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PERINATAL MORTALITY IN THE AUSTRALIAN CAPITAL TERRITORY 2011–2015

Report of the ACT Perinatal Mortality Committee

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We also acknowledge and thank all of the midwives who provided information for this report by completing the ACT Perinatal Death Forms.

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CHAIRPERSON'S REPORT

We are pleased to present the third report from the ACT Maternal and Perinatal Mortality Committee (ACT MPMC), and I would personally like to thank the members for their ongoing participation and enthusiasm. The Committee meets two to three times per year and reports to the ACT Health Quality and Safety Committee each year.

The ACT MPMC developed from a few enthusiastic clinicians in 2002 who recognised the importance of collecting perinatal mortality data to allow accurate reporting and comparisons of perinatal deaths within the ACT and nationally. The committee now consists of a maternal-fetal medicine specialist, obstetricians, pathologist, neonatologist, data collection officer, representative midwives from each hospital in the Territory and a representative from the Epidemiology Section, Health Improvement Branch, ACT Health.

The ACT MPMC classifies all perinatal deaths in the ACT using the Perinatal Society of Australia and New Zealand - Perinatal Death Classification (PSANZ-PDC) and the Perinatal Society of Australia and New Zealand - Neonatal Death Classification (PSANZ-NDC) (APPENDIX C). The majority of members are active in the Perinatal Society of Australia and New Zealand (PSANZ) Stillbirth and Neonatal Death Alliance, which continues to refine these classifications and implement their use throughout Australia.

As the ACT is a small territory, the ACT MPMC has the ability to review all perinatal deaths within the ACT and classify them according to the PSANZ classification systems. Due to the small number of deaths, a five-year report is felt to be the most appropriate timeframe to examine perinatal deaths in the Territory.

I would like to acknowledge and thank the staff of ACT Health's Epidemiology Section for their ongoing support in producing this report and assistance in maintaining the perinatal mortality database.

Professor Alison Kent
Chairperson, ACT Maternal and Perinatal Mortality Committee

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LIST OF ABBREVIATIONS

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ACT CAC	ACT Clinical Audit Committee
ACT MPDC	ACT Maternal and Perinatal Data Collection
ACT PMC	ACT Perinatal Mortality Committee
AIHW	Australian Institute of Health and Welfare
ANU	Australian National University
ANZ	Australian and New Zealand
CI	Confidence Interval
Dept	Department
ICD-10-AM	International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian modification
NSW	New South Wales
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
PSANZ-PMC	Perinatal Society of Australia and New Zealand - Perinatal Mortality Classification
RM	Registered midwife
TOP	Terminations of Pregnancy
WHO	World Health Organization

1. EXECUTIVE SUMMARY

As a small jurisdiction, the number of perinatal deaths that occur in the ACT is relatively low. However, reviewing, classifying and reporting perinatal deaths provides a powerful tool for health professionals to improve procedures and practices to ensure that the ACT continues to be one of the safest places in the world to give birth.

Over the five-year period, 2011–2015, a total of 31,015 births occurred in the ACT. Of these, 30,769 (99.2%) were classified as live births. Around, 4,518 (14.6%) of all births throughout this period were for women whose usual place of residence was outside of the Territory.

In 2011–2015, 346 perinatal deaths occurred in the ACT. Of these, 252 (72.8%) were for ACT residents and 94 (27.2%) were for babies of women from outside of the ACT. The ACT resident perinatal mortality rate for the period was 9.5 deaths per 1,000 total births. The ACT resident fetal death rate was 7.3 deaths per 1,000 total births and the ACT resident neonatal mortality rate 2.2 deaths per 1,000 live births.

Based on the Perinatal Society of Australia and New Zealand Perinatal Death Classification (PSANZ-PDC), in 2011–2015, the primary cause of perinatal death for ACT residents was cited as congenital abnormality (24.6%), specific perinatal conditions (14.3%), antepartum haemorrhage (11.1%) and spontaneous preterm (10.3%). Unfortunately, 19% of perinatal deaths were unexplained, which may be due to inadequate investigation or death occurring prior to 20 weeks gestation. Births that occur after 20 weeks gestation where death has occurred prior to 20 weeks gestation are not routinely reported in all Australian states and territories; however, they have been included in this report due to ACT legislative requirements.

The leading cause of neonatal death as per the Perinatal Society of Australia and New Zealand Neonatal Death Classification (PSANZ-NDC) reported throughout the period 2011–2015 in the ACT, was extreme prematurity (42.0%) followed by neurological conditions (16.9%).

Preterm delivery (less than 37 weeks gestation) occurred in 7.8% of all births, and 82.9% of perinatal deaths in the ACT. Extreme prematurity (less than 28 weeks gestation) occurred in 0.8% of all births and 64.7 % of perinatal deaths.

Of all perinatal deaths, 11.1% were multiple births. The perinatal mortality rate for multiple births was 32.7 deaths per 1,000 multiple births in comparison to 8.7 deaths per 1,000 singleton births.

The number of perinatal deaths associated with complications of monochorionic twin pregnancies fell from 12 deaths throughout the 2001–2005 reporting period, to a single death in 2006–2010. However, the figure rose to 10 deaths in 2011–2015.

The perinatal autopsy rate for the ACT in 2011–2015 was 59.1%. This figure compared favourably with other Australian states and territories. ACT Health follows the recommendations of the Royal College of Pathologists that every family experiencing perinatal loss should be offered an autopsy, and where an autopsy is not performed, alternative investigations should be made available.

There were no significant differences reported between fetal death rates and perinatal mortality rates for the ACT and Australia between 2011 and 2015 for either the annual rates or for the five-year combined rates.

2. RECOMMENDATIONS

2.1 Congenital abnormalities

The ACT should continue to maintain data on congenital abnormalities as a cause of perinatal death, and support the development of a nation-wide register and epidemiological investigation of congenital anomalies to enable state and territory comparisons.

2.2 Unexplained antepartum death and fetal growth restriction

Two major areas of ongoing focus in perinatal loss are unexplained antepartum death and fetal growth restriction. The goal of investigating a perinatal loss is to provide answers to families as to why their baby has died and whether this has implications for future pregnancies. Sadly, despite investigations, a proportion of antepartum deaths remain unexplained. Unexplained antepartum death was the second most cited cause of perinatal death in 2011–2015. It is important that the value of conducting autopsies is recognised and that staff are educated on how to discuss this procedure with families to enable the proportion of perinatal deaths listed as unexplained to be minimised. The Canberra Hospital has been involved with a large NHMRC funded study designed to determine the investigations that should be performed when an antepartum death has occurred, to maximise the likelihood of explaining the death. The results of this study will likely be available in 2018.

Fetal growth restriction (FGR) is associated with a significant proportion of perinatal deaths. Focus in the early antepartum period is aimed at identifying risk factors. During the later antepartum period, there is increased surveillance for signs of FGR and early delivery when recommended. However, a proportion of babies continue to not be identified as growth restricted during pregnancy. A number of ACT MPMC members are involved in the development of a national training program focused on increasing the identification of pregnancies complicated by FGR, with the aim of reducing the morbidity and mortality associated with this risk factor. This program is planned to be available both as a live instructional course and as an e-learning program in 2018. In the ACT, rates of perinatal loss associated with FGR have declined significantly since the last reporting period, from 35 to 17 deaths (1.5 to 0.6 deaths per 1,000 births).

2.3 Perinatal autopsy

A high perinatal autopsy rate improves accuracy when classifying the cause of perinatal deaths and the information provided to parents. All parents should be offered the option of an autopsy following a perinatal death. This must be accompanied by an adequate explanation of the procedure and the availability of suitable materials to assist with their decision.

All clinical staff involved in perinatal care need to be aware of the value of perinatal autopsy. Clinical practice guidelines for perinatal autopsy and audit should be available for all perinatal clinical care providers. Access to educational material such as the Improving Perinatal Mortality Review & Outcomes Via Education (IMPROVE) course should also be provided to all staff involved in perinatal care.

ACT Health must ensure that a high standard of perinatal autopsy is always available and should strive to achieve high autopsy rates, with results made available within six to eight weeks. This will enable appropriate counselling to be provided to parents and ensure that a high standard of perinatal audit is maintained. An audit of the time required to provide autopsy results may be useful to indicate service improvement or provision required in this area.

2.4 Data quality

Ongoing data support should be provided to the ACT MPMC for data management and to incorporate the collection of perinatal data electronically to improve data quality. Over the five years since the last report, administrative support has improved for the ACT MPMC with the allocation of a data coordinator. However, continued support is required for this position and for the Epidemiology Section in order to maintain this important database.

Australian States and Territories should work together with the Australian Government to ensure consistency of national reporting and the development and maintenance of a National Perinatal Mortality Minimum Dataset.

3. INTRODUCTION

The majority of pregnancies that occur in Australia do not result in mortality or severe illness. However, pregnancy, childbirth and infancy remain a time of vulnerability for mothers and their children. Tragically, around 3,000 families each year in Australia will experience the loss of a baby who was either stillborn or died in the first four weeks of life (Monk A, 2016). Over the past 15 years in the ACT, an average of 48 perinatal deaths were reported each year among residents of the ACT, with an additional 21 deaths recorded for women who reside outside of the ACT, but gave birth in the Territory.

Perinatal mortality is an important indicator of the health status of a given population and reflects the risk of a fetus being stillborn or not surviving beyond 28 days of life. In the ACT, all perinatal deaths are reviewed by the ACT Maternal and Perinatal Mortality Committee (ACT MPMC), which was established in 2002. One of the ACT MPMC's principal responsibilities is the provision of a five year report for ACT Health on Perinatal Mortality. This is the third report from the ACT Perinatal Mortality Committee (ACT MPMC). The report aims to shine a light on perinatal mortality and focuses on deaths that occurred throughout the five year period 2011–2015. Unless otherwise stated, the report focuses on women who are both resident in the ACT and gave birth in the Territory.

3.1 Purpose of the ACT Maternal and Perinatal Mortality Committee

The ACT Maternal and Perinatal Mortality Committee seeks to provide advice through the ACT Health Quality and Safety Committee on matters that relate to maternal and perinatal mortality in the ACT. While not all perinatal deaths are preventable, the Committee seeks to gain a better understanding of how to prevent those deaths that are, through research and the provision of reports such as this. This report focuses only on perinatal mortality, maternal mortality is reported in the Australian Institute of Health and Welfare National Report on Maternal Mortality.

3.2 Terms of reference

The ACT Maternal and Perinatal Mortality Committee is a sub-committee of the ACT Maternal Perinatal Information Network Committee.

***The membership will include*:**

- An obstetrician with involvement in high-risk pregnancy and fetal medicine;
- A fetal medicine specialist;
- An obstetrician;
- A neonatologist;
- A pathologist with involvement in perinatal pathology;

- A representative from the Epidemiology Section, Population Health Protection and Prevention;
- A midwife representative from each of the hospitals providing maternity services in the ACT;
- A perinatal and maternal mortality data collection officer and
- Any other members the committee feels are appropriate.

***The role of the committee is to*:**

- Review all perinatal and maternal deaths that occur in the ACT;
- Classify all perinatal deaths according to the PSANZ classification system;
- Provide an annual non-public report to the ACT Health Quality and Safety Committee on perinatal deaths;
- Provide a five-year public health report for ACT Health on Perinatal Mortality;
- Provide maternal mortality data to the National Report on Maternal Mortality;
- Provide data for the ACT Child and Young People Death Review Committee;
- Liaise with the ACT Maternity Services Advisory Network with relevant information related to perinatal and maternal mortality and services within the ACT.
- Provide data for the National Report on Perinatal Mortality

3.3 Provision of data for statistical and research purposes

The ACT MPMC has collected information regarding all perinatal deaths that occur in the ACT from 20 weeks gestation since 2001. The Committee has permission to release information from the database under the provision that it does not risk the confidentiality of individuals.

With regards to the public release of health related data, ACT Health follows national best practice and does not publish tables that contain less than five cases within a given category. However, due to the small number of perinatal deaths that occur each year in the ACT and the importance and value placed on this information, permission was sought and granted from the ACT Chief Health Officer to publish tables with small numbers.

In addition, all requests for information related to the ACT Perinatal Mortality Dataset are reviewed by the ACT MPMC. Formal research projects must conform to National Health and Medical Research Council Guidelines, and be approved by the ACT Health Human Research Ethics Committee.

