

# Te mate pēpi | Perinatal mortality

## Aotearoa/New Zealand overview and key findings

Since 2007, when the PMMRC started collecting data, there has been a statistically significant decrease in the rate of stillbirths (chi-squared test for trend  $p < 0.001$ ) but no reduction in neonatal mortality. Overall, there is some evidence of a statistically significant decrease in the rates of perinatal (fetal and early neonatal) mortalities, and in deaths overall (perinatal related mortality) (Figure 3.1 and Table 3.1).

To examine the populations that benefitted, further analyses by prioritised ethnic group were undertaken (data not shown). Over the time period 2007–2017, for stillbirths, there was a statistically significant decrease in stillbirths in babies of both Māori and New Zealand European mothers, and no change in other groups.

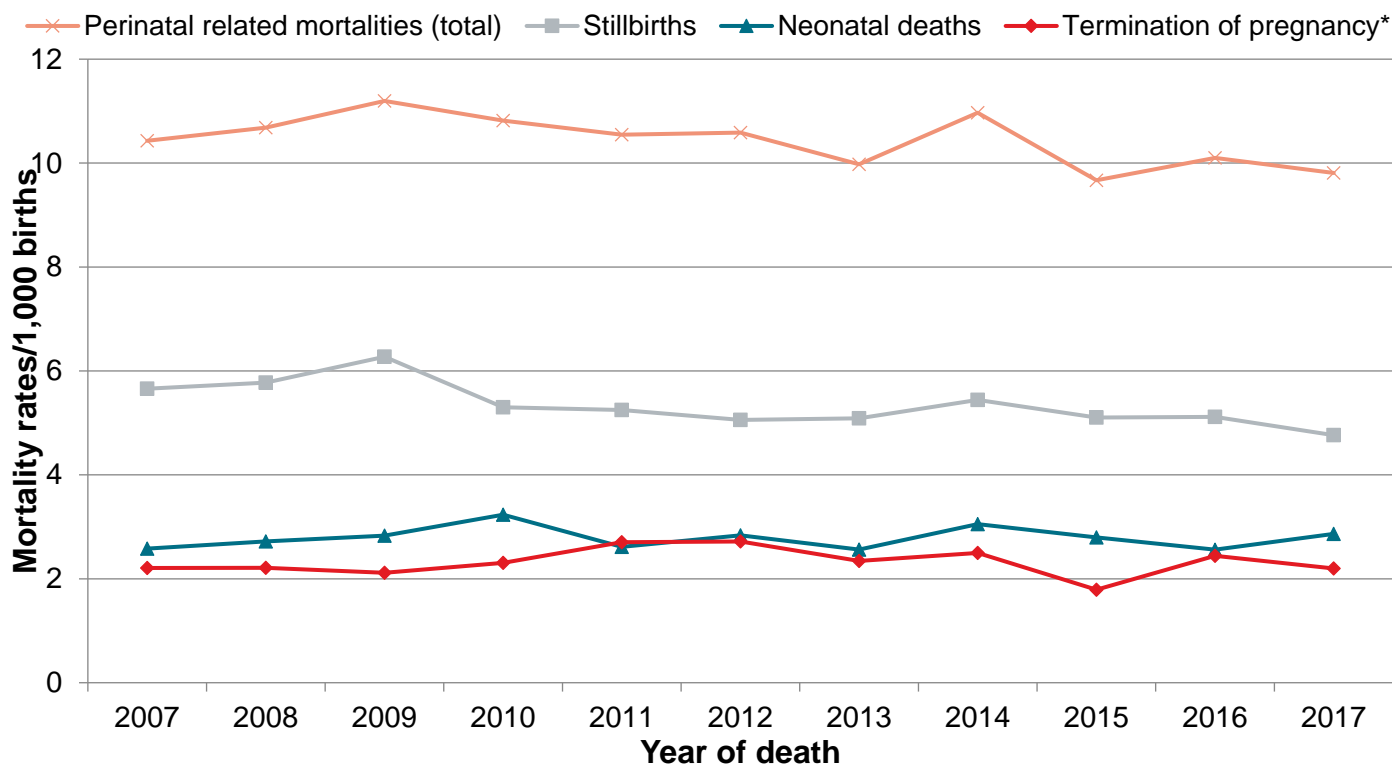
The reduction in perinatal mortalities was driven by a statistically significant reduction in babies of New Zealand European mothers, with no change in other ethnic groups. Similarly, there was a statistically significant decrease in fetal deaths and perinatal related mortalities for New Zealand European mothers, but not for any other ethnic groups.

