



**Australian Government**  
**Australian Institute of  
Health and Welfare**



# Stillbirths and neonatal deaths in Australia

2017 and 2018

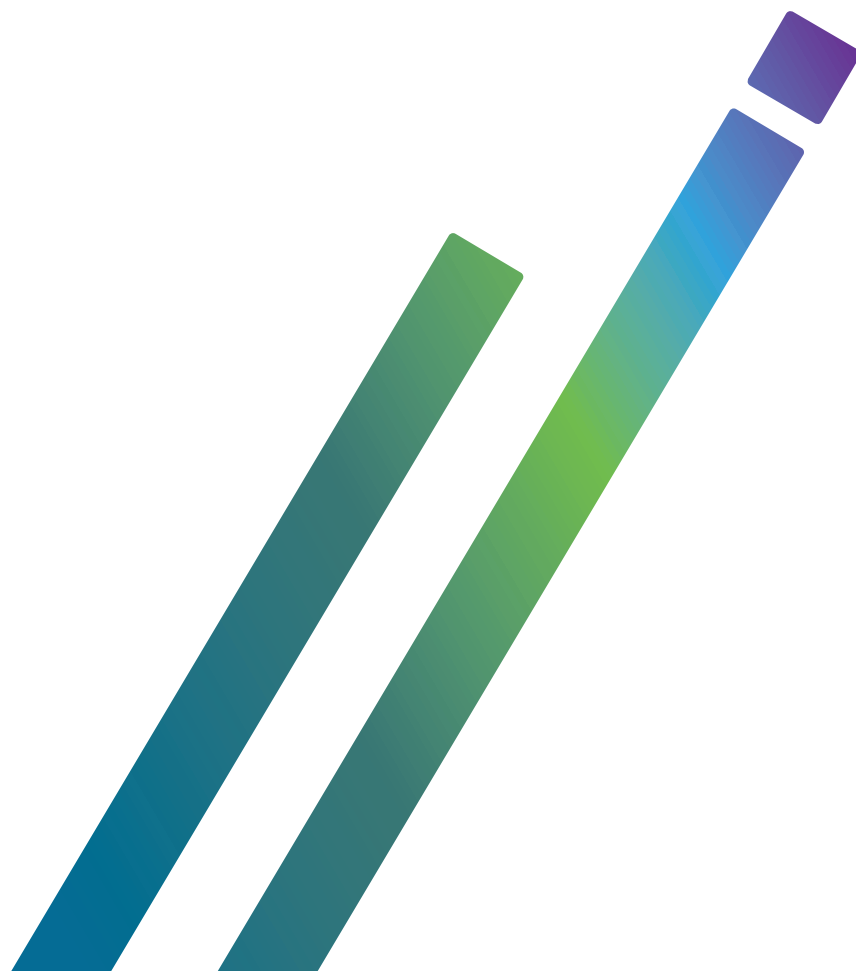


**AIHW**



# Stillbirths and neonatal deaths in Australia

2017 and 2018



The Australian Institute of Health and Welfare is a major national agency whose purpose is to create authoritative and accessible information and statistics that inform decisions and improve the health and welfare of all Australians.

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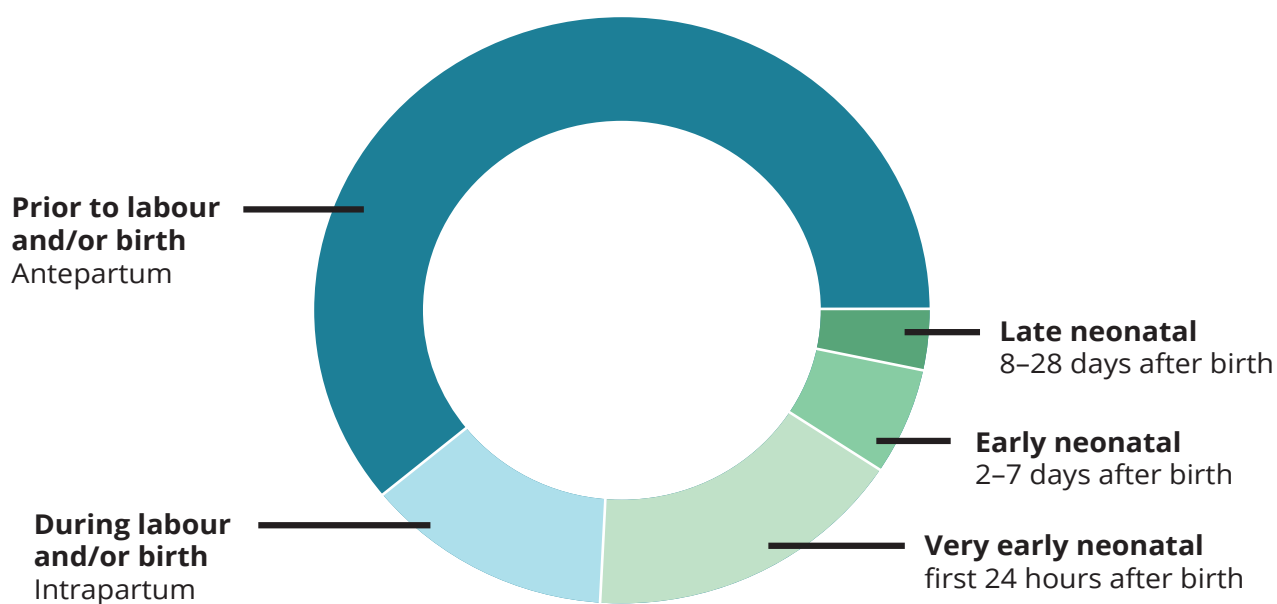
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# Stillbirths and neonatal deaths at a glance

Of the **5,808 perinatal deaths** in 2017 and 2018:

**74%** or **4,290** were **stillbirths**

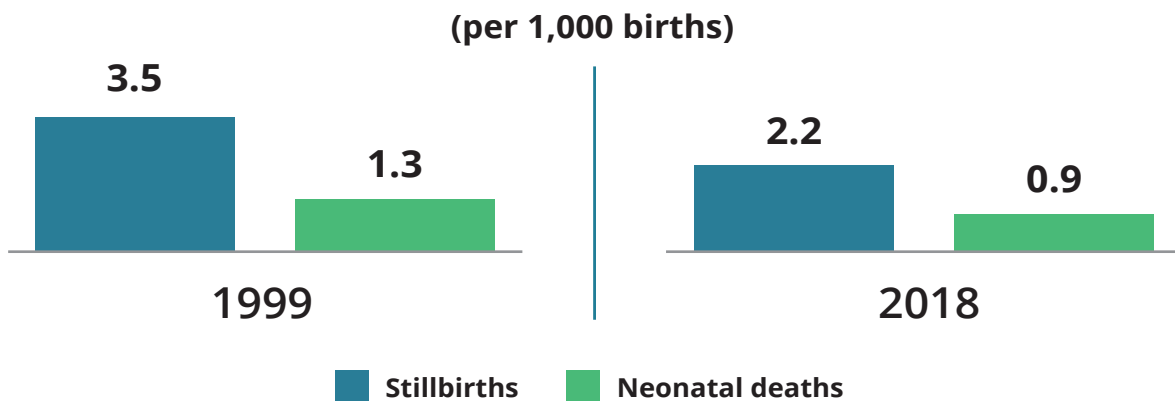
**26%** or **1,518** were **neonatal deaths**



**60%** of perinatal deaths occurred at 20-26 completed weeks gestation

Perinatal deaths are those occurring prior to or during labour and/or birth (stillbirth) or up to 28 days after birth (neonatal death) where babies are of 20 or more completed weeks gestation or with a birthweight of at least 400 grams.

### Perinatal mortality rates have decreased among births in the third trimester



### Congenital anomaly

was the most common cause of perinatal death



**22%** of stillbirths

occurred prior to labour with no known reason (unexplained antepartum death)



**27%** of neonatal deaths

occurred due to spontaneous preterm birth

Autopsies were performed for: **47%** of stillbirths and **36%** of neonatal deaths



# 1

## Overview

Australia is one of the safest places in the world for a baby to be born. However, every day in Australia, 6 babies are stillborn and 2 die within 28 days of birth (neonatal death). Collectively, these deaths are called perinatal deaths.

In 2017 and 2018 combined, there were:

- 608,696 babies born to 599,725 women.
- 5,808 perinatal deaths (1.0% of babies born). Of these deaths, 74% were stillbirths (4,290) and 26% were neonatal deaths (1,518).
- 9.5 perinatal deaths per 1,000 births (7.0 stillbirths per 1,000 total births and 2.5 neonatal deaths per 1,000 live births).

**Table 1.1: Stillbirths, neonatal deaths and perinatal deaths, 2017 and 2018**

Year	Total births	Live births	Stillbirths		Neonatal deaths		Perinatal deaths	
			Number	Rate	Number	Rate	Number	Rate
2017	305,667	303,478	2,174	7.1	800	2.6	2,974	9.7
2018	303,029	300,902	2,116	7.0	718	2.4	2,834	9.4
<b>Total</b>	<b>608,696</b>	<b>604,380</b>	<b>4,290</b>	<b>7.0</b>	<b>1,518</b>	<b>2.5</b>	<b>5,808</b>	<b>9.5</b>

### Notes

1. The rate is the number of deaths per 1,000 births. Stillbirth and perinatal mortality rates were calculated using total births. Neonatal mortality rates were calculated using only live births.
2. The sum of the number of stillbirths plus the number of live births may not always be equal to the total number of births as they are sourced from different data collections.

### What is a perinatal death?

Perinatal deaths are those occurring prior to or during labour and/or birth (stillbirth) or up to 28 days after birth (neonatal death) where the baby is of 20 or more completed weeks of gestation or with a birthweight of at least 400 grams.

For information about calculating mortality rates, see Appendix A.

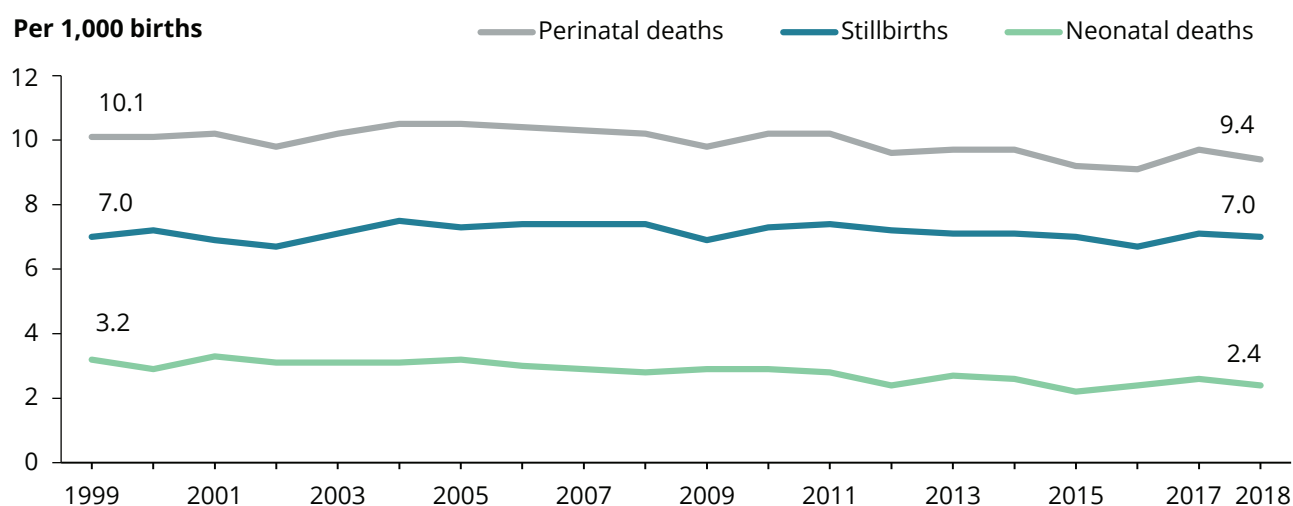


**Find out more:** Supplementary data tables to accompany this report can be found online at <http://www.aihw.gov.au/reports/mothers-babies/stillbirths-and-neonatal-deaths-in-australia-2017/data>.

## Perinatal deaths over time

Since 1999, the overall perinatal mortality rate in Australia has remained relatively constant. The highest rates were reported in 2004 and 2005 at 10.5 perinatal deaths per 1,000 births for each of those years and the lowest rate was 9.1 perinatal deaths per 1,000 births in 2016. From 1999 to 2018, the overall stillbirth rate has not changed notably (7.0 per 1,000 births in both years) while there has been a reduction in the rate of neonatal deaths (from 3.2 to 2.4 per 1,000 live births) (Figure 1.1).

**Figure 1.1: Rates of perinatal deaths in Australia, 1999–2018**



*Notes*

1. Data for this figure are available in Supplementary Table 1.
2. Data from the Northern Territory for 2000 to 2002 and from Victoria in 2009 were not available so have been excluded from both the numerator and denominator.

The majority of perinatal deaths occur in the second trimester of pregnancy (from 52.5% in 1999 to 66.5% in 2018). From 1999 to 2018, births in this gestational period accounted for less than 1% of all births.

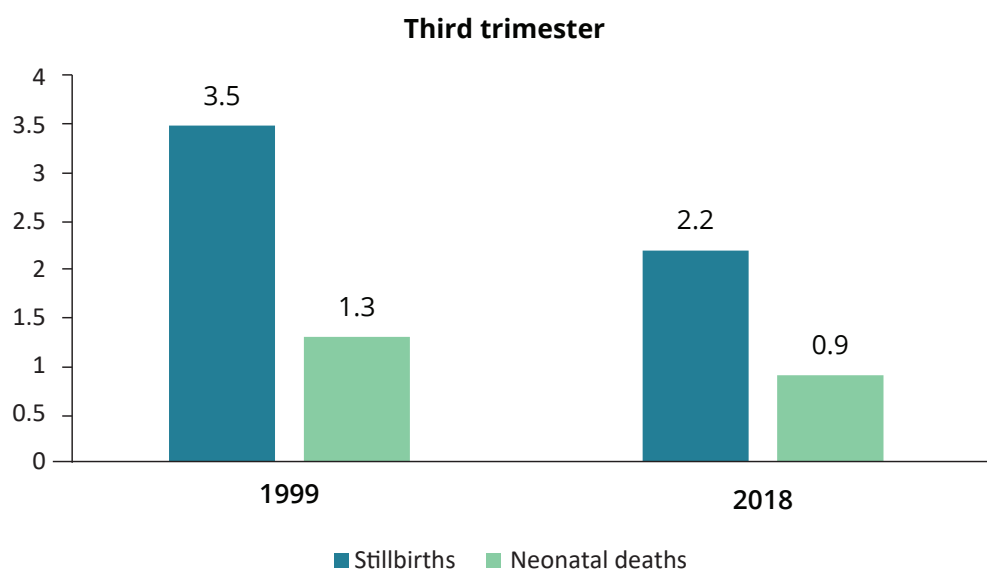
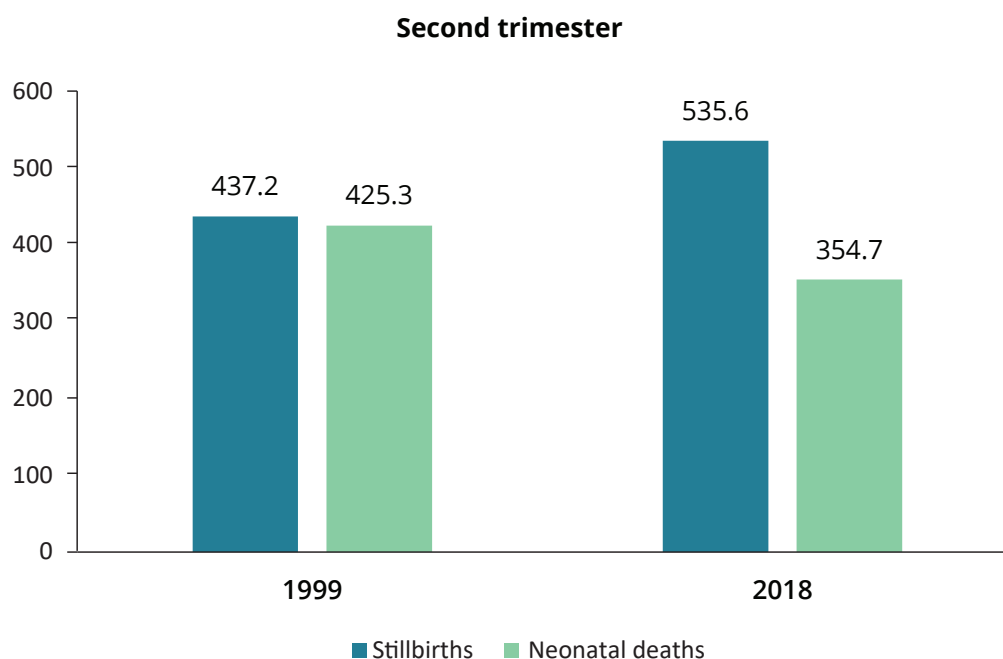
Neonatal deaths in both the second and third trimesters of pregnancy have decreased over this period, with deaths in the second trimester decreasing from 425.3 per 1,000 live births to 354.7 per 1,000 live births in 2018, and deaths in the third trimester decreasing from 1.3 per 1,000 live births to 0.9 per 1,000 live births in 2018 (Figure 1.2).

The rate of late gestation stillbirths in Australia (those occurring after 28 weeks of gestation, or in the third trimester of pregnancy) has decreased from 3.5 per 1,000 births in 1999 to 2.2 per 1,000 births in 2018. Evidence indicates that late gestational stillbirths are the most likely to be preventable (Flenady et al. 2016).

Offsetting the improvement in the rate of stillbirths occurring in the third trimester, is an increase in stillbirths in the second trimester, from 437.2 stillbirths per 1,000 births in 1999 to 535.6 stillbirths per 1,000 births in 2018.

This results in an apparent lack of improvement in the overall incidence of stillbirth. This increase in early gestation stillbirths may reflect improvements in data quality, as well as improvements in detecting congenital anomalies that may result in earlier diagnosis and clearer indications for the offer of termination of pregnancy, for this gestational period. Stillbirths resulting from a termination of pregnancy are included in these rates and throughout this report.

**Figure 1.2: Changes in perinatal mortality rates in Australia, 1999–2018**



*Notes*

1. Data for this figure are available in Supplementary Table 3.
2. The rate is the number of deaths per 1,000 births. Stillbirth and perinatal mortality rates were calculated using total births. Neonatal mortality rates were calculated using only live births.
3. While the second trimester is defined clinically as 14–27 weeks of gestation, the scope of the National Perinatal Mortality Data Collection is limited to deaths occurring from 20 weeks gestation or of at least 400 grams birthweight.

## An international perspective

For the purposes of international comparison, the World Health Organization (WHO) recommends that all countries report perinatal mortality data using the WHO international definitions of stillbirth and neonatal death (WHO 2006).