3.4 Membership

Membership of the ACT Perinatal Mortality Committee

Professor Alison Kent (Chair)	Dept of Neonatology, Centenary Hospital for Women and Children, Canberra Hospital, Australian National University
Ms Louise Freebairn	Epidemiology Section, ACT Health

Professor Jane Dahlstrom	Dept of Anatomical Pathology, Canberra Hospital, Australian National University
Dr Farah Sethna	Dept of Obstetrics and Gynaecology, Centenary Hospital for Women and Children, Canberra Hospital, Fetal Medicine Specialist, Australian National University
A/Prof Boon Lim	Director Obstetrics and Gynaecology, Centenary Hospital for Women and Children, Canberra Hospital, Australian National University
RM Jo Borrman	Data Coordinator, Centenary Hospital for Women and Children, Canberra Hospital
RM Wendy Alder	CMC Birthing, Centenary Hospital for Women and Children, Canberra Hospital
Dr John Hehir	Director Obstetrics and Gynaecology, Calvary Public Hospital Bruce
RM Christine Falez	Nurse Manager, Calvary Public Hospital Bruce
RM Michelle Thinnius	CMC Birth Suite, Antenatal Clinic & Parent Education, Calvary Public Hospital Bruce
RM Sue Simms	CMC Birthing, Calvary John James Hospital

4. SCOPE

4.1 Maternity services in the ACT and the Australian Capital Region

There are four hospitals (two public and two private) in the ACT that provide maternity services to ACT residents and residents of the surrounding regions of NSW. During the period 2011–2015, 14.6% of babies born in the ACT were to women who were not usual residents of the ACT. Many of these babies were those of women who were referred to the Centenary Hospital for Women and Children, Canberra Hospital for tertiary level maternal and neonatal care for high-risk pregnancies and births. This is reflected in the higher rate of perinatal deaths for babies of women from outside of the ACT compared to those women resident in the ACT. In 2011–2015, perinatal deaths reported in the ACT were significantly higher among non-ACT residents compared to ACT residents, at 20.8 deaths per 1,000 births and 9.5 deaths per 1,000 births respectively.

4.2 Report focus

This report primarily focuses on perinatal deaths for babies of ACT residents where the birth occurred in the ACT. It does not include ACT residents who gave birth outside of the ACT. Unless otherwise stated, residents from other jurisdictions who gave birth in the ACT have been excluded to allow for a population based analysis.

While this report's focus is on perinatal deaths among ACT residents, all perinatal deaths that occur in the ACT are routinely monitored and reviewed. Three of the hospitals in the ACT perform their own review of perinatal deaths. All hospitals complete a confidential perinatal mortality form for each perinatal death that occurs and is forwarded to the ACT MPMC. An annual presentation is made to the ACT Health Quality and Safety Committee of perinatal deaths, with recommendations implemented as required.

In 2011–2015, a total of 346 perinatal deaths were reported in the ACT. The number of perinatal deaths has remained relatively unchanged over the last three reporting periods (Table 1).

Table 1: Fetal, neonatal and perinatal deaths by year and usual place of residence

	Fetal deaths		Neonatal deaths		Perinatal deaths	
	No.	Per cent	No.	Per cent	No.	Per cent
2001–2005						
ACT residents	153	75.0	64	54.7	217	67.6
Non ACT residents	51	25.0	53	45.3	104	32.4
Total	204	100	117	100	321	100
2006–2010						
ACT residents	187	71.9	62	52.5	249	65.9
Non ACT residents	73	28.1	56	47.5	129	34.1
Total	260	100	118	100	378	100
2011–2015						
ACT residents	193	75.4	59	65.6	252	72.8
Non ACT residents	63	24.6	31	34.4	94	27.2
Total	256	100	90	100	346	100

Source: ACT Perinatal Mortality Dataset.

5. PERINATAL MORTALITY RATES AND TRENDS

5.1 Perinatal mortality rates

The perinatal mortality rate for the ACT over the five-year period 2011–2015, was 9.5 deaths per 1,000 total births. This comprised a fetal death rate of 7.3 deaths per 1,000 total births and a neonatal mortality rate of 2.2 deaths per 1,000 live births (Table 2).

In order to comply with ACT legislation Table 2 includes babies born with a birthweight of less than 400 grams who were born at 20 weeks gestation or more. Not all states and territories report births where there is a birth weight of less than 400 grams independent of gestation at birth. When these cases are excluded, the perinatal mortality in the ACT is 6.9 deaths per 1,000 total births.

Table 2: Fetal, neonatal and perinatal deaths, ACT residents, 2011–2015

			Fetal deaths			Neonatal deaths			Perinatal deaths		
	Total births	Live births	No.	Rate[(a)]	95% CI	No.	Rate[(b)]	95% CI	No.	Rate[(a)]	95% CI
2011	4,836	4,809	32	6.6	(4.3–8.9)	12	2.5	(1.1–3.9)	44	9.1	(6.4–11.8)
2012	5,259	5,216	48	9.1	(6.6–11.7)	12	2.3	(1.0–3.6)	60	11.4	(8.5–14.3)
2013	5,360	5,329	35	6.5	(4.4–8.7)	10	1.9	(0.7–3.0)	45	8.4	(6.0–10.8)
2014	5,530	5,485	45	8.1	(5.8–10.5)	12	2.2	(1.0–3.4)	57	10.3	(7.6–13.0)
2015	5,512	5,478	33	6.0	(4.0–8.0)	13	2.4	(1.1–3.7)	46	8.3	(5.9–10.7)
Total	26,497	26,317	193	7.3	(6.3–8.3)	59	2.2	(1.7–2.8)	252	9.5	(8.3–10.7)

(a) Rate per 1,000 births.

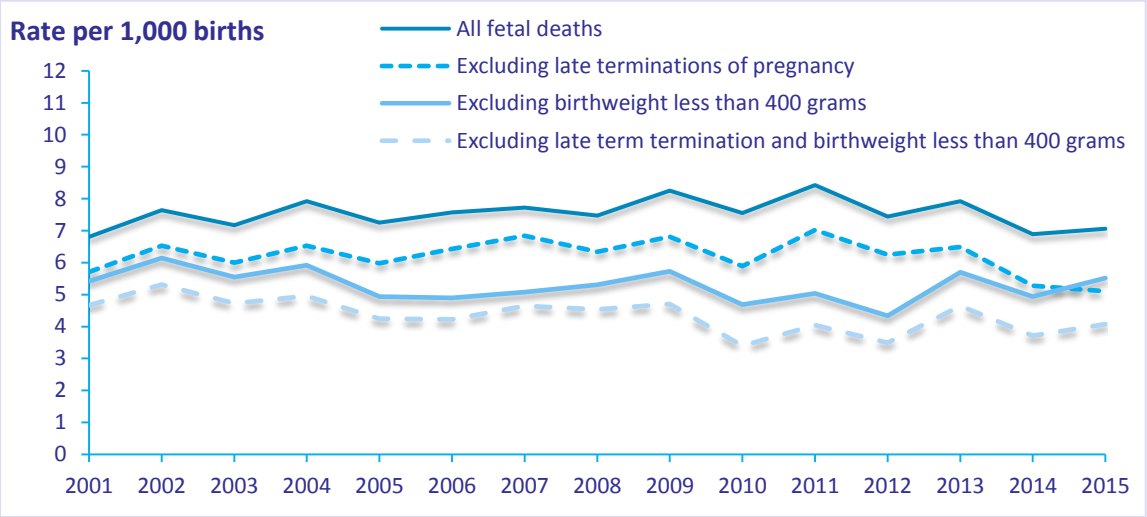
(b) Rate per 1,000 live births.

Source: ACT Perinatal Death Data Collection and ACT Maternal and Perinatal Data Collection.

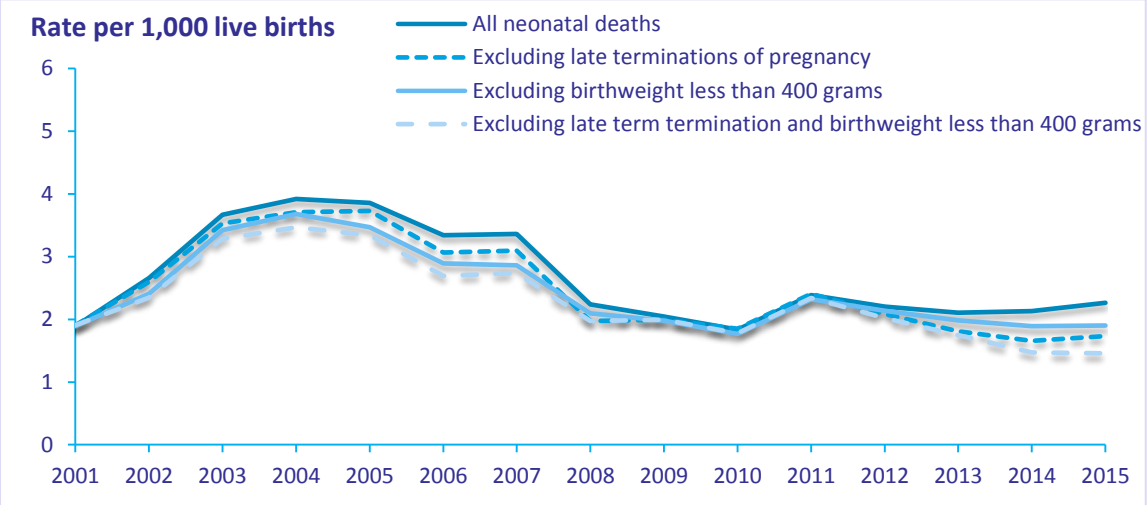
Late termination of pregnancy (termination at 20 weeks gestation or more) for severe and lethal congenital abnormalities and other medical conditions are included in the ACT Perinatal Data Collection and thus contribute to the Territory's perinatal mortality rate. Throughout the period 2011–2015, there were 49 late terminations reported in the ACT. The Canberra Hospital is currently the only hospital in the ACT that performs late terminations for congenital abnormalities under the framework of a Termination Review Committee. When late terminations and babies born with a birth weight of less than 400 grams are removed from the analysis, the perinatal mortality rate for ACT residents over the period 2011–2015 was 5.5 deaths per 1000 births. Figure 1 compares the fetal, neonatal and perinatal mortality rates for ACT residents from 2011–2015, adjusted for late terminations and birthweight less than 400 grams.

Figure 1: Fetal, neonatal and perinatal mortality rates corrected for late terminations and birthweight less than 400 grams, ACT residents, 2001–2015

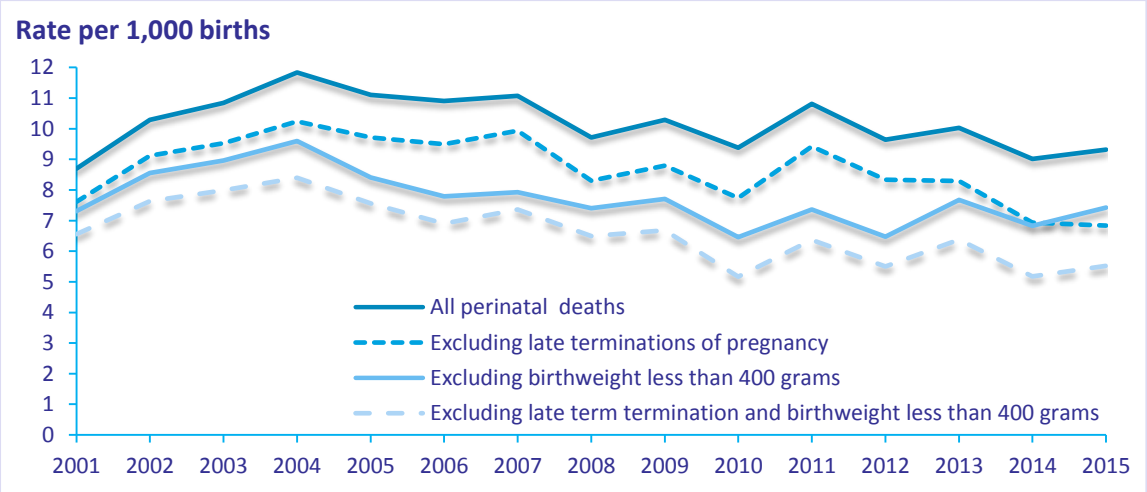
Fetal deaths



Neonatal deaths



Perinatal deaths



Source: ACT Perinatal Death Data and ACT Perinatal Data Collection, Data based on three year rolling averages.

5.2 Antecedent cause of perinatal mortality

Based on the Perinatal Society of Australia and New Zealand - Perinatal Death Classification (PSANZ-PDC) system, the leading causes of perinatal death in 2011–2015 were: congenital abnormality, specific perinatal conditions, antepartum haemorrhage and spontaneous preterm birth (Table 3). There was no significant difference in the total ACT perinatal mortality rate reported between 2006–2010 and 2011–2015. The following changes were noted in antecedent causes of perinatal deaths in comparison to the previous reporting periods: there was a slight increase in deaths due to perinatal infection (0.2 deaths to 0.6 deaths per 1,000 births) and decreases in fetal growth restriction (1.5 deaths to 0.8 deaths per 1,000 births) and spontaneous preterm birth (1.8 deaths to 1.0 death per 1,000 births).

