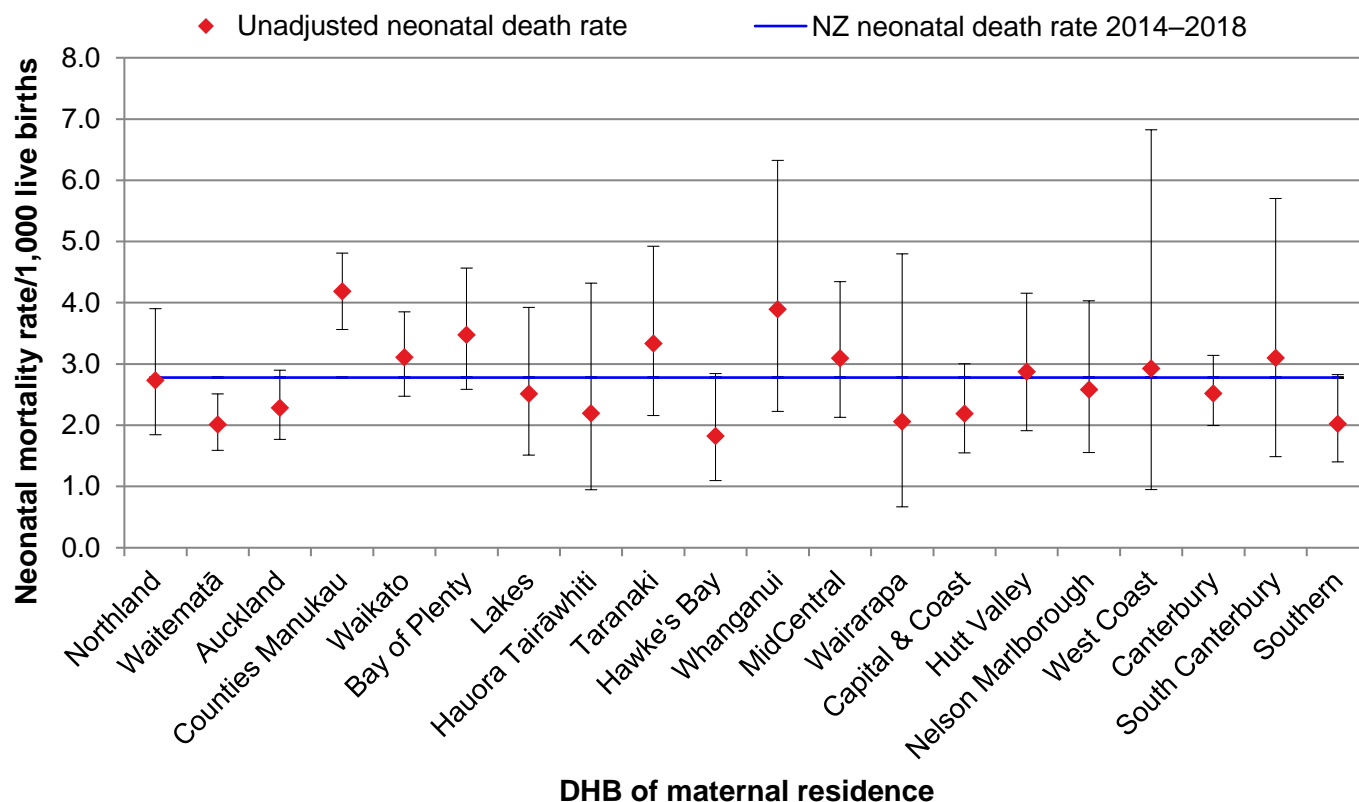


Figure 3.20: Unadjusted neonatal mortality rates (per 1,000 live births, with 95% CIs) by DHB of maternal residence compared with New Zealand neonatal mortality 2014–2018