### World Health Organization international definitions

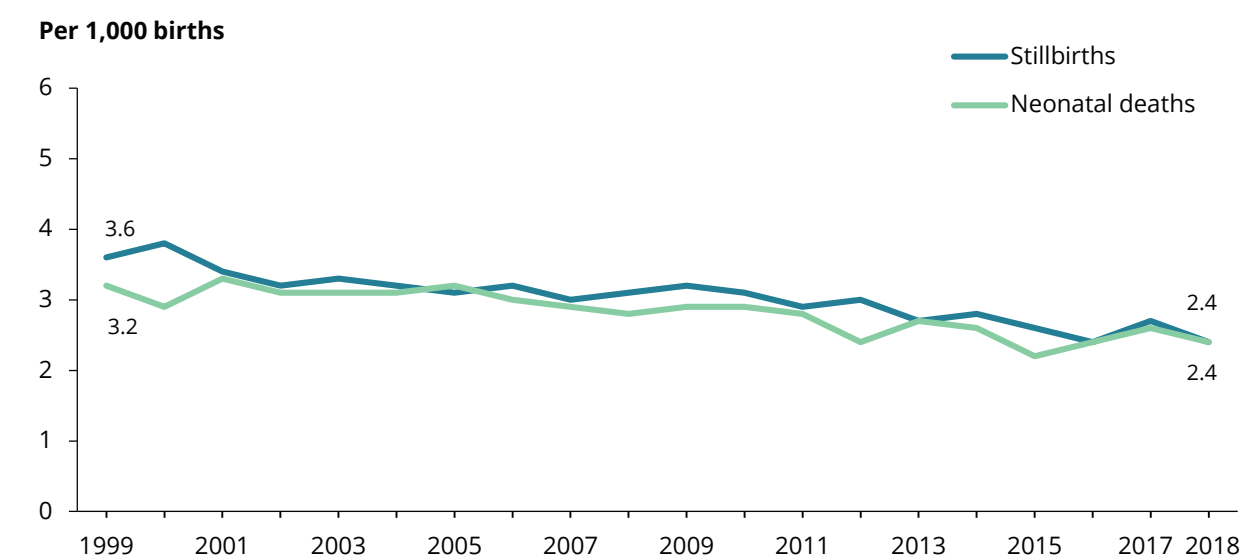
For the purposes of international comparison, stillbirths are defined as those occurring in the third trimester—born at 28 weeks of gestation or more, and/or weighing 1,000 grams or more (WHO 2015). This differs from the standard definitions used for stillbirths in Australia—born at 20 weeks of gestation or more, and/or weighing 400 grams or more.

Neonatal deaths are all registered deaths occurring within 28 days of birth. In Australia, registered deaths are those born at 20 weeks of gestation or more, and/or weighing 400 grams or more. As a result, the reporting of neonatal deaths is the same for both the Australian and WHO definitions.

The estimated worldwide stillbirth rate in 2019 was 13.9 stillbirths per 1,000 births, varying from 3.0 stillbirths per 1,000 births in combined high-income countries, including Australia and New Zealand, to 22.7 stillbirths per 1,000 in combined low-income countries (UNICEF 2020a). The estimated worldwide neonatal mortality rate in 2019 was 17 neonatal deaths per 1,000 live births, varying from 2–4 neonatal deaths per 1,000 live births in combined high-income countries, to 26 neonatal deaths per 1,000 live births in those countries that the United Nations classifies as ‘least developed countries’ (UNICEF 2020b).

Using the WHO definitions, which account only for stillbirths occurring from 28 weeks’ onwards, the rate of stillbirths in Australia has decreased from 3.6 stillbirths per 1,000 births in 1999 to 2.4 stillbirths per 1,000 births in 2018 (Figure 1.3). The rate of neonatal deaths in Australia is the same using both Australian and WHO definitions, and has decreased from 3.2 per 1,000 live births in 1999 to 2.4 per 1,000 live births in 2018.

**Figure 1.3: Rate of stillbirths and neonatal deaths in Australia, WHO definitions, 1999–2018**



Notes

1. Data for this figure are available in Supplementary Table 2.
2. Data from the Northern Territory for 2000 to 2002 and from Victoria in 2009 were not available so have been excluded from both the numerator and denominator.

# 2

## Gestational age, birthweight and plurality

### Gestational age

In 2017 and 2018, the majority (94.7%) of babies were born from 36+ completed weeks of gestation (Table 2.1). The largest proportion of perinatal deaths (38.3%) occurred from 20 to 22 weeks of gestation. Over 60% of perinatal deaths occurred between 20 and 26 weeks of gestation.

**Table 2.1: Perinatal deaths by gestational age, 2017 and 2018**

Completed weeks	Total births	Live births	Stillbirths		Neonatal deaths		Perinatal deaths	
			Number	Rate	Number	Rate	Number	Rate
20-22	2,232	508	1,719	770.2	508	1000.0	2,227	997.8
23-26	2,433	1,455	975	400.7	405	278.4	1,380	567.2
27-31	5,206	4,719	484	93.0	136	28.8	620	119.1
32-35	22,018	21,614	401	18.2	132	6.1	533	24.2
36+	576,623	575,905	704	1.2	336	0.6	1,040	1.8
Not stated	184	179	7	..	1	..	8	..
<b>Total</b>	<b>608,696</b>	<b>604,380</b>	<b>4,290</b>	<b>7.0</b>	<b>1,518</b>	<b>2.5</b>	<b>5,808</b>	<b>9.5</b>

#### Notes

1. The rate is the number of deaths per 1,000 births. Stillbirth and perinatal mortality rates were calculated using total births. Neonatal mortality rates were calculated using only live births.
2. The sum of the number of stillbirths plus the number of live births may not always be equal to the total number of births as they are sourced from different data collections.
3. Includes a small number of babies in 20-22 weeks of gestation who were born at less than 20 weeks of gestation but whose birthweight was greater than or equal to 400 grams.

### Birthweight

Stillbirth and neonatal mortality rates both decline dramatically with increasing birthweight. In 2017 and 2018, two-thirds (64.5%) of perinatal deaths occurred in babies weighing less than 1,000 grams, and 81.0% of perinatal deaths occurred in those classified as low birthweight (less than 2,500 grams).

**Table 2.2: Perinatal deaths by birthweight, 2017 and 2018**

Birthweight (grams)	Total births	Live births	Stillbirths		Neonatal deaths		Perinatal deaths	
			Number	Rate	Number	Rate	Number	Rate
Less than 2,500	43,993	40,365	3,615	82.2	1,183	29.3	4,798	109.1
2,500 to 4,499	557,340	556,770	564	1.0	294	0.5	858	1.5
4,500 and over	7,024	7,010	14	2.0	3	0.4	17	2.4
Not stated	339	235	97	..	38	..	135	..
<b>Total</b>	<b>608,696</b>	<b>604,380</b>	<b>4,290</b>	<b>7.0</b>	<b>1,518</b>	<b>2.5</b>	<b>5,808</b>	<b>9.5</b>

#### Notes

1. The rate is the number of deaths per 1,000 births. Stillbirth and perinatal mortality rates were calculated using total births. Neonatal mortality rates were calculated using only live births.
2. The sum of the number of stillbirths plus the number of live births may not always be equal to the total number of births as they are sourced from different data collections.

## Birthweight for gestational age

Birthweight and gestational age are interrelated and birthweight is best expressed in relation to gestational age to take this into account.

A baby may be small due to being pre-term (born early), or due to being small for gestational age (either due to genetic factors, or because it is the subject of a growth restriction within the uterus). Poor fetal growth is associated with increased risk of perinatal death and with fetal distress during labour, and these babies are more likely to develop long-term health conditions later in life (Queensland Health 2016).

Adjusting birthweight for gestational age allows for differences in a baby's growth status and maturity to be taken into account when examining their health outcomes at birth.

When looking at birthweight for gestational age, babies are often referred to in the following categories:

**Small for gestational age:** Babies with a birthweight less than the 10th percentile for their gestational age.

**Large for gestational age:** Babies with a birthweight more than the 90th percentile for their gestational age.

**Appropriate for gestational age:** Babies with a birthweight between the 10th and 90th percentiles for their gestational age.

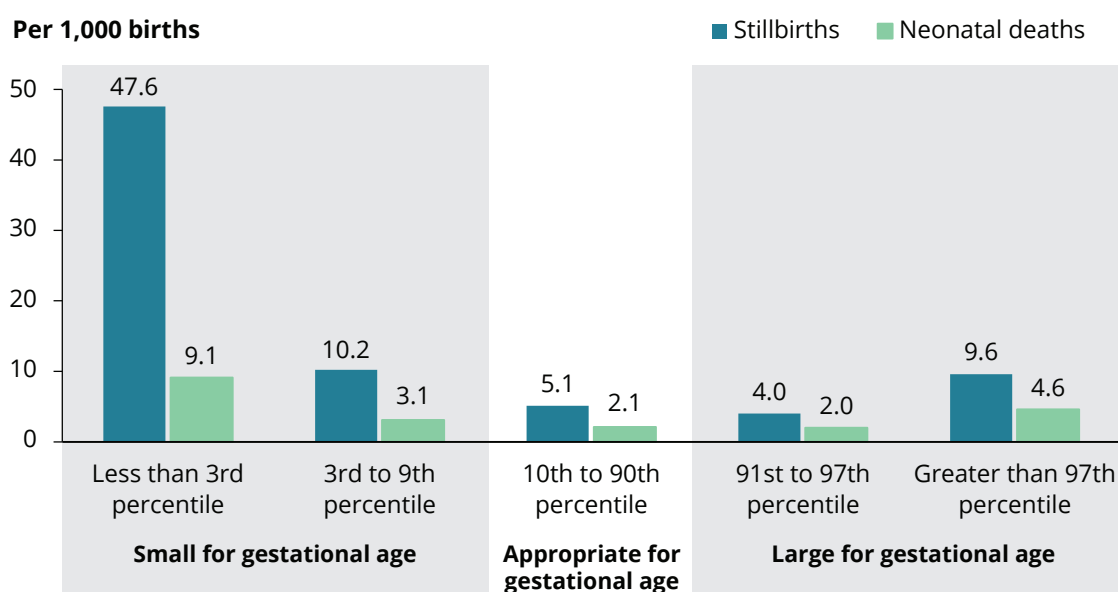
The most recently published birthweight percentiles were developed for Australia using information about live born singleton babies born between 2004 and 2013 (Johnson et al. 2016). To view this information, see the supplementary data tables.

Perinatal death was most common in babies who were small for their gestational age (24.7 deaths per 1,000 births), especially for those babies whose birthweight was less than the 3rd percentile for their gestational age (56.3 deaths per 1,000 births) (Figure 2.1).

Babies considered to be an appropriate birthweight for their gestational age had a perinatal mortality rate of 7.2 deaths per 1,000 births.

The lowest rates of perinatal death occurred among babies whose birthweight was in the 91st to 97th percentile for their gestational age (6.0 deaths per 1,000 births). However, for babies weighing greater than the 97th percentile the mortality rate was higher (14.2 per 1,000 births).

**Figure 2.1: Perinatal deaths by birthweight percentiles, 2017 and 2018**



*Notes*

1. Data for this figure are available in Supplementary Table 4.
2. Excludes records where birthweight and/or gestational age is not stated.

### Risk of perinatal death by gestational age

The gestational age-specific risk of perinatal death is the likelihood of a perinatal death occurring within a specified gestation interval. This is calculated by dividing the number of perinatal deaths occurring in the gestational interval (numerator) by the total number of unborn babies at the start of the interval (denominator). The perinatal mortality risk is expressed as the proportion per 1,000 babies remaining in utero.

The risk of a baby dying in the perinatal period was greatest before 24 weeks of gestation and after 40 weeks of gestation (Table 2.3).

**Table 2.3: Risk of perinatal death per 1,000 fetuses remaining in utero by gestational age, 2017 and 2018**

Gestational age	Babies remaining in utero at start of interval	Stillbirths		Neonatal deaths		Neonatal deaths	
		Number	Risk	Number	Risk	Number	Risk
20–21 weeks	608,512	1,183	1.9	321	0.5	1,504	2.5
22–23 weeks	607,006	982	1.6	367	0.6	1,349	2.2
24–25 weeks	605,558	393	0.6	180	0.3	573	0.9
26–27 weeks	604,477	260	0.4	78	0.1	338	0.6
28–29 weeks	603,122	179	0.3	50	0.1	229	0.4
30–31 weeks	601,489	181	0.3	53	0.1	234	0.4
32–33 weeks	598,641	189	0.3	59	0.1	248	0.4
34–35 weeks	592,832	212	0.4	73	0.1	285	0.5
36–37 weeks	576,623	292	0.5	119	0.2	411	0.7
38–39 weeks	499,543	252	0.5	138	0.3	390	0.8
40 weeks or more	188,883	160	0.8	79	0.4	239	1.3
Not stated	184	7		1		8	
<b>Total</b>	<b>608,696</b>	<b>4,290</b>		<b>1,518</b>		<b>5,808</b>	

*Notes*

1. Risk calculation excludes births where gestational age is not stated.
2. Includes a small number of babies in 20–21 weeks of gestation who were born at less than 20 weeks of gestation but whose birthweight was greater than or equal to 400 grams.

# Plurality

Plurality refers to the number of babies resulting from a pregnancy.

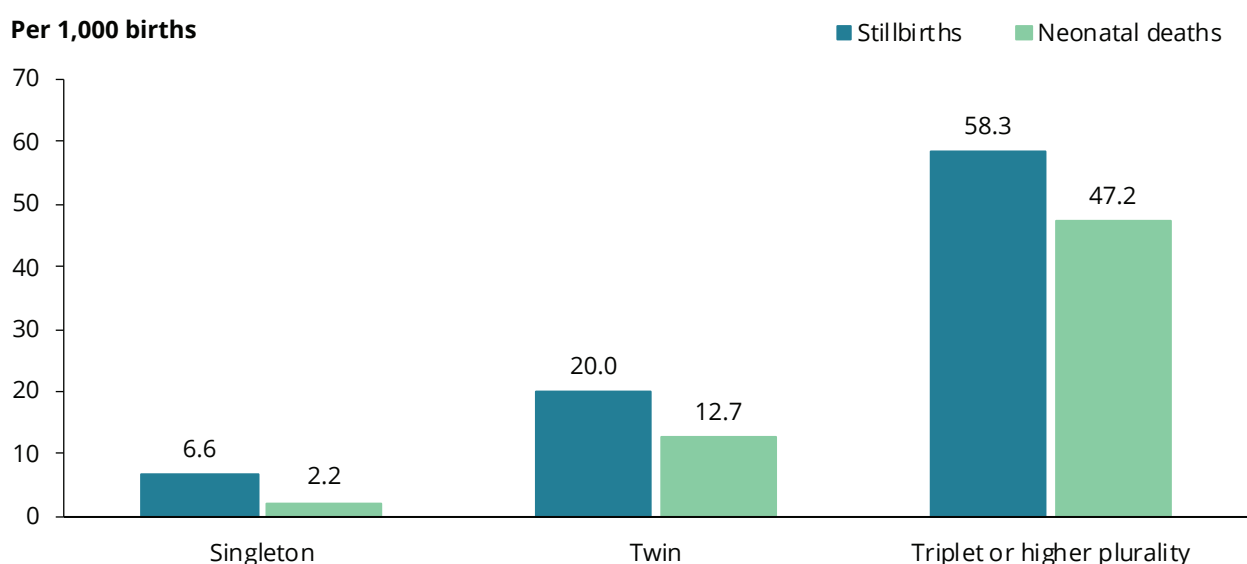
In 2017 and 2018, 97.1% of all births were singleton births (where only one baby was born) and 2.9% were multiple births (twins, triplets and higher pluralities such as quadruplets).

The perinatal mortality rate for singleton births was 8.8 deaths per 1,000 births, with 3,917 (75.3%) of those being stillbirths (Supplementary Table 4).

The perinatal mortality rate for twins (32.5 deaths per 1,000 births) was almost 4 times that of singletons, and for higher multiples (triplets or higher pluralities) it was almost 12 times that of singletons (102.8 deaths per 1,000 births).

As plurality increased, neonatal deaths became more prominent relative to stillbirths (Figure 2.2). This increased incidence of neonatal death primarily relates to a greater risk of pre-term birth associated with twins and higher pluralities.

**Figure 2.2: Perinatal deaths by plurality, 2017 and 2018**



Note: Data for this figure are available in Supplementary Table 4.

# 3

## Maternal characteristics

This section presents data on maternal characteristics including demographics and medical and obstetric conditions that have been commonly associated with stillbirth or neonatal death. While these characteristics are more commonly found in women with pregnancies that result in stillbirth and neonatal death, it is understood that they are often unavoidable and it is not implied that these characteristics are the cause of perinatal deaths.



### Higher for Aboriginal and Torres Strait Islander mothers

In 2017 and 2018, babies born to Indigenous women accounted for 4.6% of all births and 7.8% of all perinatal deaths. The rate of perinatal death for babies born to Indigenous women was 16.4 deaths per 1,000 births (Figure 3.1). A section focusing on Indigenous women and their babies can be found on page 35.



### Higher for those living in remote and very remote areas

The majority of babies born in 2017 and 2018 were to mothers who lived in major cities (72.1%) and inner regional areas (16.0%), while 2.4% were born to mothers living in remote and very remote areas.

The rate of perinatal death increased with remoteness, and was notably higher for babies born to those living in very remote areas (18.1 deaths per 1,000 births) compared to those in major cities (9.2 deaths per 1,000 births) (Figure 3.1). The incidence of perinatal death in remote and very remote areas should be interpreted with caution due to the relatively small numbers of women living in these areas.



### Socioeconomic disadvantage more common

Women living in the most disadvantaged areas of Australia (quintiles 1 and 2) were 25% more likely to have a perinatal death than women living in the least disadvantaged areas (quintiles 4 and 5) (Figure 3.1).



### Similar rates for mothers born overseas

There was little overall difference in the perinatal mortality rates of babies of women who were born in Australia compared to babies of women born overseas (9.3 and 9.9 perinatal deaths per 1,000 births respectively) (Figure 3.1).

The highest rates of perinatal death were amongst babies of mothers born in:

- Melanesia (including Papua New Guinea) (24.3 perinatal deaths per 1,000 births)
- Central and West Africa (21.2 perinatal deaths per 1,000 births)
- North Africa (16.0 perinatal deaths per 1,000 births).

Further disaggregation of country of birth can be found in Supplementary Table 5. It is important to note that country of birth is not always an indication of ethnicity.

**Figure 3.1: Perinatal deaths by select demographics of the mother, 2017 and 2018**

	Perinatal deaths		Stillbirths	Neonatal deaths
	Number	Deaths per 1,000 births	Deaths per 1,000 births	Deaths per 1,000 live births
<b>Total</b>	<b>5,808</b>	<b>9.5</b>	<b>7.0</b>	<b>2.5</b>
<b>State or territory of birth</b>				
New South Wales	1,656	8.7	6.2	2.5
Victoria	1,754	11.1	8.5	2.6
Queensland	1,100	9.1	6.4	2.7
Western Australia	576	8.5	6.8	1.7
South Australia	353	9.1	6.8	2.3
Tasmania	100	9.0	6.0	3.0
Australian Capital Territory	147	11.9	9.1	2.9
Northern Territory	122	16.0	10.5	5.6
<b>State or territory of mother's usual residence</b>				
New South Wales	1,755	9.0	6.5	2.5
Victoria	1,576	10.3	7.8	2.5
Queensland	1,116	9.3	6.6	2.7
Western Australia	597	8.8	7.0	1.8
South Australia	354	8.9	6.7	2.3
Tasmania	104	9.3	6.4	3.0
Australian Capital Territory	113	10.4	8.0	2.4
Northern Territory	136	16.7	11.2	5.6
Not stated	14	..		
<b>Mother's Indigenous status</b>				
Indigenous	455	16.4	11.1	5.3
Non-Indigenous	5,318	9.2	6.8	2.4
Not stated	35	..		
<b>Remoteness of mother's usual residence</b>				
Major cities	4,017	9.2	6.8	2.3
Inner regional	943	9.7	7.0	2.6
Outer regional	535	11.0	7.8	3.2
Remote	90	10.1	7.6	2.5
Very remote	100	18.1	12.1	6.0
Not stated/unable to be assigned	123	..		
<b>Disadvantage quintile of mother's area of usual residence</b>				
Quintile 1 (Most disadvantaged)	1,446	12.0	8.6	3.4
Quintile 2	1,168	10.1	7.5	2.6
Quintile 3	1,147	8.8	6.3	2.5
Quintile 4	1,067	8.7	6.6	2.2
Quintile 5 (Least disadvantaged)	848	7.8	6.1	1.7
Not stated/unable to be assigned	132	..		
<b>Mother's country of birth</b>				
Australia (includes External Territories)	3,662	9.3	6.9	2.5
Born overseas	2,108	9.9	7.3	2.6
Not stated	38	..		