Of the 62 perinatal deaths attributed to congenital abnormalities in 2011–2015, 52 (83.9%) were recorded as fetal deaths and 10 (16.1%) neonatal deaths. The most common congenital abnormalities recorded over the period were central nervous system (21; 33.9%), chromosomal (19; 30.6%) and musculoskeletal (8; 12.9%).

Of the 252 perinatal deaths reported for ACT residents throughout the 2011–2015 reporting period, 48 (19%) were coded as unexplained antepartum deaths. Of these, 20 (41.7%) occurred at less than 28 weeks gestation, 16 (33.3%) occurred between 28 and 36 weeks gestation and 12 (25.0%) occurred at greater than 36 weeks gestation.

Over the past three reporting periods, the proportion of unexplained antepartum deaths at more than 37 weeks gestation fell from 30.6% in 2001–2005 to 25.0% in 2011–2015. However, there was a small increase in the proportion of unexplained antepartum deaths less than 28 weeks from 38.9% in 2001–2005 to 41.7% in 2011–2015.

While ACT Health strives to reduce the number of perinatal deaths with a cause of death listed as unexplained, it is important that the level of investigations and the degree of deterioration experienced by the baby prior to delivery be taken into account. Of the 48 unexplained antepartum deaths reported in 2011–2015, there were 19 cases where severe deterioration of the baby prior to birth occurred to the extent that it was not possible to determine a cause of death. In nine cases, death occurred at less than 20 weeks gestation. Such deaths are not routinely reported in all Australian states and territories, however, the ACT reports these deaths due to local ACT legislative requirements.

A total of 13 deaths which received a post mortem (either partial or full) remained unexplained, as a definitive cause of death could not be determined, while a further 15 cases did not receive a post mortem. While deaths that do not receive a post mortem are included in the overall classification of unexplained perinatal deaths, they fall within the category of incomplete investigation. It is important that the value of conducting a post mortem is recognised and that staff are educated on how to discuss post mortem with families to enable the proportion of perinatal deaths listed as unexplained to be minimised.

Specific perinatal conditions were the third most common cause of perinatal death identified during the 2011–2015 period, contributing 36 deaths (14.3%). Of these deaths, complications of monochorionic twin pregnancies was cited as the primary cause of 10 deaths (27.8%), uterine

abnormalities were attributed to nine deaths (25.0%), and antepartum cord complications accounted for eight deaths (22.2%). The remaining deaths were a consequence of feto-maternal haemorrhage, idiopathic hydrops fetalis, birth trauma, and other causes.

Of the 28 deaths due to antepartum haemorrhage (APH), eight were due to placental abruption and two were due to placenta praevia.

Perinatal infection contributed to 6.7% of all perinatal deaths, with Group B streptococcus and Escherichia coli accounting for the majority of these infections.

Many of the specific perinatal conditions responsible for perinatal death were not avoidable (e.g. feto-maternal haemorrhage, cord complications and hydrops fetalis). Unrecognised fetal growth restriction however, is potentially avoidable. In the ACT, the number of deaths related to unrecognised fetal growth restriction fell significantly between 2006–2010 and 2011–2015, from 35 deaths to 20 deaths respectively. Fetal growth restriction was identified as a significant factor in the previous report from the Committee and improvements were made to clinical education in identifying and managing this issue.

The number of deaths due to spontaneous preterm births also fell significantly from 44 deaths in 2006–2010 to 26 deaths in 2011–2015. Across Australia and including the ACT, lower gestation babies are more frequently being actively resuscitated, where in the previous reporting period palliative care may have been the predominant care plan. This may explain the reduction in deaths due to spontaneous preterm birth.

Table 3: Fetal, neonatal and perinatal deaths by antecedent cause of death, ACT and non-Act residents, 2011–2015

PSANZ-PDC[a]	Fetal deaths			Neonatal deaths			Perinatal deaths		
	No.	Per cent	Rate[b]	No.	Per cent	Rate[c]	No.	Per cent	Rate[b]
ACT residents									
Congenital abnormality	52	26.9	2.0	10	16.9	0.4	62	24.6	2.3
Perinatal infection	14	7.3	0.5	3	5.1	..	17	6.7	0.6
Hypertension	4	2.1	..	1	1.7	..	5	2.0	0.2
Antepartum haemorrhage	13	6.7	0.5	15	25.4	0.6	28	11.1	1.1
Maternal conditions	4	2.1	..	0	..	..	4	1.6	..
Specific perinatal conditions	28	14.5	1.1	8	13.6	0.3	36	14.3	1.4
Hypoxic peripartum deaths	1	0.5	..	4	6.8	..	5	2.0	0.2
Fetal growth restriction	19	9.8	0.7	1	1.7	..	20	7.9	0.8
Spontaneous preterm	10	5.2	0.4	16	27.1	0.6	26	10.3	1.0
Unexplained antepartum death	48	24.9	1.8	0	..	..	48	19.0	1.8
No obstetric antecedent	0	..	..	1	1.7	..	1	0.4	..
Total	193	100	7.3	59	100	2.2	252	100	9.5
Non-ACT residents									
Congenital abnormality	23	36.5	5.1	8	25.8	1.8	31	33.0	6.9
Perinatal infection	5	7.9	1.1	2	6.5	..	7	7.4	1.5
Hypertension	0	..	..	1	3.2	..	1	1.1	..
Antepartum haemorrhage	11	17.5	2.4	4	12.9	..	15	16.0	3.3
Maternal conditions	0	..	..	0	..	..	0	..	..
Specific perinatal conditions	6	9.5	1.3	5	16.1	1.1	11	11.7	2.4
Hypoxic peripartum deaths	1	1.6	..	1	3.2	..	2	2.1	..
Fetal growth restriction	5	7.9	1.1	1	3.2	..	6	6.4	1.3
Spontaneous preterm	3	4.8	..	9	29.0	2.0	12	12.8	2.7
Unexplained antepartum death	9	14.3	2.0	0	..	..	9	9.6	2.0
No obstetric antecedent	0	..	..	0	..	..	0	..	..
Total	63	100	13.9	31	100	7.0	94	100	20.8

(a) Perinatal Society of Australia and New Zealand - Perinatal Death Classification.

(b) Rate per 1,000 births.

(c) Rate per 1,000 live births.

.. Not calculated.

Source: ACT Perinatal Death Data Collection and ACT Maternal and Perinatal Data Collection.

5.3 Perinatal mortality by gestational age and birthweight

Two of the most important factors that determine a baby's perinatal health are birthweight and gestational age. Infants with an extremely low birthweight and an early gestational age have an increased risk of perinatal death.

In 2011–2015, preterm births (those that are delivered at less than 37 weeks gestation) accounted for 7.8% of all births and 82.9% of perinatal deaths. Very preterm births (those that delivered at less than 28 weeks gestation) accounted for 0.8% of all births and 64.7% of all perinatal deaths.

The risk of perinatal death at term (deliveries at 37 weeks gestation or more) was 1.8 deaths per 1,000 total births compared with 779.9 deaths per 1,000 births for babies born at less than 28 weeks gestation.

The leading causes of perinatal death for babies born at term in 2011–2015 were unexplained antepartum death and fetal growth restriction (Table 4).

Table 4: Perinatal deaths by cause and gestational age, ACT residents, 2011–2015

	Gestational age							
	20–27 weeks		28–36 weeks		37 weeks or more		Total	
PSANZ-PDC[(a)]	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Congenital abnormality	50	30.7	7	15.2	5	11.6	62	24.6
Perinatal infection	9	5.5	3	6.5	5	11.6	17	6.7
Hypertension	4	2.5	1	2.2	0	..	5	2.0
Antepartum haemorrhage	23	14.1	2	4.3	3	7.0	28	11.1
Maternal conditions	2	1.2	1	2.2	1	2.3	4	1.6
Specific perinatal conditions	25	15.3	6	13.0	5	11.6	36	14.3
Hypoxic peripartum deaths	0	..	0	..	5	11.6	5	2.0
Fetal growth restriction	7	4.3	7	15.2	6	14.0	20	7.9
Spontaneous preterm	23	14.1	3	6.5	0	..	26	10.3
Unexplained antepartum death	20	12.3	16	34.8	12	27.9	48	19.0
No obstetric antecedent	0	..	0	..	1	2.3	1	0.4
Total deaths	163	100	46	100	43	100	252	100
Total births	209	0.8	1,863	7.0	24,433	92.2	26,505	100
Rate per 1,000 births	779.9	..	24.7	..	1.8	..	9.5	..

(a) Perinatal Society of Australia and New Zealand - Perinatal Death Classification.

Source: ACT Perinatal Death Data Collection.

Over the period 2011–2015, low birthweight babies (those with a birthweight less than 2,500 grams) accounted for 6.7% of all births and 84.5% of all perinatal deaths in the ACT. Infants with a birthweight less than 1,000 grams (0.9% of all births) accounted for 68.5% of perinatal deaths (Table 5). The perinatal mortality rate for babies with a birthweight less than 1,000 grams was 761.1 deaths per 1,000 births compared with 1.6 deaths per 1,000 births for babies weighing 2,500 grams of more.

The mortality rate for babies born with a birthweight of greater than 2,500 grams remained relatively unchanged with a rate of 1.6 deaths per 1,000 births in 2011–2015 compared to 2.3 deaths per 1,000 births in the previous two reporting periods.

Table 5: Perinatal deaths by cause and birthweight, ACT residents, 2011–2015

	Birthweight							
	Less than 1,000 grams		1,000–2,499 grams		2,500 grams or more		Total	
PSANZ-PDC[(a)]	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Congenital abnormality	51	82.3	8	12.9	3	4.8	62	100
Perinatal infection	9	52.9	2	11.8	6	35.3	17	100
Hypertension	4	80.0	1	20.0	0	0.0	5	100
Antepartum haemorrhage	23	82.1	3	10.7	2	7.1	28	100
Maternal conditions	2	50.0	0	0.0	2	50.0	4	100
Specific perinatal conditions	27	75.0	4	11.1	5	13.9	36	100
Hypoxic peripartum deaths	0	..	0	..	5	100	5	100
Fetal growth restriction	10	50.0	8	40.0	2	10.0	20	100
Spontaneous preterm	24	92.3	2	7.7	0	..	26	100
Unexplained antepartum death	22	46.8	12	25.5	13	27.7	47 *	100
No obstetric antecedent	0	..	0	..	1	100	1	100
Total	172	68.5	40	15.9	39	15.5	251	100
Total births	226	0.9	1,557	5.9	24,723	93.3	26,506	100
Rate per 1,000 births	761.1	..	25.7	..	1.6	..	9.5	..

* One birth coded to unexplained antepartum death was not listed as it did not contain an appropriate weight classification.

(a) Perinatal Society of Australia and New Zealand - Perinatal Death Classification.

Source: ACT Perinatal Death Data Collection.

5.4 Fetal deaths by birthweight and gestational age

A total of 193 fetal deaths (fetal death in-utero or intrapartum death) were reported in the ACT in 2011–2015 (Table 6). The majority of these deaths occurred where the fetus weighed less than 2,500 grams (82.8 %) and/or was less than 37 weeks gestation (81.9 %).

Table 6: Fetal deaths by birthweight and gestational age, ACT residents, 2011–2015

	No.	Per cent
Birthweight		
Less than 1,000 grams	126	65.6
1,000 to 2,499 grams	33	17.2
2,500 grams or more	33	17.2
Total	192	100
Gestational age		
Less than 28 weeks gestation	118	61.1
28 to 36 weeks gestation	40	20.7
37 weeks gestation or more	35	18.1
Total	193	100

Note: Birthweight was not included for one fetal death in 2011–2015.

Source: ACT Perinatal Death Data Collection.

5.5 Neonatal mortality

Neonatal deaths were classified using the Perinatal Society of Australia and New Zealand - Neonatal Death Classification1 (PSANZ-NDC) system which classifies factors present during the neonatal period that contributed to the death.

The neonatal mortality rate among ACT residents was 2.2 deaths per 1,000 live births in 2011–2015 (Table 7). Extreme prematurity was the most cited cause of neonatal death among ACT residents, recording a rate of 0.9 deaths per 1,000 live births, followed by neurological conditions (0.5 deaths per 1,000 live births).

Of the 25 neonatal deaths recorded for ACT residents in 2011–2015 due to extreme prematurity (infants less than 24 weeks gestation and less than 600 grams birthweight), 24 were considered pre-viable and were not resuscitated.

Of the 13 deaths attributable to neurological conditions, seven were due to hypoxic ischaemic encephalopathy and six to intraventricular or intracerebral haemorrhage.