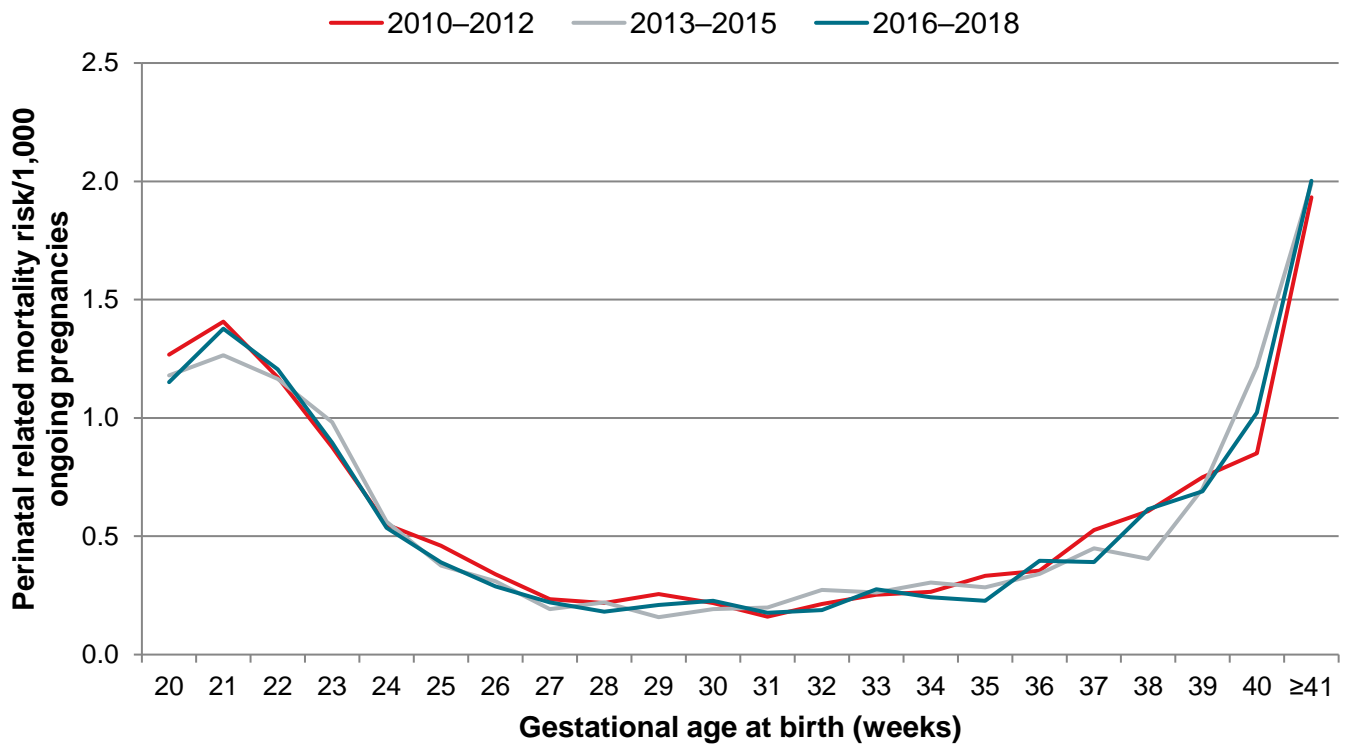


Sources: Numerator: PMMRC's perinatal data extract, neonatal deaths only, 2014–2018; Denominator: MAT births excluding fetal deaths 2014–2018.

Gestational age and birthweight

Perinatal related mortality by gestational age has seen little change over the period 2010–2018. While the risk of death appears highest from 41 weeks' gestation onwards, this is influenced by the number of ongoing pregnancies (the denominator). As there are fewer ongoing pregnancies at this gestational age compared with 23–24 weeks' gestation, the mortality ratio (per 1,000 ongoing pregnancies) is higher from 41 weeks (Figure 3.21). While the rate of death at later gestational ages is lower (1.70 per 1,000 births at ≥41 weeks' gestation compared with 735.54 per 1,000 births at 23–24 weeks' gestation) (Table 3.25), a higher proportion of pregnancies at this gestational age is at risk of adverse outcomes.