**Notes**

1. Data for this figure, as well as perinatal deaths by Primary Health Network, are available in Supplementary Table 5.
2. The perinatal mortality rate for Victoria includes terminations due to maternal psychosocial indications.
3. In 2017 and 2018, 14.7% of women who gave birth in the ACT were non-ACT residents (proportion calculated after excluding records where state/territory of usual residence was 'Not stated'). These women are often transferred to the ACT requiring access to maternity services for high-risk pregnancies.
4. State or territory of mother's usual residence excludes those residing in Other territories and non-Australian residents.
5. 'Not stated/unable to be assigned' includes non-Australian residents and those whose geographic area of usual residence was 'Not stated'.
6. Disadvantage proportions are calculated after excluding records where mother's area of usual residence was 'Not stated'.
7. Further disaggregation of mother's country of birth can be found on page 9 and Supplementary Table 5.

**Figure 3.2: Perinatal deaths by select characteristics of the mother, 2017 and 2018**

	Perinatal deaths		Stillbirths	Neonatal deaths
	Number	Deaths per 1,000 births	Deaths per 1,000 births	Deaths per 1,000 live births
<b>Total</b>	<b>5,808</b>	<b>9.5</b>	<b>7.0</b>	<b>2.5</b>
<b>Mother's age</b>				
Under 20	233	18.2	14.1	4.2
20–24	815	11.7	8.6	3.1
25–29	1,422	8.8	6.4	2.3
30–34	1,839	8.4	6.2	2.3
35–39	1,153	9.6	7.2	2.5
40 or over	341	12.7	9.7	3.1
Not stated	5	..		
<b>Smoking status</b>				
Smoked only in the first 20 weeks	128	10.5	7.4	3.0
Smoked throughout pregnancy	784	17.0	12.3	4.7
Reported not smoking in pregnancy	4,715	8.7	6.5	2.3
Not stated	181	..		
<b>Parity (number of previous pregnancies)</b>				
0	2,672	10.4	7.7	2.7
1	1,633	7.6	5.7	2.0
2	828	9.6	7.3	2.4
3	332	11.2	8.0	3.3
4 or more	299	14.6	10.1	4.5
Not stated	44	..		
<b>Previous stillbirth</b>				
Had a previous stillbirth	106	24.7	18.9	5.9
No previous stillbirth	1,780	9.0	6.6	2.4
Not applicable—No previous births	1,672	11.3	8.5	2.9
Not stated	18	..		
<b>Diabetes during pregnancy</b>				
Pre-existing diabetes	123	22.9	16.4	6.6
Gestational diabetes	329	4.7	3.1	1.6
None	4,474	9.9	7.3	2.6
Not stated	3	..		
<b>Body mass index of mother</b>				
Less than 18.5	195	8.5	6.2	2.3
18.5–24.9	2,489	8.4	6.2	2.2
25.0–29.9	1,312	8.6	6.4	2.2
30 or more	1,251	10.4	7.6	2.8
Not stated	561	..		

**Notes**

1. Data for this figure are available in Supplementary Table 5.
2. Methods used for data collection of smoking status can vary across jurisdictions.
3. Previous stillbirth in multiparous women excludes NSW and WA for 2017 and 2018 as data were not available.
4. Mother's diabetes status excludes Victoria in 2017 as data were not available.
5. Tests to diagnose gestational diabetes are usually performed between 24 and 28 weeks of gestation (or earlier for those considered high risk). Therefore perinatal deaths that occur prior to the gestational age where testing for gestational diabetes usually occurs may be under represented in this category.
6. Body mass index of mother is usually collected at the first antenatal visit; the stage of pregnancy at which this occurs can vary across women and pregnancies.

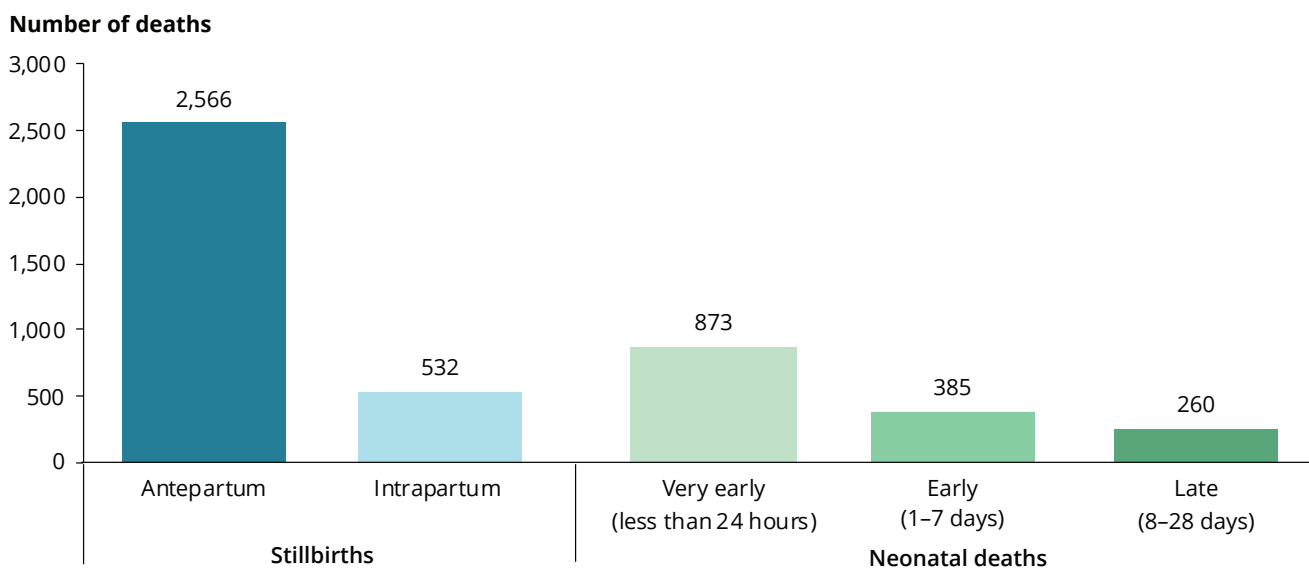
<b>Maternal age</b>	<p>Perinatal mortality rates were highest among babies born to women aged under 20 (18.2 perinatal deaths per 1,000 births) and women aged 40 or over (12.7 perinatal deaths per 1,000 births) (Figure 3.2). Perinatal mortality was lowest for babies born to women aged 25–34.</p>
<b>Smoking during pregnancy</b>	<p>Perinatal death was more common among babies born to women who smoked during pregnancy (Figure 3.2). Perinatal mortality rates for babies born to women who reported smoking only within the first 20 weeks' were lower than for those women who smoked throughout (10.5 and 17.0 perinatal deaths per 1,000 births, respectively).</p> <p>It should be noted that methods used for data collection of a woman's smoking status can vary across jurisdictions.</p>
<b>Parity</b>	<p>Parity refers to the number of previous pregnancies resulting in live births or stillbirths, excluding the current pregnancy.</p> <p>Babies born to women with a parity of 4 or more had the highest rate of perinatal death (14.6 perinatal deaths per 1,000 births), while babies born to mothers with a parity of 1 or 2 had the lowest rate of perinatal death (8.2 perinatal deaths per 1,000 births) (Figure 3.2).</p>
<b>Previous stillbirth</b>	<p>Women who have had a previous stillbirth were almost 3 times as likely to experience another stillbirth when compared with women who had had at least 1 previous pregnancy and no previous stillbirth (18.9 and 6.6 stillbirths per 1,000 births respectively) (Figure 3.2).</p> <p>Data on previous stillbirth were not available from New South Wales or Western Australia so these states have been excluded from the analysis.</p>
<b>Diabetes</b>	<p>Perinatal death was more than twice as likely among babies born to women with pre-existing diabetes mellitus compared with babies born to women with no diabetes (22.9 and 9.9 perinatal deaths per 1,000 births respectively) (Figure 3.2).</p>
<b>Body mass index (BMI)</b>	<p>Babies born to women classed as obese (BMI of 30 or more) had higher perinatal mortality rates than those born to women with a BMI below 30 (Figure 3.2).</p>

# 4

## Timing of perinatal deaths

Antepartum stillbirth (fetal death prior to the onset of labour) was the most frequent type of perinatal death (55.6%) (Figure 4.1). A further 11.5% of perinatal deaths were the result of intrapartum stillbirth (fetal death during labour and birth). The majority (57.5%) of neonatal deaths occurred within the first 24 hours following birth (18.9% of perinatal deaths). Timing of perinatal death was not stated for 1,192 (20.5%) of perinatal deaths and these deaths have been excluded from this analysis.

**Figure 4.1: Perinatal deaths by timing of death, 2017 and 2018**



**Notes**

1. Data for this figure are available in Supplementary Table 7.
2. Excludes 1,192 stillbirth records where timing is not stated.

### Intrapartum stillbirths and very early neonatal deaths

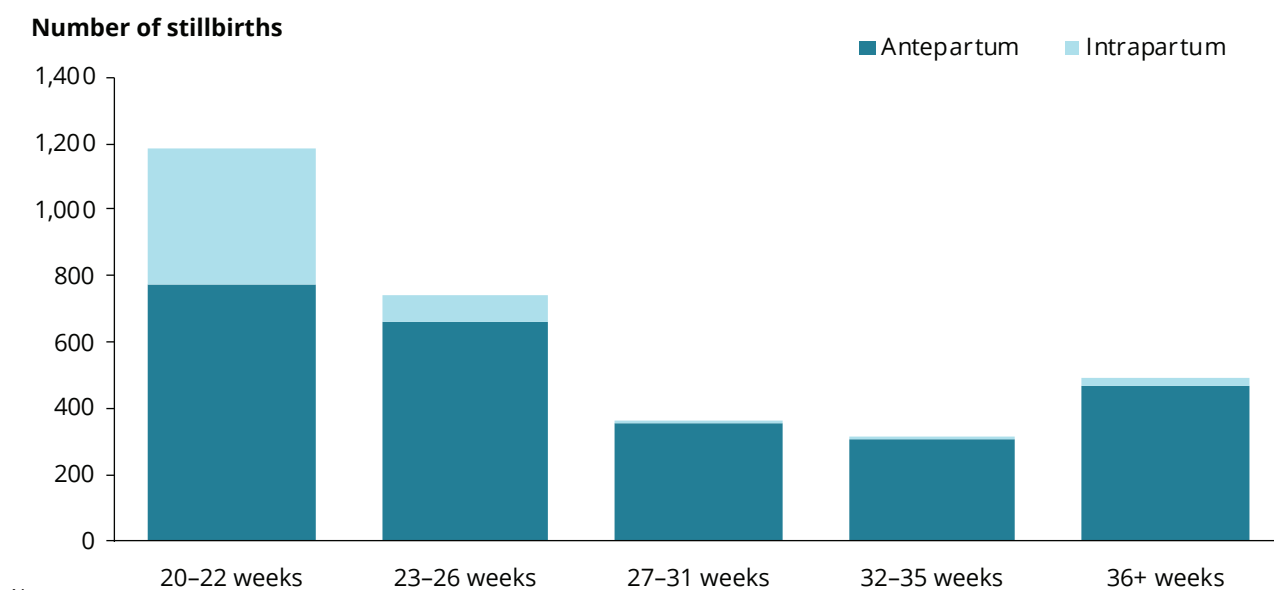
Intrapartum stillbirth (fetal death occurring during labour and birth) and neonatal death within the first 24 hours after birth are often considered together as, in many cases, the process leading to the death is a continuum that may result in death before or after the birth occurs. The most common causes of these deaths were congenital anomaly (38.2%) and spontaneous preterm birth (29.5%) (Supplementary Table 8).

## Timing of stillbirths

Where the timing of fetal death was stated (3,098 deaths), 82.8% of stillbirths in 2017 and 2018 were antepartum (occurring prior to the onset of labour). The majority of antepartum stillbirths (56.1%) occurred prior to 27 weeks of gestation, while 18.3% occurred at 36 or more weeks of gestation (Figure 4.2).

Fetal deaths occurring during labour and birth (intrapartum) accounted for 17.2% of stillbirths where timing of death was stated. More than three-quarters (78.0%) of intrapartum stillbirths occurred prior to 23 weeks of gestation.

**Figure 4.2: Stillbirths by timing of death and gestation, 2017 and 2018**



**Notes**

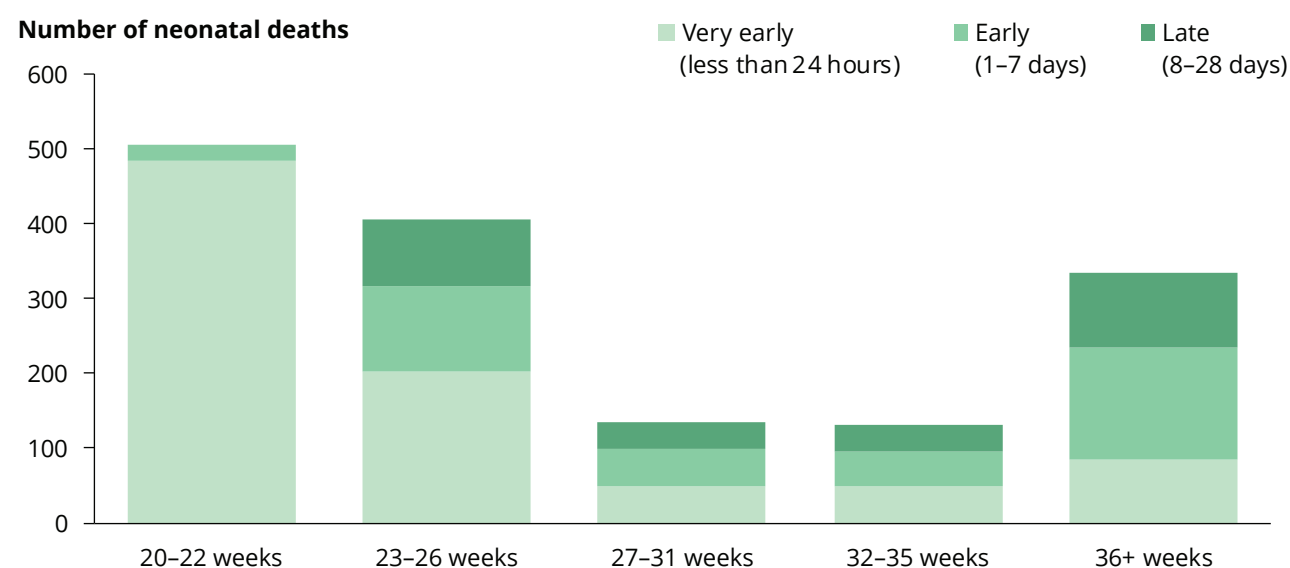
1. Data for this figure are available in Supplementary Table 7.
2. Excludes 1,197 records where timing or gestation of stillbirth were not stated.

## Timing of neonatal deaths

More than half of neonatal deaths (57.5%) occurred within 24 hours of birth and a total of 82.9% occurred within the first 7 days of life (Figure 4.3).

The majority of neonatal deaths (69.1%) occurred in babies born before 32 weeks of gestation. One-third (33.5%) of neonatal deaths occurred in babies born prior to 23 weeks of gestation, with 95.5% of these babies dying within the first 24 hours after birth.

**Figure 4.3: Neonatal deaths by timing of death and gestation, 2017 and 2018**



**Notes**

1. Data for this figure are available in Supplementary Table 7.
2. Excludes 1 record where gestation was not stated.

# 5

## Causes of perinatal deaths

Causes of perinatal deaths were classified according to the Perinatal Society of Australia and New Zealand (PSANZ) Perinatal Mortality Classification System, version 2.2 (Flenady et al. 2009), as part of each state or territory's perinatal mortality review process. The PSANZ Perinatal Mortality Classification System incorporates a Perinatal Death Classification (PSANZ-PDC) and a Neonatal Death Classification (PSANZ-NDC). The PSANZ-PDC system classifies all perinatal deaths (stillbirths and neonatal deaths) by the single most important factor that led to the chain of events which resulted in the death.

The PSANZ-NDC is an additional classification system, applied only to neonatal deaths, to identify the single most significant condition present in the neonatal period—the time between birth and 28 days—that caused the baby's death.

### PSANZ-PDC primary classification groups:

These are the 11 high-level groups used in reporting:

**Congenital anomaly:** deaths in which a congenital anomaly in the baby (whether structural, functional or chromosomal) is considered to have been of major importance in the cause of the death.

**Perinatal infection:** primary infections occurring in term and preterm neonatal and fetal deaths and secondary infections in term infants (such as Group B Streptococcus and Cytomegalovirus).

**Hypertension:** deaths where a hypertensive disorder, such as pre-eclampsia or pre-existing high blood pressure, is considered to have led to the death.

**Antepartum haemorrhage:** all perinatal deaths where the primary factor leading to the death was bleeding from the placental bed in the woman's uterus.

**Maternal conditions:** deaths where a medical condition (eg diabetes) or a surgical condition (eg appendicitis) or an injury in the mother (including complications or treatment of that condition) is the cause.

**Specific perinatal conditions:** deaths of normally formed, appropriately grown babies, in which a specific perinatal condition, such as cord entanglement or a blood group incompatibility, was the main underlying cause.

**Hypoxic peripartum deaths:** deaths from acute or chronic inadequate oxygen supply from the placenta of normally formed babies, typically of >24 weeks of gestation or >600grams birthweight.

**Fetal growth restriction:** deaths of babies that were significantly low birthweight for their gestational age or where repeated antenatal ultrasound measurements had shown poor or absent growth before death.

**Spontaneous preterm:** deaths of normally formed, appropriately grown preterm babies following spontaneous onset of preterm labour or spontaneous rupture of membranes, irrespective of whether labour was subsequently induced and mode of delivery.

**Unexplained antepartum death:** deaths of normally formed fetuses prior to the onset of labour where no predisposing factors are considered likely to have caused the death.

**No obstetric antecedent:** Includes Sudden Infant Death Syndrome (SIDS), postnatally acquired infection (such as Newborn Intensive Care Unit-acquired septicaemia from an intravenous line), accidental asphyxiation and other accidents, poisoning or violence.

The most common causes of perinatal deaths in 2017 and 2018 were (Table 5.1):

- congenital anomaly (30.8%)
- unexplained antepartum death (16.2%)
- spontaneous preterm birth (11.8%).

At gestations below 26 weeks', maternal conditions, including medical or surgical conditions or injury, was a more common cause of death and unexplained antepartum death was a less common cause (Supplementary Table 8).

**Table 5.1: Number of perinatal deaths by cause of death (PSANZ-PDC), 2017 and 2018**

Cause of death		Stillbirths	Neonatal deaths	Perinatal deaths
Congenital anomaly	Structural, functional or chromosomal abnormality	1,298	492	1,790
Unexplained antepartum death	Fetal death prior to labour where no cause is identified	942	–	942
Spontaneous preterm	Spontaneous onset of preterm labour or rupture of membranes	284	404	688
Maternal conditions	Medical/surgical disorders of the mother or complications or treatment	523	82	605
Specific perinatal conditions	Specific conditions in appropriately grown babies without congenital anomalies	330	111	441
Antepartum haemorrhage	Bleeding after 20 weeks gestation from placental origin	261	126	387
Fetal growth restriction	Fetal growth restriction without evidence of maternal or fetal cause	274	29	303
Perinatal infection	Primary and secondary infections in term infants	205	94	299
Hypertension	Pre-existing and pregnancy related hypertensive disorder	109	37	146
Hypoxic peripartum death	Acute or chronic hypoxia of normally formed babies	39	61	100
No obstetric antecedent	SIDS, postnatally acquired infection, accident or trauma	–	41	41
Not stated	PSANZ-PDC classification not stated	25	41	66
<b>Total</b>		<b>4,290</b>	<b>1,518</b>	<b>5,808</b>

*Notes*

1. Detailed definitions of PSANZ-PDC categories are on page 15.
2. The category of unexplained antepartum death includes deaths of normally-formed fetuses prior to the onset of labour where no identified predisposing factors are considered likely to have caused the death and deaths where insufficient information was available to allow more specific classification of the cause of death.
3. The classification 'no obstetric antecedent' is not applicable for stillbirths as it is only applied to neonatal deaths. The classification 'unexplained antepartum death' is not applicable for neonatal deaths as it is only applied to stillbirths.