All three deaths attributed to infection, were due to congenital bacterial infection.

Table 7: Neonatal deaths by cause[(a)], ACT residents, 2011–2015

PSANZ-NDC[(a)]	No.	Per cent	Rate[(b)]
Congenital abnormality	13	22.0	0.5
Extreme prematurity	25	42.4	0.9
Cardio-respiratory disorders	2	3.4	..
Infection	3	5.1	..
Neurological	13	22.0	0.5
Gastrointestinal	2	3.4	..
Other	1	1.7	..
Total	59	100	2.2

(a) Perinatal Society of Australia and New Zealand - Neonatal Death Classification.

(b) Rate per 1,000 live births.

.. Not calculated.

Source: ACT Perinatal Death Data Collection.

Based on the PSANZ-PDC, which classifies the main obstetric factors that contributed to the death, the majority of neonatal deaths that occurred in the ACT in 2011–2015 (Table 8) were associated with spontaneous preterm birth (27.1%), antepartum haemorrhage (25.4%) and congenital abnormality (16.9%).

Table 8: Neonatal deaths by perinatal death classification, ACT residents, 2011–2015

PSANZ-PDC[(a)]	No.	Per cent	Rate[(b)]
Congenital abnormality	10	16.9	0.4
Perinatal infection	3	5.1	..
Hypertension	1	1.7	..
Antepartum haemorrhage	15	25.4	0.6
Maternal conditions	0	..	..
Specific perinatal conditions	8	13.6	0.3
Hypoxic peripartum deaths	4	6.8	..
Fetal growth restriction	1	1.7	..
Spontaneous preterm	16	27.1	0.6
No obstetric antecedent	1	1.7	..
Total	59	100	2.2

(a) Perinatal Society of Australia and New Zealand - Perinatal Death Classification.

(b) Rate per 1,000 live births.

.. Not calculated.

Source: ACT Perinatal Death Data Collection.

5.6 Cause of neonatal mortality by gestational age and birthweight

Extreme prematurity (less than 28 weeks gestation) accounted for 76.3 % of neonatal deaths in 2011–2015 (Table 9), while premature births (less than 37 weeks gestation) accounted for 86.4 % of neonatal deaths.

The neonatal mortality rate for pre-term babies (less than 37 weeks gestation) was 26.5 deaths per 1,000 live births, while the overall neonatal mortality rate was 2.2 deaths per 1,000 live births.

Table 9: Neonatal deaths by cause and gestational age, ACT residents, 2011–2015

	Gestational age							
	20–27 weeks		28–36 weeks		37 weeks or more		Total	
PSANZ-NDC[(a)]	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Congenital abnormality	3	6.7	3	50.0	3	37.5	9	15.3
Extreme prematurity	21	46.7	0	..	0	..	21	35.6
Cardio-respiratory disorders	2	4.4	0	..	0	..	2	3.4
Infection	3	6.7	0	..	0	..	3	5.1
Neurological	6	13.3	2	33.3	4	50.0	12	20.3
Gastrointestinal	2	4.4	0	..	0	..	2	3.4
Other	0	..	1	17	0	..	1	1.7
Uncoded	8	17.8	0	..	1	12.5	9	15.3
Total	45	100	6	100	8	100	59	100
Live births	98	0.4	1,827	6.9	24,399	92.7	26,324	100
Rate per 1,000 live births	459.2	..	3.3	..	0.3	..	2.2	..

(a) Perinatal Society of Australia and New Zealand - Neonatal Death Classification.

Source: ACT Perinatal Death Data Collection.

Extremely low birthweight (less than 1,000 grams) represented 0.4% of all live births and accounted for 78.0% of neonatal deaths, while babies with a birthweight less than 2,500 grams represented 6.2% of live births and 89.8% of neonatal deaths. The neonatal mortality rate for babies that weighed less than 1,000 grams was 429.9 deaths per 1,000 live births, while the rate for babies weight from 1,000 grams to less than 2,500 grams was 4.6 deaths per 1,000 live births. (Table 10)

Table 10: Neonatal deaths by cause and birthweight, ACT residents, 2011–2015

	Birthweight							
	Less than 1,000		1,000–2,499 grams		2,500 grams or		Total	
PSANZ-NDC[(a)]	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Congenital abnormality	4	8.7	4	57.1	1	16.7	9	15.3
Extreme prematurity	21	45.7	0	..	0	..	21	35.6
Cardio-respiratory disorders	2	4.3	0	..	0	..	2	3.4
Infection	3	6.5	0	..	0	..	3	5.1
Neurological	6	13.0	2	28.6	4	66.7	12	20.3
Gastrointestinal	2	4.3	0	..	0	..	2	3.4
Other	0	..	1	14.3	0	..	1	1.7
Uncoded	8	17.4	0	..	1	16.7	9	15.3
Total	46	100	7	100	6	100	59	100
Total live births	107	0.4	1,527	5.8	24,691	93.8	26,325	100
Rate per 1,000 live births	429.9	..	4.6	..	0.2	..	2.2	..

(a) Perinatal Society of Australia and New Zealand - Neonatal Death Classification.

Source: ACT Perinatal Death Data Collection.

5.7 Place and type of perinatal death

Perinatal deaths were classified into the following categories based on place and type: fetal death in-utero, intrapartum death, termination of pregnancy, non-admitted neonatal death and neonatal intensive care death (Table 11).

In 2001–2005, 81.6% of all perinatal deaths occurred prior to delivery or where the baby was not admitted to the Neonatal Intensive Care Unit (NICU). In 2006–2010, this figure increased slightly to 88.8%, with no change reported in 2011–2015 (88.9%).

In 2011–2015, late terminations of pregnancy were responsible for 25.8% of all perinatal deaths. Deaths that occurred where the baby was not admitted to the NICU were predominantly in the less than 28 week gestation group (21 of 23 deaths).

Intrapartum perinatal deaths occurring at term (37 weeks or more gestation) were also reviewed. The most common causes of intrapartum perinatal deaths at term included congenital anomalies (0.2 per 1000 births), hypoxic peripartum death (0.2 per 1,000 births), perinatal infection (0.04 per 1000 births), and maternal hypertension (0.04 per 1000 births).

Table 11: Perinatal deaths by place and type of death and year, ACT residents

	2001–2005		2006–2010		2011–2015	
	No.	Per cent	No.	Per cent	No.	Per cent
Fetal death in-utero	98	45.2	118	47.4	118	46.8
Intrapartum death	23	10.6	26	10.4	18	7.1
Termination of pregnancy	36	16.6	48	19.3	65	25.8
Non-admitted neonatal death	20	9.2	29	11.6	23	9.1
Neonatal intensive care death	40	18.4	28	11.2	28	11.1
Total	217	100	249	100	252	100

Source: ACT Perinatal Death Data Collection.

Of the 59 neonatal deaths that were reported for ACT residents in 2011–2015, 69.5% survived less than one day. Of these deaths, 90.2% weighed less than 1,500 grams (Table 12). The majority of neonatal deaths (90%) occurred in the first week of life.

Table 12: Neonatal deaths by birthweight and days survived, ACT residents, 2011–2015

	1 day or less	2–3 days	4–7 days	8–14 days	15–21 days	22–28 days	Total
				(Number)			
Less than 1,500 grams	37	6	3	1	1	0	48
1,500 to 2,499 grams	1	3	0	0	1	0	5
2,500 grams or more	3	0	0	1	2	0	6
Total	41	9	3	2	4	0	59

Source: ACT Perinatal Death Data Collection.

5.8 Multiple births

Throughout the period 2011–2015, 3.2% of all babies among ACT residents who gave birth in the ACT were from multiple pregnancies. Of the deaths involving multiple births, all (28 deaths) involved

twins. Overall, deaths from multiple births represented 11.1% of all perinatal deaths, with neonatal and perinatal death rates for multiple births significantly higher than for singleton births at 32.7 deaths per 1,000 births and 8.7 deaths per 1,000 births respectively (Table 13).

Table 13: Fetal, neonatal and perinatal deaths by plurality, ACT residents, 2011–2015

			Fetal deaths			Neonatal deaths			Perinatal deaths		
	Total births	Live births	No.	Rate[a]	95% CI	No.	Rate[b]	95% CI	No.	Rate[a]	95% CI
Singleton	25,640	25,477	177	6.9	(5.9–7.9)	47	1.8	(1.3–2.4)	224	8.7	(7.6–9.9)
Twins	836	819	16	19.1	(9.9–28.4)	12	14.7	(6.4–22.9)	28	33.5	(21.3–45.7)
Triplets	21	21	0	..	..	0	..	..	0	..	..
Multiple births	857	840	16	18.7	(9.6–27.7)	12	14.3	(6.3–22.3)	28	32.7	(20.8–44.6)
Total	26,497	26,317	193	7.3	(6.3–8.3)	59	2.2	(1.7–2.8)	252	9.5	(8.3–10.7)

(a) Rate per 1,000 births.

(b) Rate per 1,000 live births.

Source: ACT Perinatal Death Data Collection and ACT Maternal and Perinatal Data Collection.

The percentage of extremely low birthweight perinatal deaths (less than 1,000 grams) was higher for multiple birth babies (88.9%)[1] than for singleton babies (66.1%).

Of the 28 perinatal deaths for multiple birth babies that occurred throughout the 2011–2015 reporting period, the primary cause was specific perinatal conditions (42.9%) followed by spontaneous preterm birth (17.9%). Among singleton births, the leading cause of perinatal death was congenital abnormality (27.7%).

Perinatal deaths associated with monochorionic twin pregnancies still represent an important proportion of perinatal deaths related to multiple pregnancies (32.1%). For this report, committee members reviewed the monochorionic twin pregnancies that resulted in a perinatal death. All were assessed as having been managed and treated according to current guidelines and standards of care.

1 Birthweight was not included for one multiple birth death in 2011–2015 and was thus excluded from the calculation of percentages.

Table 14: Perinatal deaths by cause and plurality, ACT residents, 2011–2015

	Singleton			Multiple		
PSANZ-PDC[a]	No.	Per cent	Rate[b]	No.	Per cent	Rate[c]
Congenital abnormality	62	27.7	2.4	0	..	..
Perinatal infection	15	6.7	0.6	2	7.1	..
Hypertension	5	2.2	0.2	0	..	..
Antepartum haemorrhage	24	10.7	0.9	4	14.3	..
Maternal conditions	4	1.8	..	0	..	..
Specific perinatal conditions	24	10.7	0.9	12	42.9	14.3
Hypoxic peripartum deaths	5	2.2	0.2	0	..	..
Fetal growth restriction	20	8.9	0.8	0	..	..
Spontaneous preterm	21	9.4	0.8	5	17.9	6.0
Unexplained antepartum death	44	19.6	1.7	4	14.3	..
No obstetric antecedent	0	..	..	1	3.6	..
Total	224	100	8.8	28	100	33.3

(a) Perinatal Society of Australia and New Zealand - Perinatal Death Classification.

(b) Rate per 1,000 live singleton births.

(c) Rate per 1,000 live multiple births.

.. Not calculated.

Source: ACT Perinatal Death Data Collection and ACT Maternal and Perinatal Data Collection.

5.9 Maternal characteristics

National reporting has shown that perinatal mortality is highly related to maternal age; with mothers aged less than 20 years and those aged 45 years and older experiencing significantly higher rates than other mothers (Monk A, 2016). There were less than five perinatal deaths reported for mothers aged 45 years or older in the ACT in 2011–2015.

In the ACT in 2011–2015, there were no significant differences reported in perinatal mortality rates by maternal age (Table 15). The average age of mothers with a perinatal death was 30.8 years.

Table 15: Fetal, neonatal and perinatal deaths by maternal age, ACT residents, 2011–2015

			Fetal deaths			Neonatal deaths			Perinatal deaths		
	Total births	Live births	No.	Rate	95% CI	No.	Rate	95% CI	No.	Rate	95% CI
Less than 20 yrs	444	441	3	..	..	1	..	..	4	..	..
20-29 yrs	9,448	9,378	74	7.8	(6.1–9.6)	24	2.6	(1.5–3.6)	98	10.4	(8.3–12.4)
30-39 yrs	15,359	15,261	107	7.0	(5.7–8.3)	32	2.1	(1.4–2.8)	139	9.1	(7.6–10.5)
40 yrs or more	1,245	1,236	9	7.2	(2.5–11.9)	2	..	..	11	8.8	(3.6–14)
Not stated	1	1	0	..	..	0	..	..	0	..	..
Total	26,497	26,317	193	7.3	(6.3–8.3)	59	2.2	(1.7–2.8)	252	9.5	(8.3–10.7)

(a) Rate per 1,000 births.

(b) Rate per 1,000 live births.

.. Not calculated.

