschisis in Queensland. Statbite #57, Health Statistics Centre, Queensland Health. www.health.qld.gov.au/__data/assets/pdf_file/0026/361385/statbite57.pdf

Neural tube defects among births to Indigenous mothers pre and post-folate fortification

Neural tube defects (NTDs) are congenital anomalies of the brain, spine or spinal cord. The most common NTDs are spina bifida and anencephaly. Folic acid supplementation has been found to reduce the risk of NTDs, which led to the introduction of mandatory fortification of bread making flour with folic acid throughout Australia in 2010.

In Queensland, rates of NTDs among babies born to Indigenous mothers have declined over the past two decades (see Figure 11). Rates of NTDs for babies born to Indigenous compared to non-Indigenous women have reduced from 2.98 times higher (95 per cent CI: 1.67-5.01) in 1994 to 1997 (the period before promotion of taking folate during pregnancy to prevent NTDs) to 2.26 times higher (95 per cent CI: 1.59-3.14) in 1998 to 2009 (the period during which folate use was promoted but no food fortification had been initiated) to 1.21 times higher (95 per cent CI: 0.65-2.09) in 2010 to 2014 (post fortification). This substantial decrease in the gap between the rates of NTDs in babies of Indigenous and non-Indigenous mothers has also been observed elsewhere in Australia²² and has occurred in births among both urban and rural Indigenous women.

Figure 11: Rate of NTDs per 1,000 births*, by Indigenous status of mother and epoch, Queensland, 1994 to 2014



**These figures are based on perinatal data collection data only as linked data are not available for the full time period.*

Congenital syphilis

Since January 2011, there has been an outbreak of infectious syphilis in north Queensland mainly affecting young Aboriginal and Torres Strait Islander people (15-29 years of age). The outbreak involves Cairns and Hinterland Hospital and Health Service (HHS), North West HHS, Torres and Cape HHS and Townsville HHS. Between 1 January 2011 and 31 May 2017 there have been five notifications of congenital syphilis of Aboriginal and Torres Strait Islander babies associated with the outbreak. There were three intrauterine fetal deaths and two live births, one of which resulted in neonatal death. There have also been cases of congenital syphilis in Queensland during this time that are unrelated to the north Queensland syphilis outbreak.

The Council supports the actions of the *North Queensland Aboriginal and Torres Strait Islander Sexually Transmissible Infections Action Plan 2016–2021* and the overarching *Queensland Sexual Health Strategy 2016–2021*²³ to eliminate congenital syphilis in Queensland. Key actions include:

- promotion and prevention through specialised community engagement
- diagnosis, treatment and ongoing management of women with syphilis or at risk of syphilis in pregnancy
- management of babies born to mothers with undiagnosed syphilis and
- investigation of all cases of congenital syphilis.

✓ Good practice point

Clinicians should adhere to guidelines for antenatal syphilis screening and perinatal syphilis management, including the National Antenatal Care Guidelines or regional antenatal screening guidelines recommending increased testing frequency, and the Australasian Society for Infectious Diseases (ASID) Management of Perinatal Infections.

✓ Good practice point

Clinicians should seek access to specialist support services for the management of women who are identified with syphilis infection during pregnancy.

✓ Good practice point

Clinicians should be supported to participate in investigations of cases of congenital syphilis and contribute to improvements in local responses and system wide recommendations.

! Recommendation

That all cases of congenital syphilis are to be consistently identified, reported and then investigated to identify factors for improvement at both clinical and system levels and mechanisms are made available to implement recommended changes to practice.

First trimester screening for chromosomal anomalies

All pregnant women should be provided with information and offered the opportunity for a discussion about the range of chromosomal anomalies that can be detected, and the available prenatal screening and diagnostic tests. Women should have timely access to tests for assessment of chromosomal anomalies with adequate sensitivity and specificity. Prenatal screening options should be discussed early in the first trimester where possible to maximise screening options. See Appendix C for the screening tests that should be considered.

✓ Good practice point

All pregnant women should be provided with information about possible chromosomal anomalies, and offered the opportunity to discuss available prenatal screening and diagnostic tests early in the first trimester.

23 North Queensland Aboriginal and Torres Strait Islander Sexually Transmissible Infections Action Plan 2016-2021, Queensland Health 2016
www.health.qld.gov.au/__data/assets/pdf_file/0028/157555/sti-action-plan-2016-21.pdf

Preconception health and primary prevention

Promoting health and wellbeing in young women prior to and during pregnancy aims to reduce poor pregnancy outcomes, including potentially preventable congenital anomalies. The *Health and Wellbeing Strategic Framework 2017 to 2026*²⁴ provides a prevention-focused pathway for the improved health of all Queenslanders, including women of child-bearing age. The framework focuses on the key modifiable behaviours of unhealthy eating, physical activity and tobacco smoking by empowering people with the knowledge, skills, positive attitude and motivation to live healthy lives. It recognises that the places where people live, work, learn and play can support or hinder such choices.

As young women transition from childhood to young adulthood, and potentially become pregnant, maintaining a healthy weight, adopting healthy eating habits, being active, not smoking, avoiding substance abuse and meeting the social and emotional challenges of the transition is a complex process. The Framework addresses this complexity in diverse ways by using a multi-strategy approach to implement a variety of interventions such as intensive quit smoking support programs, smoke-free public places and healthy lifestyle programs to increase healthy eating and physical activity.

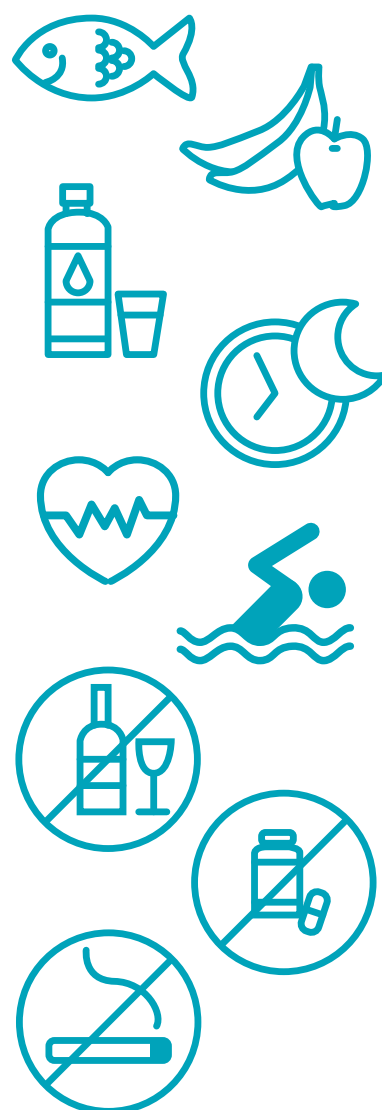
There are encouraging trends in health behaviours among young women aged 18 to 29 years in Queensland: smoking rates are declining, risky alcohol consumption is reducing, levels of activity are increasing and fruit consumption is growing. Rates of obesity are unfortunately still rising.

Achieving change in healthy lifestyles depends on sustained strategic delivery of those programs and interventions that support people and contribute to cultural change. These are long term investments and steady gains over the past decade are indicative of the recognition that prevention is a critical component in health care delivery and better outcomes.

Preconception health care and healthy pregnancy are fundamental to reducing rates of congenital anomaly. The Council supports the aims of the Framework, particularly as it relates to the primary prevention of poor pregnancy outcomes.

! Recommendation

That Queensland Health consider placing within current healthy lifestyle initiatives, a stronger emphasis on the link between good pregnancy outcomes and preconception care/ healthy pregnancy, including a reduction in congenital anomalies.



²⁴ *Health and Wellbeing Strategic Framework 2017 to 2026*, State of Queensland (Queensland Health), June 2017 <https://publications.qld.gov.au/dataset/health-and-wellbeing-strategic-framework-2017-to-2026/resource/2d8461d3-98bb-4c45-9c1b-19e88a3cf56d>



Maternal mortality

Maternal death definition

A maternal death is defined by the World Health Organisation²⁵ (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 by the Council in this report include, in addition to the WHO definition, incidental deaths and deaths occurring more than 42 days after termination of pregnancy, that is, 43 days up to 365 days.

²⁵ World Health Organization, Maternal Mortality Ratio (per 100 000 live births), WHO 2017 www.who.int/healthinfo/statistics/indmaternalmortality/en

Classification of maternal deaths

Deaths in pregnancy and for the first 365 days after the end of pregnancy are uncommon and are classified in a number of ways.

Direct deaths are those that 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. These deaths are not included in the calculation of the Maternal Mortality Ratio (MMR).

Late maternal death is the death of a woman later than 42 days but within one year of giving birth or otherwise ending a pregnancy. These deaths are not included in the calculation of the MMR (see below).

Classification of maternal suicide

While the World Health Organisation has reclassified maternal suicide as a direct cause of maternal death, the Council has endorsed the continuation of its classification of 'direct', only for those maternal suicide deaths where no pre-existing mental health condition was noted. For all other maternal suicide deaths, the classification given is either 'indirect' or 'incidental'. This ensures consistency with all other Australian States and Territories which classify maternal suicide in this way to align with national reporting.

Maternal mortality ratio (MMR)

The MMR is defined as
$$\frac{\text{Number of maternal deaths}}{\text{Number of women who gave birth}} \times 100,000$$

In 2014 and 2015, 57 deaths occurred during pregnancy or within 365 days of the end of a pregnancy. For the purpose of calculating the MMR, the WHO definition²⁶ for maternal death is applied. There were nine maternal deaths (six direct deaths and three indirect deaths) giving an MMR of 7.3 per 100,000 births. Additionally, two deaths were classified as incidental – one death during pregnancy and one death within 42 days of the end of pregnancy. There were 46 late maternal deaths, two of which could not be classified.

The MMR in Queensland in the most recent four triennia are shown in Table 10 and have been explained in more detail in previous Council reports²⁷.

Table 10: Maternal mortality ratios (MMR), Queensland, 2004-06 to 2013-15

Triennia	Direct	Indirect	Number of women who gave birth in Queensland	MMR Queensland
2004–06	9	13	160,107	13.7
2007–09	7	4	180,577	6.1
2010–12	8	9	184,819	9.2
2013–15	7	4	185,935	5.9

Includes direct and indirect deaths within 42 days of the end of pregnancy.

In Queensland

57 maternal deaths occurred during pregnancy or within 365 days of the end of a pregnancy in 2014 and 2015.

The maternal mortality ratio for this period was 7.3 per 100,000 births. This ratio includes only the 9 direct and indirect deaths that occurred during pregnancy or within 42 days of a birth.

²⁶ Ibid.

²⁷ Previous Council reports are available to download at: www.health.qld.gov.au/improvement/networks/qmpqc_publications

Classification of cause of maternal deaths

In this section, the broader definition of maternal death is used, including incidental and late maternal deaths.

Table 11 shows the classification of the 57 deaths that occurred during pregnancy or within 365 days of the end of a pregnancy in the period 2014 to 2015. Eight deaths were a direct result of the pregnancy and 14 were indirect deaths (resulting from a pre-existing condition aggravated by the physiological effects of pregnancy). 33 women died of incidental causes. Two maternal deaths could not be classified; one because the cause of death could not be determined by the Coroner and the other because information was not available to enable a thorough review of the death for classification and inclusion in this report.

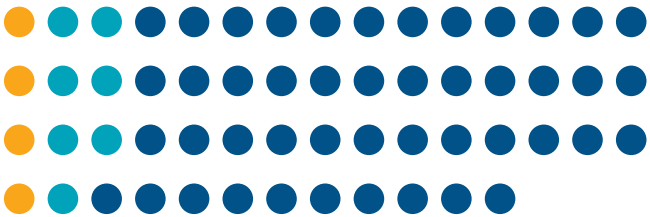
Table 11: Classification of maternal deaths, Queensland, 2014 and 2015

Maternal death timing	Classification	Total
Deaths during pregnancy	Indirect	3
	Incidental	1
Deaths within 42 days of end of pregnancy	Direct deaths	6
	Incidental	1
Deaths between 43 days and 365 days of end of pregnancy (i.e. late maternal deaths)	Direct	2
	Indirect	11
	Incidental	31
	Unclassifiable	1
	Awaiting further information to allow review for classification	1
Total		57

Includes all maternal deaths.

In 2014 and 2015

- 4 women died during pregnancy
- 7 women died within 42 days of the end of pregnancy
- 46 were late maternal deaths



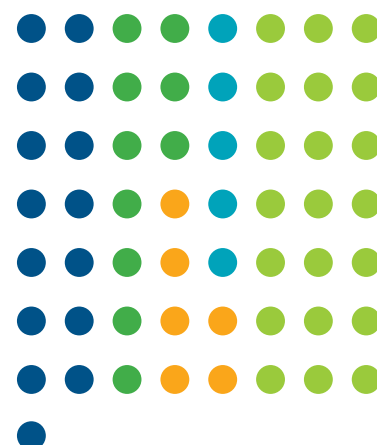
Cause of maternal death

Table 12 shows the cause of the 57 deaths that occurred during pregnancy or within 365 days of the end of a pregnancy. Malignancy (15), suicide (10), homicide (6) and motor vehicle trauma (5) were the most prominent causes of death. As the numbers are small on a population basis, care should be taken with interpretation.