Figure 3.21: Perinatal related mortality risk (per 1,000 ongoing pregnancies) by gestational age at birth and year 2010–2018



Sources: Numerator: PMMRC's perinatal data extract 2010–2018; Denominator: MAT births 2010–2018.

Table 3.25: Perinatal related mortality rates (per 1,000 births) by gestational age and birthweight 2018

	Total births		Fetal deaths						Neonatal deaths			Perinatal related deaths (total)		
			Termination of pregnancy			Stillbirths			n	%	Rate	n	%	Rate
	N	%	n	%	Rate	n	%	Rate						
Gestational age at birth (weeks)														
20–22	228	0.4	87	64.4	*	100	31.7	*	51	33.1	*	238	39.4	*
23–24	121	0.2	26	19.3	214.88	29	9.2	239.67	34	22.1	515.15	89	14.7	735.54
25–27	170	0.3	16	11.9	94.12	23	7.3	135.29	6	3.9	45.80	45	7.5	264.71
28–31	469	0.8	<3	x	s	27	8.6	57.57	14	9.1	31.82	43	7.1	91.68
32–36	3,553	6.0	3	2.2	0.84	56	17.8	15.76	15	9.7	4.29	74	12.3	20.83
37–40	45,126	76.2	<3	x	s	69	21.9	1.53	31	20.1	0.69	101	16.7	2.24
≥41	8,217	13.9	-	-	-	11	3.5	1.34	3	1.9	0.37	14	2.3	1.70
Unknown	1,374	2.3	-	-	-	-	-	-	-	-	-	-	-	-
Birthweight (g)														
<500	258	0.4	92	68.1	*	125	39.7	*	44	28.6	*	261	43.2	*
500–999	267	0.5	36	26.7	134.83	41	13.0	153.56	50	32.5	263.16	127	21.0	475.66
1,000–1,499	358	0.6	5	3.7	13.97	26	8.3	72.63	9	5.8	27.52	40	6.6	111.73
1,500–1,999	655	1.1	<3	x	s	19	6.0	29.01	8	5.2	12.60	28	4.6	42.75
2,000–2,499	2,118	3.6	<3	x	s	20	6.3	9.44	11	7.1	5.25	32	5.3	15.11
2,500–2,999	7,940	13.4	-	-	-	24	7.6	3.02	11	7.1	1.39	35	5.8	4.41
3,000–3,499	18,568	31.3	-	-	-	34	10.8	1.83	9	5.8	0.49	43	7.1	2.32
3,500–3,999	17,168	29.0	-	-	-	11	3.5	0.64	6	3.9	0.35	17	2.8	0.99
4,000–4,499	6,466	10.9	-	-	-	7	2.2	1.08	5	3.2	0.77	12	2.0	1.86
≥4,500	1,299	2.2	-	-	-	<3	x	s	<3	x	s	3	0.5	2.31
Unknown	4,161	7.0	-	-	-	6	1.9	-	-	-	-	6	1.0	-

* Denominator data unreliable and therefore rates have not been calculated.

'x' indicates percentage suppressed due to small numbers.

's' indicates rate suppressed due to small numbers.

Sources: Numerator: PMMRC's perinatal data extract 2018; Denominator: MAT births 2018.

Over the period 2007–2018, there is some evidence of a statistically significant decrease in the risk of death for babies born at 28–31, 37–38 and ≥41 weeks' gestation (see Table 3.26 for years 2009–2018).