There was a statistically significant increase in terminations of pregnancy for Māori mothers, but no significant change for other ethnic groups.

Between the years 2007 and 2017, there was a statistically significant increase in neonatal deaths for babies of Pacific women, but no significant change for other groups.

There were no statistically significant changes in any of the above mortality rates for babies of women of Indian; Other Asian; Middle Eastern, Latin American, or African (MELAA); or Other European groups (data not shown).

Figure 3.1: Perinatal related mortality rates (per 1,000 births) using New Zealand definitions 2007–2017



\* In this report, 'Termination of pregnancy' refers to the interruption of an ongoing pregnancy from 20 weeks' gestation onwards. Sources: Numerator: PMMRC's perinatal data extract 2007–2017; Denominator: MAT births 2007–2017.

Table 3.1: Summary of New Zealand perinatal related mortality rates using New Zealand definition ( $\geq 20$  weeks or  $\geq 400$ g if gestation is unknown) 2007–2017

	n											Chi-squared test for trend (p)
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
Total births	65,200	65,623	65,202	65,449	63,242	63,280	60,133	60,079	59,777	60,600	60,454	
Fetal deaths (terminations of pregnancy and stillbirths)*	513	524	547	498	503	492	447	477	412	458	421 <sup>§</sup>	0.004
Terminations of pregnancy	144	145	138	151	171	172	141	150	107	148	133	0.98
Stillbirths	369	379	409	347	332	320	306	327	305	310	288 <sup>§</sup>	<0.001
Early neonatal deaths <7 days	133	134	137	165	139	142	122	150	131	123 <sup>‡</sup>	137 <sup>§</sup>	
Late neonatal deaths 7–27 days	34	43	46	45	25	36	31	32	35	31	35	
Neonatal deaths <28 days <sup>#</sup>	167	177	183	210	164	178	153	182	166	154 <sup>‡</sup>	172 <sup>§</sup>	0.90
Perinatal mortalities <sup>+</sup>	646	658	684	663	642	634	569	627	543	581 <sup>‡</sup>	558 <sup>§</sup>	0.024
Perinatal related mortalities <sup>^</sup>	680	701	730	708	667	670	600	659	578	612 <sup>‡</sup>	593 <sup>§</sup>	0.017
Perinatal mortalities excluding lethal and terminated fetal abnormalities <sup>*</sup>	462	488	515	466	446	445	417	449	402	416 <sup>‡</sup>	409	0.053
Perinatal related mortalities excluding lethal and terminated fetal abnormalities <sup>*</sup>	482	516	546	497	462	467	436	468	420	437 <sup>‡</sup>	434	0.041

	Rate											Chi-squared test for trend (p)
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
Total births												
Fetal deaths (terminations of pregnancy and stillbirths)*	7.9	8.0	8.4	7.6	8.0	7.8	7.4	7.9	6.9	7.6	7.0	0.004
Terminations of pregnancy	2.2	2.2	2.1	2.3	2.7	2.7	2.3	2.5	1.8	2.4	2.2	0.98
Stillbirths	5.7	5.8	6.3	5.3	5.2	5.1	5.1	5.4	5.1	5.1	4.8	<0.001
Early neonatal deaths <7 days												
Late neonatal deaths 7–27 days												
Neonatal deaths <28 days <sup>#</sup>	2.6	2.7	2.8	3.2	2.6	2.8	2.6	3.1	2.8	2.6	2.9	0.90
Perinatal mortalities <sup>+</sup>	9.9	10.0	10.5	10.1	10.2	10.0	9.5	10.4	9.1	9.6	9.2	0.024
Perinatal related mortalities <sup>^</sup>	10.4	10.7	11.2	10.8	10.5	10.6	10.0	11.0	9.7	10.1	9.8	0.017
Perinatal mortalities excluding lethal and terminated fetal abnormalities <sup>*</sup>	7.1	7.4	7.9	7.1	7.1	7.0	6.9	7.5	6.7	6.9	6.8	0.053
Perinatal related mortalities excluding lethal and terminated fetal abnormalities <sup>*</sup>	7.4	7.9	8.4	7.6	7.3	7.4	7.3	7.8	7.0	7.2	7.2	0.041

\* Fetal death rate per 1,000 babies born (includes terminations and stillbirths).