## Causes of stillbirths

In 2017 and 2018, the main causes of stillbirth were:

- congenital anomaly (30.3%)
- unexplained antepartum death (22.0%)
- maternal conditions (12.2%).

Congenital anomaly was the main cause of stillbirth for singleton babies (31.8%), while specific perinatal conditions was the main cause of death for multiples (33.4%) (Table 5.2).

Congenital anomaly was the leading cause of stillbirth for babies who were considered small for their gestational age (26.6%) as well as those considered large for their gestational age (43.0%).

**Table 5.2: Stillbirths by cause of death (PSANZ-PDC), plurality and birthweight percentiles, 2017 and 2018**

Cause of death	Stillbirths		Plurality		Birthweight percentiles	
	Number	Total (%)	Singleton	Multiple	< 10th percentile	> 90th percentile
Congenital anomaly	1,298	30.3%	31.8%	14.0%	26.6%	43.0%
Unexplained antepartum death	942	22.0%	21.3%	29.1%	23.0%	14.9%
Maternal conditions	523	12.2%	13.1%	2.7%	5.9%	9.4%
Specific perinatal conditions	330	7.7%	5.2%	33.4%	7.5%	11.3%
Spontaneous preterm	284	6.6%	6.1%	11.9%	3.7%	4.9%
Fetal growth restriction	274	6.4%	6.6%	4.3%	18.3%	6.0%
Antepartum haemorrhage	261	6.1%	6.6%	1.1%	4.2%	5.8%
Perinatal infection	205	4.8%	5.0%	2.4%	3.7%	6.5%
Hypertension	109	2.5%	2.7%	0.8%	5.6%	1.6%
Hypoxic peripartum death	39	0.9%	1.0%	0.3%	0.7%	1.6%
Not stated	25	0.6%	0.6%	0.0%	0.6%	0.3%
<b>Number of stillbirths</b>	<b>4,290</b>		<b>3,917</b>	<b>371</b>	<b>1,202</b>	<b>309</b>

Interpretation of the incidence of congenital abnormality as the leading cause of stillbirths is complicated by the fact that a proportion of these stillbirths were due to terminations of pregnancy, including some in relation to non-lethal abnormalities.

The number of terminations of pregnancy cannot be determined because they are not consistently reported in the National Perinatal Mortality Data Collection due to variations in jurisdictional legislation and reporting practices.

For stillbirths, congenital anomalies, maternal conditions and spontaneous preterm birth were more prominent causes of death at gestations below 26 weeks', while unexplained antepartum death, specific perinatal conditions, fetal growth restriction and antepartum haemorrhage were more prominent causes of death at later gestations (Table 5.3).

**Table 5.3: Stillbirths by cause of death (PSANZ-PDC) and gestational age group, 2017 and 2018**

Cause of death	Stillbirths		Gestational age at birth				
	Number	Total (%)	20–22 weeks	23–26 weeks	27–31 weeks	32–35 weeks	36+ weeks
Congenital anomaly	1,298	30.3%	38.3%	35.2%	29.3%	21.7%	9.5%
Unexplained antepartum death	942	22.0%	15.2%	15.9%	25.8%	29.9%	39.3%
Maternal conditions	523	12.2%	14.0%	16.1%	5.6%	8.2%	9.1%
Specific perinatal conditions	330	7.7%	5.0%	6.2%	10.7%	12.5%	11.4%
Spontaneous preterm	284	6.6%	13.4%	4.9%	0.2%	0.7%	0.1%
Fetal growth restriction	274	6.4%	3.3%	7.6%	11.8%	9.5%	6.8%
Antepartum haemorrhage	261	6.1%	4.5%	6.5%	6.6%	8.0%	8.0%
Perinatal infection	205	4.8%	5.2%	3.7%	3.3%	3.2%	7.1%
Hypertension	109	2.5%	0.8%	3.5%	5.2%	4.0%	3.0%
Hypoxic peripartum death	39	0.9%	0.1%	0.3%	0.2%	1.7%	3.7%
Not stated	25	0.6%	0.1%	0.2%	1.2%	0.5%	2.0%
<b>Number of stillbirths</b>	<b>4,290</b>		<b>1,719</b>	<b>975</b>	<b>484</b>	<b>401</b>	<b>704</b>

The most common causes of death also varied depending on a mother's age at birth. For stillbirths, maternal conditions was a more prominent cause of death for babies born to younger mothers (under 20 and 20–24), while congenital anomaly was a more prominent cause of death for babies born to older mothers (aged 35–39 and 40 or over) (Table 5.4).

**Table 5.4: Stillbirths by cause of death (PSANZ-PDC) and maternal age group, 2017 and 2018**

Cause of death	Stillbirths		Mother's age at birth					
	Number	Total (%)	Under 20	20–24	25–29	30–34	35–39	40 or over
Congenital anomaly	1,298	30.3%	16.1%	24.7%	29.8%	31.9%	34.2%	33.1%
Unexplained antepartum death	942	22.0%	17.8%	23.0%	23.4%	22.3%	21.5%	16.5%
Maternal conditions	523	12.2%	31.7%	18.2%	12.5%	8.6%	8.9%	13.1%
Specific perinatal conditions	330	7.7%	8.3%	5.0%	7.2%	8.1%	9.1%	8.5%
Spontaneous preterm	284	6.6%	4.4%	7.0%	6.5%	6.3%	7.6%	6.2%
Fetal growth restriction	274	6.4%	5.0%	6.5%	6.7%	7.1%	4.9%	7.3%
Antepartum haemorrhage	261	6.1%	7.2%	5.8%	5.8%	7.1%	4.7%	6.5%
Perinatal infection	205	4.8%	5.0%	4.8%	4.5%	5.0%	5.3%	3.1%
Hypertension	109	2.5%	3.3%	3.2%	2.3%	2.2%	2.6%	3.5%
Hypoxic peripartum death	39	0.9%	0.0%	1.0%	1.0%	0.9%	0.8%	1.5%
Not stated	25	0.6%	1.1%	0.7%	0.4%	0.6%	0.6%	0.8%
<b>Number of stillbirths</b>	<b>4,290</b>		<b>180</b>	<b>599</b>	<b>1,044</b>	<b>1,346</b>	<b>857</b>	<b>260</b>

# Causes of neonatal deaths

## **PSANZ-NDC primary classification groups:**

The PSANZ-NDC classification system is applied only to neonatal deaths and classifies them by the most significant condition present in the baby, in the neonatal period, leading to the death.

**Congenital anomaly:** deaths in which a congenital anomaly in the baby (whether structural, functional or chromosomal) is considered to have been of major importance in the cause of the death.

**Extreme prematurity:** neonatal death in infants deemed too immature for resuscitation or continued life support beyond the delivery room (typically infants of gestational age  $\leq 24$  weeks' or birthweight  $\leq 600$  grams).

**Cardio-respiratory disorders:** neonatal deaths in which a cardio-respiratory condition (such as respiratory distress syndrome or meconium aspiration syndrome) is considered to have been the major contributor to the death.

**Infection:** neonatal deaths in which infection is considered to have been the major contributor (such as early onset Group B Streptococcus sepsis, pneumonia).

**Neurological:** neonatal deaths in which asphyxial brain damage (hypoxic ischaemic encephalopathy) or intracranial haemorrhage was considered to have been the major contributor.

**Gastrointestinal:** Primarily includes neonatal deaths related to necrotizing enterocolitis (a medical condition where a portion of the bowel dies).

**Other:** Includes Sudden Infant Death Syndrome (SIDS), multisystem failure, trauma and treatment complications.

In 2017 and 2018, the main PSANZ-PDC classified causes of neonatal death were (Table 5.5):

- congenital anomaly (32.4%)
- spontaneous preterm birth (26.6%)
- antepartum haemorrhage (8.3%).

Congenital anomaly was the main cause of neonatal death for singleton babies (36.1%), while spontaneous pre-term birth was the main cause of death for multiples (38.6%).

Congenital anomaly was the leading cause of neonatal death for babies who were considered small for their gestational age (49.1%) and those considered large for their gestational age (35.3%). Spontaneous pre-term birth was the main cause of neonatal deaths for babies considered an appropriate birthweight for their gestational age (31.6%).

**Table 5.5: Neonatal deaths by cause of death (PSANZ-PDC), plurality and birthweight percentiles, 2017 and 2018**

Cause of death	Neonatal deaths		Plurality		Birthweight percentiles	
	Number	Total (%)	Singleton	Multiple	< 10th percentile	> 90th percentile
Congenital anomaly	492	32.4%	36.1%	12.0%	49.1%	35.3%
Spontaneous preterm	404	26.6%	24.5%	38.6%	11.0%	22.7%
Antepartum haemorrhage	126	8.3%	8.5%	7.3%	6.2%	8.0%
Specific perinatal conditions	111	7.3%	5.5%	17.6%	6.2%	13.3%
Perinatal infection	94	6.2%	5.8%	8.6%	4.0%	4.0%
Maternal conditions	82	5.4%	5.2%	6.4%	2.6%	8.0%
Hypoxic peripartum death	61	4.0%	4.7%	0.4%	2.6%	3.3%
Not stated	41	2.7%	3.0%	0.9%	3.7%	2.0%
No obstetric antecedent	41	2.7%	2.9%	1.7%	1.1%	1.3%
Hypertension	37	2.4%	2.3%	3.4%	4.4%	2.0%
Fetal growth restriction	29	1.9%	1.7%	3.0%	9.2%	0.0%
<b>Number of neonatal deaths</b>	<b>1,518</b>		<b>1,284</b>	<b>233</b>	<b>273</b>	<b>150</b>

For neonatal deaths, spontaneous preterm and antepartum haemorrhage were more prominent causes of death at gestations below 26 weeks', while congenital anomaly, hypoxic peripartum death, and no obstetric antecedent were more prominent causes of death at later gestations (Table 5.6).

A higher proportion of deaths are noted as cause 'Not stated' for later gestations, particularly babies aged 36 weeks' or more (Supplementary Table 8).

**Table 5.6: Neonatal deaths by cause of death (PSANZ-PDC) and gestational age group, 2017 and 2018**

Cause of death	Neonatal deaths		Gestational age at birth				
	Number	Total (%)	20-22 weeks	23-26 weeks	27-31 weeks	32-35 weeks	36+ weeks
Congenital anomaly	492	32.4%	27.0%	14.1%	33.8%	62.9%	50.0%
Spontaneous preterm	404	26.6%	39.6%	42.5%	17.6%	2.3%	1.2%
Antepartum haemorrhage	126	8.3%	10.2%	10.4%	10.3%	4.5%	3.6%
Specific perinatal conditions	111	7.3%	7.5%	10.1%	8.1%	8.3%	3.0%
Perinatal infection	94	6.2%	5.9%	8.4%	8.1%	6.8%	3.0%
Maternal conditions	82	5.4%	6.7%	5.7%	5.9%	4.5%	3.3%
Hypoxic peripartum death	61	4.0%	0.4%	0.5%	3.7%	3.0%	14.3%
Not stated	41	2.7%	0.0%	1.0%	4.4%	2.3%	8.3%
No obstetric antecedent	41	2.7%	1.0%	0.0%	0.0%	1.5%	10.1%
Hypertension	37	2.4%	1.2%	4.9%	2.2%	2.3%	1.5%
Fetal growth restriction	29	1.9%	0.6%	2.5%	5.9%	1.5%	1.8%
<b>Number of neonatal deaths</b>	<b>1,518</b>		<b>508</b>	<b>405</b>	<b>136</b>	<b>132</b>	<b>336</b>

The most common causes of death also varied depending on a mother's age at the baby's birth. For neonatal deaths, spontaneous preterm and maternal conditions were more prominent causes of death for babies born to younger mothers, while congenital anomaly and specific perinatal conditions were more prominent causes of death for babies born to older mothers (Table 5.7).

A higher proportion of deaths are noted as cause 'Not stated' for the babies born to older mothers (Supplementary Table 8).

**Table 5.7: Stillbirths by cause of death (PSANZ-PDC) and maternal age group, 2017 and 2018**

Cause of death	Neonatal deaths		Mother's age at birth					
	Number	Total (%)	Under 20	20–24	25–29	30–34	35–39	40 or over
Congenital anomaly	492	32.4%	30.2%	30.6%	30.7%	34.5%	31.1%	38.3%
Spontaneous preterm	404	26.6%	34.0%	27.3%	30.7%	27.2%	19.6%	23.5%
Antepartum haemorrhage	126	8.3%	7.5%	11.1%	8.2%	8.5%	6.8%	6.2%
Specific perinatal conditions	111	7.3%	3.8%	6.9%	6.9%	6.3%	9.5%	11.1%
Perinatal infection	94	6.2%	5.7%	6.5%	6.9%	5.1%	7.1%	6.2%
Maternal conditions	82	5.4%	11.3%	6.5%	4.8%	6.5%	3.7%	1.2%
Hypoxic peripartum death	61	4.0%	3.8%	1.9%	4.0%	3.7%	6.8%	2.5%
Not stated	41	2.7%	0.0%	1.4%	2.6%	3.7%	2.4%	3.7%
No obstetric antecedent	41	2.7%	1.9%	5.6%	3.2%	1.2%	3.4%	0.0%
Hypertension	37	2.4%	0.0%	0.9%	1.3%	2.0%	6.1%	2.5%
Fetal growth restriction	29	1.9%	1.9%	1.4%	0.8%	1.4%	3.7%	4.9%
<b>Number of neonatal deaths</b>	<b>1,518</b>		<b>53</b>	<b>216</b>	<b>378</b>	<b>493</b>	<b>296</b>	<b>81</b>

In 2017 and 2018, the most frequent PSANZ-NDC causes of neonatal deaths (the most significant condition present in the baby in the neonatal period leading to the death) were (Table 5.8):

- extreme prematurity (34.0%)
- congenital anomaly (32.4%)
- neurological conditions (11.9%).

**Table 5.8: Neonatal deaths by cause of death (PSANZ-NDC), 2017 and 2018**

Cause of death		Neonatal deaths	
		Number	%
Extreme prematurity	Too immature for resuscitation or death after unsuccessful resuscitation	516	34.0%
Congenital anomaly	Structural, functional or chromosomal abnormality	492	32.4%
Neurological	Includes deaths from asphyxial brain damage or intracranial haemorrhage	180	11.9%
Cardio-respiratory disorders	Such as respiratory distress syndrome or meconium aspiration syndrome	111	7.3%
Infection	Congenital or acquired infection such as sepsis or pneumonia	82	5.4%
Other	Includes SIDS, multisystem failure, trauma and treatment complications	54	3.6%
Not stated	PSANZ-NDC classification not stated	54	3.6%
Gastrointestinal	Gastrointestinal conditions including necrotizing enterocolitis	29	1.9%
<b>Total</b>		<b>1,518</b>	<b>100%</b>

Note: Detailed definitions of PSANZ-NDC categories are on page 19.

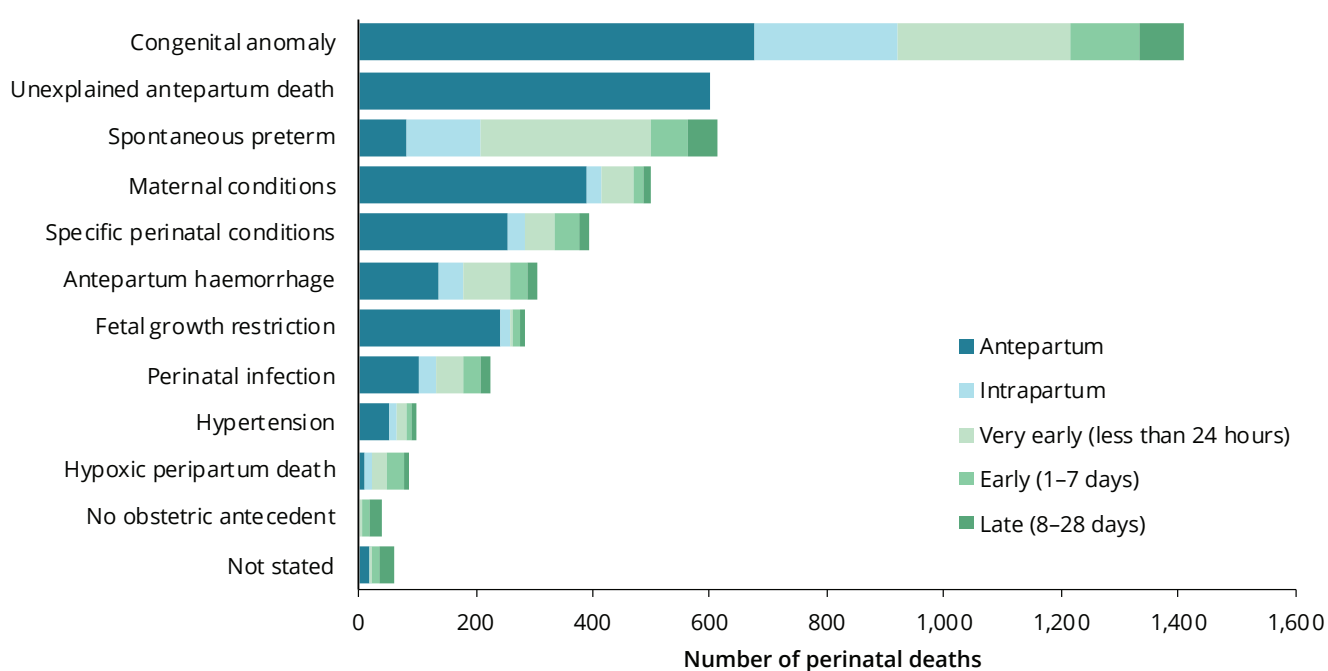
## Timing and causes of perinatal deaths

The most common causes of antepartum stillbirths were congenital anomaly (26.4%), unexplained antepartum death (23.4%), maternal conditions (15.1%) and specific perinatal conditions (9.9%) (Figure 5.1).

Congenital anomaly (45.5%) and spontaneous pre-term birth (23.5%) were the most common causes of death for intrapartum stillbirths.

Congenital anomaly (32.4%) and spontaneous pre-term birth (26.6%) were the most common causes of neonatal death; antepartum haemorrhage (8.3%) and specific perinatal conditions (7.3%) were also common.

**Figure 5.1: Perinatal deaths by cause of death (PSANZ-PDC) and timing of death, 2017 and 2018**



*Notes*

1. Data for this figure are available in Supplementary Table 8.
2. The classification 'no obstetric antecedent' is not applicable for stillbirths as it is only applied to neonatal deaths. The classification 'unexplained antepartum death' is not applicable for neonatal deaths as it is only applied to stillbirths.
3. Excludes 1,192 stillbirth records where timing is 'Not stated'.

# 6

## Investigation following perinatal death

The Perinatal Society of Australia and New Zealand (PSANZ) recommends that investigation be undertaken following all perinatal deaths. The primary motivation for conducting an investigation is to accurately identify the cause of the stillbirth or neonatal death, both to help the families involved understand why their baby has died and to aid in the prevention of future stillbirths or neonatal deaths.

The National Perinatal Mortality Data Collection collects information on different forms of investigation. This chapter presents data for two forms of investigation identified by PSANZ as core investigations to be undertaken following all perinatal deaths; autopsy and placental examination (Flenady et al. 2020).