Table 3.26: Perinatal related mortality risk (per 1,000 ongoing pregnancies) by year 2009–2018

Gestation at birth (weeks)	2009		2010		2011		2012		2013		2014		2015		2016		2017		2018	
	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n
20–22	210	216	231	248	230	235	231	247	215	217	245	253	169	175	206	216	211	210	228	238
23–24	137	105	122	81	129	95	119	94	123	85	137	98	117	92	126	84	110	81	121	89
25–27	237	70	227	73	185	52	219	70	192	55	187	49	206	52	189	50	212	64	170	45
28–31	539	66	560	52	511	58	505	50	471	49	462	46	458	41	483	48	477	49	469	43
32–36	3,978	90	4,005	101	3,909	87	3,933	73	3,724	91	3,729	85	3,652	78	3,824	79	3,750	76	3,553	74
37–38	13,145	78	13,611	62	13,175	64	13,445	65	13,398	38	13,682	56	13,604	42	14,499	59	14,713	45	14,362	53
39–40	34,633	72	34,595	65	33,874	59	33,596	51	32,208	51	32,161	60	32,134	69	32,084	56	32,032	51	30,764	48
≥41	11,740	32	11,547	26	10,729	17	10,325	20	9,479	14	9,093	12	9,075	29	8,787	20	8,467	17	8,217	14
Unknown	584	<3	551	-	501	-	913	-	327	-	384	-	368	-	408	-	506	-	1,374	-

Gestation at birth (weeks)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk
20–22	3.34	3.82	3.75	3.96	3.63	4.24	2.95	3.59	3.50	4.11
23–24	1.63	1.25	1.52	1.51	1.43	1.65	1.55	1.40	1.36	1.54
25–27	1.09	1.13	0.83	1.13	0.92	0.83	0.88	0.84	1.07	0.78
28–31	1.03	0.81	0.93	0.81	0.83	0.78	0.70	0.80	0.82	0.75
32–36	1.42	1.58	1.41	1.19	1.55	1.45	1.33	1.33	1.29	1.30
37–38	1.31	1.04	1.11	1.13	0.69	1.02	0.77	1.07	0.82	0.99
39–40	1.55	1.41	1.32	1.16	1.22	1.45	1.67	1.37	1.26	1.23
≥41	2.73	2.25	1.58	1.94	1.48	1.32	3.20	2.28	2.01	1.70
Unknown	-	-	-	-	-	-	-	-	-	-

Sources: Numerator: PMMRC's perinatal data extract 2009–2018; Denominator: MAT births 2009–2018.

No significant change in termination of pregnancy rates by gestational age (from 20 weeks' gestation onwards) occurred over the study period 2007–2018 (data not shown). Table 3.27 presents the rates of termination of pregnancy by gestational age for the years 2009–2018.

Table 3.27: Termination of pregnancy risk (per 1,000 ongoing pregnancies) by year 2009–2018

Gestation at birth (weeks)	2009		2010		2011		2012		2013		2014		2015		2016		2017		2018	
	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n
20–22	210	88	231	92	230	107	231	118	215	83	245	91	169	66	206	87	211	81	228	87
23–24	137	31	122	20	129	29	119	32	123	32	137	31	117	27	126	32	110	25	121	26
25–27	237	9	227	20	185	15	219	14	192	16	187	10	206	8	189	13	212	16	170	16
28–31	539	4	560	6	511	11	505	5	471	5	462	7	458	3	483	14	477	5	469	<3
≥32	63,496	6	63,758	13	61,687	9	61,299	3	58,809	5	58,665	11	58,465	3	59,194	<3	58,962	6	56,896	4
Unknown	584	-	551	-	501	-	913	-	327	-	384	-	368	-	408	-	506	-	1,374	-

Gestation at birth (weeks)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk
20–22	1.36	1.42	1.71	1.89	1.39	1.52	1.11	1.45	1.35	1.50
23–24	0.48	0.31	0.46	0.51	0.54	0.52	0.46	0.53	0.42	0.45
25–27	0.14	0.31	0.24	0.23	0.27	0.17	0.14	0.22	0.27	0.28
28–31	0.06	0.09	0.18	0.08	0.08	0.12	0.05	0.23	0.08	s
≥32	0.09	0.20	0.15	0.05	0.09	0.19	0.05	s	0.10	0.07
Unknown	-	-	-	-	-	-	-	-	-	-

's' indicates rate suppressed due to small numbers.