Table 12: Cause of maternal deaths, Queensland, 2014 and 2015

Cause of death	During Pregnancy/0-42 days postpartum Number	43-365 days Postpartum Number
Suicide	1	9
Homicide	2	4
Motor vehicle trauma	2	3
Malignancy	0	15
Pulmonary Embolism	2	0
Amniotic Fluid Embolism	2	0
Uterine Haemorrhage	1	0
Choriocarcinoma	0	1
Coronary Artery Dissection	1	0
Cardiomyopathy	0	2
Infective Endocarditis	0	1
Acute Myocardial Infarction	0	1
Myocarditis	0	1
Cerebral Haematoma	0	1
Sub-arachnoid haemorrhage	0	1
Epilepsy	0	1
Intracranial Abscess	0	1
Familial blood disorder	0	1
Mixed Drug Toxicity	0	1
Burns	0	1
Unable to be determined	0	1
Yet to be determined	0	1
Total	11	46

Includes all maternal deaths.



In 2014 and 2015

- 15 maternal deaths due to malignancy
- 10 due to suicide
- 6 due to homicide
- 5 due to motor vehicle trauma
- 21 due to other causes as described in Table 12.

Hypertension in pregnancy

There were no maternal deaths relating to failure in the diagnosis and management of hypertension in pregnancy, however this condition remains a common cause of maternal deaths throughout the world. Council urges vigilance in ensuring that any rise in blood pressure during pregnancy is carefully assessed.

Deaths due to malignancy

Malignancy was the leading cause of maternal mortality resulting in the death of 15 women between 43 and 365 days of the end of pregnancy. Compared to previous reports, the Council was pleased to note that none of the cases reviewed included delayed diagnosis or failure to fully investigate symptoms during pregnancy.

As a reminder, women who have any of the following symptoms warrant a thorough clinical history, examination, and appropriate investigations:

- longstanding post coital bleeding
- rectal bleeding
- abdominal pain
- fevers
- unexplained weight loss.

✓ Good practice point

Given the increasing rates of older maternal age and obesity in pregnant women, it remains very important to consider malignancy in the differential diagnosis in a range of symptoms presenting in pregnancy.

Suicide

Suicide was the second highest cause of maternal death with ten cases reported. Three occurred following termination of pregnancy (TOP). This has been a consistent feature of recent Council reports. The lack of clarity around the Queensland legislation for access to early and late termination of pregnancy, and in relation to the termination of pregnancy for a fetal anomaly remains problematic. The majority of TOP providers do not operate in the public sector, and may be less well connected to other components of the medical care system such as, for example, a woman's usual General Practitioner. Therefore, women with, or who are at risk of mental health problems may fall through the gaps between termination providers, the general practice community and mental health providers. The development of a pathway for the provision of mental health screening, referral to mental health services and termination of pregnancy services, would assist in enhancing communication between these services to the ultimate benefit of women who undertake TOP.


! Recommendation

That the Queensland Department of Health, Mental Health Alcohol and Other Drugs Branch explore how communication between mental health services, primary health practitioners and termination of pregnancy providers could be enhanced to ensure women are appropriately supported after a termination of pregnancy.

Postpartum suicide

It is distressing to review the deaths of mothers due to suicide who had infants of less than 12 months of age. Women continue to fall through the gaps of mental health care provision, including appropriate identification of their mental health issues during and immediately post pregnancy. This is a significant public health issue and needs urgent attention. As perinatal mental health issues are common and often poorly diagnosed, managed and followed up, it is clear that this is a matter that must be prioritised. Timely access to specialist perinatal mental health services and/or advice is a matter of serious concern, as is the lack of systematic mental health screening in the private sector for women accessing care through that sector. Delays in access to public mental health professionals have also been identified in some maternal deaths.

The Council noted in its 2015 Report that active follow-up of the women known to be at risk of depression from prenatal and postnatal screening needs to be universal and effective.



**Approximately
1 in 6 maternal deaths
are due to suicide**

Beyondblue, in its Clinical Practice Guidelines²⁸, recommends that:

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

New guidelines by the Centre of Perinatal Excellence were launched in October 2017. Information about the guidelines can be found at www.cope.org.au/about/review-of-new-perinatal-mental-health-guidelines.

These recommend that the EPDS is used in conjunction with psychosocial screening (which incorporates screening for domestic violence as well as past mental health issues).

✓ Good practice point

Women with a history of serious mental illness (e.g. schizophrenia, bipolar affective disorder, schizoaffective disorder) should routinely be offered mental health follow-up for at least the first twelve months postpartum.

✓ Good practice point

Mental health screening is performed almost universally in the public sector but less so in the private sector. Use of the Edinburgh Postnatal Depression Scale, psychosocial screening and screening for past mental health conditions in the private sector, may help to identify women who warrant further follow-up in the setting of identified referral pathways.

Psychosocial causations of death

Antenatal and postnatal screening has led to a higher identification of women at risk of mental health issues during pregnancy. However, the challenge lies in managing new and ongoing mental health and psychosocial difficulties beyond the first six weeks postpartum.

The importance of good communication between Maternity Services and Child Health Services that may undertake initial mental health and psychosocial screening of women antenatally and within six weeks postnatally, and their general practitioners, cannot be understated.

It is significant that in six of the 10 cases, suicide was through violent means. This reflects similar data for women who suicide under the age of 35 in Queensland²⁹.

In three cases, alcohol and substance misuse issues were identified. Furthermore, there were often additional psychosocial risk factors including loss of custody of children.

The Council will consider initiating a detailed investigation of maternal suicides including all services involved in caring for the woman, which may identify patterns and risk factors to target interventions for vulnerable populations with multiple morbidities apart from mental health, including substance and alcohol abuse, complex social factors and domestic violence.³⁰



Antenatal and postnatal screening has led to a higher identification of women at risk of mental health issues during pregnancy.

28 www.beyondblue.org.au/health-professionals/clinical-practice-guidelines

29 Potts, B, Kolves, Kairi, O'Gorman, J, De Leo, D. Suicide in QLD Mortality rates and related data 2011-2013. Australian Institute for Suicide Research and Prevention, March 2016

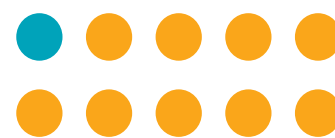
30 Cantwell R, Knight M, Oates M and Shakespeare J. on behalf of the MBRRACE-UK mental health chapter writing group. Lessons on maternal mental health. In Knight M, Tuffnell D, Kenyon S, Shakespeare J, Gray R, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care - Surveillance of maternal deaths in the UK 2011-13 and lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2009-13. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2015: p22-41.

Domestic violence

Six women died from homicide. On review of the case notes, multiple and complex psychosocial risk factors, including mental health and substance abuse issues were mostly evident. The mental health care of the immediate family should not be overlooked. In one case, the mental health state of an immediate family member may have contributed to the death of the woman.

The Council views with concern the high rates of domestic violence that have been reported by various agencies, and often in Indigenous communities. At times, it is impossible to quantify the impact this can have on the physical and mental health of a woman and her children, and its impact on maternal mortality, particularly those due to suicide. The Council supports initiatives taken by various groups, for example, White Ribbon, to highlight and reduce this problem in the community.

Maternal deaths in the setting of domestic violence lend strength to the implementation of the Queensland and national domestic violence prevention strategies. Information about the Queensland Domestic and Family Violence Prevention Strategy 2016-2026 can be found at www.communities.qld.gov.au/resources/gateway/campaigns/end-violence/dfv-prevention-strategy.pdf



**Approximately
1 in 10 maternal
deaths are due to
homicide**

Avoidability

The Council considers the national reporting preference in relation to avoidability when classifying maternal death cases, that is:

- sub-optimal factor(s) identified but unlikely to have contributed to outcome (insignificant)
- sub-optimal factor(s) identified but might have contributed to outcome (possible)
- sub-optimal factor(s) identified likely to have contributed to outcome (significant)
- no sub-optimal care factors identified
- contributing factor assessment not undertaken.

A number of avoidable factors were identified during the review of maternal deaths by the Council's Maternal Mortality Sub-Committee.

- Ongoing effort needs to be given to the engagement of Indigenous women in antenatal care to improve pregnancy outcomes for both mother and baby.
- Attention needs to be given to the provision of contraceptive advice following termination of pregnancy to prevent another pregnancy within a short period of time, in what may be complex social circumstances.
- Care needs to also be given to appropriate contraception in high-risk women where pregnancies have been complicated with significant medical and psychiatric illness.

In reviewing maternal deaths, the difficulties that can arise for clinicians when referring to both paper-based and electronic medical records that rely on a document scanning solution, have become apparent. The lack of a clear pregnancy chronology, risk assessment, investigation results (especially those conducted in the private health sector) and management plan, can lead to delays in provision of appropriate care. In at least one case, the fragmentation of medical records contributed to poor risk assessment and inappropriate care.

In two cases of maternal death, routine observations of heart rate, blood pressure and oxygen saturations were not recorded and may have contributed to delay in resuscitation.

✓ Good practice point

Detailed counselling regarding contraception should be provided to all women who have had a termination of pregnancy.

✓ Good practice point

All postnatal women should be provided with advice regarding contraception before they leave their maternity care facility. Women who have had complicated pregnancies and who have additional risk factors need particular care and skilled senior clinician involvement in contraception decisions. Women who require one, should be provided with an appropriate contraception plan early in the postpartum period.

✓ Good practice point

All clinical staff should be regularly reminded about performing and recording basic observations and to seek appropriate medical assessment when those observations are outside acceptable parameters. In all acute settings involving pregnant or immediately postpartum women, an observation chart such as the Queensland Maternity Early Warning Tool (Q-MEWT) should be used.

A recurring theme across maternal mortality reports in Queensland^{31, 32} is that the lack of seat belt wearing contributes to deaths in motor vehicle accidents. Some women may feel that wearing a seat belt will cause injury to their unborn baby in the event of an accident. Seat belt wearing by pregnant women is required by law. There is evidence that unborn babies are protected by the appropriate wearing of a seat belt in the event of a motor vehicle accident. Women are more likely to be injured or killed in a motor vehicle accident from not wearing a seat belt.

The Maternal Mortality Sub-Committee, in reviewing maternal death cases, noted the importance of reminding clinicians that the period where anticoagulation is reduced should be as short as possible in women at high risk for thromboembolism. Situations such as prolonged induction of labour and consequent emergency caesarean section, contribute to the length of the anticoagulation period and the risk of embolism and death. Clinicians need to be mindful of these potential risks.

Autopsies following maternal death

Unexpected and/or sudden death in women who are pregnant has a wide range of possible diagnoses or causes which should be considered in all cases. Whilst some causes of death are known to be increased in incidence with pregnancy (for example, pulmonary embolus), or even unique to pregnancy (such as amniotic fluid embolism) the broader range of possible diagnoses should be considered in all cases. In the case of sudden death, where there may be limited opportunity to perform diagnostic investigations, the cause of death will only be apparent after post-mortem examination. In several cases included in this report, the cause of death was based on a clinical diagnosis but on review the Council felt that the diagnosis was uncertain. The Council strongly recommends that an autopsy, and where appropriate molecular investigations, be performed in all cases of maternal mortality unless the cause of death is certain on clinical grounds. Genetic testing is of paramount importance because many cases of sudden unexpected death in the young are due to inherited causes.



**Between 2004 and 2015,
82.3%
of direct and indirect
maternal deaths within
42 days of pregnancy
were investigated
by autopsy.**

✓ Good practice point

Healthcare providers should remind their pregnant and postpartum patients that they must wear a seat belt while driving or as a passenger during their pregnancy.

✓ Good practice point

For women who are anticoagulated, the peripartum period for which anticoagulation is ceased, should be as short as possible and appropriate expertise in managing it should be sought.

✓ Good practice point

Unexpected and/or sudden death in women of child bearing age has a broad differential diagnosis which should be considered in all cases. In several cases included in this report the cause of death was based on a clinical diagnosis but on review, the Council felt that the diagnosis was uncertain.

! Recommendation

That an autopsy, and where appropriate and available, molecular investigations, be performed in all cases of maternal mortality. Consideration should be given to amending the *Queensland Coroners Act* to include investigation of all maternal deaths, that is, women who die in pregnancy and within the first twelve months postpartum, except where there is a known metastatic malignancy which is believed to be the cause of death.

31 Klinich K.D., Flannagan C.A.C., Rupp J.D., et al: Fetal outcome in motor-vehicle crashes: effects of crash characteristics and maternal restraint. Am J Obstet Gynecol 2008; 198: pp. 450.e1-e9

32 Pearce, C and Martin, SR. Trauma and considerations unique to pregnancy. Critical Care Obstetrics for the Obstetrician and Gynecologist, Obstetrics and Gynecology Clinics of North America. 2016; 43(4): pp. 791-808

Characteristics of women who died in the period 2004 to 2015

Table 13 provides an overview of the 62 women who died as a direct or indirect result of pregnancy between 2004 and 2015, during pregnancy or within 42 days of the end of pregnancy.

Thirty-one (50%) of the deaths were direct deaths. Fifteen (24.2%) occurred during pregnancy, 36 (58.1%) occurred after the birth of the baby and 11 (17.7%) occurred after a termination of pregnancy or miscarriage. Twenty-two (35.5%) of the deaths were found to have been avoidable or possibly avoidable.