Source: ACT Perinatal Death Data Collection and ACT Maternal and Perinatal Data Collection.

Over the period, 2011–2015, ten percent of perinatal deaths had been conceived with assisted reproduction technology.

Of women who experienced a perinatal death, 11.6% stated that they had smoked cigarettes while pregnant. Throughout the 2011–2015 reporting period, women who stated that they had smoked

during pregnancy experienced significantly higher perinatal mortality rates than those who did not smoke (74% higher). Similar findings were reported nationally (Monk A, 2016).

5.10 Aboriginal and Torres Strait Islander perinatal mortality

Throughout the period 2011–2015, there were 14 perinatal deaths for babies born to Aboriginal and Torres Strait Islander residents of the ACT and eight deaths among Aboriginal and Torres Strait women who resided outside of the ACT and gave birth in the ACT (Table 16).

Table 16: Perinatal deaths by usual place of residence and Aboriginal and Torres Strait Islander status, 2011–2015

	ACT residents		Non ACT residents		Total	
	No.	Per cent	No.	Per cent	No.	Per cent
Aboriginal and Torres Strait Islander	14	5.6	8	8.5	22	6.4
non-Indigenous	232	92.1	84	89.4	316	91.3
Not stated	6	2.4	2	2.1	8	2.3
Total	252	100	94	100	346	100

Source: ACT Perinatal Death Data Collection.

5.11 Perinatal autopsy

The perinatal autopsy rate for babies born to ACT residents in 2011–2015, was 59.1%, while 34.9% of autopsy requests were declined (Table 17). This was a slight improvement on the figures reported in 2006–2010 when rates were 53.5% and 40.8% respectively and higher than the 2011–2012 national autopsy rate of 38.7%[2] (Monk A, 2016).

Perinatal autopsies were performed for 63.2% of fetal deaths and 45.8 % of neonatal deaths.

In 2001–2005, an autopsy was not requested in 11.1% of cases. This figure fell to 2.2% in 2006–2010 and remained low throughout the current 2011–2015 period (1.2%).

Table 17: Perinatal autopsy by type of perinatal death, ACT residents, 2011–2015

	Fetal deaths		Neonatal deaths		Perinatal deaths	
	No.	Per cent	No.	Per cent	No.	Per cent
Performed	122	63.2	27	45.8	149	59.1
Declined	60	31.1	28	47.5	88	34.9
Not requested	3	1.6	1	1.7	4	1.6
Not stated	8	4.1	3	5.1	11	4.4
Total	193	100	59	100	252	100

Source: ACT Perinatal Death Data Collection.

2 Includes Victoria, Queensland, Western Australia, South Australia, Tasmania and the Australian Capital Territory (n = 4,344 perinatal deaths). Data not available from New South Wales and the Northern Territory (n = 1,721 perinatal deaths).

In 2011–2015, an autopsy was performed on the majority of perinatal deaths in the ACT that were the result of fetal growth restriction (95.0%). Around 66.7% of all unexplained antepartum deaths received an autopsy, while 63.9% of deaths due to specific perinatal conditions were autopsied (Table 18).

Table 18: Proportion of fetal, neonatal and perinatal deaths where an autopsy was performed by cause of death, ACT residents, 2011–2015

PSANZ-PDC[(a)]	Fetal deaths	Neonatal deaths	Perinatal deaths
		(Per cent)	
Congenital abnormality	50.0	70.0	53.2
Perinatal infection	42.9	100	52.9
Hypertension	75.0	..	60.0
Antepartum haemorrhage	69.2	13.3	39.3
Maternal conditions	50.0	..	50.0
Specific perinatal conditions	71.4	37.5	63.9
Hypoxic peripartum deaths	100	50.0	60.0
Fetal growth restriction	94.7	100	95.0
Spontaneous preterm	50.0	50.0	50.0
Unexplained antepartum death	66.7	..	66.7
No obstetric antecedent	..	100	100
Total	63.2	45.8	59.1

(a) Perinatal Society of Australia and New Zealand - Perinatal Death Classification.

Source: ACT Perinatal Death Data Collection and ACT Maternal and Perinatal Data Collection.

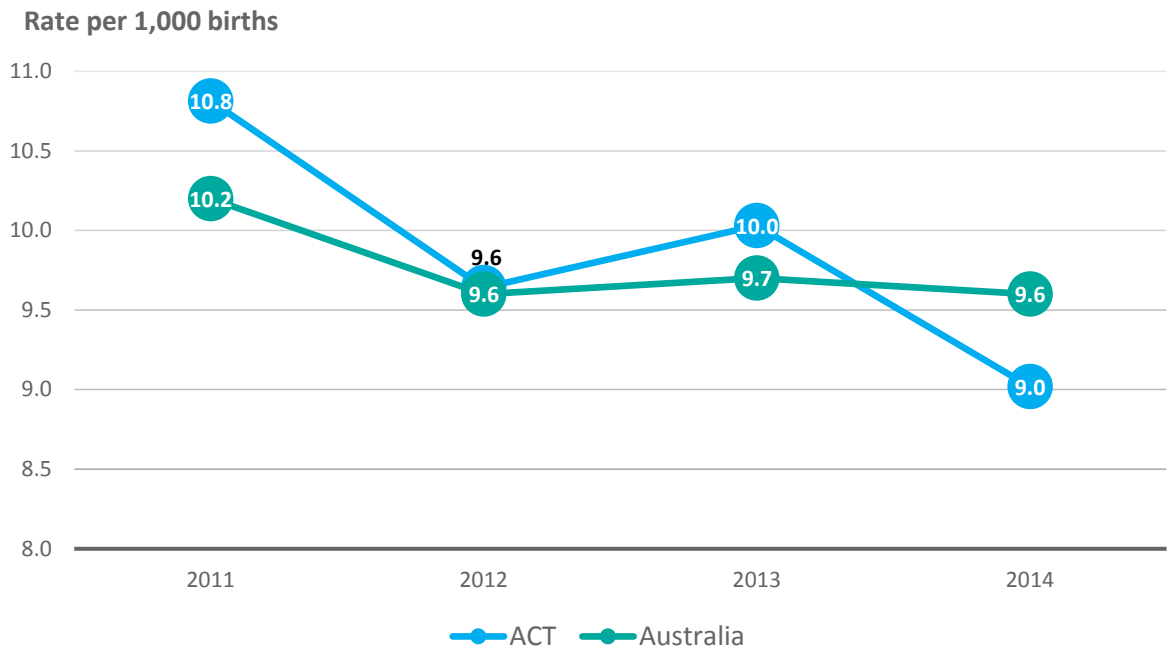
6. COMPARISON WITH NATIONAL DATA

6.1 Perinatal mortality rates

Caution should be taken when comparing perinatal mortality figures across the states and territories. In the ACT perinatal mortality rates fluctuate due to the small number of deaths that occur each year. There may also be slight variations in the reporting practices and definitions utilised by each of the Australian state and territories that must be considered when comparing data by jurisdiction or against national figures. For example, a number of jurisdictions do not report perinatal deaths less than 400 grams.

Due to the small number of deaths that occur annually in the ACT, the rates presented in Figure 2 are based on three year rolling averages to enable a more valid comparison with the national figures. Overall, there was no significant difference in perinatal rates in the ACT compared to the national figures between 2011 and 2014.

Figure 2: Perinatal mortality rates, ACT residents and Australia, 2011–2014



Note: ACT rates are based on three year rolling averages.
Notes for Australian data.
(a) Stillbirth and perinatal death rates were calculated using all births; neonatal death rates were calculated using all live births.
(b) Neonatal deaths may exclude neonatal deaths within 28 days of birth for babies transferred to another hospital or readmitted to hospital and those dying at home.
(c) Perinatal deaths may include late terminations of pregnancy.
Source: Source: ACT Perinatal Death Data Collection, ACT Maternal and Perinatal Data Collection and AIHW National Perinatal Data Collection.

In 2011–2014, mortality rates for fetal, neonatal and perinatal deaths among ACT residents were not significantly different to rates reported for Australia (Table 19).

Table 19: Fetal, neonatal and perinatal mortality rates, ACT residents and Australia, 2011–2014

	ACT residents		Australia	
	Rate	CI	Rate	CI
Fetal deaths[a]				
2011	8.4	(7.0–9.9)	7.4	(7.1–7.7)
2012	7.4	(6.1–8.8)	7.2	(6.9–7.5)
2013	7.9	(6.6–9.3)	7.1	(6.8–7.4)
2014	6.9	(5.6–8.2)	7.0	(6.7–7.3)
Total	7.7	(7–8.3)	7.2	(7.0–7.7)
Neonatal deaths[b]				
2011	2.4	(1.6–3.2)	2.8	(2.6–3.0)
2012	2.2	(1.5–2.9)	2.4	(2.2–2.5)
2013	2.1	(1.4–2.8)	2.6	(2.4–2.8)
2014	2.1	(1.4–2.8)	2.5	(2.3–2.7)
Total	2.2	(1.8–2.6)	2.6	(2.5–2.7)
Perinatal deaths[a]				
2011	10.8	(9.2–12.5)	10.2	(9.8–10.5)
2012	9.6	(8.1–11.2)	9.6	(9.2–9.9)
2013	10.0	(8.5–11.6)	9.7	(9.3–10)
2014	9.0	(7.6–10.5)	9.6	(9.2–9.9)
Total	9.9	(9.1–10.6)	9.7	(9.6–9.9)

Note: ACT rates are based on three year rolling averages.

(a) Rate per 1,000 births.

(b) Rate per 1,000 live births.

Source: ACT Perinatal Death Data Collection and ACT Maternal and AIHW Perinatal Data Collection; Perinatal data portal.

6.2 Antecedent causes of death

Perinatal mortality rates for antecedent cause were similar in the ACT and Australia (Table 20). The main antecedent causes of perinatal death for both the ACT and Australia were congenital anomalies, spontaneous preterm births and unexplained antepartum deaths.

Table 20: Perinatal mortality rate per 1,000 births, ACT residents, 2011–2015 and Australia, 2014

PSANZ-PDC[a]	ACT[b]	Australia[b]
Congenital abnormality	2.3	3.1
Perinatal infection	0.6	0.4
Hypertension	0.2	0.2
Antepartum haemorrhage	1.1	0.8
Maternal conditions	0.2	1.1
Specific perinatal conditions	1.4	0.8
Hypoxic peripartum deaths	0.2	0.3
Fetal growth restriction	0.8	0.6
Spontaneous preterm	1.0	1.6
Unexplained antepartum death	1.8	1.7
No obstetric antecedent	0.0	0.1
Total	9.5	10.8

(a) Perinatal Society of Australia and New Zealand - Perinatal Death Classification.

(b) Rate per 1,000 births.

Source: ACT Perinatal Death Data Collection and ACT Maternal and AIHW Perinatal Data Collection; Perinatal data portal.

7. METHODS

7.1 Clinical classification

All perinatal deaths reported in the ACT receive a primary cause of perinatal and neonatal death code based on the Perinatal Society of Australia and New Zealand - Perinatal Death Classification (PSANZ-PDC) and the Perinatal Society of Australia and New Zealand - Neonatal Death Classification (PSANZ-NDC). The use of these classifications ensures that the ACT can contribute to national reporting and enables state, territory and national comparisons. Furthermore, it ensures that the aetiology of these deaths is established and any factors that may prevent future deaths are identified. An additional benefit of this work is that it has the potential to identify possible areas of research in perinatal mortality that may help to reduce the number of these deaths deemed preventable.

7.2 Data collection

The primary data source for this report is the ACT Confidential Report on Perinatal Death Forms (Appendix B), which includes placental pathology and autopsy details. Data is cross-referenced with the ACT Maternal Perinatal Data Collection, the ACT Admitted Patient Care data collection and ACT mortality data.

Forms for perinatal deaths that occur at The Canberra Hospital (TCH) are initially completed by midwives caring for mother and baby in the Birthing Suite. Finalisation of data is performed by the ACT MPMC data coordinator and Chair of the ACT MPMC and sent to the Epidemiology Section for entering into the database. Forms for perinatal deaths that occur at other ACT hospitals are completed by the hospital's midwifery representatives or a designated person and forwarded to the ACT MPMC Chair and finalised with the ACT MPMC data coordinator. The committee meets three times per year to review and classify all cases. This information then forms the ACT Maternal and Perinatal Data Collection (ACT MPDC).

The ACT MPDC collects information and reports on live births and fetal deaths of at least 20 weeks gestation or, where gestation is not known, a birthweight of at least 400 grams. Data are collected on births that occur in hospitals, birth centres and the community. To ensure quality and completeness, these data are validated against the ACT Admitted Patient Care Data Collection and mortality data sourced from the ABS. The ACT MPDC is provided to the National Perinatal Data Collection for national reporting.