### Autopsy

The purpose of an autopsy is to accurately identify the cause(s) of death. An accurate identification of the cause of death assists with identifying disorders that have implications for counselling and monitoring in future pregnancies (Flenady et al. 2020). Autopsy results contribute to clinical audit and assist with identification of factors contributing to the death. Perinatal autopsy examinations require written consent from parent(s) following informed discussion. While autopsy is not mandatory, PSANZ and the National Maternal and Perinatal Mortality Clinical Expert Group recommend that a senior clinician discuss autopsy with all parents after a perinatal death.

The National Perinatal Mortality Data Collection collects data on whether or not an autopsy was performed and, where applicable, the type of autopsy performed (a full autopsy, limited autopsy or external examination). For the purposes of this report, deaths where any of these autopsy types have been performed will collectively be treated as deaths where an 'autopsy' has been performed.

**Full autopsy:** examination of all body cavities and dissection of all organs.

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

**External 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.

Some jurisdictions are only able to report if an autopsy was performed, but are unable to report the type, these have been included as **Autopsy performed but type unknown**.

In 2017 and 2018, there were 5,808 perinatal deaths, 68.8% (3,995) of which (3,000 stillbirths and 995 neonatal deaths) had a stated autopsy status (Table 6.1).

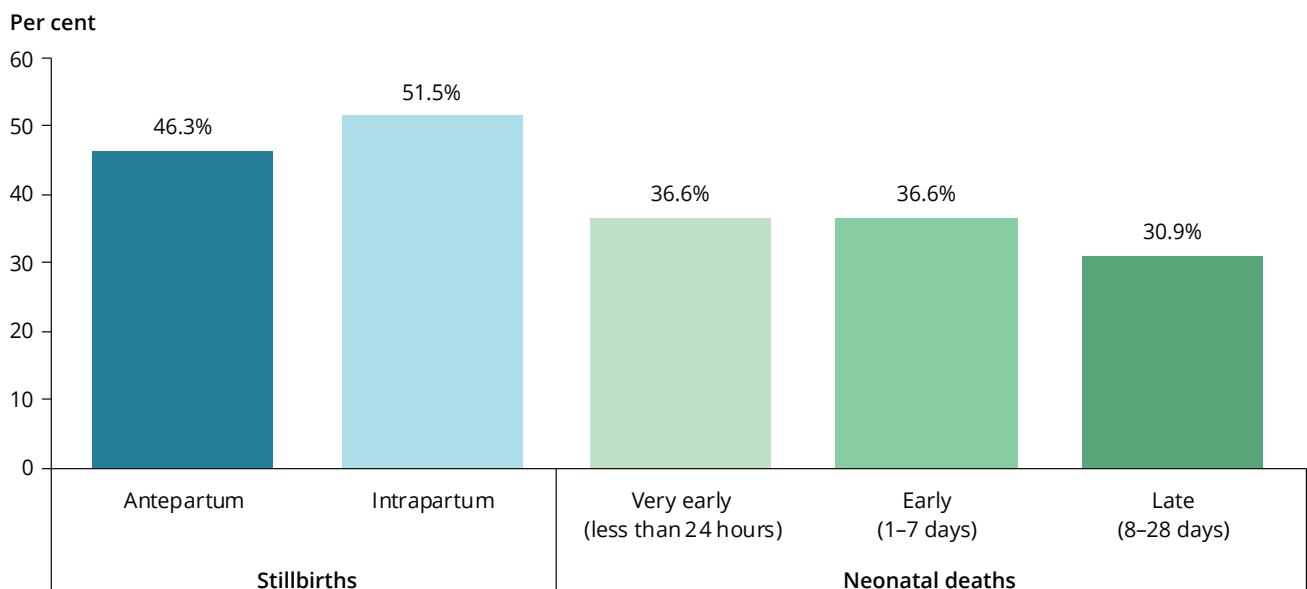
Where autopsy status was known, an autopsy was reported to have been performed for 44.1% of all perinatal deaths (46.8% of stillbirths and 35.7% of neonatal deaths). Intrapartum stillbirths (those occurring during labour and/or birth) had the highest rate of autopsies performed (51.5%) (Figure 6.1).

**Table 6.1: Perinatal deaths by autopsy status, 2017 and 2018**

Autopsy type	Stillbirths		Neonatal deaths		Perinatal deaths	
	Number	%	Number	%	Number	%
Full autopsy	658	21.9%	154	15.5%	812	20.3%
Limited autopsy	101	3.4%	41	4.1%	142	3.6%
External examination only	124	4.1%	49	4.9%	173	4.3%
Autopsy performed but type unknown	522	17.4%	111	11.2%	633	15.8%
No autopsy performed	1,595	53.2%	640	64.3%	2,235	55.9%
Not stated	1,290		523		1,813	
<b>Total</b>	<b>4,290</b>		<b>1,518</b>		<b>5,808</b>	

Note: Autopsy status data were not available from NSW for 2017 and 2018. These records have been included as 'Not stated'.

**Figure 6.1: Proportion of perinatal deaths where autopsy was performed by timing of death, 2017 and 2018**



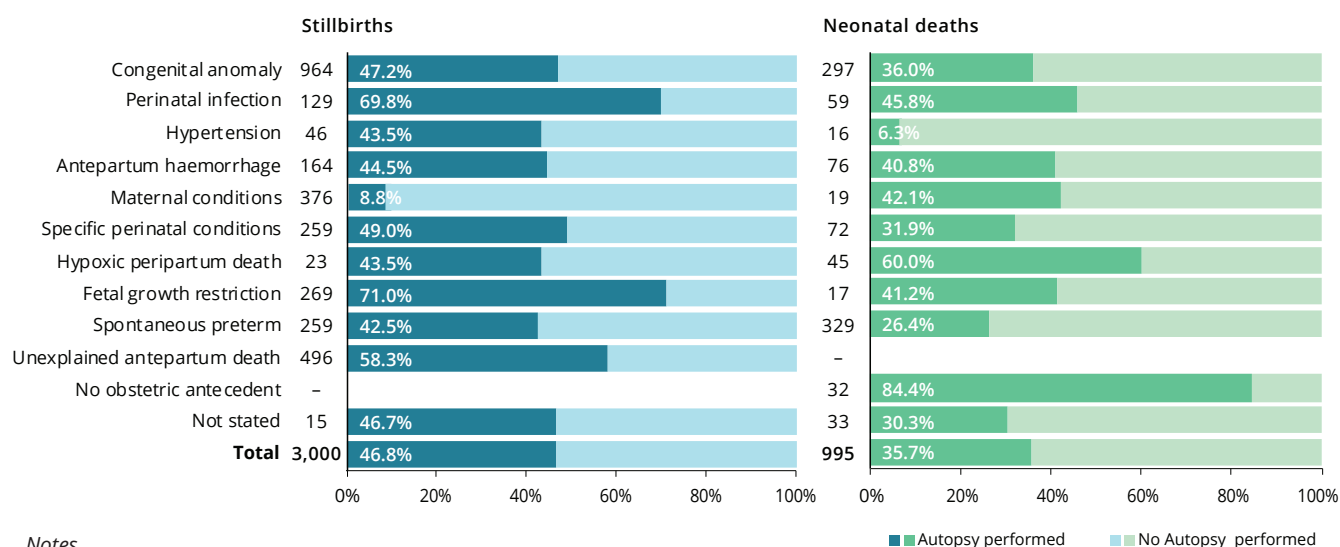
**Notes**

1. Data for this figure are available in Supplementary Table 10.
2. Autopsy performed includes full and limited autopsies, external examinations and records where an autopsy was performed but type is unknown.
3. Excludes 2,142 records where timing of death or autopsy status is 'Not stated'.

The incidence of autopsy varied depending on the cause of death, with 71.0% of stillbirths due to fetal growth restriction undergoing an autopsy compared to only 8.8% of deaths where the cause was classified as maternal conditions (Figure 6.2).

For neonatal deaths, 84.4% of deaths where no obstetric antecedent was the cause of death underwent an autopsy, while only 4.6% of deaths due to perinatal infection underwent an autopsy.

**Figure 6.2: Proportion of perinatal deaths where autopsy was performed by cause of death (PSANZ-PDC), 2017 and 2018**



**Notes**

1. Data for this figure are available in Supplementary Table 10.
2. Autopsy performed includes full and limited autopsies, external examinations and records where an autopsy was performed but type is unknown.
3. The classification 'no obstetric antecedent' is not applicable for stillbirths as it is only applied to neonatal deaths. The classification 'unexplained antepartum death' is not applicable for neonatal deaths as it is only applied to stillbirths.
4. Excludes 1,813 records where autopsy status is 'Not stated'.

## Placental examination

The placenta is integral to a baby's growth and survival prior to birth. Microscopic examination of the placenta, membranes and cord by a pathologist (histological examination) should be considered after all births (Flenady et al. 2020). Histological examination of the placenta is of particular importance when the baby's weight is not consistent with its gestation at birth, when birth is significantly preterm or the baby is ill at birth, or a stillbirth has occurred. Consent is not required for placental examination.

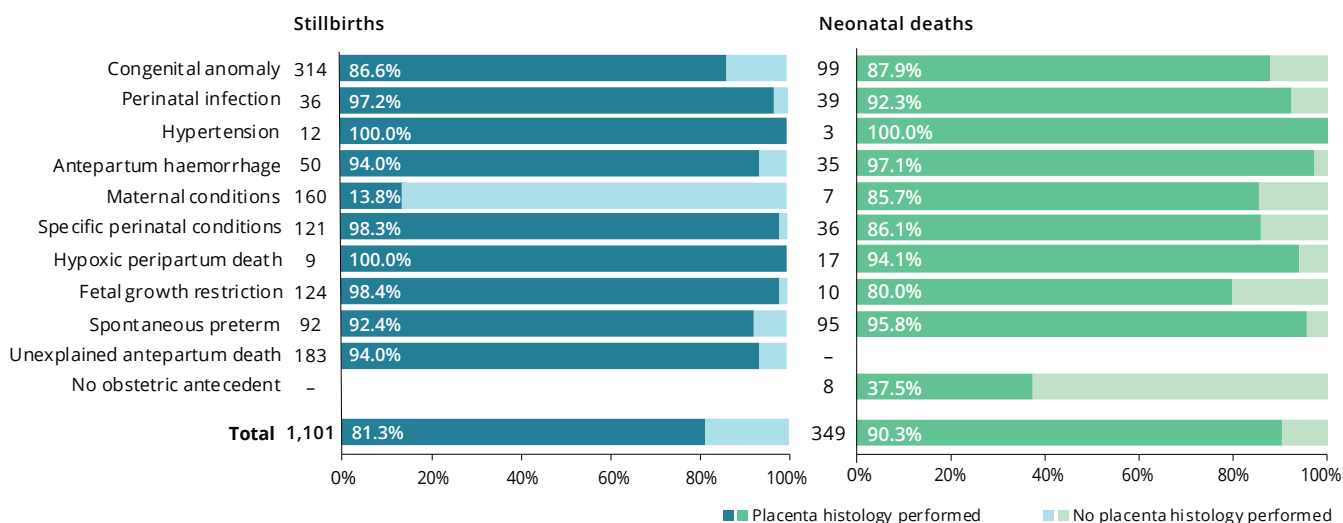
In 2017 and 2018, there were 1,450 perinatal deaths (1,101 stillbirths and 349 neonatal deaths) where placental histology status was stated. Of these, 1,210 placental histological examinations were performed (895 stillbirths and 315 neonatal deaths) (Table 6.2).

Data on placental histological examinations were not available for New South Wales, Queensland or Western Australia for 2017 and 2018, and data were not available for Victoria for 2018. All records from these states are reported as 'Not stated'. Excluding these records, this equates to placental examination being performed in 83.4% of all perinatal deaths (81.3% of stillbirths and 90.3% of neonatal deaths) where placental investigation status was known.

**Table 6.2: Perinatal deaths by placental examination status, 2017 and 2018**

Placental examination	Stillbirths		Neonatal deaths		Perinatal deaths	
	Number	%	Number	%	Number	%
Placental histology performed	895	81.3%	315	90.3%	1,210	83.4%
None	206	18.7%	34	9.7%	240	16.6%
Not stated	3,189		1,169		4,358	
<b>Total</b>	<b>4,290</b>		<b>1,518</b>		<b>5,808</b>	

**Figure 6.3: Proportion of perinatal deaths where placental examination was performed by cause of death (PSANZ-PDC), 2017 and 2018**



**Notes**

1. Data for this figure are available in Supplementary Table 10.
2. Excludes NSW, Qld and WA for 2017–2018 and Vic for 2018, as data were not available, and records where placental examination is 'Not stated'.
3. The classification 'no obstetric antecedent' is not applicable for stillbirths as it is only applied to neonatal deaths. The classification 'unexplained antepartum death' is not applicable for neonatal deaths as it is only applied to stillbirths.

## Contributory factors

State and territory perinatal mortality committees examine circumstances associated with perinatal deaths to identify possible contributory factors, so that systematic factors affecting the perinatal mortality rate may be identified. Review of a perinatal death may identify more than one contributory factor.

**Contributory factors are grouped into three main categories:**

**Professional practice** (such as failure to recognise clinical deterioration and inadequate clinical monitoring in at-risk situations).

**Lack of, or delay in, access to appropriate care** (including access to appropriate expertise, services and treatment).

**Family and social situation** (such as substance abuse, family violence and language barriers).

In 2017 and 2018, Victoria, Tasmania and the Australian Capital Territory supplied contributory factor assessment information. Data are also available for Queensland and South Australia for 2018 only. In total, there were 2,662 perinatal deaths with contributory factor review information (2,005 stillbirths and 478 neonatal deaths), or 45.8% of all perinatal deaths. Of these, an assessment was undertaken for 2,150 or 80.8% of perinatal deaths (83.4% of stillbirths and 72.8% of neonatal deaths) (Table 6.3).

Contributory factors were identified in relation to 455 of these perinatal deaths, or 21.2% of deaths with an assessment undertaken. The majority of cases with contributory factors identified had only one factor found (399 deaths, or 87.7%), and there were no cases with more than two factors identified. Of the perinatal deaths that were reviewed, factors were found to have significantly contributed to the outcome in 177 deaths (8.2%).

Of the 511 contributory factors identified, most frequent were those relating to access to care (40.7%), and to professional practice (29.9%). There was a greater proportion of factors identified related to access to care for stillbirths (44.0% compared with 30.3% for neonatal deaths) while there was a greater proportion of factors identified related to professional practice for neonatal deaths (37.7% compared with 27.5% for stillbirths).

**Table 6.3: Contributory factor review for perinatal deaths, 2017 and 2018**

	Stillbirths	Neonatal deaths	Perinatal deaths
<b>Deaths reviewed for contributory factor(s)</b>			
Number of deaths reviewed	1,672	478	2,150
<i>Deaths with contributory factor(s) identified</i>	346	109	455
<i>Deaths with no contributory factor(s) identified</i>	1,326	369	1,695
Deaths where contributory factor assessment not undertaken	333	179	512
Records excluded as not supplied to data collection	2,285	861	3,146
<b>Total</b>	<b>4,290</b>	<b>1,518</b>	<b>5,808</b>
<b>Contributory factors identified (more than one can be identified per case)</b>			
Contributory factor(s) related to access to care	171	37	208
Contributory factor(s) related to professional care	107	46	153
Contributory factor(s) related to the mother/her family/social situation	109	39	148
Other contributory factor(s) identified	2	0	2
<b>Total number of contributory factor(s) identified</b>	<b>389</b>	<b>122</b>	<b>511</b>

*Notes*

1. More than one contributory factor can be identified in relation to a perinatal death.
2. Excludes NSW, WA, and NT for 2017–2018 and Qld and SA for 2017, as data were not available.

# 7

## Focus groups

- ◆ **Near-term singleton perinatal deaths without congenital anomaly**
- ◆ **Aboriginal and Torres Strait Islander women and their babies**

# Near-term singleton perinatal deaths without congenital anomaly

This section examines perinatal deaths that occurred in singleton pregnancies, where the baby did not have a major congenital anomaly causing death and where the pregnancy ended at or after 36 weeks of gestation. For the purposes of this report, such babies are called 'near-term normally-formed singleton babies'.

In 2017 and 2018, near-term normally-formed singleton babies accounted for a large proportion (93.0%) of all babies born, and a small proportion (13.0%) of perinatal deaths with a low rate of perinatal death (1.3 perinatal deaths per 1,000 births).

When considering potential avoidability in relation to perinatal death, review of perinatal deaths in this group of babies is likely to be most effective when examining policy and practice in maternity and neonatal care (Draper et al. 2015, 2017; Royal College of Obstetricians and Gynaecologists 2017).

A **near-term normally-formed singleton** baby is one that meets all 3 of the following criteria:

- Born at or after 36 weeks of gestation
- Classified cause of death not due to a congenital anomaly
- Plurality must be that of a single fetus

In 2017 and 2018, perinatal deaths of near-term normally-formed singleton babies (Supplementary Tables 11 and 12):

- accounted for 757 perinatal deaths (13.0% of perinatal deaths), of which 599 (79.1%) were stillbirths and 158 (20.9%) were neonatal deaths
- were most common at 36 weeks of gestation (8.0 perinatal deaths per 1,000 births) and among babies with a birthweight less than the 10th percentile (3.5 perinatal deaths per 1,000 births).

## Maternal characteristics

This section presents data on demographic and medical characteristics that have been commonly associated with stillbirth or neonatal death for near-term normally-formed singleton babies. While these characteristics are more commonly found in women with pregnancies that result in stillbirth and neonatal death, it is understood that they are often unavoidable and it is not implied that these characteristics are the cause of perinatal deaths.

It is also important to note that many of the associations noted in this section are similar to those observed for all perinatal deaths in Australia. For near-term normally-formed singleton babies, as with all babies born to women in Australia, rates of perinatal death are higher amongst babies born to women:

- living in the most disadvantaged areas
- who had pre-existing diabetes
- who reported smoking during pregnancy
- who were either aged under 20 or aged 40 or more
- who had a parity of 4 or more
- who had a BMI of 30 or more.

### Number of antenatal visits

Perinatal mortality rates were highest among near-term normally-formed singleton babies born to women who had accessed 0–2 antenatal visits (3.0 perinatal deaths per 1,000 births). Perinatal mortality was lowest for babies born to women who accessed 6 or more antenatal visits (1.2 deaths per 1,000 births).

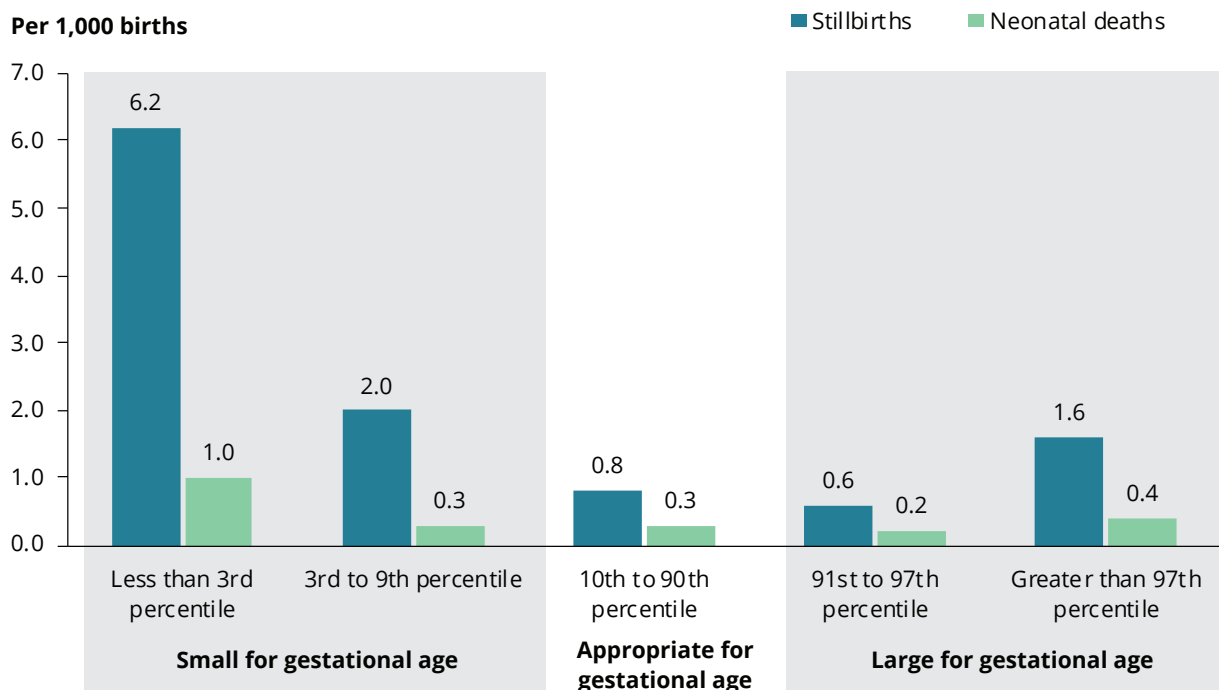
### Remoteness

Perinatal mortality rates were highest among near-term normally-formed singleton babies born to women who lived in *Outer regional* areas of Australia (1.7 perinatal deaths per 1,000 births). Perinatal mortality was lower for babies born to women who lived in all other remoteness classification areas of Australia (1.3 deaths per 1,000 births).