Table 13: Clinical characteristics of direct and indirect maternal deaths within 42 days of the end of pregnancy, Queensland, 2004 to 2015

Characteristic		2004 to 2015	%
Death classification	Direct	31	50
	Indirect	30	48.4
	Classification uncertain	1	1.6
Timing of death	Death occurred after miscarriage	3	4.8
	Death occurred after a termination of pregnancy	8	12.9
	Death occurred in trimester 1 of pregnancy	5	8.1
	Death occurred in trimester 2 of pregnancy	5	8.1
	Death occurred in trimester 3 of pregnancy	5	8.1
	Death occurred after the woman gave birth	36	58.1
Autopsy	Autopsy performed	51	82.3
	Autopsy not performed	11	17.7
Avoidability	Avoidable	3	4.8
	Possibly Avoidable	19	30.6
	No avoidable factors	38	61.3
	Avoidability uncertain	2	3.2

Includes direct and indirect deaths within 42 days of the end of pregnancy.

In Queensland

In the 12 years between 2004 and 2015 there were 62 direct or indirect maternal deaths that occurred during or within 42 days of the end of a pregnancy.

17.7% of these maternal deaths occurred after a termination of pregnancy or miscarriage.

35.5% of these maternal deaths were judged to have been avoidable or possibly avoidable.

Four Indigenous women died in 2014 and 2015, which is 18.2 per cent of maternal deaths, whereas the Indigenous population is 6.4 per cent. This indicates an ongoing elevated rate of Indigenous maternal deaths. There is still a long way to go in closing the gap for Indigenous women in social deprivation and maternal and perinatal health. The Council encourages clinicians to continue to work to improve these outcomes.

Table 14 shows 15.1 per cent of the deaths occurred in Indigenous women over the period from 2006 to 2015, despite Indigenous women making up only 5.8 per cent of the women giving birth in Queensland during that period.

Table 14: Characteristics of women who died (direct and indirect deaths), and percentages of all women giving birth, Queensland, 2006 to 2015

Characteristic	Maternal Deaths		Queensland	
	Count	Per cent	Count	Per cent
Indigenous	11	15.1	35,418	5.8
Non-Indigenous	62	84.9	571,632	94.2
First time mother	8	17.0	247,266	40.7
One/more previous birth	39	83.0	359,782	59.3
Underweight	0	0.0	26,146	5.2
Normal	17	45.9	257,507	50.8
Overweight	10	27.0	122,728	24.2
Obese	10	27.0	100,177	19.8
Less than 20	5	7.2	30,800	5.1
20-34	49	71.0	458,130	75.5
35+	15	21.7	118,120	19.5
Major cities	36	50.7	364,317	60.6
Inner regional	25	35.2	121,042	20.1
Outer regional	7	9.9	96,692	16.1
Remote/Very remote	3	4.2	19,151	3.2

Includes all direct and indirect deaths.

Percentages are calculated as proportion of women with available data for that characteristic. Totals for each characteristic vary depending on data completeness. BMI only available from July 2007.

Women who had previously given birth had a higher incidence of maternal death when compared to all women giving birth in Queensland. Overweight and obese women also had a higher than expected rate of maternal mortality. The proportion of deaths among women living in remote and very remote locations was not much higher than the proportion of overall births to women in remote and very remote locations, suggesting that remoteness of residence was not a risk factor for maternal deaths. Maternal age was also not shown to be a risk factor among maternal deaths that occurred in Queensland over this period.

In Queensland

For the 10 year period between 2006 and 2015, higher than expected rates of maternal mortality occurred among Aboriginal and Torres Strait Islander women, overweight and obese women and women who had a previous pregnancy.

✓ Good practice point

Prior good outcomes in women with chronic medical conditions should not be taken as a reason to reduce surveillance levels.

Hypothetical cases

A variety of lower risk models of care are available to women. It is essential that vigilance is still undertaken with low-risk women to ensure significant and emerging clinical features are not missed, resulting in maternal morbidity or even death. Pregnant women need to be reminded that non-disclosure of medical history (for any reason) in order to be allocated to low risk models of care can pose significant risks to both them and the baby.

These invented illustrative cases involve “near miss” scenarios where the women survived and are provided for the purpose of understanding where pitfalls may lie.

1. A 35 year old recent migrant in her second pregnancy has been cared for in a hospital-based midwifery model of care, after she was assessed and triaged by a junior obstetric registrar as low risk, based on the history provided and the difficulty in accessing her past medical records from country of origin. As she was very committed to her pregnancy and the birth of her baby being regarded as normal, she did not inform any of her carers about her previous history in China of peripartum cardiomyopathy. She presented to her local hospital Emergency Department at 34 weeks gestation with symptoms of heart failure. She had been dismissing her difficulties of increasing shortness of breath and had not communicated this to her healthcare providers. She required significant medical intervention and, after a two week admission to an Intensive Care Unit, made a reasonable recovery, though it is likely that she will suffer significant deterioration in her cardiac status in future.
2. A 23 year old woman in her first pregnancy was cared for in a low risk model of maternity care. She had a history of headaches for four years, which her GP had diagnosed as migraine. Throughout her pregnancy, she continued to complain of headaches but at no stage was a formal neurological examination performed or detailed clinical history taken. Her pregnancy record noted headaches at every midwifery review. At 34 weeks, her midwife referred her for obstetric review. The obstetrician noted the history of migraines and suggested some simple analgesia. At 36 weeks, the headaches were increasingly severe and she was admitted for assessment of pre-eclampsia and fetal health. Neurological examination conducted by the Resident revealed papilledema so she was referred for a CT scan of the brain which revealed a tumour of 10cm in diameter. This was resected and found to be benign. The patient made a complete recovery.

These two cases demonstrate the care that needs to be taken with clinical history, clinical examination, and appropriate investigations in all models of care and the importance of timely clinical escalation when required. All practitioners providing maternity care need to be vigilant, and recognise that, although pregnancy is not usually associated with deterioration in a woman's health, new problems can arise, and it is imperative that unusual symptoms and signs are acted upon promptly.

Reporting of maternal deaths

Since the change to the *Public Health Act* in 2013 to mandate the reporting of maternal deaths by health professionals, there has been a dramatic improvement in the Council's capacity to review and appropriately classify maternal deaths. This demonstrates the value of high quality, well-targeted legislation. The Council wishes to acknowledge the support of the Minister for Health; the Queensland Health Director-General and departmental legal advisors in actioning such change.



Severe Acute Maternal Morbidity Indicators

The Queensland Department of Health, Patient Safety and Quality Improvement Service has commenced monitoring severe acute maternal morbidity (SAMM).

The SAMM indicators are intended for facility-level monitoring of severe acute maternal events, and to explore variation in these outcomes over time. They are not suitable for comparing performance between facilities and are not linked to funding or accreditation. Rather they are for individual facilities to monitor and review, and to improve quality of care.

The SAMM indicators were developed by the Australian Commission on Safety and Quality in Health Care, and reviewed for local use by a working group within Queensland Department of Health, Patient Safety and Quality Improvement Service³³. Due to the nature of clinical events being monitored, the number of SAMM events in each facility is expected to be low. It was the consensus of the National Working Group that, while a frequency of zero is preferable, this is not realistic as the events are not always preventable.

The SAMM indicators collected by Queensland Health are derived from the Queensland Hospital Admitted Patient Data Collection (inpatient) for all SAMM indicators and also linked to the Perinatal Data Collection for postpartum haemorrhage blood loss.

See Appendix B for SAMM definitions.

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³³ In implementing the SAMM indicators within Queensland Health, the Queensland working group adopted the National SAMM indicators with the following variations: i) where indicators specified transfer to ICU, linkage keys were used to attribute the event to the transferring facility; ii) linkage to perinatal data was used to capture blood loss for haemorrhages; iii) linkage keys were also used to capture, where indicators specified this requirement, length of stay and time since birth event.



Perinatal mortality

Definitions

Fetal death (stillbirth): defined by the *Registration of Births, Deaths and Marriages Act* as a child who has shown no sign of respiration or heartbeat, or other sign of life after completely leaving the child's mother and who has been gestated for 20 weeks or more, or weighs 400g or more.

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

Perinatal mortality is defined in this report as all fetal deaths (stillbirths) of at least 20 weeks gestation or at least 400 grams birthweight and neonatal deaths (deaths of liveborn babies of any weight or gestation within the first 28 days of life).

In 2014 and 2015 the perinatal mortality rate in Queensland was 9.8 per 1,000 births. This included:

- 841 stillbirths or 6.7 stillbirths per 1,000 births
- 387 neonatal deaths or 3.1 neonatal deaths per 1,000 live births.

The stillbirth and neonatal mortality rates in Queensland are similar to the national rates³⁴.

The overall rates of stillbirths have not changed significantly in Queensland over the decade 2006 to 2015 while neonatal death rates have declined modestly (annual percent change: -2.2; 95 per cent CI: -3.7, -0.7). When data are stratified by gestational age, however, it can be seen that both stillbirth rates and neonatal death rates among babies born at later gestational ages have declined (Statbite 64)³⁴.

Higher perinatal mortality rates occur in hospitals where women with higher risk pregnancies give birth. Table 15 shows that the highest rates occur in hospitals where the rate of preterm birth and other associated risk factors is highest. While these risk factors and medical conditions in the mother and/or baby account for a large proportion of deaths, quality of care can also be a factor.

Table 15: Rate of perinatal mortality and selected perinatal/maternal risk factors, excluding terminations of pregnancy and babies with selected sentinel congenital anomalies, by hospital peer group, Queensland, 2014 and 2015

Peer Group	stillbirth (a)	neonatal death (b)	perinatal death (a)	preterm (c)	lbw (d)	< 5 antenatal visits (e)	smoking after 20 weeks (f)	obesity (g)
Level 2/3	3.9	2.0	5.9	3.7	2.7	4.8	19.3	19.7
Level 4/5	4.6	1.8	6.4	8.0	5.9	6.3	17.2	25.4
Level 6	5.3	3.7	9.0	10.7	8.7	5.5	7.7	16.7
Private	3.5	0.8	4.3	8.6	5.4	0.7	0.8	13.7
Total (h)	4.6	2.2	6.8	8.7	6.4	4.6	10.2	19.3

Peer group determined based on Clinical Services Capability Framework.
Birthing centres categorised as peer group of parent facility.

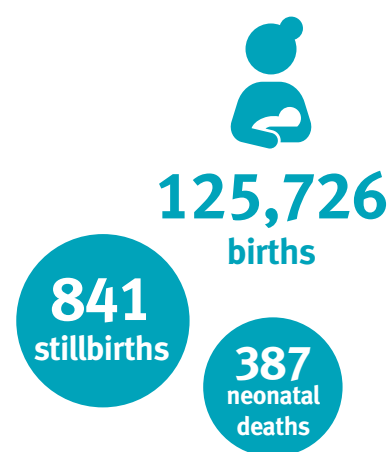
- (a) Rate per 1,000 births.
 (b) Rate per 1,000 livebirths; mortality within 28 days of birth.
 (c) Rate of babies born prior to 37 weeks gestation per 100 births. Excludes records of unknown gestation.
 (d) Low birthweight (lbw). Rate of babies < 2500g per 100 livebirths. Excludes records of unknown birthweight.
 (e) Rate per 100 births. Excludes babies born to mothers with unknown number of antenatal visits and births at less than 32 weeks gestation.
 (f) Rate per 100 births. Excludes babies born to mothers of unknown smoking status after 20 weeks.
 (g) Rate per 100 births. Excludes babies born to mothers of unknown BMI.
 (h) Includes babies born at level 1 facilities, born before arrival, home birthed and born at not stated facility.

In Queensland

There were 6.7 stillbirths per 1,000 births and 3.1 neonatal deaths per 1,000 live births.

Stillbirths and neonatal deaths at later gestations have declined over the decade 2006 to 2015.

Higher perinatal death rates occur in public tertiary hospitals which reflects the higher rate of high risk pregnancies managed in these facilities.



34 AIHW 2016. Australia's mothers and babies 2014—in brief. Perinatal statistics series no. 32. Cat. no. PER 87. Canberra: AIHW.

Utz, M., Johnston, T., Zarate, D., 2015, Trends in stillbirths and neonatal deaths among babies born to Indigenous and non Indigenous women in Queensland, 1989-1993 to 2009-2013, Statbite #64, Health Statistics Branch, Queensland Health at www.health.qld.gov.au/__data/assets/pdf_file/0029/144677/statbite64.pdf

Perinatal mortality audit

Recent national and international reports have reinforced the importance of timely perinatal mortality audit to prevent future perinatal deaths through improved quality of care (e.g. the Bacchus Marsh enquiry into cases of substandard care in Victoria, and the confidential enquiries from Western Australia³⁵, Victoria³⁶, United Kingdom³⁷ and New Zealand³⁸). In addition to reviewing all perinatal deaths and to ensure accurate classification of causes of death, the Council's Perinatal Mortality Sub-Committee has conducted an in depth review of certain deaths to look for contributory factors relating to care (substandard care factors) as a pilot project to inform the development of an ongoing approach to this review. Perinatal deaths of 34 weeks gestation or more, excluding those with major congenital anomalies, were identified through the Queensland Perinatal Data Collection Unit. A request was then made to the relevant Director of Obstetrics to complete a comprehensive case summary using the Australian Perinatal Mortality Audit Tool (APMAT) for each case³⁹. A multidisciplinary panel using the nationally recommended rating system⁴⁰ undertook the audit over two time periods: January-March 2014 and January-June 2015.