ABS perinatal death data includes perinatal deaths registered with Birth, Deaths and Marriages in each of the states and territories in Australia. These data are reported annually by the ABS by the mother's usual state of residence. The ABS no longer publishes perinatal deaths separately for the ACT.

7.3 Statistical analysis

Rates described as statistically significant are significant at the $p<0.05$ level and where appropriate, confidence intervals have been included. A confidence interval is a computed interval with a given probability (95% in this report) that the true value of a statistic, such as a rate, mean or proportion is contained within the interval. When the confidence intervals of two estimated values do not overlap, the values are considered to be statistically different.

7.4 Definitions

Fetal death

The death of a baby prior to birth (alternatively, stillbirth).

Fetal death rate

The number of fetal deaths per 1,000 total births.

Live birth

The complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered live born (WHO definition).

Neonatal death

The death of an infant within 28 days of birth.

Neonatal mortality rate

The number of deaths of live born infants under 28 days of age per 1,000 live births.

Infant death

The death of a live born infant under one year of age and includes neonatal deaths and post-neonatal deaths up to 1 year.

Infant mortality rate

The number of deaths of infants under 1 year of age per 1,000 live births.

Perinatal death

Refers to a fetal death or a neonatal death.

Perinatal mortality rate

The number of fetal and neonatal deaths per 1,000 total births.

7. APPENDIX A - SUMMARY OF PERINATAL DEATHS

Table 21: Fetal, neonatal and perinatal deaths by year of birth and usual place of residence

		Fetal deaths		Neonatal deaths		Perinatal deaths	
		No.	Per cent	No.	Per cent	No.	Per cent
2001	ACT residents	29	82.9	6	33.3	35	66.0
	Non ACT residents	6	17.1	12	66.7	18	34.0
	Total	35	100	18	100	53	100
2002	ACT residents	25	71.4	9	37.5	34	57.6
	Non ACT residents	10	28.6	15	62.5	25	42.4
	Total	35	100	24	100	59	100
2003	ACT residents	38	71.7	17	58.6	55	67.1
	Non ACT residents	15	28.3	12	41.4	27	32.9
	Total	53	100	29	100	82	100
2004	ACT residents	25	75.8	19	70.4	44	73.3
	Non ACT residents	8	24.2	8	29.6	16	26.7
	Total	33	100	27	100	60	100
2005	ACT residents	36	75.0	13	68.4	49	73.1
	Non ACT residents	12	25.0	6	31.6	18	26.9
	Total	48	100	19	100	67	100
2006	ACT residents	33	67.3	18	60.0	51	64.6
	Non ACT residents	16	32.7	12	40.0	28	35.4
	Total	49	100	30	100	79	100
2007	ACT residents	33	80.5	14	56.0	47	71.2
	Non ACT residents	8	19.5	11	44.0	19	28.8
	Total	41	100	25	100	66	100
2008	ACT residents	42	75.0	15	60.0	57	70.4
	Non ACT residents	14	25.0	10	40.0	24	29.6
	Total	56	100	25	100	81	100
2009	ACT residents	32	71.1	3	23.1	35	60.3
	Non ACT residents	13	28.9	10	76.9	23	39.7
	Total	45	100	13	100	58	100
2010	ACT residents	47	68.1	12	48.0	59	62.8
	Non ACT residents	22	31.9	13	52.0	35	37.2
	Total	69	100	25	100	94	100
2011	ACT residents	32	66.7	12	60.0	44	64.7
	Non ACT residents	16	33.3	8	40.0	24	35.3
	Total	48	100	20	100	68	100
2012	ACT residents	48	88.9	12	66.7	60	83.3
	Non ACT residents	6	11.1	6	33.3	12	16.7
	Total	54	100	18	100	72	100
2013	ACT residents	35	79.5	10	58.8	45	73.8
	Non ACT residents	9	20.5	7	41.2	16	26.2
	Total	44	100	17	100	61	100
2014	ACT residents	45	71.4	12	66.7	57	70.4
	Non ACT residents	18	28.6	6	33.3	24	29.6
	Total	63	100	18	100	81	100
2015	ACT residents	33	70.2	13	76.5	46	71.9
	Non ACT residents	14	29.8	4	23.5	18	28.1
	Total	47	100	17	100	64	100

Source: ACT Perinatal Death Data Collection.

8. APPENDIX B - ACT PERINATAL DEATH FORM

ACT perinatal death form

35402

Mother's Sticky Label

ACT CONFIDENTIAL REPORT ON PERINATAL DEATH

Return completed form to:

Infant's Sticky Label

Dr Alison Kent
Centre for Newborn Care
Dept of Neonatology
The Canberra Hospital
P.O. Box 11, Woden, ACT 2606

Copy sent to Dr Alison Kent Yes / No
Copy placed in patient notes Yes / No

ACT CONFIDENTIAL REPORT ON PERINATAL DEATH

Date information collected ...../...../.....

Information collected by .....

Year of Death Review .....

Maternal ID: _____

Baby ID: _____

State of Residence:	1	ACT		
	2	NSW		
	3	Other		
State of Perinatal Death:	1	ACT		
	2	NSW		
	3	Other		
Family Status:	1	Never married	2	Widowed
	3	Separated	4	Divorced
	5	Married/Defacto	6	Not stated
Indigenous Status:	1	Aboriginal		
	2	Torres Strait Islander		
	3	Aboriginal and Torres Strait Islander		
	4	Non indigenous		
	9	Not stated		
Accommodation:	1	Public		
	2	Private		

Previous Pregnancies

0 No
1 Yes

Number of:

_____ Live births (survived to 28 days)
_____ Neonatal Deaths (NND)
_____ Stillbirths
_____ Spontaneous miscarriage
_____ Termination of pregnancy
_____ Ectopic pregnancies

Note: Livebirths, NND and stillbirths must be 20 weeks gestation or at least 400 grams in birth weight

History of multiple births

0 No
1 Yes
Includes this pregnancy

This Pregnancy

Gravidity _____

Parity _____
(exclude this pregnancy)

Date of last menstrual period ...../...../.....

Clinically estimated gestation (weeks) _____

Maternal medical conditions while pregnant (may circle more than one)

1 Type II Diabetes Mellitus
2 Chronic renal disease
3 Essential hypertension
4 Epilepsy
5 Cardiac disease
6 Maternal injury
7 Abdominal operation
8 Malignancy (specify) .....
9 Infection (specify) .....
10 Maternal death (specify cause) .....
11 BMI > 40
88 Other .....

Obstetric Complications
(may circle more than one)

1 APH/Placenta praevia
2 APH-other
3 Abruptio placenta
4 Pregnancy induced hypertension
5 Prelabour ruptured membranes
6 ROM < 24 hours
7 ROM > 24 hours
8 Gestational diabetes
9 Threatened abortion
10 Threatened preterm labour
11 Fetal distress
12 IUGR
13 Oligohydramnios
14 Polyhydramnios
15 Twin twin transfusion syndrome (TTTS)
16 Fetal anomaly
17 Cervical incompetence
88 Other (specify) .....

.....
.....

Procedures and Operations

Number of ultrasounds _____

0 None
1 Cardiotocography
2 Chorionic villus sampling
3 Amniocentesis < 20 weeks
4 Amniocentesis > 20 weeks
5 X-Ray/CT scan
6 MRI
7 Cervical suture

Assisted Conception

0 No
1 Yes

Type of Assisted Conception

1 Hyperovulation
2 IVF/GIFT
3 Other ..... (specify)
4 Not stated

Responsibility for Antenatal Care
1 Obstetrician
2 General practitioner
3 Midwife led clinic (with max 2 GP)
4 Hospital Antenatal clinic
5 Shared care
6 Independent midwife
7 Birth centre or CMP protocols
8 Aboriginal Health Service
9 Not stated

Duration of pregnancy at first visit ____

No. of visits
1 None
2 1 to 5
3 6 to 10
4 11 to 15
5 16 to 20
6 More than 20

Baby's Place of Birth
1 The Canberra Hospital
2 TCH Birth Centre
3 Calvary Bruce Public
4 Calvary Bruce Private
5 Calvary John James
6 National Capital Private
7 Home
8 Born before arrival
0 Interstate Hospital

Intended Place of birth at onset of labour
1 Hospital
2 Birth centre
4 Home

Was mother transferred Antenatally?
1 No
2 Prior to labour
3 During labour

Transferred from
1 Planned homebirth
2 Birth centre
3 Another ACT hospital
4 Interstate hospital

Reason for transfer
1 PTL
2 PROM
3 Fetal anomaly
4 FDIU
5 PIH
6 APH
7 Infant condition
8 Septicaemia
9 Fetal distress

Drugs during pregnancy?
None.....0
Nicotine/Cigarettes... ..1
Heroin..... ...2
Methadone.....3
Cocaine..... .4
Marijuana.....5
Other (specify).....6
Alcohol.....7
Not stated.....9

Onset and type of labour
1 Spontaneous
2 Induction
3 No labour

Method of induction
1 Oxytocin
2 Prostaglandins
3 ARM
4 Other (specify).....

Augmented
0 No
1 Yes

Method of augmentation
1 Oxytocin
2 Prostaglandins
3 ARM
4 Other (specify).....

Reason for augmentation or induction
1 FDIU
2 Fetal anomaly
3 PIH
4 APH
5 Post term
6 Incoordinate contractions
7 Other

Corticosteroids
0 Not stated
1 None
2 Less than 24 hours prior to baby's birth
3 Complete
4 More than 7 days before baby's birth

Analgesia
1 None
2 Nitrous oxide
3 IMI/IV Narcotic
4 Epidural
5 Spinal
8 Other (specify) .....

Anaesthesia
1 None
2 Local to perineum
3 Pudendal
4 Epidural
5 Spinal
6 General
8 Other (specify)

Presentation
1 Vertex
2 Breech
3 Face
4 Brow
8 Other (compound specify).....

Method of birth
1 Spontaneous cephalic
2 Forceps
3 Vaginal breech
4 Caesarean Section
5 Vacuum extraction
8 Other (specify).....

If Caesarean Section was there a medical or obstetric emergency?
0 No
1 Yes

Complications of labour and birth
1 None
2 Fetal distress
3 Cord prolapse
4 Obstructed labour
5 PPH
6 Retained placenta
7 Major infection
8 Uterine rupture
9 Other

Birth Outcome
0 Stillbirth
2 Neonatal Death

Date of birth/stillbirth ……/……/……..

Time of birth ……

Date of Neonatal Death ……/……/……..

Time of death ……

Age at death ……..day(s) ……. hour(s)

Sex
1 Male
2 Female
3 Indeterminate

Plurality
1 Singleton
2 Twins
3 Triplets
8 Other

Birth Order
1 1
2 2
3 3
8 Other

Birth weight……_____grams

Head circumference ……_____cm

Length……_____cm

Apgar At 1 minute _____
At 5 minutes _____

No numbers for Apgars if a stillbirth without any resuscitation

Resuscitation – Active measures
1 None
2 Suction
3 Oxygen therapy
4 IPPV – bag and mask
5 IPPV – intubation
6 External cardiac massage

Resuscitation – Drug therapy
1 None
2 Narcotic antagonist
3 Sodium bicarbonate
4 Adrenaline
5 Other drugs (specify) ……

Who performed resuscitation?
0 Not done
1 Neonatologist
2 Paediatrician
3 Obstetrician
4 Neonatal Nurse
5 Neonatal Registrar
6 Paediatric Registrar
7 Obstetric Registrar
8 Midwife
9 Other (specify) ……..

Admission to NICU/SCN
1 Yes
2 No
Length of stay (days) _____

APH?
0 No
1 Yes

Bleeding during pregnancy?
0 Not stated
1 None
2 Placental abruption
3 Placenta praevia
4 Vasa praevia
5 Undetermined
6 Other ……

Was hypertension present?
0 Not stated
1 None
2 Chronic hypertension – essential
3 Chronic hypertension – renal disease
4 Pregnancy induced
5 Chronic superimposed PIH

ACT PMMC Staff will complete the remainder of the form from here

Histology of placenta?
0 No
1 Yes (If histology performed include report)
2 Unknown

Chorioamnionitis?
0 Unknown
1 None
2 Clinically suspected
3 Pathology proven
Clinically & pathologically proven

Funisitis?
0 Unknown
1 None
2 Pathologically proven

Lymphohistiocytic/chronic villitis?
0 No
1 Yes

Post Mortem

0 = No autopsy or examination performed

1 = Full autopsy performed (examination of all cavities and dissection of all organs)

2 = Limited autopsy performed (examination of one or more cavities (such as chest and/or abdomen) and dissection of one or more organs, but not the whole body)

3 = Autopsy performed but type unknown

4 = Other examination only (external examination of the body and growth parameters and any other relevant investigations such as radiological survey, genetic testing, placental histology, virology and microbiology)

9 = Not stated

Reason for not performing autopsy

1 = Autopsy not requested

2 = Autopsy requested but declined by parents

3 = Autopsy requested but not performed for other reason

4 = Autopsy requested but not performed and no reason specified

9 = Not stated why autopsy not performed or whether requested

0 = Not applicable (autopsy performed)

Type of post-mortem investigation: microbiology

0 = None

1 = Microbiology

9 = Not stated

Type of post-mortem investigation: genetic

0 = None

1 = Genetic

9 = Not stated

Type of post-mortem investigation: endocrinology

0 = None

1 = Endocrinology

9 = Not stated

Type of post-mortem investigation: biochemistry

0 = None

1 = Biochemistry

9 = Not stated

Type of post-mortem investigation: radiology

0 = None

1 = Radiology

9 = Not stated

Type of post-mortem investigation: serology

0 = None

1 = Serology

9 = Not stated

Type of post-mortem investigation: toxicology

0 = None

1 = Toxicology

9 = Not stated

Type of post-mortem investigation: Other

0 = None

1 = Other

9 = Not stated

Was death an unexplained antepartum death?