# Neonatal death rate per 1,000 live born babies.

+ Fetal deaths and early neonatal deaths per 1,000 babies born.

^ Fetal deaths and early and late neonatal deaths per 1,000 babies born.

• Lethal and terminated fetal abnormalities are all perinatal related deaths with Perinatal Society of Australia and New Zealand Perinatal Death Classification (PSANZ-PDC) of congenital abnormality, and neonatal deaths with PSANZ Neonatal Death Classification (PSANZ-NDC) of congenital abnormality.

‡ Included two late notifications.

§ Included two late notifications.

Sources: Numerator: PMMRC's perinatal data extract 2007–2017; Denominator: MAT births 2007–2017.

Using international definitions, there is strong evidence of a statistically significant decrease in fetal deaths, stillbirths, perinatal mortalities and perinatal related mortalities since 2007 (Table 3.2 and Figure 3.2).

Table 3.2: New Zealand perinatal related mortality rates (per 1,000 births) using the international definition ( $\geq 1,000\text{g}$  or  $\geq 28$  weeks if birthweight unknown) 2007–2017

	n											Chi-squared test for trend (p)
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
Total births	64,650	65,076	64,629	64,885	62,694	62,717	59,600	59,513	59,316	60,090	59,928	
Fetal deaths (terminations of pregnancy and stillbirths)*	212	207	231	199	191	166	155	162	164	171	158	
Terminations of pregnancy	6	14	9	17	24	13	12	13	7	15	16	
Stillbirths	206	193	222	182	167	153	143	149	157	156	142	
Early neonatal deaths <7 days	57	67	59	68	65	54	45	59	57	53	46	
Late neonatal deaths 7–27 days	28	35	30	31	18	24	24	23	28	23	22	
Neonatal deaths <28 days#	85	102	89	99	83	78	69	82	85	76	68	
Perinatal mortalities+	269	274	290	267	256	220	200	221	221	224	204	
Perinatal related mortalities^	297	309	320	298	274	244	224	244	249	247	226	
Perinatal mortalities excluding lethal and terminated fetal abnormalities*	224	220	238	204	180	169	158	168	177	170	159	
Perinatal related mortalities excluding lethal and terminated fetal abnormalities*	238	240	254	221	189	179	170	178	188	183	172	
	Rate											
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
Total births												
Fetal deaths (terminations of pregnancy and stillbirths)*	3.3	3.2	3.6	3.1	3.0	2.6	2.6	2.7	2.8	2.8	2.6	<0.001
Terminations of pregnancy	0.1	0.2	0.1	0.3	0.4	0.2	0.2	0.2	0.1	0.2	0.3	0.25
Stillbirths	3.2	3.0	3.4	2.8	2.7	2.4	2.4	2.5	2.6	2.6	2.4	<0.001
Early neonatal deaths <7 days												
Late neonatal deaths 7–27 days												
Neonatal deaths <28 days#	1.3	1.6	1.4	1.5	1.3	1.2	1.2	1.4	1.4	1.3	1.1	0.11
Perinatal mortalities+	4.2	4.2	4.5	4.1	4.1	3.5	3.4	3.7	3.7	3.7	3.4	<0.001
Perinatal related mortalities^	4.6	4.7	5.0	4.6	4.4	3.9	3.8	4.1	4.2	4.1	3.8	<0.001
Perinatal mortalities excluding lethal and terminated fetal abnormalities*	3.5	3.4	3.7	3.1	2.9	2.7	2.7	2.8	3.0	2.8	2.7	<0.001
Perinatal related mortalities excluding lethal and terminated fetal abnormalities*	3.7	3.7	3.9	3.4	3.0	2.9	2.9	3.0	3.2	3.0	2.9	<0.001

\* Fetal death rate per 1,000 babies born (includes terminations and stillbirths).