A total of 63 perinatal deaths were reviewed; 22 over the period January-March 2014, and 41 over the period January-June 2015. In just over one-third (22) of cases, the panel was unable to reach a firm conclusion due to insufficient information provided. A total of 32 (50.8 per cent) perinatal deaths were identified as having substandard care factors present of which 11 (17.5 per cent) were rated as 'Significant. Sub-optimal factors identified were likely to have contributed to the outcome'.

The major substandard care factors identified were around:

- reporting and management of decreased fetal movements
- antenatal detection of fetal growth restriction
- management of maternal pre-existing diabetes
- maternal smoking
- inadequate antenatal care attendance/detection or recognition of fetal macrosomia
- decision to delivery time for intrapartum fetal compromise
- response to antepartum haemorrhage.

The pilot demonstrated the value of an in depth review for substandard care factors, but also highlighted some difficulties which need to be overcome before the full value of this work can be realised. The main issue is the lack of timely, quality data to ensure reviews can be undertaken close to the events enabling interventions to be rapidly implemented to reduce the risk of further deaths. A rapid reporting system using an electronic version of the APMAT is currently being implemented in Victoria to address this issue, and it is hoped that this can also be implemented in Queensland in the near future.

Some progress has been made recently to assist maternity services to undertake review of stillbirths, which includes a change to the *Hospital and Health Boards Regulation 2012* to specifically include stillbirth as a reportable event.

! Recommendation

That the Queensland Department of Health participate in a national public awareness campaign initiated by the Stillbirth Centre for Research Excellence on the importance of timely reporting of decreased fetal movements (DFM).

! Recommendation

That the PSANZ/Stillbirth CRE Guidelines on detection and management of women with fetal growth restriction (FGR) and detection and management of women with decreased fetal movements (DFM) be implemented by all maternity services and all staff encouraged to complete the FGR and DFM eLearning programs.

35 Ballestas T, on behalf of the Perinatal and Infant Mortality Committee of Western Australia 2014. The 14th Report of the Perinatal and Infant Mortality Committee of Western Australia for deaths in the triennium 2008-2010. Perth: Department of Health WA.

36 State of Victoria 2016. 2012 and 2013 Victoria's Mothers, Babies and Children Section 1: Findings and Recommendations. Melbourne: Department of Health and Human Services.

37 Draper ES, Kurinczuk JJ, Kenyon S. (Eds.) on behalf of MBRRACE-UK. MBRRACE-UK Perinatal Confidential Enquiry: Term, singleton, normally formed, antepartum stillbirth. Leicester: The Infant Mortality and Morbidity Studies, Department of Health Sciences, University of Leicester. 2015.

38 PMMRC 2017. Eleventh Annual Report of the Perinatal and Maternal Mortality Review Committee: Reporting mortality 2015. Wellington: Health Quality & Safety Commission.

39 www.sanda.psanz.com.au/clinical-practice/clinical-guidelines

40 Ibid.

Comprehensive clinical incident analysis following stillbirth

On 25 November 2016, an amendment initiated by Queensland Department of Health Patient Safety and Quality Improvement Service (PSQIS), to section 29 (1) of the *Hospital and Health Boards Regulation 2012* (the Regulation) was approved by the Governor in Council to include stillbirth as a reportable event. Prior to the amendment, stillbirth was not specifically listed as a 'reportable event' under section 29 of the Regulation which may be subject to a legally privileged Root Cause Analysis (RCA) under the *Hospital and Health Boards Act 2011* (the Act). While some prescribed 'reportable events' refer to the death of a 'person', the term 'person' is not defined in the Act or the Regulation. However, the *Acts Interpretation Act 1954* defines a 'person' as including an individual, which means a 'natural person' (section 36). As a stillborn baby is not born alive, it was argued that a stillbirth does not meet the usual meaning of a 'person' as a living being, and therefore does not meet the definition of a reportable event.

While not mandating action, the change to the Regulation allows Hospital and Health Services to conduct an RCA into stillbirths in a legally privileged environment, to determine whether there are any improvements that might reduce the risk of preventable stillbirths. RCAs do not have to be undertaken for all stillbirths as it is acknowledged that not all stillbirths are preventable. However, all stillbirths (and neonatal deaths) should be appropriately investigated and reviewed as part of high quality perinatal mortality audit at every maternity hospital. The Council has prepared a guidance document to assist Hospital and Health Service executives and clinicians in determining which stillbirths should be considered for comprehensive clinical incident analysis, for example, an RCA and/or other available forms of analysis. The guidance document has been provided to all Hospital and Health Services and can be found on the Council webpage www.health.qld.gov.au.



Factors associated with risk of perinatal mortality

There are many risk factors that increase the likelihood of stillbirth or neonatal death. Medical conditions and risk factors found in a recent multivariate⁴¹ analysis to contribute to an increased risk of stillbirths and/or neonatal death, are shown in Figure 12.

Figure 12: Risk factors associated with an increased risk of stillbirth and neonatal deaths, Queensland, 2007/08–2011/12

Perinatal risk factors and outcomes 2007/08–2011/12

Key findings of a multivariate analysis of the relationship between perinatal risk factors and adverse perinatal outcomes.

Risk ratios

The numbers given are adjusted risk ratios, which represent the chance of an event in a group exposed to a risk compared to a group not exposed to that risk. The risk ratios are adjusted to assume that other risk factors are the same between groups. For instance, if maternal diabetes has an adjusted risk ratio of 3.3 for preterm birth, women who have diabetes are 3.3 times as likely to have a

premature birth as women who do not, assuming that other risk factors (e.g. obesity) are constant between those groups. Risk ratios are shown only when significant at $p < .05$. Some risk factors with significant risk ratios are omitted from this document (e.g. low birth-weight for gestational age).

Maternal factors	Risk ratio		
	Stillbirth	Neonatal death	Preterm birth
Obesity			
The mother has a Body Mass Index (BMI) more than 30. ⁽¹⁾	1.5 x	1.3 x	
Overweight			
The mother has a Body Mass Index (BMI) between 25 and 29.99. ⁽¹⁾	1.3 x		
Underweight			
The mother has a Body Mass Index (BMI) less than 20. ⁽¹⁾			1.4 x
Diabetes			
The mother has been diagnosed with diabetes prior to current pregnancy.	2.0 x		3.3 x
Hypertension			
The mother has been diagnosed with hypertension prior to current pregnancy.			2.5 x
Indigenous status			
The mother identifies as Indigenous.			1.2 x
Previous stillbirth			
The mother has had a stillbirth prior to current pregnancy.			1.9 x

Pregnancy factors

Antepartum haemorrhage			
The mother has an antepartum (before birth) haemorrhage.	1.6 x	1.4 x	3.8 x
Insufficient antenatal visits			
The mother attends less than five antenatal visits during the pregnancy.	1.4 x	1.3 x	2.1 x
Pre-eclampsia			
The mother is diagnosed with pre-eclampsia.			4.6 x
Smoking			
The mother smokes after 20 weeks gestation.			1.4 x

(1) Compared to mothers with a Body Mass Index (BMI) in the healthy weight range (20 to 24.99).

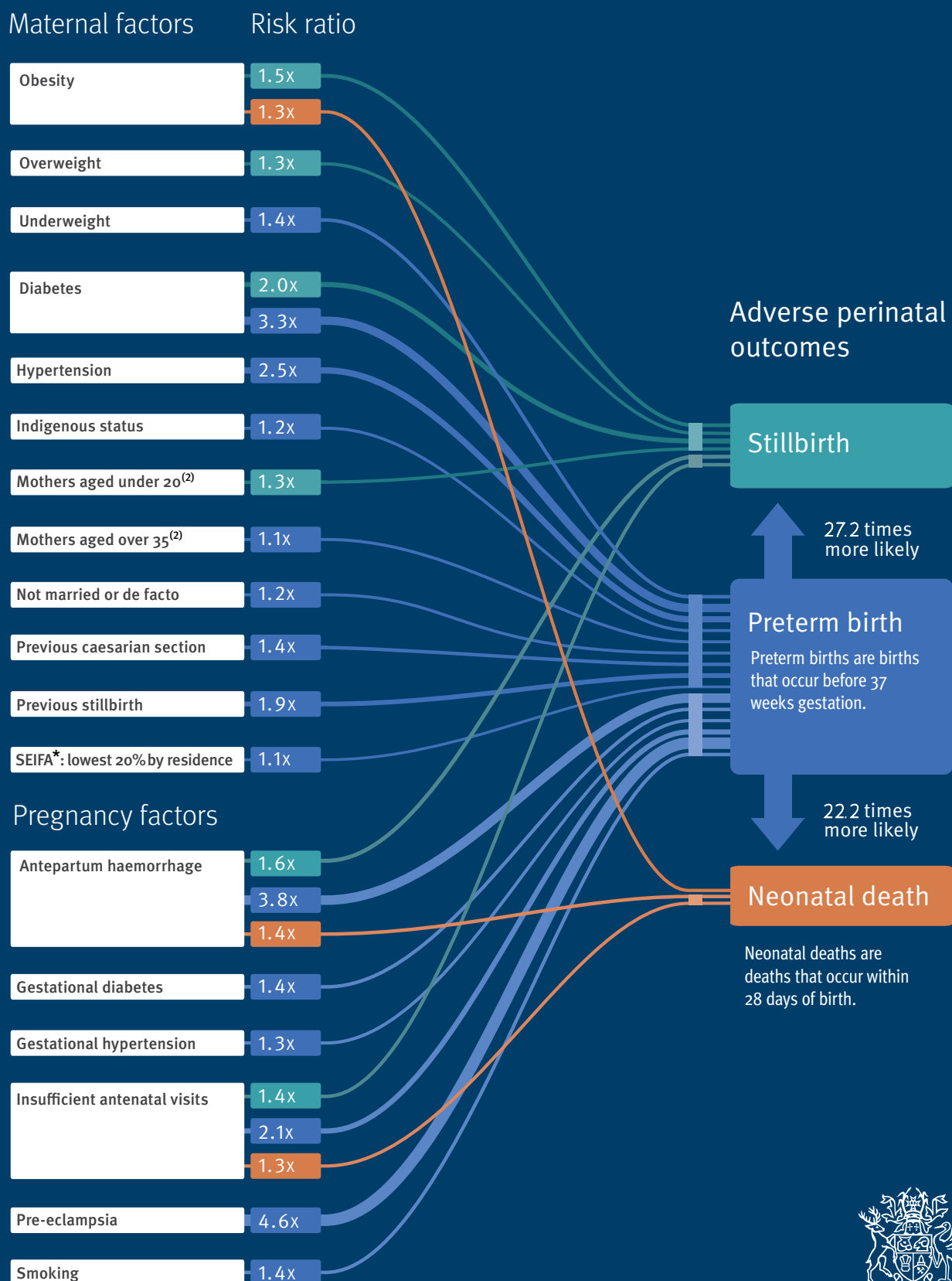
(2) Compared to women aged 20 to 34 years.

* Socio-Economic Indexes for Areas

Data Source: Perinatal Data Collection, Queensland Health, 2007/08–2011/12.

For full report see www.health.qld.gov.au/hsu/peri/indigenous-peridisparity.pdf created by the Health Statistics Branch in collaboration with the Queensland Maternal and Perinatal Quality Council and the Aboriginal and Torres Strait Islander Health Unit.

41 A multivariate approach to the disparity in perinatal outcomes between Indigenous and non-Indigenous women, Queensland. Utz M, Johnston T, Zarate D and Humphrey M. Health Statistics Branch, Queensland Health. 2014. www.health.qld.gov.au/hsu/peri/indigenous-peridisparity.pdf



An electronic version of this poster is available at www.health.qld.gov.au/hsu/peri/risk_chart.pdf



Certain groups have higher rates of perinatal deaths:

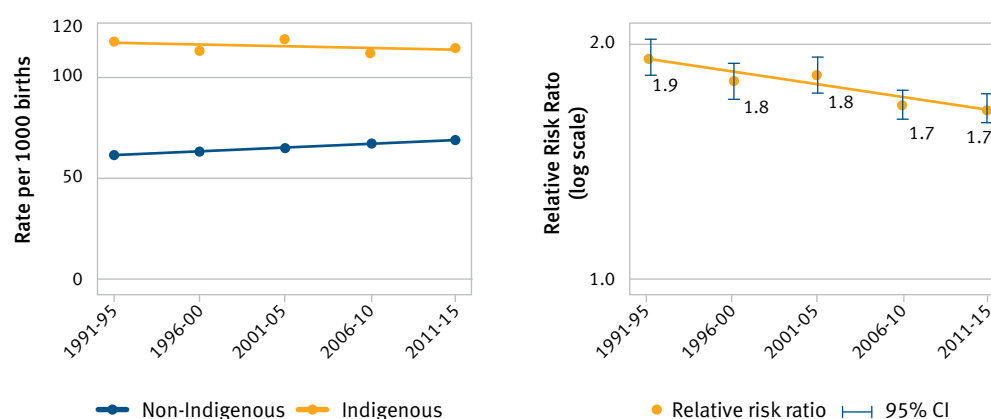
- Babies born to Indigenous mothers were 1.4 times as likely to die during the perinatal period compared to babies born to non-Indigenous mothers. This is largely due to the higher rates of preterm birth among babies of Indigenous mothers. Factors contributing to a higher risk of preterm births that are present at a higher rate among Indigenous mothers include smoking during pregnancy, poor social support, pre-existing diabetes, and attending a lower than recommended number of antenatal visits. Further details about the higher perinatal mortality rates among babies born to Indigenous women are described below, and in Statbite 64⁴².
- Twins and other multiples had a perinatal death rate that was 4.5 times that of singletons. Cause of death information (see below) suggests that this is largely related to the higher risk of preterm birth for multiple births, but is also due to some specific perinatal conditions such as twin-to-twin transfusion syndrome in monochorionic twins.
- Babies born to women who are very young (under 20 years) or 35 years and older also had a higher risk of perinatal death. Younger mothers have a higher risk of preterm birth and high rates of risk factors such as being underweight and smoking while older mothers have higher rates of babies born with congenital anomalies and higher rates of pregnancy complications and risk factors such as being overweight or obese (see maternal age section page 10 and www.health.qld.gov.au/__data/assets/pdf_file/0031/692860/statbite75.pdf)

Deaths of Aboriginal and Torres Strait Islander babies

In Queensland and nationally, stillbirths and neonatal deaths occur at a higher rate among babies born to Indigenous women than among babies born to non-Indigenous women; in Queensland in 2014 and 2015 stillbirths occur at 1.2 times the rate and neonatal deaths occur at 2.1 times the rate. There has been little change in the excess over the past decade⁴³.