## Birthweight for gestational age

The rate of perinatal death was highest for near-term normally-formed singleton babies whose birthweight was classified as being small for their gestational age (3.5 deaths per 1,000 births) (Figure 7.1). The rate of both stillbirth and neonatal death was particularly high for those babies whose birthweight was classified as being less than the 3rd percentile for their gestational age.

**Figure 7.1: Perinatal deaths in near-term normally-formed singleton babies by birthweight percentiles, 2017 and 2018**



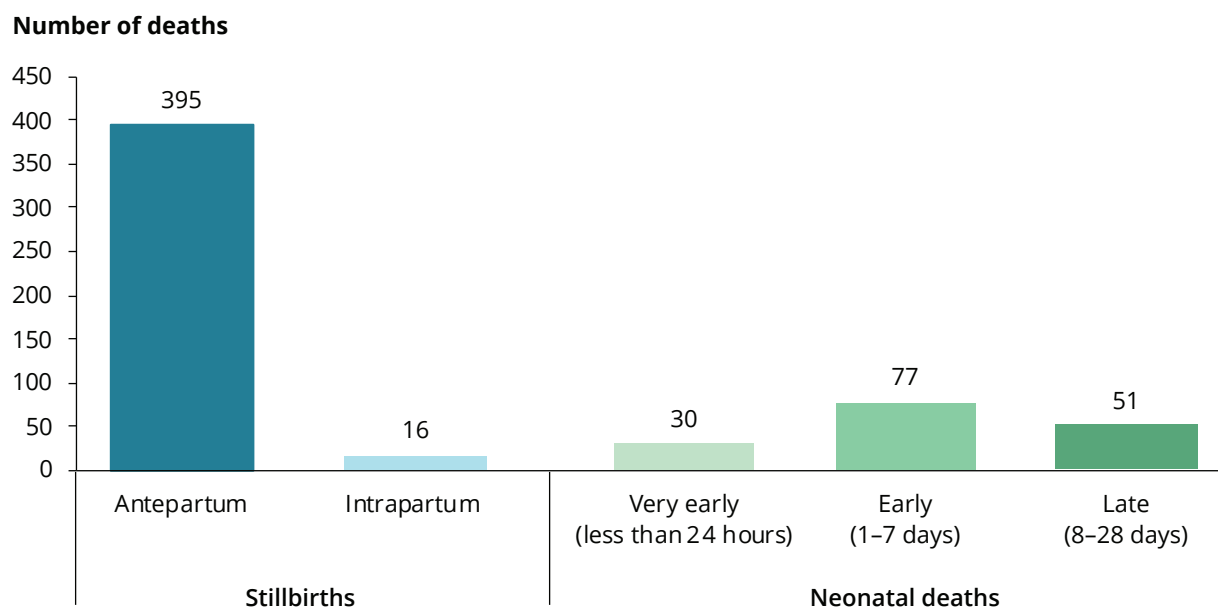
#### Notes

1. Data for this figure are available in Supplementary Table 11.
2. Excludes 218 records where birthweight percentile is not stated.

## Timing of perinatal deaths

Where timing of death was known, antepartum stillbirth (death prior to the onset of labour) was the most common type of perinatal death (69.4%) for near-term normally-formed singleton babies (Figure 7.2).

**Figure 7.2: Perinatal deaths in near-term normally-formed singleton babies by timing of death, 2017 and 2018**



### Notes

1. Data for this figure are available in Supplementary Table 13.
2. Excludes 188 stillbirth records where timing is not stated.

## Causes of death

The most common causes of perinatal death for near-term normally-formed singleton babies, using the PSANZ-PDC classification, were unexplained antepartum death (34.2%) and hypoxic peripartum death and maternal conditions (both 9.6%) (Table 7.1).

The most common causes differed for stillbirths and neonatal deaths. For stillbirths, the most common causes were unexplained antepartum death and maternal conditions (43.2% and 10.5%, respectively). For neonatal deaths, the most common causes were hypoxic peripartum death (29.7%) and deaths where there was no obstetric antecedent (19.0%). For more information on these classifications, please refer to the PSANZ-PDC categories on page 15 and the PSANZ-NDC categories on page 19.

**Table 7.1: Perinatal deaths in near-term normally-formed singleton babies by cause of death (PSANZ-PDC), 2017 and 2018**

Cause of death	Stillbirths		Neonatal deaths		Perinatal deaths	
	Number	%	Number	%	Number	%
Unexplained antepartum death	259	43.2%	-	-	259	34.2%
Hypoxic peripartum death	26	4.3%	47	29.7%	73	9.6%
Maternal conditions	63	10.5%	10	6.3%	73	9.6%
Specific perinatal conditions	61	10.2%	9	5.7%	70	9.2%
Antepartum haemorrhage	56	9.3%	11	7.0%	67	8.9%
Perinatal infection	50	8.3%	10	6.3%	60	7.9%
Fetal growth restriction	48	8.0%	6	3.8%	54	7.1%
No obstetric antecedent	-	-	30	19.0%	30	4.0%
Hypertension	21	3.5%	5	3.2%	26	3.4%
Spontaneous preterm	1	0.2%	3	1.9%	4	0.5%
Not stated	14	2.3%	27	17.1%	41	5.4%
<b>Total</b>	<b>599</b>		<b>158</b>		<b>757</b>	

*Notes*

1. Detailed definitions of PSANZ-PDC categories are on page 15.
2. The category of unexplained antepartum death includes deaths of normally-formed fetuses prior to the onset of labour where no identified predisposing factors are considered likely to have caused the death and deaths where insufficient information was available to allow more specific classification of the cause of death.
3. The classification 'no obstetric antecedent' is not applicable for stillbirths as it is only applied to neonatal deaths. The classification 'unexplained antepartum death' is not applicable for neonatal deaths as it is only applied to stillbirths.

Causes of perinatal deaths among near-term normally-formed singleton babies varied by birthweight percentile, with the majority (66.8%) of babies who died having birthweights appropriate for their gestational age.

Babies considered small for their gestational age (weighing less than the 10th percentile) accounted for 188 or 25.0% of perinatal deaths among near-term normally formed singleton babies (Table 7.2). These deaths were most commonly due to:

- unexplained antepartum death (54 perinatal deaths)
- fetal growth restriction (49 perinatal deaths).

Babies considered large for their gestational age (weighing greater than the 90th percentile) most commonly died as a result of:

- maternal conditions (15 perinatal deaths)
- unexplained antepartum death (13 perinatal deaths).

**Table 7.2: Perinatal deaths in near-term normally-formed singleton babies by cause of death (PSANZ-PDC) and birthweight percentiles, 2017 and 2018**

Cause of death	Stillbirths			Neonatal deaths		
	< 10th percentile	10th–90th percentile	> 90th percentile	< 10th percentile	10th–90th percentile	> 90th percentile
Unexplained antepartum death	33.3%	50.1%	27.1%	-	-	-
Hypoxic peripartum death	4.3%	3.7%	10.4%	15.4%	32.8%	30.8%
Maternal conditions	7.4%	9.4%	27.1%	3.8%	5.9%	15.4%
Specific perinatal conditions	4.3%	13.3%	6.3%	7.7%	5.9%	0.0%
Antepartum haemorrhage	6.2%	10.4%	12.5%	7.7%	5.0%	23.1%
Perinatal infection	6.8%	8.4%	8.3%	0.0%	8.4%	0.0%
Fetal growth restriction	27.2%	1.0%	0.0%	19.2%	0.8%	0.0%
No obstetric antecedent	-	-	-	7.7%	21.8%	15.4%
Hypertension	7.4%	1.3%	8.3%	3.8%	2.5%	7.7%
Spontaneous preterm	0.0%	0.3%	0.0%	3.8%	1.7%	0.0%
Not stated	3.1%	2.1%	0.0%	30.8%	15.1%	7.7%
<b>Total</b>	<b>162</b>	<b>383</b>	<b>48</b>	<b>26</b>	<b>119</b>	<b>13</b>

*Notes*

1. The classification 'no obstetric antecedent' is not applicable for stillbirths as it is only applied to neonatal deaths. The classification 'unexplained antepartum death' is not applicable for neonatal deaths as it is only applied to stillbirths.
2. Excludes 6 records where birthweight percentile was not stated.

For the majority of neonatal deaths among near-term normally-formed singleton babies, the single most significant condition present in the baby in the neonatal period that caused the baby's death, using the PSANZ-NDC classification, was neurological conditions (48.1%) (Table 7.3).

**Table 7.3 Perinatal deaths in near-term normally-formed singleton babies by cause of death (PSANZ-NDC), 2017 and 2018**

Cause of death	Neonatal deaths	
	Number	%
Neurological	76	48.1%
Other	31	19.6%
Infection	12	7.6%
Cardio-respiratory disorders	11	7.0%
Gastrointestinal	1	0.6%
Not stated	27	17.1%
<b>Total</b>	<b>158</b>	

Note: Detailed definitions of PSANZ-NDC categories are on page 19.

## Investigation

Stillbirths classified as unexplained antepartum deaths and neonatal deaths classified as having no obstetric antecedent, are deaths where the underlying causes are largely unknown. These, combined with hypoxic peripartum deaths accounted for 47.8% of deaths in near-term normally-formed singleton babies (Supplementary Table 13). This is a higher incidence than for all babies, where these causes of death accounted for 18.6% of deaths. Investigations such as autopsy are of particular importance in seeking the underlying causes of death in near-term normally-formed singleton babies.

## Autopsy

Where autopsy status was known, autopsy was performed more frequently among near-term normally-formed singleton babies (62.5%) than for perinatal deaths occurring across all babies (44.1%) (Table 7.4). For near-term normally-formed singleton babies, the proportion of autopsy was similar across stillbirths (219 or 61.0% of stillbirths) and neonatal deaths (73 or 67.6% of neonatal deaths).

**Table 7.4: Perinatal deaths in near-term normally-formed singleton babies by autopsy status, 2017 and 2018**

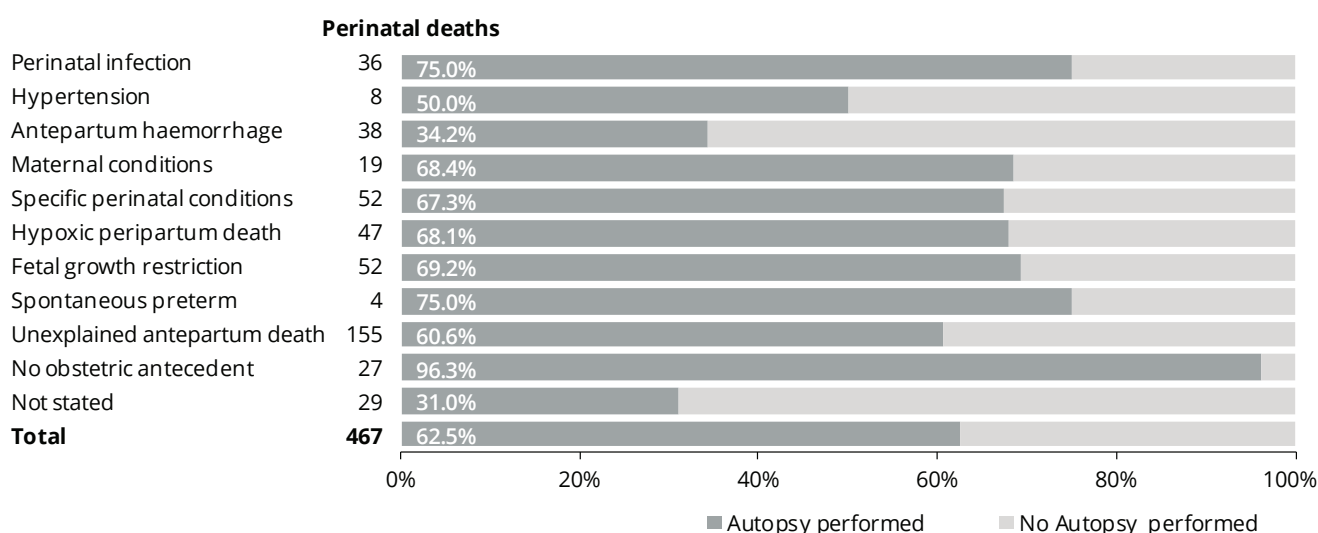
Autopsy status	Stillbirths		Neonatal deaths		Perinatal deaths	
	Number	%	Number	%	Number	%
Autopsy performed	219	61.0%	73	67.6%	292	62.5%
No autopsy performed	140	39.0%	35	32.4%	175	37.5%
Not stated	240		50		290	
<b>Total</b>	<b>599</b>		<b>158</b>		<b>757</b>	

Note: Autopsy performed includes full and limited autopsies, external examinations and records where an autopsy was performed but type is unknown.

Autopsy investigation was conducted more frequently in relation to neonatal deaths, with the highest proportion being performed in very early (less than 24 hours) neonatal deaths (83.3%) (Supplementary Table 13).

The incidence of autopsy varied depending on the cause of death, with 96.3% of deaths with no obstetric antecedent undergoing an autopsy compared with 34.2% of deaths due to antepartum haemorrhage (Figure 7.3).

**Figure 7.3: Proportion of perinatal deaths in near-term normally-formed singleton babies where an autopsy was performed by cause of death (PSANZ-PDC), 2017 and 2018**



Notes

1. Data for this figure are available in Supplementary Table 13.
2. Autopsy performed includes full and limited autopsies, external examinations and records where an autopsy was performed but type is unknown.
3. Excludes 290 records where autopsy status is 'Not stated'.

# Aboriginal and Torres Strait Islander women and their babies

This chapter presents data for mothers who identified as Aboriginal and Torres Strait Islander, and their babies, during their maternity and neonatal care. In 2017 and 2018, babies born to Indigenous women accounted for 4.6% of all births and 7.8% of all perinatal deaths (7.2% of stillbirths and 9.6% of neonatal deaths).

**Table 7.5: Perinatal deaths in babies of Indigenous women, 2017 and 2018**

Year	Total births	Live births	Stillbirths		Neonatal deaths		Perinatal deaths	
			Number	Rate	Number	Rate	Number	Rate
2017	13,757	13,607	148	10.8	77	5.7	225	16.4
2018	13,962	13,801	161	11.5	69	5.0	230	16.5
<b>Total</b>	<b>27,719</b>	<b>27,408</b>	<b>309</b>	<b>11.1</b>	<b>146</b>	<b>5.3</b>	<b>455</b>	<b>16.4</b>

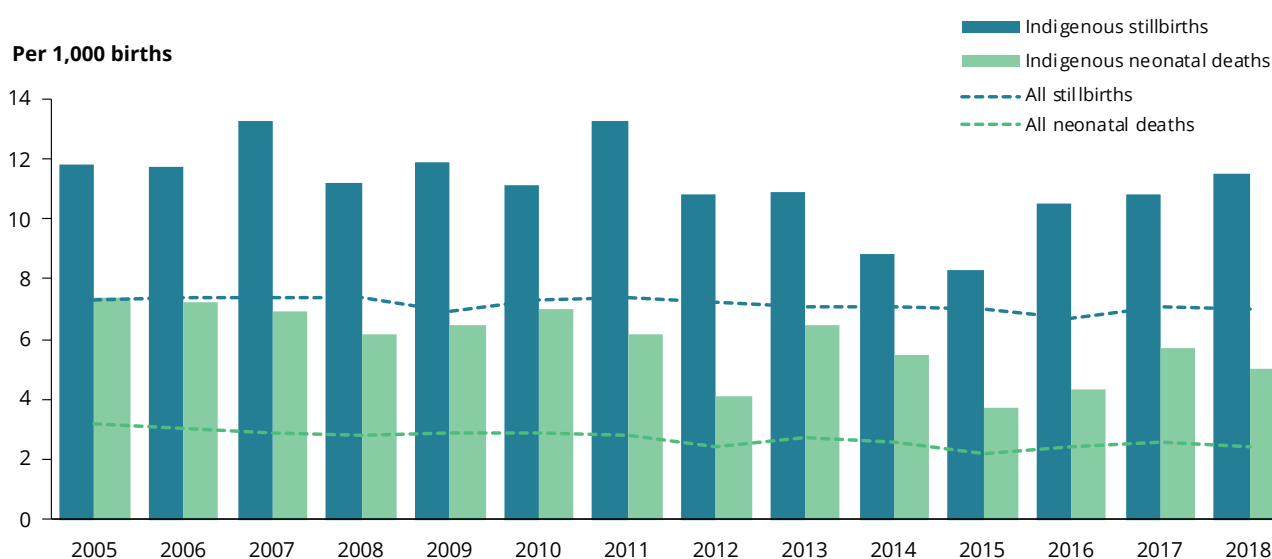
*Notes*

1. The rate is the number of deaths per 1,000 births.
2. The sum of the number of stillbirths plus the number of live births may not always be equal to the total number of births as they are sourced from different data collections.

The rate of perinatal death for babies born to Indigenous women decreased from 19.1 deaths per 1,000 births in 2005 to 16.5 deaths per 1,000 births in 2018 (Figure 7.4). The rate of neonatal death for babies born to Indigenous women decreased from 7.4 to 5.0 deaths per 1,000 live births. The rate of stillbirth for babies born to Indigenous women has held relatively steady over the period, from 11.8 stillbirths per 1,000 births in 2005 to 11.5 stillbirths per 1,000 births in 2018.

This is similar to the trend that has been observed for the national stillbirth rate, which has held steady from 7.3 to 7.0 stillbirths per 1,000 births over the same period.

**Figure 7.4: Rates of perinatal deaths in babies of Indigenous women, 2005 to 2018**



*Notes*

1. Data for this figure are available in Supplementary Table 14.
2. Data from Victoria were not available for 2009 so have been excluded.

## Maternal characteristics

This section presents data on demographic and medical characteristics that have been commonly associated with stillbirth or neonatal death for women who identified as Aboriginal and Torres Strait Islander. While these characteristics are more commonly found in women with pregnancies that result in stillbirth and neonatal death, it is understood that they are often unavoidable and it is not implied that these characteristics are the cause of perinatal deaths.

It is also important to note that many of the associations noted in this section (see Figure 7.5) are similar to those observed for all perinatal deaths in Australia. For all women, rates of perinatal death are higher for women in *Remote* and *Very remote* areas, for women living in the most disadvantaged areas, for women who reported smoking during pregnancy, for women who had a previous stillbirth, and for women who had pre-existing diabetes (see Chapter 3 for more details).