# Neonatal death rate per 1,000 live born babies.

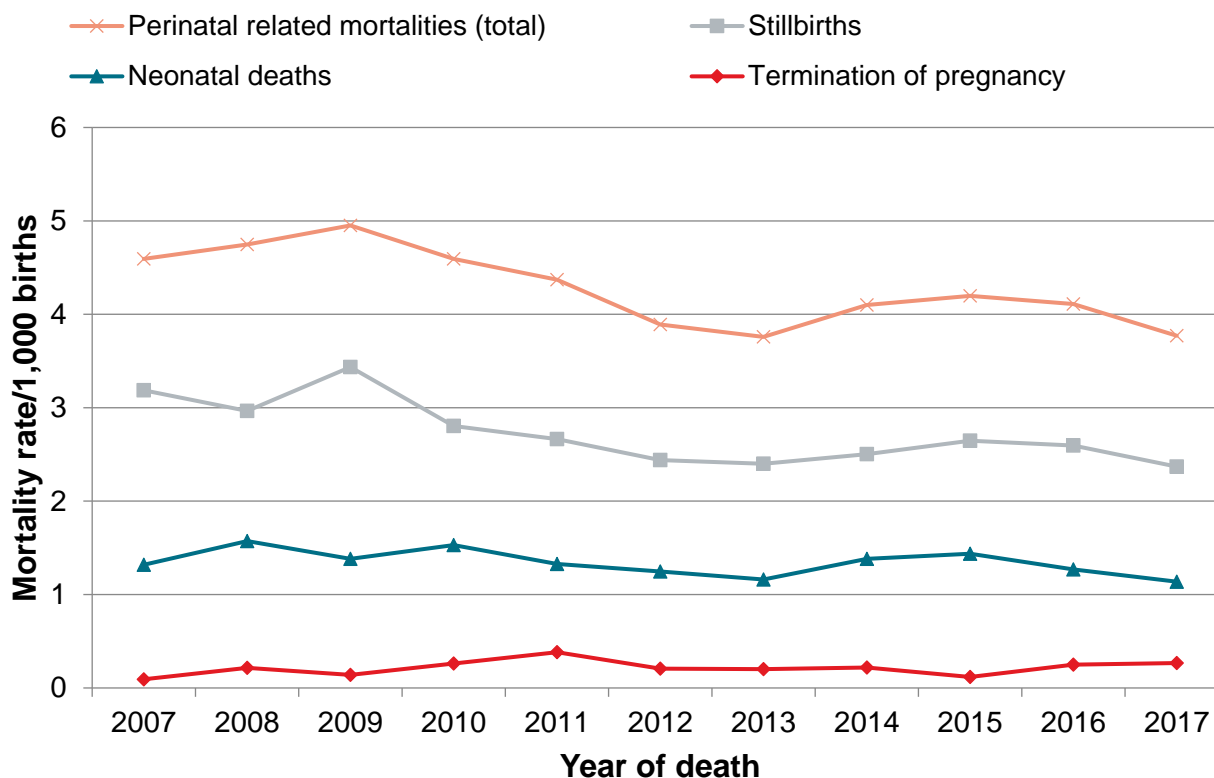
+ Fetal deaths and early neonatal deaths per 1,000 babies born.

^ Fetal deaths and early and late neonatal deaths per 1,000 babies born.

• Lethal and terminated fetal abnormalities are all perinatal related deaths with PSANZ-PDC of congenital abnormality, and neonatal deaths with PSANZ-NDC of congenital abnormality.

Sources: Numerator: PMMRC's perinatal data extract using the international definition ( $\geq 1,000\text{g}$  or  $\geq 28$  weeks if birthweight unknown) 2007–2017; Denominator: MAT births using the international definition ( $\geq 1,000\text{g}$  or  $\geq 28$  weeks if birthweight unknown) 2007–2017.

Figure 3.2: Perinatal related mortality annual rates (per 1,000 births) using international definitions\* 2007–2017



\* Rates of fetal death, neonatal death, perinatal mortality and perinatal related mortality of babies weighing  $\geq 1,000\text{g}$ , or  $\geq 28$  weeks if birthweight is unknown, per 1,000 total births of babies weighing  $\geq 1,000\text{g}$ , or  $\geq 28$  weeks if birthweight is unknown. Babies without birthweight or gestation are included if they have been registered.