In a recent report (Statbite 64)⁴² when death rates were explored within gestational age categories, a significant disparity in neonatal deaths between babies born to Indigenous women and babies born to non-Indigenous women was evident among babies born at term. The stillbirth rate was also higher among babies of Indigenous mothers who were born at term, though the difference was not significant in the most recent period examined (Statbite 64)⁴². The stillbirth and neonatal mortality rates for babies born at earlier gestations were not higher in babies born to Indigenous mothers. (Statbite 64)⁴² This suggests that the higher neonatal mortality rate in babies of Indigenous women is largely due to the higher rate of preterm births of babies of Indigenous mothers.

Figure 13: Trends in preterm (< 37 weeks gestation) birth rate and relative risk ratio, by Indigenous status of mother, Queensland, 1991-95 to 2011-15



42 Utz, M., Johnston, T., Zarate, D., 2015, Trends in stillbirths and neonatal deaths among babies born to Indigenous and non Indigenous women in Queensland, 1989-1993 to 2009-2013, Statbite #64, Health Statistics Branch, Queensland Health at www.health.qld.gov.au/__data/assets/pdf_file/0029/144677/statbite64.pdf

43 Utz, M., Johnston, T., Zarate, D., 2015, Trends in stillbirths and neonatal deaths among babies born to Indigenous and non Indigenous women in Queensland, 1989-1993 to 2009-2013, Statbite #64, Health Statistics Branch, Queensland Health at www.health.qld.gov.au/__data/assets/pdf_file/0029/144677/statbite64.pdf

A previous study examining stillbirths in Queensland attributed the higher rate of stillbirths at term for babies of Indigenous women to the higher rates of maternal diabetes, perinatal infection, fetal growth restriction and unexplained antepartum fetal death⁴⁴.

Overall, there has been a slight decrease over time in the gap in neonatal mortality rates for babies born at term, but the higher rate for babies of Indigenous women remains (Statbite 64). There has been little change over time in the proportion of Indigenous babies born pre-term (Figure 13) and the overall excess in neonatal mortality for babies of Indigenous women is unlikely to reduce until the excess in preterm births is addressed.

The Queensland Government provided \$3.0 million over the 2016–2018 years, through the *Making Tracks towards closing the gap in health outcomes for Indigenous Queenslanders by 2033: Investment Strategy 2015-2018*, to the Institute for Urban Indigenous Health for the expansion of the Birthing in Our Communities workforce increasing the number of midwives and Indigenous worker positions and the establishment of a Birthing in Our Communities Hub based in Salisbury, Brisbane which opened in October 2016.

Ministerial Taskforce on Perinatal and Infant Mortality Rates in Queensland

In August 2014, Queensland Department of Health was asked to establish a taskforce to prepare a report for the then Queensland Minister for Health. The request to establish the taskforce was in response to reports which showed that Queensland had a higher perinatal and infant mortality rate than most other Australian states and territories over a number of years. The purpose of the taskforce was to examine the causes and circumstances of Queensland's high perinatal and infant mortality rate and suggest appropriate policy and practice responses.

The Taskforce confirmed the following:

- a. Queensland does not have a higher overall perinatal mortality rate than other jurisdictions, but does have a higher neonatal mortality rate and lower stillbirth rate. The appearance of a higher perinatal mortality rate in Queensland is related to differences in legislative definitions of stillbirths and data collection practices across jurisdictions. More detail about this topic is available at www.health.qld.gov.au/__data/assets/pdf_file/0031/671584/info-sheet1.pdf
- b. It is not clear why Queensland has a higher neonatal mortality rate than Australia
- c. Limitations in the recording of cause of death on death certificates prevents a clear understanding of the reasons for any excess of infant deaths in Queensland.

While it is not clear why Queensland has a higher neonatal mortality rate than Australia, the taskforce noted that action should be taken to reduce any avoidable deaths. Consequently, the taskforce presented a range of findings and suggestions for future actions covering a variety of areas:

- improving data collection and reporting at state and national level
- enhancing the role of the QMPQC and the Queensland Paediatric Quality Council (QPQC)
- improving clinical and systemic review of perinatal and infant deaths
- supporting low volume maternity facilities
- enhancing clinical practice and strategies to address risk factors.

These future actions are designed to support better understanding of the causes of death and the positioning of system policy responses to address any emerging trends.



44 Ibiebele I, Coory M, Boyle F, Humphrey M, Vlack S, Flenady V. Stillbirth rates among indigenous and nonindigenous women in Queensland, Australia: is the gap closing? BJOG 2014;DOI: 10.1111/14 DOI: 10.1111/14 DOI: 10.1111/1471-0528.13047.

Causes of perinatal deaths

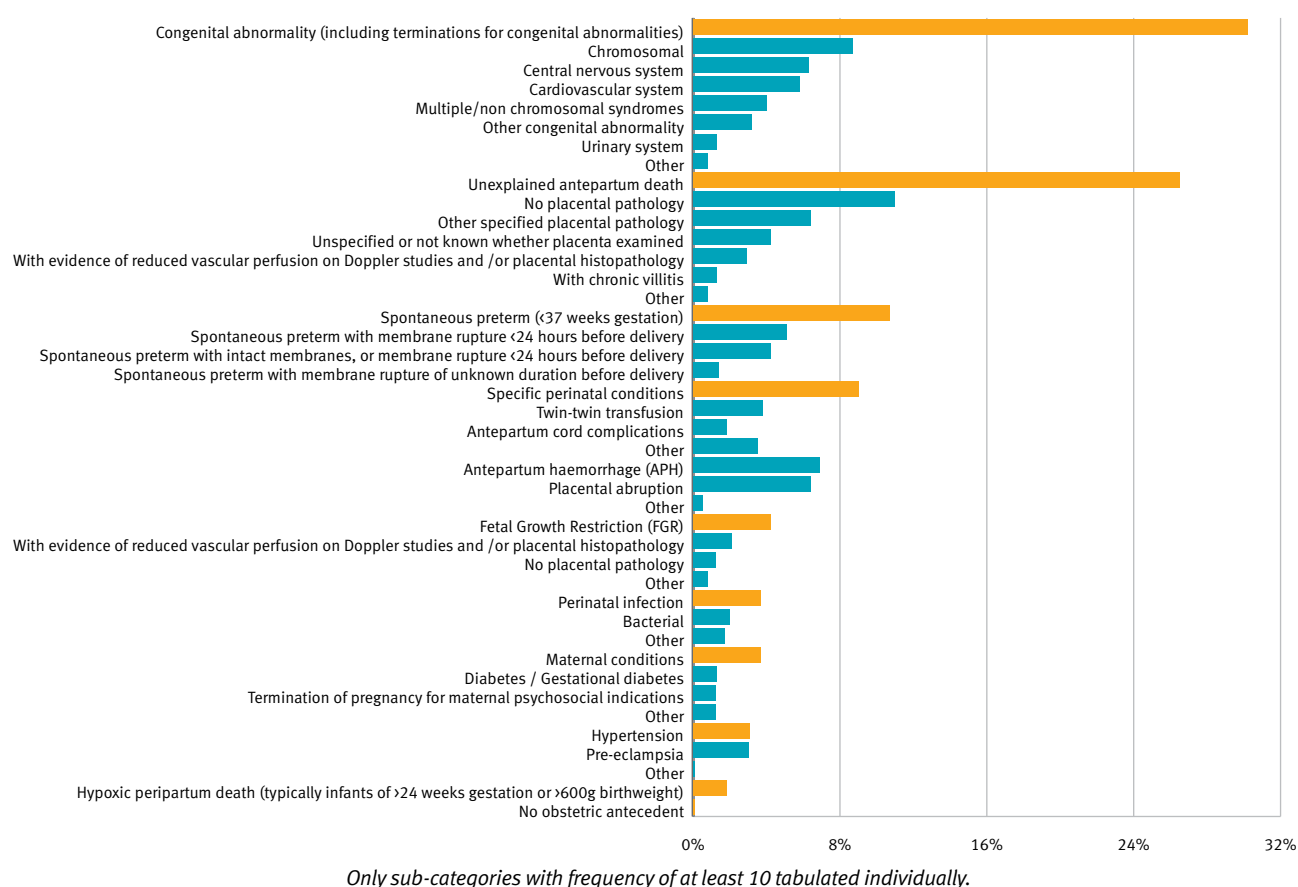
The Perinatal Society of Australia and New Zealand (PSANZ) perinatal mortality classification system was developed for use in Australia and New Zealand to use as part of the process of clinical audit of perinatal deaths. The classification system includes a Perinatal Death Classification (PSANZ-PDC) for classifying the main obstetric antecedent factor that led to the chain of events resulting in the stillbirth or neonatal death and a Neonatal Death Classification (NDC) for classifying the main condition in the neonatal period that caused the death. The PSANZ classifications are assigned by the Council's Perinatal Mortality Sub-Committee following consideration of all available clinical information for each perinatal death.

Figures 14 and 15 show the PSANZ-PDC causes of death for stillbirths and neonatal deaths. In 2014 and 2015, the leading cause of stillbirths was congenital abnormality, accounting for one-third of all stillbirths (including termination of pregnancy for major anomalies). This proportion is much higher than many international reports.⁴⁵ However, international comparisons are problematic due to differing definitions (including gestation age cut-off and whether terminations are excluded).⁴⁶

Approximately one quarter (26.5 per cent) of stillbirths were classified as unexplained. Up to 46 per cent of stillbirths that occurred at term gestations were unexplained. However, the proportion of stillbirths classified as unexplained is likely to be overestimated due to poor data quality. More than half of the unexplained deaths did not have placental histopathology results available. In over 10 per cent of these cases, assessment of other information suggested that some potentially causal placental pathology was present. Another major contributor to the high rate of unexplained causes of stillbirths is the very low autopsy rates. The PSANZ system is current being revised to improve the classification of placental pathology and unexplained stillbirth.

The leading PSANZ-PDC cause of neonatal deaths was spontaneous preterm birth, which led to complications in the neonatal period causing the death. Figure 16 shows the neonatal deaths by PSANZ-NDC classification as a proportion of all neonatal deaths.