---

<b>Maternal Indigenous status</b>	Perinatal mortality rates were highest among babies born to women who identify as both Aboriginal and Torres Strait Islander (24.1 deaths per 1,000 births) compared with babies born to Torres Strait Islander women and Aboriginal women (18.5 and 15.9 deaths per 1,000 births, respectively).
<b>Maternal age</b>	Perinatal mortality rates were highest among babies born to women aged 40 or over (32.3 perinatal deaths per 1,000 births). Perinatal mortality was lowest for babies born to women aged 20–29 (Figure 7.6).
<b>Parity</b>	<p>Parity refers to the number of previous pregnancies resulting in live births or stillbirths, excluding the current pregnancy.</p> <p>Babies born to women with a parity of 0 had the highest rate of perinatal death (18.7 perinatal deaths per 1,000 births), while babies born to mothers with a parity of 1 had the lowest rate of perinatal death (12.6 perinatal deaths per 1,000 births) (Figure 7.6).</p>
<b>Body mass index (BMI)</b>	<p>Perinatal mortality rates were relatively equal across Aboriginal and Torres Strait Islander women of different body mass index classifications.</p> <p>However, the rate of stillbirth increased as the mother's body mass index category increased (10.5 stillbirths per 1,000 births for BMI 30 or more), while the rates of neonatal death increased as the mother's body mass index category decreased (7.2 neonatal deaths per 1,000 live births for BMI less than 18.5).</p>

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**Figure 7.5: Perinatal deaths in babies of Indigenous women by select demographics of the mother, 2017 and 2018**

	Perinatal deaths		Stillbirths		Neonatal deaths	
	Number	Deaths per 1,000 births	Deaths per 1,000 births		Deaths per 1,000 live births	
<b>Total</b>	<b>455</b>	<b>16.4</b>	<b>11.1</b>		<b>5.3</b>	
<b>Indigenous status of the mother</b>						
Aboriginal	397	15.9	10.6		5.3	
Aboriginal and Torres Strait Islander	35	24.1	19.2		4.9	
Torres Strait Islander	23	18.5	12.9		5.7	
<b>Remoteness of mother's usual residence</b>						
Major cities	136	14.2	10.0		4.2	
Inner regional	103	15.7	11.0		4.8	
Outer regional	100	16.6	10.6		6.0	
Remote and very remote	113	21.3	14.2		7.3	
Not stated	3	..				
<b>Disadvantage quintile of mother's area of usual resider</b>						
Quintile 1 (Most disadvantaged)	239	19.2	12.7		6.6	
Quintile 2	106	15.2	10.4		4.9	
Quintile 3	63	13.3	9.5		3.8	
Quintile 4	31	13.5	10.0		3.5	
Quintile 5 (Least disadvantaged)	12	11.7	n.p.		n.p.	
Not stated/unable to be assigned	4	..				
<b>Mother's age</b>						
Under 20	70	20.3	14.5		5.9	
20–24	137	15.6	11.0		4.6	
25–29	104	13.2	8.6		4.6	
30–34	83	17.0	11.3		5.8	
35–39	44	20.0	11.8		8.3	
40 or over	16	32.3	n.p.		n.p.	
Not stated	1	..				
<b>Smoking status</b>						
Smoked during pregnancy	236	19.6	13.2		6.5	
Reported not smoking in pregnancy	198	13.0	8.9		4.1	
Not stated	21	..				
<b>Parity</b>						
0	167	18.7	12.9		5.9	
1	93	12.6	8.7		4.0	
2	77	15.5	11.1		4.5	
3	52	17.4	10.0		7.4	
4 or more	61	17.9	12.0		5.9	
Not stated	5	..				
<b>Previous stillbirth</b>						
Had a previous stillbirth	13	38.3	n.p.		n.p.	
No previous stillbirth	158	15.5	10.3		5.2	
Not applicable—No previous births	111	22.2			6.7	
Not stated	2	..				
<b>Diabetes during pregnancy</b>						
Pre-existing diabetes	23	38.6	n.p.		n.p.	
Gestational diabetes	22	6.9	4.1		2.8	
None	386	16.9	11.4		5.6	
Not stated	0	..				
<b>Body mass index of mother</b>						
Less than 18.5	27	14.9	7.7		7.2	
18.5–24.9	143	14.3	9.2		5.2	
25.0–29.9	91	14.2	9.2		5.0	
30 or more	114	14.2	10.5		3.8	
Not stated	80	..				

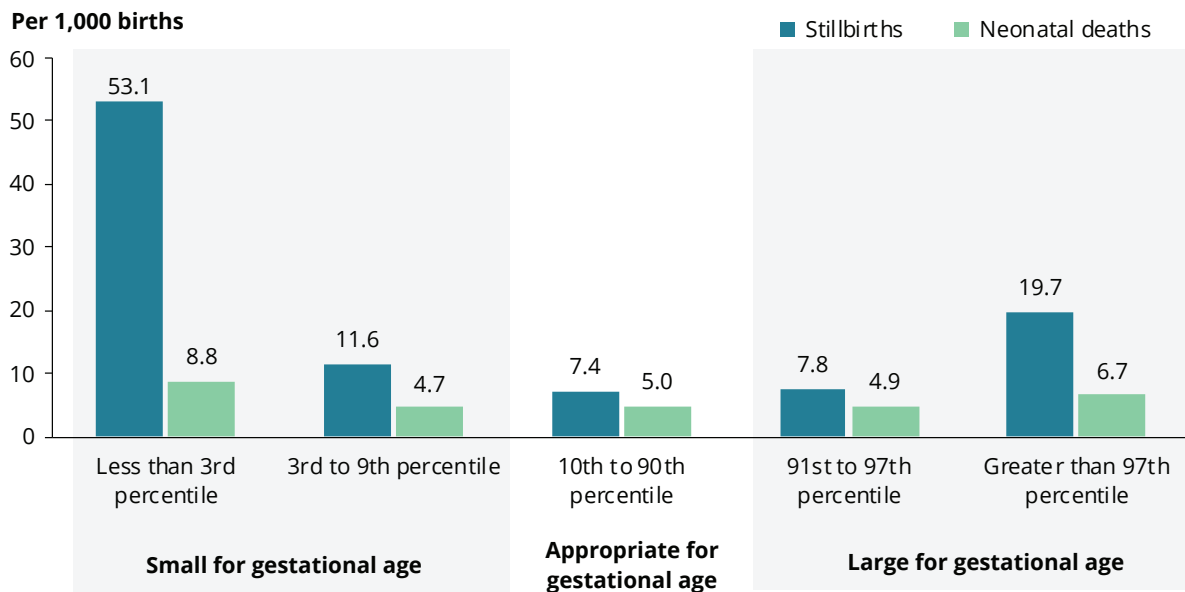
**Notes**

1. Data for this figure are available in Supplementary Table 16.
2. 'Not stated/unable to be assigned' includes non-Australian residents and those whose geographic area of usual residence was 'Not stated'.
3. Disadvantage proportions are calculated after excluding records where mother's area of usual residence was 'Not stated'.
4. Methods used for data collection of smoking status can vary across jurisdictions.
5. Previous stillbirth in multiparous women excludes NSW and WA for 2017 and 2018 as data were not available.
6. Mother's diabetes status excludes Victoria in 2017 as data were not available.
7. Tests to diagnose gestational diabetes are usually performed between 24 and 28 weeks of gestation (or earlier for those considered high risk). Therefore perinatal deaths that occur prior to the gestational age where testing for gestational diabetes usually occurs may be under represented in this category.
8. Body mass index of mother is usually collected at the first antenatal visit; the stage of pregnancy at which this occurs can vary across women and pregnancies.

## Birthweight for gestational age

The rate of perinatal death in babies born to Indigenous women was highest for those babies who were small for their gestational age (less than 10th percentile). Babies who were small or large for gestational age had a higher rate of stillbirth than babies whose birthweights were appropriate for gestational age (Figure 7.6). The rate of stillbirth was particularly high for those babies whose birthweight was classified as being less than the 3rd percentile for their gestational age.

**Figure 7.6: Perinatal deaths in babies of Indigenous women by percentiles, 2017 and 2018**



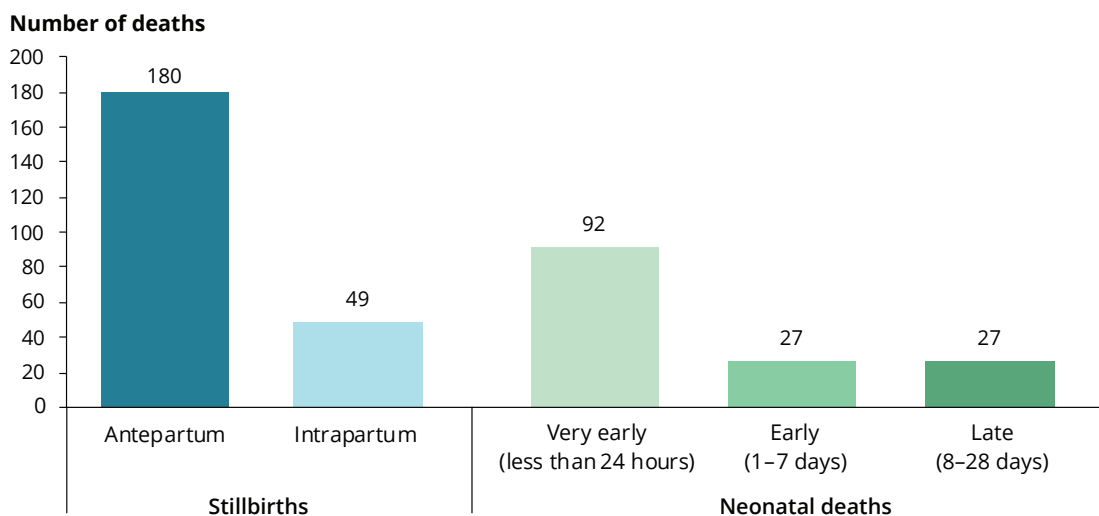
**Notes**

1. Data for this figure are available in Supplementary Table 15.
2. Excludes 24 records where birthweight and/or gestational age is not stated.

## Timing of perinatal deaths

In babies born to Indigenous women, antepartum stillbirths (those occurring prior to the onset of labour) were the most common type of perinatal death (48.0%) (Figure 7.7).

**Figure 7.7: Perinatal deaths in babies of Indigenous women by timing of death, 2017 and 2018**



**Notes**

1. Data for this figure are available in Supplementary Table 17.
2. Excludes 80 stillbirth records where timing is not stated.

## Causes of death

The most common causes of perinatal deaths among babies born to Indigenous women, classified using the PSANZ-PDC system, were congenital anomaly, spontaneous preterm and maternal conditions. Unexplained antepartum death, maternal conditions, and congenital anomaly were the main causes of stillbirth. Spontaneous pre-term, congenital anomaly and perinatal infection were the main causes of neonatal death.

**Table 7.6: Perinatal deaths in babies of Indigenous women by cause of death (PSANZ-PDC), 2017 and 2018**

Cause of death	Stillbirths		Neonatal deaths		Perinatal deaths	
	Number	%	Number	%	Number	%
Congenital anomaly	55	17.8%	43	29.5%	98	21.5%
Spontaneous preterm	31	10.0%	45	30.8%	76	16.7%
Maternal conditions	56	18.1%	9	6.2%	65	14.3%
Unexplained antepartum death	58	18.8%	-	-	58	12.7%
Perinatal infection	23	7.4%	19	13.0%	42	9.2%
Antepartum haemorrhage	31	10.0%	4	2.7%	35	7.7%
Fetal growth restriction	25	8.1%	1	0.7%	26	5.7%
Specific perinatal conditions	13	4.2%	12	8.2%	25	5.5%
Hypertension	14	4.5%	1	0.7%	15	3.3%
No obstetric antecedent	-	-	5	3.4%	5	1.1%
Hypoxic peripartum death	1	0.3%	3	2.1%	4	0.9%
Not stated	2	0.6%	4	2.7%	6	1.3%
<b>Total</b>	<b>309</b>		<b>146</b>		<b>455</b>	

### Notes

1. Detailed definitions of PSANZ-PDC categories are on page 15.
2. The category of unexplained antepartum death includes deaths of normally-formed fetuses prior to the onset of labour where no identified predisposing factors are considered likely to have caused the death and deaths where insufficient information was available to allow more specific classification of the cause of death.
3. The classification 'no obstetric antecedent' is not applicable for stillbirths as it is only applied to neonatal deaths. The classification 'unexplained antepartum death' is not applicable for neonatal deaths as it is only applied to stillbirths.

Causes of perinatal deaths for the babies of Indigenous women varied by birthweight percentile, with the majority (263 perinatal deaths, 57.8%) of babies who died having birthweights appropriate for their gestational age (Table 7.7). These deaths were most commonly due to:

- spontaneous preterm (64 perinatal deaths)
- congenital anomaly (50 perinatal deaths).

Babies considered small for their gestational age (weighing less than the 10th percentile) accounted for 123 or 27.0% of perinatal deaths among babies of Indigenous women. These deaths were most commonly due to:

- congenital anomaly (31 perinatal deaths)
- fetal growth restriction (21 perinatal deaths).

Babies considered large for their gestational age (weighing greater than the 90th percentile) accounted for 45 (9.9%) babies of Indigenous women, and they most commonly died as a result of:

- congenital anomaly (12 perinatal deaths)
- maternal conditions (11 perinatal deaths); these can include conditions such as diabetes.

**Table 7.7: Perinatal deaths in babies of Indigenous women by cause of death (PSANZ-PDC) and birthweight percentiles, 2017 and 2018**

Cause of death	Stillbirths			Neonatal deaths		
	< 10th percentile	10th–90th percentile	> 90th percentile	< 10th percentile	10th–90th percentile	> 90th percentile
Congenital anomaly	23.0%	14.0%	19.4%	34.8%	26.4%	42.9%
Spontaneous preterm	2.0%	16.6%	9.7%	17.4%	35.8%	14.3%
Maternal conditions	11.0%	17.8%	32.3%	4.3%	6.6%	7.1%
Unexplained antepartum death	19.0%	19.1%	9.7%	-	-	-
Perinatal infection	7.0%	6.4%	16.1%	8.7%	16.0%	0.0%
Antepartum haemorrhage	7.0%	12.7%	6.5%	8.7%	9.0%	0.0%
Fetal growth restriction	20.0%	2.5%	0.0%	4.3%	0.0%	0.0%
Specific perinatal conditions	3.0%	5.7%	3.2%	8.7%	6.6%	21.4%
Hypertension	8.0%	3.2%	3.2%	4.3%	0.0%	0.0%
No obstetric antecedent	-	-	-	4.3%	2.8%	7.1%
Hypoxic peripartum death	0.0%	0.6%	0.0%	4.3%	1.9%	0.0%
Not stated	0.0%	1.3%	0.0%	0.0%	2.8%	7.1%
<b>Total</b>	<b>100</b>	<b>157</b>	<b>31</b>	<b>23</b>	<b>106</b>	<b>14</b>

*Notes*

1. The classification 'no obstetric antecedent' is not applicable for stillbirths as it is only applied to neonatal deaths. The classification 'unexplained antepartum death' is not applicable for neonatal deaths as it is only applied to stillbirths.
2. Excludes 24 records where birthweight percentile was not stated.

Using the PSANZ-NDC classification to identify the single most significant condition present in the baby in the neonatal period that caused the baby's death, the most common causes of death for babies of Indigenous women were extreme prematurity (37.7%), followed by congenital anomaly (29.5%) (Table 7.8).

**Table 7.8: Perinatal deaths in babies of Indigenous women by cause of death (PSANZ-NDC), 2017 and 2018**

Cause of death	Neonatal deaths	
	Number	%
Extreme prematurity	55	37.7%
Congenital anomaly	43	29.5%
Cardio-respiratory disorders	14	9.6%
Infection	11	7.5%
Neurological	6	4.1%
Gastrointestinal	4	2.7%
Other	7	4.8%
Not stated	6	4.1%
<b>Total</b>	<b>146</b>	

Note: Detailed definitions of PSANZ-NDC categories are on page 19.

## Investigation

This section presents data for two forms of investigation identified by PSANZ as core investigations to be undertaken following all perinatal deaths; autopsy and placental examination (Flenady et al. 2020).

## Autopsy

In 2017 and 2018, for babies born to Indigenous women, an autopsy was reported to have been performed in 155 or 47.0% of cases. This was slightly higher than the incidence of autopsy across all babies who died in the same period (44.1%) (Table 7.9; rates for all babies in Table 6.1 on page 24).

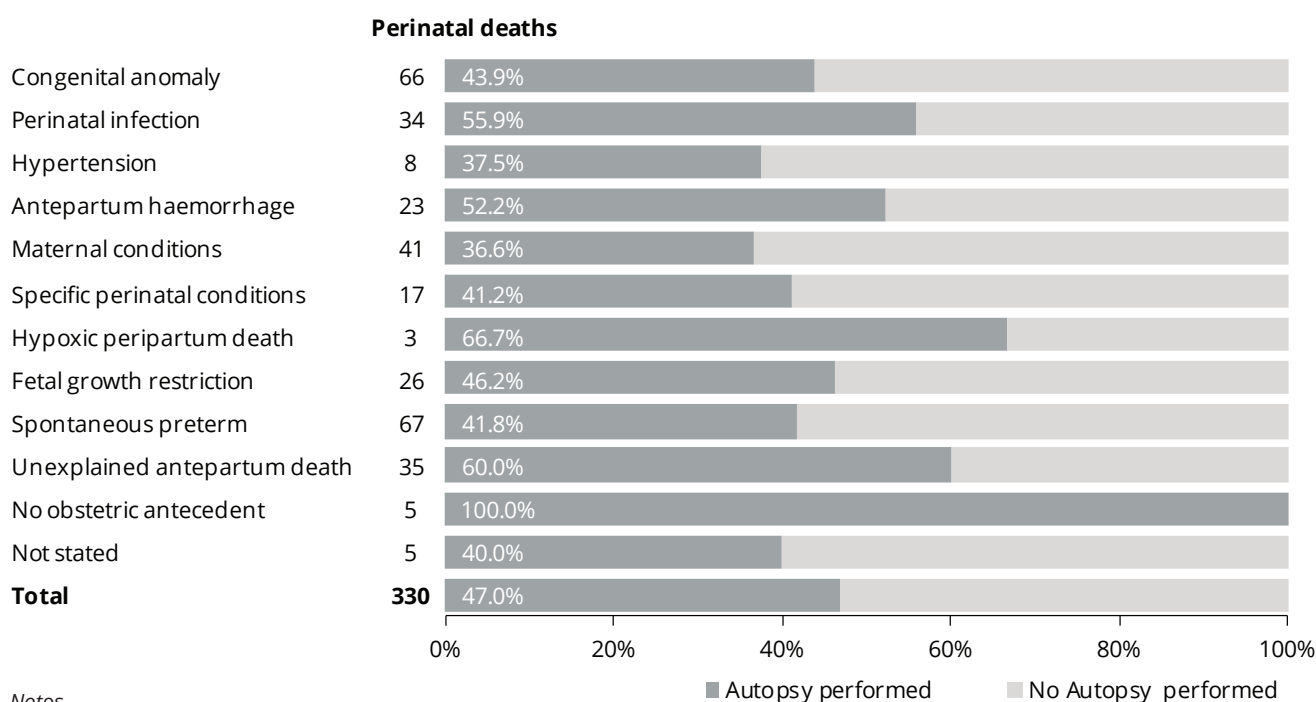
**Table 7.9: Perinatal deaths in babies of Indigenous women by autopsy status, 2017 and 2018**

Autopsy status	Stillbirths		Neonatal deaths		Perinatal deaths	
	Number	%	Number	%	Number	%
Autopsy performed	105	45.9%	50	49.5%	155	47.0%
No autopsy performed	124	54.1%	51	50.5%	175	53.0%
Not stated	80		45		125	
<b>Total</b>	<b>309</b>		<b>146</b>		<b>455</b>	

*Note:* Autopsy performed includes full and limited autopsies, external examinations and records where an autopsy was performed but type is unknown.