Sources: Numerator: PMMRC's perinatal data extract, terminations of pregnancy only, 2009–2018; Denominator: MAT births 2009–2018.

There is some evidence of a statistically significant decrease in stillbirths at 28–31 weeks' gestation,³⁷ and strong evidence for a decrease at term (37–40 weeks)³⁸ over the period 2007–2018. Table 3.28 shows the risk of stillbirth per 1,000 ongoing pregnancies by year.

³⁷ Chi-squared test for trend p=0.012.

³⁸ Chi-squared test for trend p=0.0014.

Table 3.28: Stillbirth risk (per 1,000 ongoing pregnancies) by year 2009–2018

Gestation at birth (weeks)	2009		2010		2011		2012		2013		2014		2015		2016		2017		2018	
	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n
Stillbirths																				
20–22	210	88	231	94	230	90	231	85	215	88	245	110	169	73	206	83	211	72	228	100
23–24	137	43	122	31	129	37	119	28	123	29	137	28	117	32	126	29	110	27	121	29
25–27	237	39	227	32	185	24	219	36	192	25	187	25	206	31	189	26	212	30	170	23
28–31	539	48	560	32	511	34	505	30	471	32	462	31	458	29	483	22	477	31	469	27
32–36	3,978	60	4,005	66	3,909	55	3,933	54	3,724	63	3,729	58	3,652	48	3,824	60	3,750	48	3,553	56
37–40	47,778	111	48,206	78	47,049	83	47,041	78	45,606	60	45,843	72	45,738	72	46,583	76	46,745	68	45,126	69
≥41	11,740	19	11,547	14	10,729	9	10,325	9	9,479	9	9,093	3	9,075	20	8,787	14	8,467	12	8,217	11
Unknown	584	<3	551	-	501	-	913	-	327	-	384	-	368	-	408	-	506	-	1,374	-

Gestation at birth (weeks)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk
Stillbirths										
20–22	1.36	1.45	1.43	1.36	1.47	1.84	1.23	1.38	1.20	1.73
23–24	0.67	0.48	0.59	0.45	0.49	0.47	0.54	0.48	0.45	0.50
25–27	0.61	0.50	0.38	0.58	0.42	0.42	0.52	0.43	0.50	0.40
28–31	0.75	0.50	0.55	0.49	0.54	0.52	0.49	0.37	0.52	0.47
32–36	0.94	1.04	0.89	0.88	1.07	0.99	0.82	1.01	0.81	0.98
37–40	1.86	1.31	1.44	1.36	1.09	1.31	1.31	1.37	1.23	1.29
≥41	1.62	1.21	0.84	0.87	0.95	0.33	2.20	1.59	1.42	1.34
Unknown	-	-	-	-	-	-	-	-	-	-

Sources: Numerator: PMMRC's perinatal data extract, stillbirths only, 2009–2018; Denominator: MAT births 2009–2018.

During the period 2007–2018 there was a statistically significant reduction in the rates of neonatal death for those born at ≥41 weeks' gestation,³⁹ but a statistically significant increase in deaths at 20–22 weeks' gestation.⁴⁰ Table 3.29 shows the risk of neonatal death per 1,000 ongoing pregnancies by year.

³⁹ Chi-squared test for trend p=0.006.

⁴⁰ Chi-squared test for trend p=0.001.