Figure 14: Stillbirths by PSANZ-PDC classification as a proportion of all stillbirths, Queensland, 2014 and 2015



45 Flenady V, Wojcieszek AM, Middleton P, Ellwood D, Erwich J, Coory M, Khong TY, Silver RM, Smith G, Boyle FM, et al. Stillbirths: Recall to action in high-income countries. Lancet 2016; 387: 691–702 Published Online January 18, 2016 [http://dx.doi.org/10.1016/S0140-6736\(15\)01020-X](http://dx.doi.org/10.1016/S0140-6736(15)01020-X)

46 Ibid.

Figure 15: Neonatal deaths by PSANZ-PDC classification as a proportion of all neonatal deaths, Queensland, 2014 and 2015

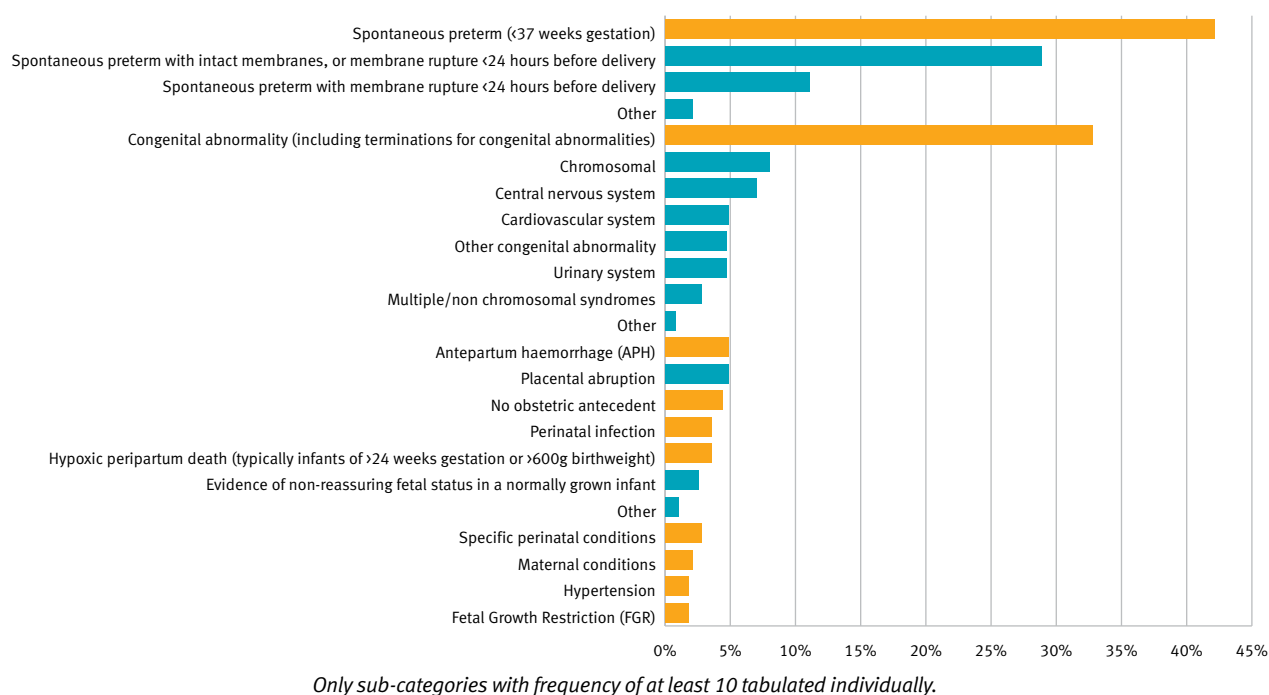
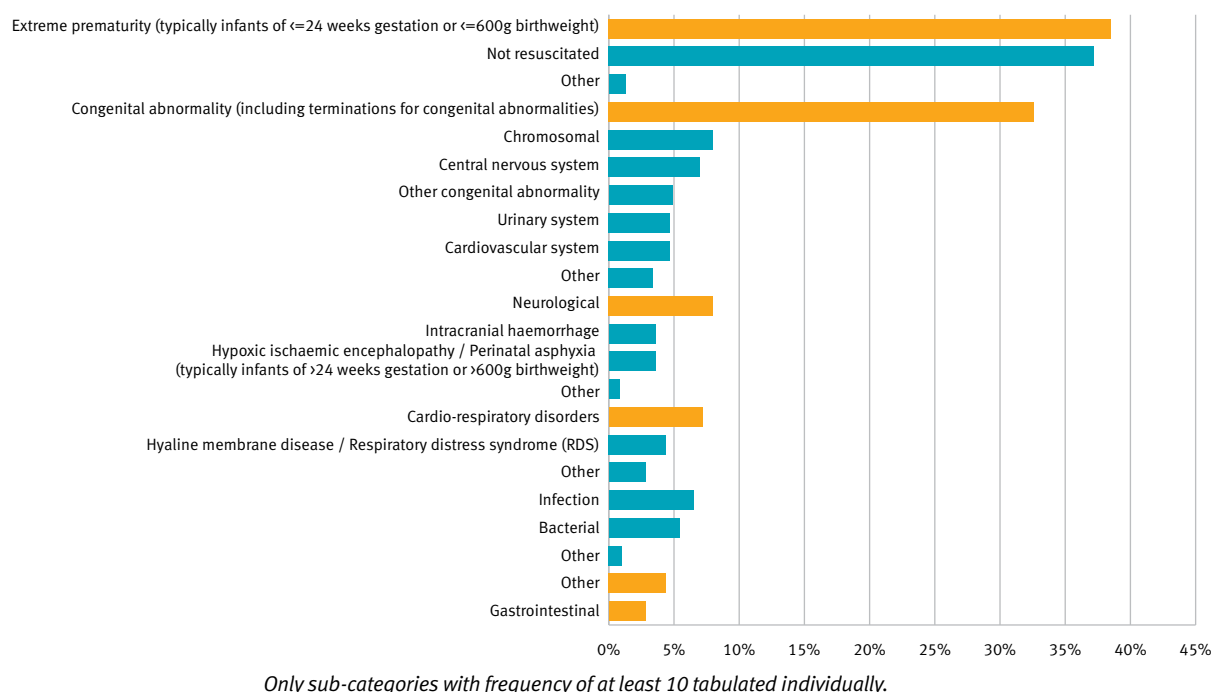


Figure 16: Neonatal deaths by PSANZ-NDC classification as a proportion of all neonatal deaths, Queensland, 2014 and 2015

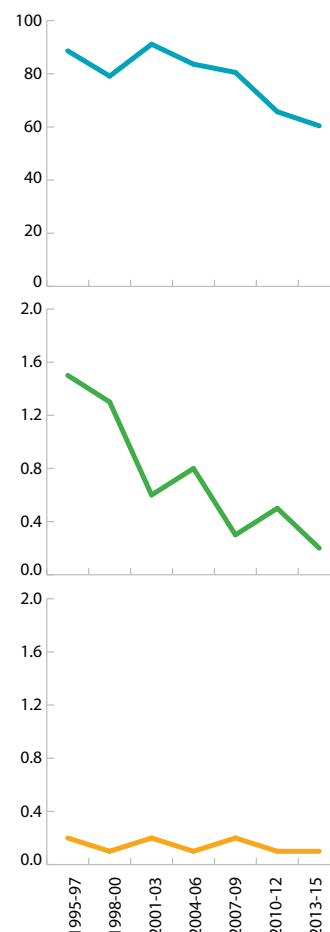


Causes of death vary by factors such as gestational age, maternal age, plurality and Indigenous status. An interactive list of PSANZ causes of death by these factors is available at www.health.qld.gov.au/hsu/dashboards/psanz.xlsm

While the majority of stillbirths are due to antepartum fetal death, attention to intrapartum deaths is important due to the potential for prevention particularly in late gestation. Trends in intrapartum deaths (excluding terminations of pregnancy and congenital anomalies) over the period 1995 to 2015 (by triennia) show a steady decline from 0.9/1000 to 0.5/1000 births with the largest reduction seen for stillbirths 29-36 weeks with a reduction from 1.5/1000 in the period 1995-97 to 0.2/1000 births in 2013-15. The rate of intrapartum stillbirths at term is currently 0.1/1000 births.

Table 16: Rate of intrapartum death, excluding terminations of pregnancy and babies with congenital anomalies), by triennia and gestational age, Queensland, 1995-97 to 2013-15

Gestation weeks	Years	Intrapartum deaths	Births	Rate (per 1,000 births)
20-28	1995-97	80	903	88.6
	1998-00	82	1,037	79.1
	2001-03	97	1,065	91.1
	2004-06	97	1,160	83.6
	2007-09	98	1,217	80.5
	2010-12	82	1,249	65.7
	2013-15	70	1,159	60.4
29-36	1995-97	15	9,773	1.5
	1998-00	13	10,039	1.3
	2001-03	6	10,810	0.6
	2004-06	10	12,443	0.8
	2007-09	4	13,822	0.3
	2010-12	7	14,447	0.5
	2013-15	3	14,852	0.2
37+	1995-97	31	132,862	0.2
	1998-00	17	134,105	0.1
	2001-03	23	136,434	0.2
	2004-06	14	148,209	0.1
	2007-09	26	167,406	0.2
	2010-12	16	170,905	0.1
	2013-15	18	171,582	0.1



Excludes babies born at less than 20 gestation weeks, babies with unknown gestation weeks, and babies who died prior to commencement of birth.

Intrapartum deaths are deaths of babies whose heart beat ceased during labour but before birth, as recorded in the heartbeat field in the Perinatal Data Collection.

Terminations of pregnancy/congenital anomalies are defined by at least one of the following:

A PSANZ Perinatal Death Classification (PSANZ-PDC) category 1 (Congenital anomalies, including terminations for congenital anomalies) recorded for the baby.

- An ICD-10-AM code of P96.4 (termination of pregnancy, affecting fetus and newborn) recorded as a cause of death for the baby.
- An ICD-9-CM code of 779.6 (termination of pregnancy [fetus]) recorded as a cause of death for the baby.
- Where the baby was a singleton, an ICD-10-AM code of 004 (medical abortion) recorded for the mother.
- Where the baby was a singleton, an ICD-9-CM code of 635 (legally induced abortion) recorded for the mother.

The coding of terminations of pregnancy has not been individually checked prior to 2005.

Terminations of pregnancy prior to 2005 should be interpreted with caution.

Investigating the causes of stillbirths and neonatal deaths

As Queensland Health does not collect data on other investigations for stillbirths and neonatal deaths, it is not possible to comment on the quality of investigation currently undertaken. However, low autopsy rates indicate there is much room for improvement.

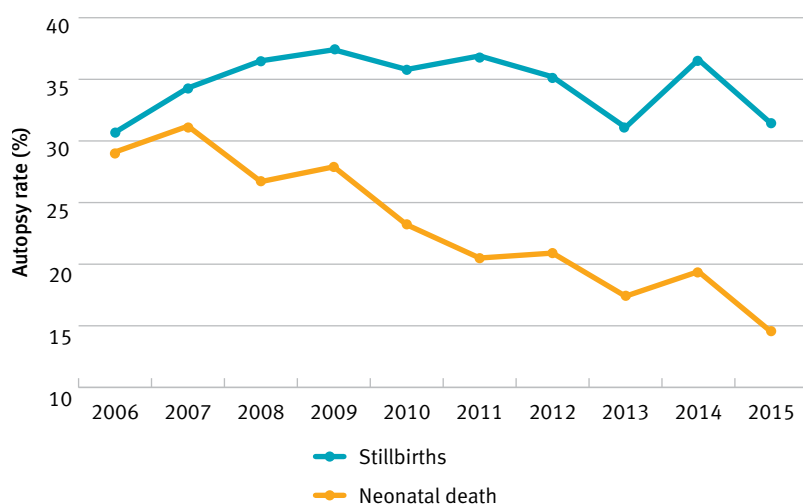
There is no legal requirement in Queensland to perform an autopsy in all cases of stillbirth and neonatal death. Approximately one third of stillborn babies had an autopsy in 2014 and 2015 (34.0 per cent). The autopsy rate for stillbirths has remained relatively constant over the past decade. The rate of neonatal death autopsy in 2014 and 2015 was much lower at only 17.1 per cent and the rate has consistently declined over the past decade (Figure 17). Higher autopsy rates are achieved in some Australian States and Territories – the neonatal death autopsy rate is 66 per cent in Western Australia and 56 per cent in the Australian Capital Territory.⁴⁷

Low perinatal autopsy rates are a concern internationally, and have been attributed to a range of reasons including: lack of appropriately skilled pathologists; poor staff knowledge and confidence and negative attitudes about the value of autopsy; parents' difficulty in making the decision at a time of intense grief⁴⁸; controversy over past practices of organ retention and complex consent requirements. Parents need clear and consistent information delivered in a timely and sensitive manner to enable informed decision-making. Counselling parents about the option of an autopsy should be carried out by a senior health care professional with a detailed understanding about the procedure.

The PSANZ bi-national guidelines on perinatal mortality⁴⁹ recommends core investigations for both stillbirths and neonatal deaths. The Queensland Clinical Guidelines has adopted the guideline for stillbirth investigation.⁵⁰ IMPROVE⁵¹ is an interactive skills based educational program for doctors and midwives aimed at increasing the uptake of best practice in investigating and reporting of causes of perinatal deaths and is available to all maternity hospitals (see Appendix E).

The PSANZ Guideline recommendations⁵² aligns with the recent WHO Guidelines⁵³ recommending that all maternity services implement high quality perinatal mortality audit including classification and consideration of substandard care factors for every stillbirth and neonatal death.

Figure 17: Stillbirths and neonatal deaths autopsy rates, Queensland, 2006 to 2015



! Recommendation

That all maternity hospitals have effective systems in place to ensure all stillbirths and neonatal deaths are appropriately investigated, reviewed, classified and reported to the Queensland Department of Health according to the PSANZ national guidelines.

! Recommendation

That the option of a high quality autopsy examination be offered to all parents following a perinatal death, with counselling on the procedure provided by a senior clinician.

! Recommendation

That in addition to the offer of autopsy, as a minimum for all stillbirths, a comprehensive maternal and pregnancy history plus placental histopathology; testing for feto-maternal haemorrhage; cytogenetics, molecular and other investigations as indicated according to the PSANZ Guidelines, be performed.

47 AIHW: Hilder L, Li Z, Zeki R & Sullivan EA 2014. Stillbirths in Australia, 1991–2009. Perinatal statistics series no. 29. Cat. no. PER 63. Canberra: AIHW National Perinatal Epidemiology and Statistics Unit.

48 Flenady V, Wojcieszek AM, Middleton P, Ellwood D, Erwich J, Coory M, Khong TY, Silver RM, Smith G, Boyle FM, et al. Stillbirths: Recall to action in high-income countries. *Lancet* 2016; 387: 691–702 Published Online January 18, 2016 [http://dx.doi.org/10.1016/S0140-6736\(15\)01020-X](http://dx.doi.org/10.1016/S0140-6736(15)01020-X)

49 www.sanda.psanz.com.au/clinical-practice/clinical-guidelines

50 www.health.qld.gov.au/qcg/publications#maternity

51 Gardiner P, Kent A, Flenady V et al. IMPROVING Perinatal Mortality Review and Outcomes Via Education; An educational program for health care professionals on best practice around the time of a perinatal death. *BMC Pregnancy Childbirth*. 2016 Nov 25;16(1):376.