Sources: Numerator: PMMRC’s perinatal data extract using the international definition ( $\geq 1,000\text{g}$  or  $\geq 28$  weeks if birthweight unknown) 2007–2017; Denominator: MAT births using the international definition ( $\geq 1,000\text{g}$  or  $\geq 28$  weeks if birthweight unknown) 2007–2017.

In 2017, from 20 weeks’ gestation onwards, 75% of terminations of pregnancy were classified as Perinatal Society of Australia and New Zealand (PSANZ) Perinatal Death Classification (PDC) congenital abnormality, with 8.3% classified as PSANZ-PDC for maternal conditions. Nearly 30% of stillbirths were classified as PSANZ-PDC unexplained antepartum death (for unknown reasons). There were no statistically significant differences between rates of unexplained stillbirth between Māori and New Zealand European women. Sixteen percent of stillbirths were due to specific perinatal conditions, and 13% due to antepartum haemorrhage. The leading PSANZ PDC category of neonatal death was spontaneous preterm birth (27.5%), followed by antepartum haemorrhage (22.8%) (Table 3.3).

During the period 2007–2017, congenital abnormalities were the most frequent cause of death. Published research shows there is good evidence that folic acid supplementation prior to and in the first weeks of pregnancy prevents neural tube defects,<sup>1</sup> and we should consider ways to increase folic acid consumption in the childbearing population.

<sup>1</sup> De-Regil LM, Peña-Rosas JP, Fernández-Gaxiola AC, et al. 2015. Effects and safety of periconceptional oral folate supplementation for preventing birth defects. *Cochrane Database of Systematic Reviews* 2015(12): CD007950. URL: <https://doi.org/10.1002/14651858.CD007950.pub3> (accessed 14 August 2019).

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Table 3.3: Perinatal related deaths by perinatal death classification (PSANZ-PDC) 2017

Perinatal death classification (PSANZ-PDC)	Fetal deaths				Neonatal deaths		Perinatal related deaths (total)	
	Termination of pregnancy		Stillbirths					
	n=133		n=287		n=171		n=591	
	n	%	n	%	n	%	n	%
Congenital abnormality	100	75.2	26	9.1	31	18.1	157	26.6
Perinatal infection	4	3.0	17	5.9	7	4.1	28	4.7
Hypertension	<3	x	10	3.5	<3	x	13	2.2
Antepartum haemorrhage	<3	x	37	12.9	39	22.8	78	13.2
Maternal conditions	11	8.3	11	3.8	6	3.5	28	4.7
Specific perinatal conditions	3	2.3	45	15.7	16	9.4	64	10.8
Hypoxic peripartum death	-	-	4	1.4	9	5.3	13	2.2
Fetal growth restriction	<3	x	33	11.5	6	3.5	41	6.9
Spontaneous preterm	10	7.5	20	7.0	47	27.5	77	13.0
Unexplained antepartum death	-	-	84	29.3	-	-	84	14.2
No obstetric antecedent	-	-	-	-	8	4.7	8	1.4

'x' indicates percentage suppressed due to small numbers.

Source: PMMRC's perinatal data extract 2017.

Our data show there is strong evidence that perinatal deaths due to maternal hypertension have statistically significantly reduced over the time period ( $p < 0.01$ ). There is some evidence of a reduction in the rate of death from hypoxic peripartum death, fetal growth restriction, and spontaneous preterm births (Table 3.4).

Using the international definition of birth weight greater than or equal to 1,000g, or gestational age 28 weeks or greater, there was some evidence for a statistically significant reduction in deaths due to antepartum haemorrhage. There was strong evidence for a statistically significant decrease in the rate of deaths due to fetal growth restriction, and hypoxic peripartum deaths (Table 3.5).