Table 3.29: Neonatal death risk (per 1,000 ongoing pregnancies) by year 2009–2018

Gestation at birth (weeks)	2009		2010		2011		2012		2013		2014		2015		2016		2017		2018	
	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n	Total births	n
20–22	34	40	45	62	33	38	28	44	44	46	44	52	30	36	36	46	58	57	41	51
23–24	63	31	71	30	63	29	59	34	62	24	78	39	58	33	65	23	58	29	66	34
25–27	189	22	175	21	146	13	169	20	151	14	152	14	167	13	150	11	166	18	131	6
28–31	487	14	522	14	466	13	470	15	434	12	424	8	426	9	447	12	441	13	440	14
32–36	3,913	25	3,930	26	3,846	24	3,876	16	3,657	24	3,666	22	3,601	27	3,762	17	3,697	23	3,494	15
37–40	47,666	38	48,124	45	46,965	39	46,963	38	45,545	28	45,765	38	45,666	39	46,507	39	46,676	27	45,056	31
≥41	11,721	13	11,533	12	10,720	8	10,316	11	9,470	5	9,090	9	9,055	9	8,773	6	8,455	5	8,206	3
Unknown	583	-	551	-	501	-	913	-	327	-	384	-	368	-	408	-	506	-	1,374	-

Gestation at birth (weeks)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk
20–22	0.62	0.96	0.61	0.71	0.77	0.88	0.61	0.77	0.96	0.89
23–24	0.48	0.47	0.47	0.55	0.40	0.66	0.56	0.39	0.49	0.59
25–27	0.34	0.33	0.21	0.32	0.24	0.24	0.22	0.18	0.30	0.10
28–31	0.22	0.22	0.21	0.24	0.20	0.14	0.15	0.20	0.22	0.24
32–36	0.39	0.41	0.39	0.26	0.41	0.38	0.46	0.29	0.39	0.26
37–40	0.64	0.75	0.68	0.66	0.51	0.69	0.71	0.71	0.49	0.58
≥41	1.11	1.04	0.75	1.07	0.53	0.99	0.99	0.68	0.59	0.37
Unknown	-	-	-	-	-	-	-	-	-	-

Sources: Numerator: PMMRC's perinatal data extract specific neonatal deaths 2009–2018; Denominator: MAT births excluding fetal deaths 2009–2018.

Over the period 2007–2018, there was some evidence of a decrease in the mortality rate from intrapartum stillbirth in babies aged 23–27 weeks.⁴¹ Strong evidence points to a reduction in intrapartum stillbirth in babies born at term (37 weeks onwards)⁴² (Table 3.30 and Figure 3.22). The reduction in deaths of babies in Māori mothers was similar to that in New Zealand European mothers (data not shown).

⁴¹ Chi-squared test for trend p=0.016.

⁴² Chi-squared test for trend p<0.001.