52 www.sanda.psanz.com.au/clinical-practice/clinical-guidelines

53 www.who.int/maternal_child_adolescent/documents/stillbirth-neonatal-death-review/en

Centre of Research Excellence in Stillbirth

The NHMRC Centre of Research Excellence in Stillbirth (Stillbirth CRE) has been established to address the problem of stillbirth in Australia. Specifically, the Stillbirth CRE recognises that stillbirth has enormous economic and psychosocial impacts; that there has been virtually no reduction in rates for over 20 years; that large equity gaps exist; and that families whose child is stillborn often receive substandard care. As many conditions leading to stillbirth and also interventions to prevent stillbirth may also lead to adverse outcomes for mothers and newborns, the Stillbirth CRE will also incorporate research into relevant outcomes for mothers and newborns. It will systematically address the Lancet 2016 series⁵⁴ calls to action and the specific priorities identified for Australia across the following areas:



1. Addressing priorities across four major program areas:
 - a. risk factors for stillbirth; developing and implementing best practice in care of women at or near term
 - b. novel methods for risk prediction; markers/interventions for women at risk
 - c. best care after stillbirth; improving care after stillbirth and in subsequent pregnancies
 - d. understanding the causes; improving data quality through investigation, audit and classification.
2. Raising public awareness – the Stillbirth CRE aims to increase understanding and prevention awareness in the community through a national public awareness program.
3. Building the health and medical workforce – Stillbirth CRE pathways provide students and future leaders unique opportunities to interact and work closely with senior researchers and clinicians nationally and internationally while forming new collaborations across a range of government and community organisations.
4. Building collaborations – the Stillbirth CRE is a virtual centre made up of partner organisations sharing a common vision. A strong national collaboration with a unified voice for stillbirth action across Australia is the only means by which we can effectively address stillbirth. Strong links internationally through the International Stillbirth Alliance will serve to ensure a high quality program which contributes to reducing the global burden of stillbirths.

The Council will collaborate with the Stillbirth CRE in promoting best practice and raising community awareness in prevention of stillbirth and care for families whose child is stillborn.

54 Flenady V, Wojcieszek AM, Middleton P, Ellwood D, Erwich J, Coory M, Khong TY, Silver RM, Smith G, Boyle FM, et al. Stillbirths: Recall to action in high-income countries. *Lancet* 2016; 387: 691–702 Published Online January 18, 2016 [http://dx.doi.org/10.1016/S0140-6736\(15\)01020-X](http://dx.doi.org/10.1016/S0140-6736(15)01020-X)

Appendix A

Data sources used in this report

This report is based on the:

- Queensland Perinatal Data Collection
- Queensland Hospital Admitted Patient Data Collection
- Queensland Death Registrations
- Master Linkage File data

It relates primarily to the two calendar years 2014 and 2015. Trend analysis is based on data for a 10 year period (from 2006), unless otherwise noted. Data are accurate at time of publication, although subsequent changes to the perinatal data collection may occur.

Appendix B

SAMM definitions

SAMM Indicator	Definition
Acute renal failure (acute kidney injury)	Acute kidney injury (AKI) is a sudden reduction in renal function resulting in accumulation of waste products of metabolism, retention of sodium and water and acid-base disturbances. The clear criterion for AKI in pregnancy is the need for dialysis and/or renal replacement therapy.
Amniotic fluid embolus requiring transfusion and/or admission to Intensive Care Unit (ICU)	Amniotic fluid embolus is defined as the presence of one or more of the following (in the absence of any other potential explanation for such signs and symptoms), during pregnancy, though usually associated with labour, or within 48 hours of birth: acute hypotension; cardiac arrest; acute hypoxia; severe haemorrhage; coagulopathy.
Attempted suicide / self-harm	The attempted suicide or self-harm by a woman during pregnancy, labour, birth or within 42 days following birth with or without an existing mental health diagnosis at the time of self-harm. The time frame is extended to 12 months following the birth if the event is seen to be related to the childbirth episode.
Eclampsia	Eclampsia is the occurrence of seizures, not caused by any coincidental neurological disease such as epilepsy, in a woman whose condition also meets the diagnostic criteria for pre-eclampsia. Seizures may occur antenatally, intrapartum or postnatally, usually within 24 hours of birth but occasionally later.
Massive obstetric haemorrhage	Bleeding originating from the genital tract during pregnancy or postpartum associated with one or more of the following: i) transfusion of five or more units of red blood cells within 24 hours; ii) $\geq 2500\text{mL}$ blood loss; iii) where a haemoglobin has been measured in the previous seven days and the results are readily available, a decrease $\geq 5\text{g/dL}$.
Massive primary postpartum haemorrhage	Postpartum bleeding originating from the genital tract associated with one or more of the three criteria listed above.
Peripartum cardiomyopathy	The management in an ICU or Coronary Care Unit, of a woman newly diagnosed with peripartum cardiomyopathy. Peripartum cardiomyopathy is an idiopathic cardiomyopathy presenting with heart failure secondary to left ventricular systolic dysfunction towards the end of pregnancy, or in the months following birth, where no other cause for heart failure is identified.
Peripartum hysterectomy	Unplanned peripartum hysterectomy is defined as life-saving emergency surgery to remove the uterus after the birth and up to 42 days postpartum. This indicator excludes women who undergo a hysterectomy for non-obstetric reasons, e.g. cancer of the cervix or for fertility control.
Pre-eclampsia	The management in an ICU of a woman diagnosed with severe pre-eclampsia. Pre-eclampsia is classified as severe when any of the following is present: i) substantial maternal organ dysfunction superimposed upon a diagnosis of pre-eclampsia; ii) severe hypertension, defined as a systolic blood pressure of ≥ 170 and/or diastolic blood pressure of $\geq 110\text{mmHg}$; iii) difficulty in controlling blood pressure and deteriorating clinical condition including HELLP syndrome, impending eclampsia, worsening thrombocytopenia or worsening fetal growth restriction.

Severe de novo cerebral event	De novo cerebral event experienced during pregnancy, labour, birth or within 42 days following birth excluding eclampsia or pre-existing conditions such as epilepsy. Cerebral events or neurological complications include conditions such as acute ischaemic stroke, intracerebral and subarachnoid haemorrhage, and cerebral venous sinus thrombosis.
Severe pulmonary oedema	The ventilation of, and/or management in an ICU, of a woman diagnosed with severe pulmonary oedema.
Severe sepsis	Severe sepsis is the systemic response to an infection manifested by organ dysfunction, hypoperfusion or hypotension combined with one or more of the following: fever, tachypnoea, elevated white cell count; suffered during pregnancy, labour, birth, or within 42 days following birth requiring admission to ICU/CCU and/or an extended hospital admission following the birth episode > 14 days.
Uterine rupture	Uterine rupture is a disruption of the uterine muscle extending to and involving the uterine serosa, and/or the bladder or the broad ligament. Such rupture may occur with or without extrusion of any portion of the fetal-placental unit. This indicator excludes women who experience extensions of uterine incisions or uterine dehiscence, including maternal or fetal sequelae.

Appendix C

Screening tests

In the first trimester these screening tests should be considered:

- combined first trimester screening (CFTS), performed at 11+0 to 13+6 weeks by incorporating maternal age, ultrasound measurement of the fetal nuchal translucency, and maternal serum markers levels to generate an overall figure for the likelihood of trisomy 21, 13 and 18
- cell-free DNA (cfDNA) screening using maternal plasma can be performed reliably from ten weeks. This has the highest sensitivity and specificity of all the screening tests for Down syndrome. However, cfDNA testing is currently more expensive than CFTS and must be self-funded (currently there is no Medicare or private insurance rebate). This direct cost currently poses a significant barrier to accessibility and widespread clinical implementation.

There are some advantages of cfDNA testing over current screening tests:

- The improved sensitivity of cfDNA testing (> 99 per cent for Trisomy 21) offers better detection of affected pregnancies than any current screening method. CFTS, the current standard of care, has a sensitivity of approximately 90 per cent.
- The most immediate clinical utility of cfDNA testing stems from its very low false positive rate (< 0.5 per cent) for Trisomy 21. This is vastly superior to the screen positive rate of other methods such as CFTS (3-5 per cent). When used in women identified as having an increased probability by a primary screening method, it has great potential to reduce invasive testing and thus procedure-related miscarriages.
- cfDNA testing also has a larger gestational age window for performance, being available from ten weeks gestation with no upper limit. Serum biochemistry screening and first trimester ultrasound screening all have narrow windows for testing.
- cfDNA testing does not require trained personnel to perform the test unlike the CFTS where regular NT training and audit is required on a yearly basis.

Potential models for the implementation of cfDNA testing are:

1. cfDNA testing as the primary screening test for women with an increased probability based on history or maternal age. This would be expected to reduce the numbers of invasive tests performed for advanced maternal age alone.
2. cfDNA testing as a primary screening tool in the general population. This approach could potentially increase the overall detection of trisomy 21 while reducing invasive testing rates.
3. cfDNA testing as a secondary 'advanced' screening test:
 - a) cfDNA testing as follow-up test in women with an increased probability after a first or second trimester screening test. Women with a high probability of aneuploidy who then go on to have a negative cfDNA test result would be expected to decline invasive testing. With this approach, the overall detection of Down syndrome would remain unchanged from that of the primary screening test, but invasive testing would be reduced.
 - b) cfDNA testing in combination with CFTS in a contingent manner. This involves using CFTS as the primary screening modality to place women into three groups:
 - i. Those with the highest probability of aneuploidy would be offered invasive testing directly.
 - ii. Those with an intermediate probability of aneuploidy would be offered cfDNA testing, invasive testing, or no testing.
 - iii. Those with the lowest probability of aneuploidy would have no further testing. The optimum thresholds for each group may vary according to local factors, but proposed reported risk thresholds include > 1 in 10-50 (to > 1 in 50) for the highest category and < 1 in 1000 for the lowest category. 15 per cent of the total screened population would fall into the intermediate category between these two cut-offs.

Advantages of using potential model 2

This increases access and availability to all pregnant mothers especially in the rural and remote areas. The need for trained personnel to visit the remote areas and having a gestational age cut off, limits pregnant mothers accessing CFTS. Moreover there is a cost for having the CFTS done in private sector. Very few public hospitals provide CFTS.

Having cfDNA done as part of routine antenatal bloods would be very acceptable to most pregnant mothers. This model may work very well in a geographically large state such as Queensland.

Appendix D

Membership of the Queensland Maternal and Perinatal Quality Council, 2016-17

Membership	Position
Professor David Ellwood (Chair)	Dean of Medicine and Head of School, School of Medicine, Griffith University. Professor of Obstetrics and Gynaecology, Gold Coast University Hospital
Professor Paul Colditz	Professor, Perinatal Medicine, University of Qld, Visiting Medical Officer, Neonatology, Royal Brisbane and Women's Hospital, Metro North Hospital and Health Service
Professor Vicki Flenady	Director, Centre of Research Excellence in Stillbirth, Mater Research Institute – The University of Queensland
Associate Professor Timothy Donovan	Neonatologist, Royal Brisbane and Women's Hospital, Metro North Hospital and Health Service
Joanne Ellerington	Principal Data Collections Officer, Statistical Services Branch, Queensland Health
Dr Trisha Johnston	Director, Statistical Analysis and Linkage Unit, Statistical Services Branch, Queensland Health
Associate Professor Kassam Mahomed (Jan 2016 to May 2017)	Senior Medical Officer, Obstetrician, Ipswich Hospital, West Moreton Hospital and Health Service
Professor Leonie Callaway (June – Dec 2017)	Senior Specialist, Obstetric and Internal Medicine, Royal Brisbane and Women's Hospital, Metro North Hospital and Health Service
Associate Professor Ted Weaver (Deputy Chair)	Senior Medical Officer, Obstetrics and Gynaecology, Nambour Hospital, Sunshine Coast Hospital and Health Service
Dr Nikki Whelan	Consultant Obstetrician and Gynaecologist
Dr Diane Payton	Anatomical Pathologist, Pathology Queensland
Dr Simon Maffey	Deputy Director, Obstetric Anaesthesia, Department of Anaesthesia, Mater Health Services, Brisbane
Dr Helen Barrett	Staff Specialist, Royal Brisbane and Women's Hospital, Metro North Hospital and Health Service. Obstetric Physician and Endocrinologist
Dr Paul Bretz	Director, Obstetrics and Gynaecology, Mater Health
Anne Bousfield	Clinical Midwifery Consultant, Roma Hospital, South West Hospital and Health Service
Pauline McGrath	Senior Genetic Counsellor, Genetic Health Queensland
Libby Morton	Program Manager, Queensland Centre for Perinatal and Infant Mental Health, Child and Youth Mental Health Service, Children's Health Queensland
Dr Ellen Whittaker	Private Hospitals Association of Queensland representative, Director of Clinical Services, North West Private Hospital, Brisbane
Dr Nathan Milne	Forensic Pathologist, Forensic and Scientific Services, Health Support Queensland
Andrea World	Consumer Representative, Queensland President, Maternity Choices Australia
Dr Anthony Brown	Rural Generalist with advanced skill in Obstetrics, Director, Medical Services, Torres & Cape Hospital & Health Service
Tonya Gibb	Neonatal Educator, Practice Development Team, Sunshine Coast Hospital and Health Service
Melanie McKenzie	Consumer Representative, Director and Founder of Harrison's Little Wings
Vacant	Aboriginal and Torres Strait Islander Health Worker
Associate Professor Rebecca Kimble	ex-officio as Chair, Statewide Maternity and Neonatal Clinical Network
Associate Professor Julie McEniery	ex-officio as Chair, Qld Paediatric Quality Council
Andrea Chitakis	Co-ordinator and Secretariat