0 No

1 Yes

2 Unknown

Was there fetal growth restriction? (<10th centile)

0 No

1 Yes - idiopathic

2 Yes - placental pathology

3 Yes - Other

4 Unknown

Was there intrapartum asphyxia?

0 No

1 Yes

2 Unknown

Was there cord complications?

0 No

1 Yes (Specify) .....

.....

2 Unknown

Was haematological disease present?

0 No

1 Yes - Resus incompatibility

2 Yes - Other feto-maternal blood group incompatibility

3 Yes – Haemoglobinopathy

4 Unknown

Was a major fetal anomaly present?

0 No

1 Yes (specify).....

.....

2 Unknown

Was there fetal infection?

0 No

1 Yes

2 Unknown

Infection documented

0 None

1 GBS

2 Listeria

3 CMV

4 Parvovirus

5 HSV

6 Rubella

7 Toxoplasmosis

8 Syphilis

9 E. coli

10 U histolytica

11 Other .....

Other conditions present

0 None

1 Twin Twin Transfusion Syndrome (TTTS)

2 Idiopathic hydrops

3 Feto-maternal haemorrhage

4 Uterine abnormality

5 Drug dependence/abuse

6 Haemolytic disease

7 Birth trauma

8 Accident, poisoning or violence

9 Cervical incompetence

10 Other .....

Cause of Death Classifications

Australia and New Zealand Antecedent Classification of Perinatal Mortality (PSANZ-PDC)

1 Congenital abnormality
2 Perinatal infection
3 Hypertension
4 Antepartum haemorrhage
5 Maternal conditions
6 Specific perinatal conditions
7 Hypoxic peripartum death
8 Fetal growth restriction
9 Spontaneous preterm
10 Unexplained antepartum death
11 No obstetric antecedent

Australia and New Zealand Neonatal Death Classification (PSANZ-NDC)

1 Congenital abnormality
2 Extreme prematurity
3 Cardio-respiratory disorders
4 Infection
5 Neurological
6 Gastrointestinal
7 Other

PSANZ-PDC: _____PSANZ-NDC: _____

Note: Full Classification done by obstetrician, neonatologist, perinatal pathologist and midwife/clinical coder using the PSANZ classification guideline 2012.

ICD-10-AM Codes _____

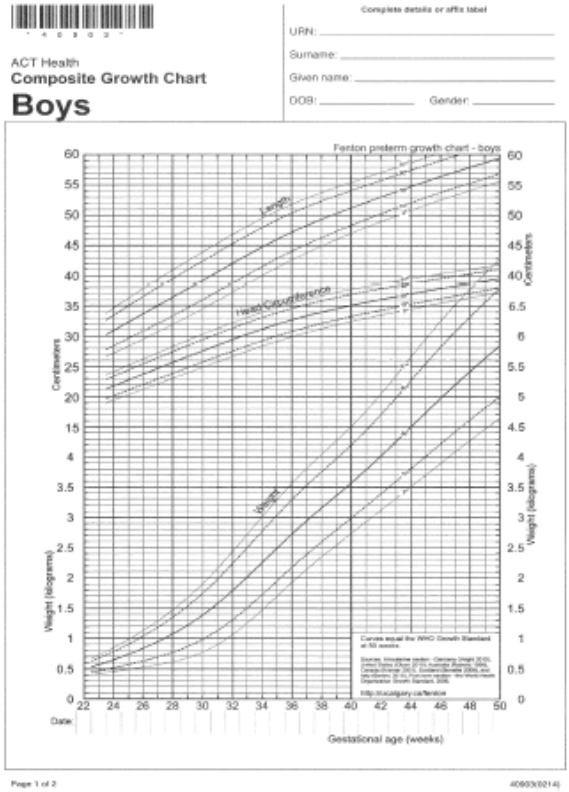
_____

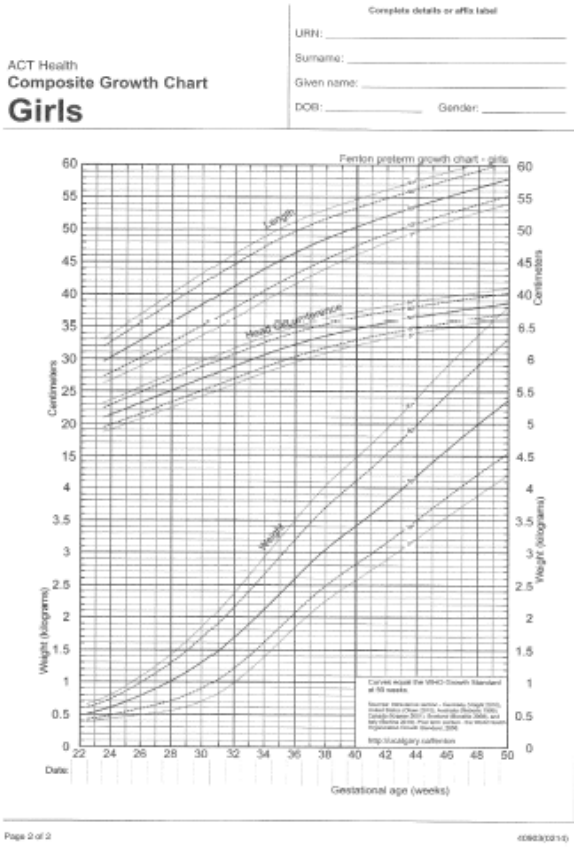
Type of Death

1. Fetal Death In-Utero
2. Intrapartum death
3. Termination of pregnancy
4. Non-admitted neonatal death
5. Admitted neonatal death

Contributory Factors

See Contributory Factors Form for Definite and Potential Contributory Factors for Stillbirth or Neonatal Death





Contributing Factors to Stillbirth or Neonatal Death (Tick those that apply) ID No._____ Initials ____
Nil Contributory Factors ☐

Mother	Definite	Potential	**Mother**	Definite	Potential
Antenatal Care			Inadequate intrapartum monitoring		
Insufficient antenatal care			Failure to expedite delivery - recognition		
Delay or lack of consultation in high risk pregnancy			Failure to expedite delivery - resources		
Inadequate care of diabetic mother					
Inadequate management of red cell antibodies			**Inadequate management of:**		
Inadequate identification/management of:			Sepsis		
			Breech/other malpresentation		
			Obstructed labour		
Hypertension/PET/eclampsia			Fetal distress		
Prolonged pregnancy			Preterm delivery		
Antepartum haemorrhage			Prolonged labour		
Multiple pregnancy			Instrumental delivery		
Premature rupture of membranes			Other maternal factor		
Growth restricted fetus					
Macrosomia					
Cervical incompetence					
Failure of transfer of patient:			**Neonate**		
PROM < 34 weeks			**Delay in recognition/treatment of:**		
PET < 34 weeks			Malformation		
Social/Environmental Factors			Haemorrhage		
Illicit maternal drugs			Sepsis		
Maternal smoking			Delay/difficulties/failure to transfer neonate		
Maternal alcohol use			Delay or lack of consultation		
Family neglect or ignorance			**Social/Environmental Factors**		
Domestic/family violence			Child abuse		
Failure/delay in reporting decreased movements			Family neglect or ignorance		
Failure to comply with treatment-attend antenatal care			Domestic/family violence		
Inadequate antenatal monitoring:			Failure to comply with treatment		
Clinical need for test apparent			**Inadequate:**		
No clinical evidence apparent			Paediatric management		
Misinterpretation of/undue reliance on tests			Nursery care		
Intrapartum care:			Resuscitation		
Unsuitable hospital for birth			**Inadequate management of:**		
Unsuitable location for labour/birth			Respiratory distress		
Failure to perform caesarean section			Low birth weight baby		
Planned delivery too early			Other neonatal factor		
Planned delivery too late					

9. APPENDIX C - PSANZ PERINATAL MORTALITY CLASSIFICATIONS

PSANZ Perinatal Death Classification (PSANZ-PDC)

- 1 - Congenital abnormality (including terminations for congenital abnormalities)
  - 1.1 - Central nervous system
  - 1.2 - Cardiovascular system
  - 1.3 - Urinary system
  - 1.4 - Gastrointestinal system
  - 1.5 - Chromosomal
  - 1.6 - Metabolic
  - 1.7 - Multiple/non chromosomal syndromes
  - 1.8 - Other congenital abnormality
    - 1.81 - Musculoskeletal
    - 1.82 - Respiratory
    - 1.83 - Diaphragmatic hernia
    - 1.84 - Haematological
    - 1.85 - Tumours
    - 1.88 - Other specified congenital abnormality
  - 1.9 - Unspecified congenital abnormality
- 2 - Perinatal infection
  - 2.1 - Bacterial
    - 2.11 - Group B Streptococcus
    - 2.12 - E coli
    - 2.13 - Listeria monocytogenes
    - 2.14 - Spirochaetal e.g. Syphilis
    - 2.18 - Other bacterial
    - 2.19 - Unspecified bacterial
  - 2.2 - Viral
    - 2.21 - Cytomegalovirus
    - 2.22 - Parvovirus
    - 2.23 - Herpes simplex virus
    - 2.24 - Rubella virus
    - 2.28 - Other viral
    - 2.29 - Unspecified viral
  - 2.3 - Protozoal e.g. Toxoplasma
  - 2.5 - Fungal
  - 2.8 - Other specified organism
  - 2.9 - Other unspecified organism
- 3 - Hypertension
  - 3.1 - Chronic hypertension: essential
  - 3.2 - Chronic hypertension: secondary, e.g. renal disease
  - 3.3 - Chronic hypertension: unspecified
  - 3.4 - Gestational hypertension
  - 3.5 - Pre-eclampsia
    - 3.51 - With laboratory evidence of thrombophilia
  - 3.6 - Pre-eclampsia superimposed on chronic hypertension
    - 3.61 - With laboratory evidence of thrombophilia
  - 3.9 - Unspecified hypertension
- 4 - Antepartum haemorrhage (APH)
  - 4.1 - Placental abruption
    - 4.11 - With laboratory evidence of thrombophilia
  - 4.2 - Placenta praevia
  - 4.3 - Vasa praevia
  - 4.8 - Other APH
  - 4.9 - APH of undetermined origin

(Continued)

PSANZ Perinatal Death Classification (PSANZ-PDC) *continued*

5 - Maternal conditions
- 5.1 - Termination of pregnancy for maternal psychosocial indications
- 5.2 - Diabetes / Gestational diabetes
- 5.3 - Maternal injury
  - 5.31 - Accidental
  - 5.32 - Non-accidental
- 5.4 - Maternal sepsis
- 5.5 - Lupus obstetric syndrome
- 5.6 - Obstetric cholestasis
- 5.8 - Other specified maternal conditions

6 - Specific perinatal conditions
- 6.1 - Twin-twin transfusion
- 6.2 - Fetomaternal haemorrhage
- 6.3 - Antepartum cord complications (e.g. cord haemorrhage; true knot with evidence of occlusion)
- 6.4 - Uterine abnormalities, e.g. bicornuate uterus, cervical incompetence
- 6.5 - Birth trauma (typically infants of >24 weeks gestation or >600g birthweight)
- 6.6 - Alloimmune disease
  - 6.61 - Rhesus
  - 6.62 - ABO
  - 6.63 - Kell
  - 6.64 - Alloimmune thrombocytopenia
  - 6.68 - Other
  - 6.69 - Unspecified
- 6.7 - Idiopathic hydrops
- 6.8 - Other specific perinatal conditions (includes iatrogenic conditions such as rupture of membranes after amniocentesis, termination of pregnancy for suspected but unconfirmed congenital abnormality).