An autopsy was most commonly performed for perinatal deaths of babies born to Indigenous women where the cause of death was no obstetric antecedent (100%), hypoxic peripartum death (66.7%) or unexplained antepartum death (60.0%). Investigations such as autopsy and placental histology examination are of particular importance in seeking the underlying causes of death in these babies. These three causes of death accounted for 14.7% of deaths for babies born to Indigenous women. This is slightly lower than for all babies, where these causes of death accounted for 18.6% of deaths.

**Figure 7.8: Proportion of perinatal deaths in babies of Indigenous women where an autopsy was performed by cause of death (PSANZ-PDC), 2017 and 2018**



*Notes*

1. Data for this figure are available in Supplementary Table 17.
2. Autopsy performed includes full and limited autopsies, external examinations and records where an autopsy was performed but type is unknown.
3. Excludes 125 records where autopsy status was 'Not stated'.

# Appendix A:

## Data sources and methods

### Data used in this report

#### National Perinatal Mortality Data Collection

The National Perinatal Mortality Data Collection (NPMDC) is a population-based cross-sectional collection of data regarding the deaths of babies in hospitals and in the community, and includes all neonatal deaths and stillbirths during pregnancy, birth or within 28 days of birth, of babies of at least 20 weeks gestation or at least 400 grams birthweight. In Victoria and Western Australia, births are included if gestational age is at least 20 weeks or, if gestation is unknown, birthweight is at least 400 grams.

The NPMDC commenced with the 2013 birth cohort and builds on information collected in the National Perinatal Data Collection (NPDC). Common identifier fields in the NPDC and NPMDC allow demographic information regarding perinatal death records in the NPMDC to be retrieved from the NPDC for reporting.

There are 33 voluntary data items collected in the NPMDC which are supplied by state and territory health authorities using a standard de-identified extract to the Australian Institute of Health and Welfare (AIHW) on an annual basis. Specifications for data items used in this report can be found online in the Supplementary Data Tables <<http://www.aihw.gov.au/reports/mothers-babies/stillbirths-and-neonatal-deaths-in-australia-2017/data>>.

For more detailed information on completeness, accuracy and other aspects of data quality for the NPMDC as it applies to this report, see:

- The 2017 data quality statement at <https://meteor.aihw.gov.au/content/index.phtml/itemId/729106>
- The 2018 data quality statement at <https://meteor.aihw.gov.au/content/index.phtml/itemId/734766>

#### National Perinatal Data Collection

The NPDC is a national population-based cross-sectional collection of data on pregnancy and childbirth. The data are based on births reported to the perinatal data collection in each state and territory in Australia. Midwives and other birth attendants, using information obtained from mothers and from hospital or other records, complete notification forms for each birth. A standard de-identified extract is provided to the AIHW on an annual basis to form the NPDC.

For more detailed information on completeness, accuracy and other aspects of data quality for the NPDC as it applies to this report, see:

- The 2017 data quality statement at <https://meteor.aihw.gov.au/content/index.phtml/itemId/71must.6326>
- The 2018 data quality statement at <https://meteor.aihw.gov.au/content/index.phtml/itemId/727886>

## Definitions used in reporting

Various definitions are used for reporting and registering perinatal deaths in Australia. The NPMDC collects data and reports using the following definitions (see also the mothers and babies glossary online at <<https://www.aihw.gov.au/reports-data/population-groups/mothers-babies/glossary>>):

**Stillbirth:** a fetal death prior to birth of a baby of 20 or more completed weeks of gestation or of 400 grams or more birthweight.

**Neonatal death:** the death of a live born baby within 28 days of birth.

**Perinatal death:** stillbirth or neonatal death of a baby of 20 or more completed weeks of gestation or of 400 grams or more birthweight.

**Antepartum death:** fetal death occurring prior to labour and/or birth.

**Intrapartum death:** fetal death occurring during labour and/or birth.

**Very early neonatal death:** death of a live born baby within the first 24 hours after birth.

**Early neonatal death:** death of a live born within 1–7 days after birth.

**Late neonatal death:** death of a live born within 8–28 days after birth.

**Figure A1: Definition of stillbirths, neonatal death and perinatal deaths**

20 weeks of gestation*	Labour	Birth	28 days	
Prior to labour and/or birth	During labour and/or birth	First 24 hours	1–7 days	8–27 days
Antepartum	Intrapartum	Very early neonatal	Early neonatal	Late neonatal
Stillbirths		Neonatal deaths		
Perinatal deaths				

\* At least 20 week of gestation and/or 400 grams birthweight.

**Live birth:** the birth of a baby who show signs of life such as voluntary muscle movement, pulsating of the umbilical cord or presence of a heartbeat at birth, regardless of whether the placenta is still attached or the umbilical cord has been cut.

**Terminations of pregnancy** performed at 20 or more weeks of gestation may be included and recorded either as stillbirths or, in the event of showing evidence of life, as live births. There are variations in legislation regarding termination of pregnancy between states and territories, and recording of terminations is likely to be incomplete.

**Trimesters:** Pregnancy is divided into trimesters, with the first trimester being the first 13 weeks of gestation, the second trimester 14–27 weeks of gestation, and the third trimester 28 weeks of gestation onwards.

## World Health Organization (WHO) definitions

To allow for international comparisons, the WHO definitions regarding perinatal mortality indicators have been used (WHO 2015). These definitions are:

- **Stillbirth:** a fetal death prior to birth of a baby in the third trimester of pregnancy, of 28 or more completed weeks of gestation or of 1,000 grams or more birthweight.
- **Neonatal death:** the death of a baby in the first 28 days of life, measured through registered deaths. In Australia, **registered deaths** are those occurring at 20 or more completed weeks of gestation or of 400 grams or more birthweight.

## Cause of death classification

The Perinatal Society of Australia and New Zealand (PSANZ) Perinatal Mortality Classification System is used in Australia and New Zealand to classify the causes of stillbirths and neonatal deaths. It includes the PSANZ Perinatal Death Classification (PSANZ-PDC) and PSANZ Neonatal Death Classification (PSANZ-NDC). The PSANZ-PDC system classifies all perinatal deaths by the single most important factor seen as the antecedent cause of death. In addition, for neonatal deaths, the PSANZ-NDC system is used to identify conditions present in the neonatal period which resulted in the death.

The PSANZ Perinatal Death Classification is an integral part of the PSANZ Perinatal Mortality Guidelines, developed for optimal standards in investigating, classifying and auditing of perinatal deaths.

The National Perinatal Mortality Data Collection (NPMDC) collects data on causes of death that have been classified according to the [PSANZ Perinatal Mortality Classification System, version 2.2](#). The classification is recorded as part of each state and territory's perinatal mortality review process following completion of investigations and at the end of a multi-disciplinary review of the perinatal death.

The other classification system used in Australia to classify perinatal deaths is the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10). This classification system is based on the registered cause/s of death on the Medical Certificate of Cause of Perinatal Death, assigned by the treating medical practitioner shortly after death without access to any subsequent investigations. As such, the National Maternal and Perinatal Mortality Advisory Group (NMPMAG) has concluded that the PSANZ-PDC and PSANZ-NDC classifications are the most appropriate for national reviews.

# Methods

## Mortality rates

### Calculation of stillbirth rate

The stillbirth rate is calculated as the proportion of births in a specified population which are stillbirths. This proportion is expressed in relation to all births.

Stillbirth rate = (Number of stillbirths / Total number of births) x 1,000

### Calculation of neonatal mortality rate

The neonatal mortality rate is calculated as the proportion of births in a specified population which are live born and subsequently die within 28 days of birth (neonatal deaths). This proportion is expressed in relation to all live births.

Neonatal mortality rate = (Number of neonatal deaths / Number of live births) x 1,000

### Calculation of perinatal mortality rate

The perinatal mortality rate is calculated as the proportion of births in a specified population which are stillbirths or neonatal deaths (perinatal deaths). This proportion is expressed in relation to all births.

Perinatal mortality rate = (Number of perinatal deaths / Total number of births) x 1,000

## Other data items

### Calculation of Australian national birthweight percentiles by gestational age

Birthweight percentiles were calculated from data on all liveborn singleton babies born in Australia between 2004 and 2013 with a gestational age of 20–44 weeks.

Records with indeterminate sex were excluded from analysis. Records with missing or not stated data for sex, birthweight or gestational age were also excluded. Birthweight outliers were calculated and excluded using a method based on Tukey's box and whisker plots.

Gestational age is reported in completed weeks of gestation, calculated from the first day of the last menstrual period (LMP) or estimated by prenatal and/or postnatal assessment if the LMP date was missing. Birthweight is reported to the nearest 5 grams.

Data used to assign percentiles are supplied in the supplementary tables.

### Geography

Geographic data are based on the usual residence of the mother. In 2017 and 2018, the usual residence of the mother is based on Statistical Area Level 2 (SA2) of the Australian Bureau of Statistics Australian Statistical Geography Standard Edition 2016 for all states and territories.

### Primary Health Network

Primary Health Networks (PHNs) have been established by the Department of Health to increase the efficiency and effectiveness of medical services and improve the coordination of care for patients.

Perinatal data at Statistical Area Level 2 (SA2) were linked to 2017 PHNs using Australian Bureau of Statistics correspondence files.

The relevant proportion for each PHN was then calculated. The majority of SA2s corresponded to one PHN. Where a record's SA2 corresponded to more than one PHN, that PHN was assigned a decimal value to reflect the proportion of the SA2 that is in that PHN. The number of births in each PHN is the sum of these values rounded to the nearest 1.

## Remoteness

This report uses the Australian Statistical Geography Standard Remoteness Structure, which groups geographic areas into five classes of Remoteness Area based on their relative access to services using the Accessibility and Remoteness Index of Australia (ARIA+). The five classes are: *Major cities*, *Inner regional*, *Outer regional*, *Remote*, and *Very remote*.

In this report, remoteness has been derived by applying the ABS's Australian Statistical Geography Standard (ASGS) remoteness structure to the area of the mother's usual residence. These areas are defined using the ABS Statistical Area Level 2 (SA2) structure. The ASGS is updated every 5 years. For this report, 2016 ASGS classifications have been used for 2017 and 2018 (ABS 2018a).

In calculating the remoteness of usual residence for women giving birth in 2017 and 2018, mothers living in an area that was located entirely within one remoteness area category would be assigned that category. For mothers living in an area considered to be in more than one remoteness area category, the entire area is assigned to the remoteness category that accounts for the majority of the area.

For example, if 75% of an SA2 area was in the *Inner regional* category and 25% was in the *Outer regional* category, the area would be assigned to the *Inner regional* category.

For more information about remoteness, see the ABS website at <https://www.abs.gov.au/websitedbs/D3310114.nsf/home/remoteness+structure>.

## Socioeconomic status

Socio-Economic Indexes for Areas (SEIFA) is a set of four indices, produced by the ABS, that aim to represent the social and economic characteristics of Australian communities, and identify areas of relative advantage and disadvantage.

Each index focuses on a different aspect of socioeconomic advantage and disadvantage. This report uses the Index of Relative Socio-Economic Disadvantage (IRSD), developed by the Australian Bureau of Statistics for use at Statistical Area Level 2 (SA2). The index value reflects the overall or average level of disadvantage of the population of an area; it does not show how individuals living in the same area differ from each other.

Socioeconomic disadvantage is typically associated with lower income, higher unemployment and lower levels of education. IRSD focuses on variables that show relative disadvantage and ranks areas from most to least disadvantaged in 10 categories (deciles). These categories can also be combined to rank areas from most to least disadvantaged in 5 categories (quintiles). Population-based Australian cut-offs for SEIFA quintiles have been used in this report. This method ranks the SEIFA scores for a particular geography (for example, Statistical Area Level 2) from lowest to highest, and the geographical areas are divided into 5 groups, such that approximately 20% of the population are in each group.

A low score indicates that an area has many low-income families, many people with little training and many people working in unskilled occupations; hence, this area may be considered disadvantaged relative to other areas. A high score implies that the area has few families with low incomes and few people with little or no training and working in unskilled occupations. These areas with high index scores may be considered less disadvantaged relative to other areas. It is important to understand that a high score reflects a relative lack of disadvantage rather than advantage and that the IRSD relates to the average disadvantage of all people living in a geographic area. It cannot be presumed to apply to all individuals living within the area.

In this report, the level of socioeconomic disadvantage of the area of usual residence has been derived by applying the relevant IRSD quintile to the area of mother's usual residence. Socio-Economic Indexes for Areas is based on information from the Census, and updated every 5 years. For this report, 2016 IRSD quintiles were used for 2017 and 2018 (ABS 2018b).

For more information about SEIFA, see the ABS website at [https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2016~Main%20Features~SOCIO-ECONOMIC%20INDEXES%20FOR%20AREAS%20\(SEIFA\)%202016~1](https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2016~Main%20Features~SOCIO-ECONOMIC%20INDEXES%20FOR%20AREAS%20(SEIFA)%202016~1).

## **Confidentiality**

To maintain privacy and confidentiality of individuals, cells in the supplementary data tables are suppressed if there is a risk of disclosure of an attribute of an individual that was not already known. A cell in a table is considered identifiable if, as well as being able to identify the entity, other details are also revealed. It is AIHW policy that these cells need to be confidentialised, unless the attribute that would be disclosed is deemed to be non-sensitive in the context of the data being published.

# Appendix B:

## Data quality and availability of national perinatal mortality data

### Data quality

Some topics in this report may exclude data for selected states and territories for reasons including:

- Data are not currently collected by a state and territory, or are not collected in a format that is comparable with the specifications for the National Perinatal Data Collection (NPDC) or National Perinatal Mortality Data Collection (NPMDC).
- Data are not currently supplied by a state and territory for the NPDC or NPMDC. Data items that are not part of the Perinatal NMDS are not mandatory for provision to the NPDC, and there are currently no Perinatal NMDS items in the NPMDC.

Links to data quality statements for the NPMDC and NPDC have been provided on page 42.

### Quality of data for reporting Indigenous status

Aboriginal and Torres Strait Islander woman is defined, for Australian health data collections, as a woman of Aboriginal and/or Torres Strait Islander descent, who identifies herself as such. Information on the Indigenous status of the women who gave birth in 2017 and 2018 is collected as part of the NPDC, and has been analysed in this report.

Unless otherwise stated, data for babies are based on the Indigenous status of the mother. However, the outcomes of babies of Aboriginal and Torres Strait Islander women remain a key data resource for assessing provision of antenatal care in pregnancy and other interventions before or during pregnancy.

### Comparing NPMDC data with ABS registrations of death data

Perinatal death data reported by the Australian Bureau of Statistics (ABS) are not directly comparable with the NPMDC and NPDC data used in this report.

ABS data are sourced from state and territory registrars of Births, Deaths and Marriages (ABS 2019). It is the responsibility of the parents to register a birth with Births, Deaths and Marriages, however, some perinatal deaths may not be recorded when notifications are not registered by the parents. NPMDC and NPDC data contained in this report are sourced from midwives, and other staff, who collect information from mothers and perinatal administrative and clinical record systems.

The ABS codes the cause of deaths using the ICD classification system, while the NPMDC uses the PSANZ classification system.

## Comparing NPMDC data with Victorian Consultative Council on Obstetric and Paediatric Mortality and Morbidity data

The stillbirth data for Victoria reported to the National Perinatal Mortality Data Collection differs to that reported by the Victorian Consultative Council on Obstetric and Paediatric Mortality and Morbidity (CCOPMM).

For 2017, the CCOPMM annual report shows 641 stillbirths and a crude stillbirth rate of 8.0 per 1,000 births (CCOPMM 2019a). For 2018, the CCOPMM annual report shows 646 stillbirths and a crude stillbirth rate of 8.2 per 1,000 births (CCOPMM 2019b).

The difference is due to the following exclusions applied to the stillbirths reported by the CCOPMM:

- Stillbirths proven to have occurred at less than 20 weeks of gestation (for example, where a fetal death in utero diagnosed by ultrasound at 19 weeks of gestation), but where birth occurs at 20 weeks of gestation or more
- Stillbirths where a fetal death in utero is diagnosed at 20 weeks of gestation or more, but where the birthweight is less than 150 grams.

# Appendix C: National Perinatal Mortality Data Collection project governance

## The National Maternity Services Plan

In 2008, a national review of maternity services was undertaken in Australia, led by the Australian Government Chief Nurse and Midwifery Officer. The findings were presented in 2009 in *Improving maternity services in Australia: the report of the Maternity Services Review* (DoH 2009). The report aimed to identify key gaps in maternity care, and inform development of the first National Maternity Services Plan (AHMC 2011).

The National Maternity Services Plan was launched in February 2011, and set out a 5-year vision for maternity care. It provided a strategic national framework to guide policy and program development across Australia (AHMC 2011). Though the plan's 5-year period has ended, its guiding principles continue to be observed.

The plan aimed to maintain Australia's high standard of maternity and newborn care, while seeking to improve access to services and choice in care. This includes increasing and supporting the maternity workforce, strengthening infrastructure, and building the evidence base of what works well in Australia.

In particular, the plan's priority areas were to:

- meet the needs of women and their families living in rural and remote areas
- improve birth outcomes for Aboriginal and Torres Strait Islander people
- meet the requirements of women and babies who are vulnerable due to medical or other risk factors.

The plan targeted primary maternity services during the antenatal, intrapartum, and 6-week postnatal period for both women and babies (AHMC 2011).

In 2011, the Australian Government provided funding for the National Maternity Data Development Project (NMDDP).

At the Australian Health Minister's Advisory Council meeting in September 2017, it was agreed to start a new process to develop a National Strategic Approach to Maternity Services.

Members agreed that the work would be led by the Australian Government, and include all jurisdictions in a time-limited Project Reference Group.

As a result, a new national strategy—*Woman-centred care: strategic directions for Australian maternity services*—was released on 5 November 2019 (COAG Health Council 2019).

## National Maternity Data Development Project

The NMDDP was set up in response to Recommendation 1 of the National Maternity Services Plan. The primary aims of the NMDDP are to develop a nationally consistent and comprehensive maternal and perinatal mortality and morbidity data collection in Australia.

High-quality and nationally consistent data are required to assess the safety and outcomes of current and emerging models of maternity care in Australia. These will enable disparities in health outcomes for population subgroups to be monitored and compared with the general population.

The project is managed by the NMDDP Advisory Group. Reports on stages of the NMDDP process have been published at [www.aihw.gov.au/reports-data/population-groups/mothers-babies/reports](http://www.aihw.gov.au/reports-data/population-groups/mothers-babies/reports).

## National Maternal and Perinatal Mortality Clinical Expert Group

The National Maternal and Perinatal Mortality Advisory Group was convened in 2015 to provide guidance and national relevance to the development national perinatal and maternal mortality data and reporting. It is a subcommittee of the NMDDP Advisory Group.

In 2019, the group was divided into:

- a group providing AIHW with expert clinical advice—the National Maternal and Perinatal Mortality Clinical Expert Group
- a group providing expert data management advice—the National Perinatal Data Development Committee.

These committees will continue to provide guidance on current and future perinatal and maternal mortality data and reporting.

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## Abbreviations

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
CCOPMM	Consultative Council on Obstetric and Paediatric Mortality and Morbidity (Victoria)
PSANZ	Perinatal Society of Australia and New Zealand
PSANZ-PDC	Perinatal Society of Australia and New Zealand Perinatal Death Classification
PSANZ-NDC	Perinatal Society of Australia and New Zealand Neonatal Death Classification
WHO	World Health Organization

## Symbols

—	nil or rounded to zero
..	not applicable
n.a.	not available
n.p.	not publishable because of small numbers, confidentiality or other concerns about the quality of the data

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Australia is one of the safest places in the world for a baby to be born, yet death occurring within the perinatal period is not uncommon. Every day in Australia, 6 babies are stillborn and 2 die within 28 days of birth (neonatal death).

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