Perinatal Mortality Sub-Committee

Membership	
Professor Vicki Flenady (Co-Chair)	Director, Centre of Research Excellence in Stillbirth, Mater Research Institute – The University of Queensland
Dr Nikki Whelan	Consultant Obstetrician Gynaecologist
Joanne Ellerington	Principal Data Collections Officer, Statistical Services Branch, Queensland Health
Anne Bousfield	Clinical Midwifery Consultant, Roma Hospital, South West Hospital and Health Service
Deb Birthisel	Clinical Midwife, Birth Suite, Royal Brisbane and Women's Hospital, Metro North Hospital and Health Service
Paul Conaghan	P/T Senior Staff Specialist, Obstetrics, Mater Health Services
Alicia Hyland	Clinical Midwifery Consultant, Birthing Services, Royal Brisbane and Women's Hospital, Metro North Hospital and Health Service
Victoria Cluff	Clinical Midwifery Consultant/Educator, Torres and Cape Hospital and Health Service
Associate Professor Kassam Mahomed (18 mths)	Senior Staff Specialist, Ipswich Hospital, West Moreton Hospital and Health Service
Dr Diane Payton	Staff Anatomical Pathologist, Pathology Queensland, Health Support Queensland
Teresa Walsh	Caseload Midwife
Associate Professor Helen Liley	Senior Staff Specialist, Neonatology, Mater Health Services
Professor David Ellwood (Co-Chair)	Dean of Medicine and Head of School, School of Medicine, Griffith University. Professor of Obstetrics and Gynaecology, Gold Coast University Hospital
Melanie McKenzie	Consumer Representative, Director and Founder of Harrison's Little Wings
Tonya Gibbs	Neonatal Educator, Practice Development Team, Sunshine Coast Hospital and Health Service
Dr Trisha Johnston	Director, Statistical Analysis and Linkage Unit, Statistical Services Branch, Queensland Health
Dr Johanna Laporte	Maternal Fetal Medicine Specialist, Royal Brisbane and Women's Hospital, Metro North Hospital and Health Service
Professor Sailesh Kumar	Maternal Fetal Medicine Specialist, Mater Health Services

Maternal Mortality Sub-Committee

Membership	Position
Dr Nikki Whelan (Chair)	Private Consultant Obstetrician & Gynaecologist
Professor Leonie Callaway	Senior Specialist, Obstetric and Internal Medicine, Royal Brisbane and Women's Hospital, Metro North Hospital and Health Service
Maree Reynolds	Director, Women's Health and Newborn Services, Mater Health Services
Libby Morton	Program Manager, Queensland Centre for Perinatal and Infant Mental Health, Children's Health Queensland
Associate Professor Ted Weaver	Senior Medical Officer, Obstetrics and Gynaecology, Nambour Hospital, Sunshine Coast Hospital and Health Service
Dr Simon Maffey	Deputy Director, Obstetric Anaesthesia, Department of Anaesthesia, Mater Health Services
Dr William Parsonage	Staff Specialist, Cardiology, Royal Brisbane and Women's Hospital, Metro North Hospital and Health Service
Anne Bousfield	Clinical Midwifery Consultant, Roma Hospital, South West Hospital and Health Service
Dr Rebecca Williams/Dr Nathan Milne	Forensic Pathologist, Forensic and Scientific Services, Health Support Queensland
Dr Susan Roberts	Psychiatrist (Perinatal & Women's Mental Health), Gold Coast University Hospital, Gold Coast Hospital and Health Service
Dr Helen Barrett	Staff Specialist, Obstetric Physician and Endocrinologist, Royal Brisbane and Women's Hospital

Congenital Anomaly Sub-Committee

Membership	Position
Professor Paul Colditz (Chair)	Professor, Perinatal Medicine, University of Queensland
Dr Paul Bretz	Director, Obstetrics and Gynaecology, Mater Health Services
Dr Gregory Duncombe	Co-Director, Qld Ultrasound for Women, Sen Staff Spec, Maternal Fetal Medicine, Royal Brisbane and Women's Hospital, Metro North Hospital and Health Service
Dr Diane Payton	Staff Anatomical Pathologist, Pathology Queensland, Health Support Queensland
Associate Professor Timothy Donovan	Neonatologist, Royal Brisbane and Women's Hospital, Metro North Hospital and Health Service
Associate Professor Julie McGaughran	Director, Genetic Health Queensland
Joanne Ellerington	Principal Data Collections Officer, Statistical Services Branch, Queensland Health
Dr Renuka Sekar	Clinical Lead, Maternal and Fetal Medicine, Royal Brisbane and Women's Hospital, Metro North Hospital and Health Service
Dr Trisha Johnston	Director, Statistical Analysis and Linkage Unit, Statistical Services Branch, Queensland Health
Melanie McKenzie	Consumer representative, Director and Founder of Harrison's Little Wings
Pauline McGrath	Senior Genetic Counsellor, Genetic Health Queensland

Appendix E

IMPROVE Program

The Perinatal Society of Australia and New Zealand (PSANZ) has developed Clinical Practice Guidelines for Perinatal Mortality to improve standards in clinical practice around the time of a perinatal death and partners with the Stillbirth CRE to maintain and disseminate the guidelines. The IMPROVE (IMproving Perinatal Review and Outcomes via Education) program has been developed for maternity health care professionals to enhance the uptake of these guidelines. IMPROVE utilises the Structured, Clinical, Objective, Referenced, Problem-orientated, Integrated and Organised (SCORPIO) educational model designed for skills training which involves small groups of learners rotating around six interactive learning stations that are each facilitated by an experienced educator.

IMPROVE involves: 1) a short introductory lecture; 2) six learning stations; and 3) formative assessment. Workshops are five hours in duration and are delivered by trained educators.

The learning stations:

1. Communicating with parents about perinatal autopsy
2. Autopsy and placental examination
3. Investigation of perinatal deaths
4. Examination of babies who die in the perinatal period
5. Audit and classification of perinatal deaths
6. Psychological and social aspects of perinatal bereavement

Who should attend?

The workshops are designed for health care professionals including obstetricians, midwives, neonatal nurses, neonatologists, pathologists, bereavement specialists, social workers, or those interested from a policy or public health perspective. IMPROVE workshops provide an opportunity for participants to understand the PSANZ Perinatal Mortality Guidelines in an interactive way.

IMPROVE program materials

A booklet of program materials is provided for each participant covering key aspects of the PSANZ Guidelines and other relevant documentation specific to that region. A certificate of completion is provided at the end of the IMPROVE program. This activity is endorsed with four MidPlus points from the Australian College of Midwives. Eligible fellows of RANZCOG can claim five CPD points in the Clinical Expertise domain.

Queensland IMPROVE

To date IMPROVE has trained over 1200 health care professionals across Australia and New Zealand. In Queensland, the IMPROVE Program is overseen by the Perinatal Mortality Sub Committee of the Council. Non recurrent funding has been made available through the Queensland Department of Health, Patient Safety and Quality Improvement Service to assist in the ongoing delivery of this Program across Queensland and the development of an accompanying eLearning program.

For further information contact Vicki Flenady, vicki.flenady@mater.uq.edu.au.

To arrange an IMPROVE workshop please contact the IMPROVE Coordinator:

Sarah Henry, MRI-UQ, Telephone: 07 3163 2463 Email: sarah.henry@mater.uq.edu.au

56 Gardiner P, Kent A, Flenady V et al. IMproving Perinatal Mortality Review and Outcomes Via Education; An educational program for health care professionals on best practice around the time of a perinatal death. BMC Pregnancy Childbirth. 2016 Nov 25;16(1):376.

Appendix F

Statewide Maternity and Neonatal Clinical Network and Queensland Clinical Guidelines

The Council consults 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 primary objective of the Queensland Clinical Guidelines (QCG), established by Queensland clinicians and working also in close partnership with both the SMNCN and the Council, is to provide clinical guidance informed by contemporary evidence.

QCG has an effective program of developing maternal and neonatal clinical guidelines with further work progressing on implementation and evaluation of health outcomes and healthcare research. Currently it has 17 maternity and 12 neonatal guidelines, and two operational frameworks.

Each guideline is accompanied by implementation resources, including a guideline supplement, education presentation, videoconference recording, knowledge assessment and consumer information. The guidelines and resources are a valuable support to the Council in improving the safety and quality of maternity and neonatal care in Queensland.

On average, one QCG resource is downloaded every four minutes and more than 8,000 knowledge assessments were completed in the last financial year, making QCG the most visited clinical website in Queensland Health.

Appendix G

Table of outcomes from 2015 Report

Queensland Maternal and Perinatal Quality Council – 2015 Report – Action Plan		
Recommendation	Suggested Action/Area Responsible	Outcome
That the Queensland Health, Private Health Regulation Team review facility registration requirements in relation to facilities providing termination of pregnancy (TOP) services, to ensure that the need for appropriate post-TOP follow-up by health practitioners is made part of the formal advice and counselling provided to their clients.	Correspondence to be forwarded to Queensland Health, Chief Health Officer recommending that the Private Health Regulation Team progress implementation of the recommendation.	Positive response – action progressing.
That all front line clinicians (medical officers, nursing staff and bereavement support personnel) involved in Queensland Hospital Maternity and Newborn Services attend the IMPROVE educational program to enhance optimal clinical practice around the time of a perinatal death according to the PSANZ Perinatal Mortality Guidelines.	Correspondence to be forwarded all to Hospital and Health Service Chief Executives recommending implementation of the recommendation. Allocation of funding to support participation in the IMPROVE educational program by relevant HHS personnel.	Done. Non-recurrent funding approved by Queensland Health to support ongoing IMPROVE training via hands-on workshops and to further the development of an E-learning Tool.
That Queensland Health recommends that the Therapeutic Goods Administration review the conditions for authorising medical practitioners to prescribe ovulation induction agents, with particular reference to techniques designed to minimise the incidence of multiple pregnancy.	Correspondence to be forwarded to the Commonwealth Therapeutic Goods Administration asking that consideration be given to the recommendation.	Done. Nil response to date.
That RANZCOG(Q) promote education programs for its Fellows and Diplomats regarding the safe and appropriate use of ovulation induction agents.	Correspondence to be forwarded to RANZCOG(Q) asking for consideration of this recommendation.	Done. Nil response to date
That the Queensland Department of Health, Statistical Services Branch progress a recommendation through the appropriate mechanisms of government to COAG, to develop an indicator relating to gestation at birth (e.g. less than 37 weeks' gestation) in addition to the indicator relating to Indigenous baby birthweight. The Indigenous baby birthweight indicator may be more valuable if calculated for gestation equal to 37 or more weeks, tracking near-term intrauterine growth restriction.	Communication with the Queensland Department of Health, Statistical Services Branch in relation to progressing implementation of the recommendation	The Statistical Services Branch has worked with the Aboriginal and Torres Strait Islander Health Branch to modify the existing closing the gap indicator relating to low birthweight to include a sub-category that measures rates of small for gestational age babies among births to Indigenous and non-Indigenous mothers (www.health.qld.gov.au/__data/assets/pdf_file/0015/142800/queensland.pdf)

Queensland Maternal and Perinatal Quality Council – 2015 Report – Action Plan (continued)

Recommendation	Suggested Action/Area Responsible	Outcome
That Queensland Health undertake a coordinated and detailed study of pregnancy outcomes for women requiring antenatal transfer during their care, to understand the reasons for and significance of the differences between outcomes for metropolitan or inner regional women and their babies when compared with rural and remote women and their babies.	Communication with the Queensland Health, Statistical Services Branch and Chief Health Officer seeking their collaboration to commit epidemiology/ research trained resources to progress implementation of the recommendation	Analysis of Queensland Perinatal Data has been conducted by the Statistical Services Branch. The analysis suggests that apparent differences in perinatal mortality rate among babies transferred in the antenatal period are likely due to perinatal deaths occurring prior to transfer in rural and remote areas. The higher perinatal mortality rate among babies who were not transferred in rural and remote locations compared with metro and inner regional locations support this assertion.
That the published guidelines of the International Society of Ultrasound in Obstetrics and Gynaecology 2013 be adopted as core training for all points of care for fetal ultrasound screening in Queensland.	Correspondence to be forwarded to all Hospital and Health Services, Chief Executives and Directors of Obstetrics and Gynaecology and the Private Hospitals Association of Queensland, recommending they progress implementation of the recommendation.	Done. Very positive response.

A large, light green, stylized graphic of a woman holding a baby is centered on the page. The woman is shown from the waist up, holding the baby in her arms. The graphic is composed of simple, flowing lines and is set against a background of soft, out-of-focus green circles. The top of the page is a solid teal color, and the bottom is a solid dark blue color.

Queensland Mothers and Babies, 2014 and 2015

Report of the Queensland Maternal and
Perinatal Quality Council 2017