7 - Hypoxic peripartum death (typically infants of >24 weeks gestation or >600g birthweight)
- 7.1 - With intrapartum complications
  - 7.11 - Uterine rupture
  - 7.12 - Cord prolapse
  - 7.13 - Shoulder dystocia
  - 7.18 - Other
- 7.2 - Evidence of non-reassuring fetal status in a normally grown infant (e.g. abnormal fetal heart rate, fetal scalp pH/lactate, fetal pulse oximetry without intrapartum complications)
- 7.3 - No intrapartum complications and no evidence of non-reassuring fetal status.
- 7.9 - Unspecified hypoxic peripartum death

8 - Fetal Growth Restriction (FGR)
- 8.1 - With evidence of reduced vascular perfusion on Doppler studies and /or placental histopathology (e.g. significant infarction, acute atherosis, maternal and/or fetal vascular thrombosis or maternal floor infarction)
- 8.2 - With chronic villitis
- 8.3 - No placental pathology
- 8.4 - No examination of placenta
- 8.8 - Other specified placental pathology
- 8.9 - Unspecified or not known whether placenta examined

9 - Spontaneous preterm (<37 weeks gestation)
- 9.1 - Spontaneous preterm with intact membranes, or membrane rupture <24 hours before delivery
  - 9.11 - With chorioamnionitis on placental histopathology
  - 9.12 - Without chorioamnionitis on placental histopathology
  - 9.13 - With clinical evidence of chorioamnionitis, no examination of placenta
  - 9.17 - No clinical signs of chorioamnionitis, no examination of placenta
  - 9.19 - Unspecified or not known whether placenta examined
- 9.2 - Spontaneous preterm with membrane rupture ?24 hours before delivery
  - 9.21 - With chorioamnionitis on placental histopathology
  - 9.22 - Without chorioamnionitis on placental histopathology
  - 9.23 - With clinical evidence of chorioamnionitis, no examination of placenta
  - 9.27 - No clinical signs of chorioamnionitis, no examination of placenta
  - 9.29 - Unspecified or not known whether placenta examined

(Continued)

PSANZ Perinatal Death Classification (PSANZ-PDC) *continued*

- 9.3 - Spontaneous preterm with membrane rupture of unknown duration before delivery
  - 9.31 - With chorioamnionitis on placental histopathology
  - 9.32 - Without chorioamnionitis on placental histopathology
  - 9.33 - With clinical evidence of chorioamnionitis, no examination of placenta
  - 9.37 - No clinical signs of chorioamnionitis, no examination of placenta
  - 9.39 - Unspecified or not known whether placenta examined
- 10 - Unexplained antepartum death
  - 10.1 - With evidence of reduced vascular perfusion on Doppler studies and /or placental histopathology (e.g. significant infarction, acute atherosis, maternal and/or fetal vascular thrombosis or maternal floor infarction)
  - 10.2 - With chronic villitis
  - 10.3 - No placental pathology
  - 10.4 - No examination of placenta
  - 10.8 - Other specified placental pathology
  - 10.9 - Unspecified or not known whether placenta examined
- 11 - No obstetric antecedent
  - 11.1 - Sudden Infant Death Syndrome (SIDS)
    - 11.11 - SIDS Category IA: Classic features of SIDS present and completely documented.
    - 11.12 - SIDS Category IB: Classic features of SIDS present but incompletely documented.
    - 11.13 - SIDS Category II : Infant deaths that meet Category I except for one or more features.
  - 11.2 - Postnatally acquired infection
  - 11.3 - Accidental asphyxiation
  - 11.4 - Other accident, poisoning or violence (postnatal)
  - 11.8 - Other specified
  - 11.9 - Unknown/Undetermined
    - 11.91 - Unclassified Sudden Infant Death
    - 11.92 - Other Unknown/Undetermined

Source: Parinatal Society of Australia and New Zealanad.

PSANZ Neonatal Death Classification (PSANZ-NDC)

1 - Congenital abnormality (including terminations for congenital abnormalities)
- 1.1 - Central nervous system
- 1.2 - Cardiovascular system
- 1.3 - Urinary system
- 1.4 - Gastrointestinal system
- 1.5 - Chromosomal
- 1.6 - Metabolic
- 1.7 - Multiple/non chromosomal syndromes
- 1.8 - Other congenital abnormality
  - 1.81 - Musculoskeletal
  - 1.82 - Respiratory
  - 1.83 - Diaphragmatic hernia
  - 1.84 - Haematological
  - 1.85 - Tumours
  - 1.88 - Other specified congenital abnormality
- 1.9 - Unspecified congenital abnormality

2 - Extreme prematurity (typically infants of ?24 weeks gestation or ?600g birthweight)
- 2.1 - Not resuscitated
- 2.2 - Unsuccessful resuscitation
- 2.9 - Unspecified or not known whether resuscitation attempted

3 - Cardio-respiratory disorders
- 3.1 - Hyaline membrane disease / Respiratory distress syndrome (RDS)
- 3.2 - Meconium aspiration syndrome
- 3.3 - Primary persistent pulmonary hypertension
- 3.4 - Pulmonary hypoplasia
- 3.5 - Chronic neonatal lung disease (typically, bronchopulmonary dysplasia)
- 3.8 - Other

4 - Infection
- 4.1 - Bacterial
  - 4.11 - Congenital bacterial
  - 4.12 - Acquired bacterial
- 4.2 - Viral
  - 4.21 - Congenital viral
  - 4.22 - Acquired viral
- 4.3 - Protozoal, e.g. Toxoplasma
- 4.4 - Spirochaetal, e.g. Syphilis
- 4.5 - Fungal
- 4.8 - Other
- 4.9 - Unspecified organism

5 - Neurological
- 5.1 - Hypoxic ischaemic encephalopathy / Perinatal asphyxia (typically infants of greater than 24 weeks gestation or greater than 600g birthweight)
- 5.2 - Intracranial haemorrhage
- 5.8 - Other

6 - Gastrointestinal
- 6.1 - Necrotising enterocolitis
- 6.8 - Other

7 - Other
- 7.1 - Sudden Infant Death Syndrome (SIDS)
  - 7.11 - SIDS Category 1A: Classic features of SIDS present and completely documented.
  - 7.12 - SIDS Category 1B: Classic features of SIDS present but incompletely documented.
  - 7.13 - SIDS Category II: Infant deaths that meet category 1 except for one or more features.
- 7.2 - Multisystem failure-only if unknown primary cause or trigger event
- 7.3 - Trauma
- 7.8 - Other specified
- 7.9 - Unknown/Undetermined
  - 7.91 - Unclassified Sudden Infant Death
  - 7.92 - Other Unknown/Undetermined

Source: Parinatal Society of Australia and New Zealanad.

10. GLOSSARY

ABORIGINAL AND TORRES STRAIT ISLANDER IDENTIFICATION (STATUS) refers to whether or not a person is of Aboriginal and/or Torres Strait Islander descent who self identifies as an Aboriginal and/or Torres Strait Islander and is accepted as such by the community in which he or she lives.

ANOMALY is a deviation from what is regarded as normal. An example would be a congenital malformation or congenital anomaly.

ANTENATAL refers to the time period of pregnancy before birth.

ANTEPARTUM FETAL DEATH refers to a fetal death occurring before the onset of labour.

BIRTH refers to the birth or delivery of a child.

BIRTH STATUS is the condition of the baby immediately after birth. The status may be a live birth or stillbirth (fetal death).

BIRTHWEIGHT is the first weight of the baby (stillborn or live born) obtained after birth. It is usually measured to the nearest five grams.

CONFIDENCE INTERVAL (95% CI) is a computed interval with a given probability (for example, 95%) that a true value of a variable such as a rate, mean or proportion, is contained between the low and high values. When the confidence intervals of two estimated values do not overlap, the values are statistically significantly different.

CONGENITAL ANOMALIES are the structural or anatomical abnormalities that are present at or existing from the time of birth, usually resulting from abnormal development in the first trimester of pregnancy. These were previously reported as birth defects, congenital anomalies or malformations.

CRUDE DEATH RATE is the number of deaths per 1,000 population (unless otherwise stipulated) in a given year (ABS definition).

FETAL DEATH refers to death prior to the complete expulsion or extraction from its mother of a product of conception of 20 or more completed weeks of gestation or of 400g or more of birthweight; the death is indicated by the fact that after separation the fetus does not breathe or show any other evidence of life, such as the beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles (WHO definition).

GESTATION is the period of development of a baby from the time of conception (fertilisation of the ovum) to birth.

GESTATIONAL AGE is the duration of the pregnancy in completed weeks from the first day of the last normal menstrual period. This is estimated from clinical assessment (including estimates from ultrasound examinations) when accurate information on the last menstrual period is not available or not consistent with the clinical assessment of gestational age.

GRAVIDITY refers to a pregnancy; the state of being pregnant, and is unrelated to the outcome.

ICD-9 (or ICD-9-CM) refers to the International Classification of Diseases Ninth Revision as developed by the World Health Organisation. The CM stands for Country Modification.

ICD-10 (or ICD-10-AM) refers to the International Classification of Diseases Tenth Revision as developed by the World Health Organisation. The AM stands for Australian Modification. In the ACT and most other states in Australia, ICD-10-AM codes were introduced in July 1998 to code hospital (morbidity) inpatient data.

INTERRUPTION OF PREGNANCY – refers to a medical termination of pregnancy most commonly for multiple pregnancies or congenital anomalies

INTRAPARTUM FETAL DEATH refers to a fetal death occurring during labour.6

LIVE BIRTH refers, in this publication, to the complete expulsion or extraction from its mother of a baby of 20 completed weeks gestation or more or at least 400 grams in birthweight or who after being born breathes or shows any other evidence of life, such as a heartbeat. The WHO defines live birth differently, as the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta attached, each product of such a birth is considered live born.

MISCARRIAGE is a common term used to describe pregnancy loss occurring at less than 20 weeks gestation

MORBIDITY is a diseased state or the ratio of sick to well in the community.

MORTALITY is a fatal outcome or the relative number of deaths (death rate) in a given population at a given time.

MULTIGRAVIDA refers to a woman who has been pregnant more than once.

MULTIPARA refers to pregnant women who have had at least one previous pregnancy resulting in a live birth or stillbirth.

MULTIPLE BIRTH refers to a pregnancy resulting in more than one birth. For example twins, triplets etc.

NEONATAL DEATH is the death of a live born baby within 28 days of birth.

NEONATAL MORBIDITY refers to any condition or disease of the baby diagnosed within 28 days of birth.

PARITY refers to the total number of previous pregnancies experienced by the woman that have resulted in a live birth or a stillbirth. The definition of parity has been changed since the last publication to align with the revised National Perinatal Data Development Committee's accepted definition.

PERINATAL refers to the period from 20 weeks gestation to within 28 days after birth.

PERINATAL DEATH refers to a stillbirth or a neonatal death.

PLURALITY refers to the number of fetuses or babies from a pregnancy. On this basis a pregnancy may be classified as single or multiple.

POST NEONATAL DEATH refers to the death of a baby after 28 completed days and before 365 completed days.

PREGNANCY LOSS refers to a loss of a pregnancy prior to 20 weeks gestation

PRETERM BIRTH refers to a birth before 36 completed weeks of gestation. Extremely preterm refers to births between 20 and 27 weeks gestation; moderately preterm refers to births between 28 and 31 weeks gestation; and late preterm refers to births between 32 and 36 weeks gestation.

PRIMIGRAVIDA refers to a woman pregnant for the first time.

PRIMIPARA refers to a pregnant woman who has had no previous pregnancy resulting in a live birth or stillbirth.

PROLONGED RUPTURE OF MEMBRANES refers to the spontaneous rupture of membranes for at least 18 hours prior to the onset of regular contractions with cervical dilation.

RESUSCITATION OF A BABY refers to active measures taken shortly after birth to assist the baby's ventilation and heartbeat, or to treat depressed respiratory effort and to correct metabolic disturbances.

SEPARATION (from hospital) refers to when a patient is discharged from hospital, transferred to another hospital or other health care accommodation, or dies in hospital following formal admission (ABS definition).

SINGLETON BIRTH refers to a pregnancy resulting in one birth.

STATISTICALLY SIGNIFICANT infers that it can be concluded on the basis of statistical analysis that it is highly probable.

STILLBIRTH see 'Fetal death'.

12. REFERENCES

Monk A, H. K. (2016). *Perinatal deaths in Australia, 1993–2012.* Canberra: AIHW.

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ACT Health acknowledges the Traditional Custodians of the land, the Ngunnawal people. ACT Health respects their continuing culture and connections to the land and the unique contributions they make to the life of this area. ACT Health also acknowledges and welcomes Aboriginal and Torres Strait Islander peoples who are part of the community we serve.

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