Table 3.4: Perinatal death classification (PSANZ-PDC) specific perinatal related mortality rates (per 1,000 births) using New Zealand definition 2007–2017

Perinatal death classification (PSANZ-PDC)	2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		Chi-squared test for trend (p)
	N=65,200		N=65,623		N=65,202		N=65,449		N=63,242		N=63,280		N=60,133		N=60,079		N=59,777		N=60,600		N=60,454		
	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	
Congenital abnormality	197	3.02	185	2.82	182	2.79	211	3.22	203	3.21	201	3.18	160	2.66	189	3.15	158	2.64	174	2.87	157	2.60	0.19
Perinatal infection	29	0.44	28	0.43	25	0.38	28	0.43	21	0.33	19	0.30	20	0.33	24	0.40	22	0.37	26	0.43	28	0.46	0.97
Hypertension	19	0.29	22	0.34	29	0.44	27	0.41	21	0.33	19	0.30	13	0.22	13	0.22	21	0.35	9	0.15	13	0.22	0.0083
Antepartum haemorrhage	64	0.98	66	1.01	79	1.21	78	1.19	78	1.23	60	0.95	75	1.25	69	1.15	79	1.32	72	1.19	78	1.29	0.076
Maternal conditions	27	0.41	23	0.35	38	0.58	32	0.49	26	0.41	36	0.57	34	0.57	39	0.65	29	0.49	37	0.61	28	0.46	0.11
Specific perinatal conditions	57	0.87	71	1.08	76	1.17	69	1.05	73	1.15	70	1.11	63	1.05	70	1.17	60	1.00	69	1.14	64	1.06	0.56
Hypoxic peripartum death	33	0.51	34	0.52	28	0.43	20	0.31	20	0.32	20	0.32	11	0.18	17	0.28	17	0.28	13	0.21	13	0.22	0.038
Fetal growth restriction	48	0.74	62	0.94	53	0.81	48	0.73	44	0.70	49	0.77	48	0.80	35	0.58	33	0.55	41	0.68	41	0.68	0.041
Spontaneous preterm	99	1.52	94	1.43	110	1.69	113	1.73	85	1.34	102	1.61	80	1.33	106	1.76	65	1.09	72	1.19	77	1.27	0.015
Unexplained antepartum death	96	1.47	102	1.55	103	1.58	72	1.10	92	1.45	85	1.34	90	1.50	90	1.50	87	1.46	91	1.50	84	1.39	0.91
No obstetric antecedent	11	0.17	14	0.21	7	0.11	10	0.15	4	0.06	9	0.14	6	0.10	7	0.12	7	0.12	6	0.10	8	0.13	0.17

Sources: Numerator: PMMRC's perinatal data extract 2007–2017; Denominator: MAT births 2007–2017.

Table 3.5: Perinatal death classification (PSANZ-PDC) specific perinatal related mortality rates (per 1,000 births) using international definition ( $\geq 1,000\text{g}$  or  $\geq 28$  weeks if birthweight unknown) 2007–2017

Perinatal death classification (PSANZ-PDC)	2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		Chi-squared test for trend (p)
	N=64,650		N=65,076		N=64,629		N=64,885		N=62,694		N=62,717		N=59,600		N=59,513		N=59,316		N=60,090		N=59,928		
	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	
Congenital abnormality	58	0.90	69	1.06	64	0.99	77	1.19	85	1.36	64	1.02	51	0.86	64	1.08	61	1.03	63	1.05	52	0.87	0.58
Perinatal infection	16	0.25	16	0.25	15	0.23	13	0.20	12	0.19	9	0.14	9	0.15	12	0.20	12	0.20	17	0.28	16	0.27	0.88
Hypertension	7	0.11	7	0.11	14	0.22	11	0.17	9	0.14	3	0.05	5	0.08	6	0.10	10	0.17	6	0.10	6	0.10	0.37
Antepartum haemorrhage	23	0.36	25	0.38	24	0.37	23	0.35	17	0.27	13	0.21	18	0.30	11	0.18	17	0.29	12	0.20	19	0.32	0.036
Maternal conditions	14	0.22	9	0.14	19	0.29	19	0.29	7	0.11	17	0.27	22	0.37	14	0.24	15	0.25	16	0.27	8	0.13	0.84
Specific perinatal conditions	29	0.45	23	0.35	32	0.50	30	0.46	32	0.51	21	0.33	24	0.40	25	0.42	32	0.54	27	0.45	25	0.42	0.85
Hypoxic peripartum death	33	0.51	34	0.52	28	0.43	20	0.31	20	0.32	20	0.32	11	0.18	17	0.29	17	0.29	13	0.22	13	0.22	<0.001
Fetal growth restriction	31	0.48	32	0.49	31	0.48	31	0.48	18	0.29	32	0.51	21	0.35	20	0.34	14	0.24	15	0.25	13	0.22	<0.001
Spontaneous preterm	9	0.14	7	0.11	10	0.15	19	0.29	9	0.14	10	0.16	5	0.08	9	0.15	14	0.24	8	0.13	9	0.15	0.91
Unexplained antepartum death	66	1.02	73	1.12	75	1.16	45	0.69	61	0.97	46	0.73	52	0.87	59	0.99	50	0.84	64	1.07	57	0.95	0.40
No obstetric antecedent	11	0.17	14	0.22	7	0.11	10	0.15	4	0.06	9	0.14	6	0.10	7	0.12	7	0.12	6	0.10	8	0.13	0.17

Sources: Numerator: PMMRC's perinatal data extract using the international definition ( $\geq 1,000\text{g}$  or  $\geq 28$  weeks if birthweight unknown) 2007–2017; Denominator: MAT births using the international definition ( $\geq 1,000\text{g}$  or  $\geq 28$  weeks if birthweight unknown) 2007–2017.

Extracted from the full report at: [www.hqsc.govt.nz/our-programmes/mrc/pmmrc/publications-and-resources/publication/3832](http://www.hqsc.govt.nz/our-programmes/mrc/pmmrc/publications-and-resources/publication/3832)

For stillbirths, there is strong evidence there was a statistically significant reduction in spontaneous preterm and hypoxic peripartum deaths between the years 2007 and 2017. There was some evidence of a reduction in the rate of stillbirths due to fetal growth restriction. For this time period, the largest category of death for stillbirth was unexplained antepartum death (Table 3.6).

Table 3.6: Perinatal death classification (PSANZ-PDC) specific stillbirth rates (per 1,000 births) 2007–2017

Perinatal death classification (PSANZ-PDC)	2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		Chi-squared test for trend (p)	
	N=65,200		N=65,623		N=65,202		N=65,449		N=63,242		N=63,280		N=60,133		N=60,079		N=59,777		N=60,600		N=60,454			
	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate	n	Rate		
Congenital abnormality	35	0.54	28	0.43	30	0.46	37	0.57	27	0.43	35	0.55	22	0.37	34	0.57	25	0.42	31	0.51	26	0.43		0.68
Perinatal infection	21	0.32	15	0.23	16	0.25	17	0.26	10	0.16	9	0.14	10	0.17	12	0.20	12	0.20	10	0.17	17	0.28		0.23
Hypertension	13	0.20	12	0.18	24	0.37	18	0.28	12	0.19	9	0.14	8	0.13	9	0.15	16	0.27	8	0.13	10	0.17		0.096
Antepartum haemorrhage	46	0.71	49	0.75	53	0.81	46	0.70	48	0.76	31	0.49	44	0.73	33	0.55	46	0.77	38	0.63	37	0.61		0.19
Maternal conditions	20	0.31	13	0.20	26	0.40	23	0.35	13	0.21	19	0.30	22	0.37	21	0.35	22	0.37	17	0.28	11	0.18		0.76
Specific perinatal condition	38	0.58	53	0.81	60	0.92	45	0.69	51	0.81	42	0.66	39	0.65	43	0.72	42	0.70	53	0.87	45	0.74		0.78
Hypoxic peripartum death	18	0.28	15	0.23	11	0.17	7	0.11	9	0.14	11	0.17	3	0.05	7	0.12	9	0.15	4	0.07	4	0.07		<0.001
Fetal growth restriction	43	0.66	53	0.81	44	0.67	39	0.60	37	0.59	42	0.66	44	0.73	33	0.55	27	0.45	33	0.54	33	0.55		0.032
Spontaneous preterm	39	0.60	39	0.59	42	0.64	43	0.66	33	0.52	37	0.58	24	0.40	45	0.75	19	0.32	25	0.41	20	0.33		0.002
Unexplained antepartum death	96	1.47	102	1.55	103	1.58	72	1.10	92	1.45	85	1.34	90	1.50	90	1.50	87	1.46	91	1.50	84	1.39		0.91
No obstetric antecedent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-

Sources: Numerator: PMMRC's perinatal data extract, stillbirths only, 2007–2017; Denominator: MAT births 2007–2017.