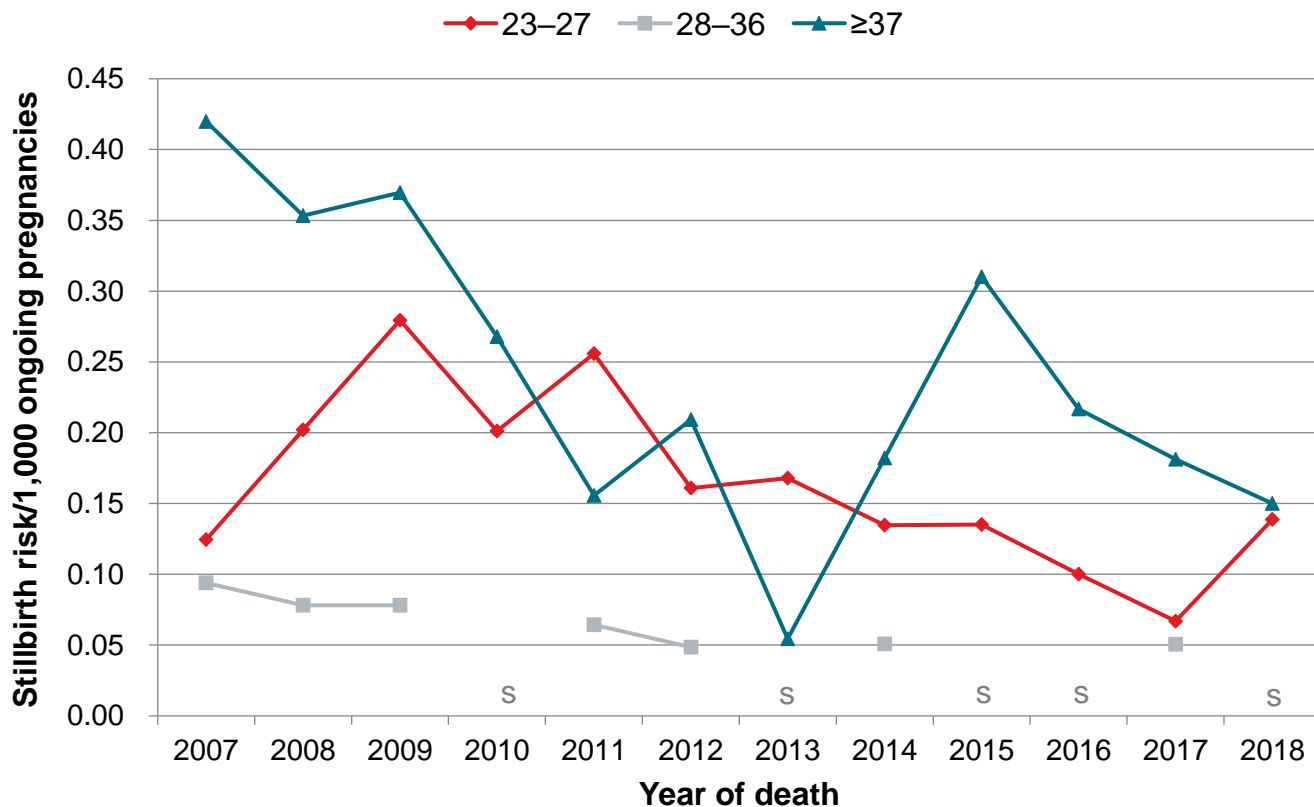
Table 3.30: Intrapartum stillbirth risk (per 1,000 ongoing pregnancies) by gestational age excluding congenital anomalies by year 2009–2018

Gestation at birth (weeks)	2009		2010		2011		2012		2013		2014		2015		2016		2017		2018	
	n	N	n	N	n	N	n	N	n	N	n	N	n	N	n	N	n	N	n	N
23–27	18	64,409	13	64,667	16	62,512	10	62,142	10	59,595	8	59,451	8	59,246	6	59,992	4	59,761	8	57,656
28–36	5	64,035	<3	64,318	4	62,198	3	61,804	<3	59,280	3	59,127	<3	58,923	<3	59,677	3	59,439	<3	57,365
≥37	22	59,518	16	59,753	9	57,778	12	57,366	3	55,085	10	54,936	17	54,813	12	55,370	10	55,212	8	53,343
	2009		2010		2011		2012		2013		2014		2015		2016		2017		2018	
	Rate		Rate		Rate		Rate		Rate		Rate		Rate		Rate		Rate		Rate	
23–27	0.28		0.20		0.26		0.16		0.17		0.13		0.14		0.10		0.07		0.14	
28–36	0.08		s		0.06		0.05		s		0.05		s		s		0.05		s	
≥37	0.37		0.27		0.16		0.21		0.05		0.18		0.31		0.22		0.18		0.15	

's' indicates rate suppressed due to small numbers.

Sources: Numerator: PMMRC's perinatal data extract, stillbirths only (excluding congenital anomalies) 2009–2018; Denominator: MAT births 2009–2018.

Figure 3.22: Intrapartum stillbirth risks (per 1,000 ongoing pregnancies) by gestational age at birth (weeks) excluding congenital anomalies 2007–2018



's' indicates risk suppressed due to small numbers.

Sources: Numerator: PMMRC's perinatal data extract, stillbirths only (excluding congenital anomalies), 2007–2018; Denominator: MAT births 2007–2018.

Mortality by customised birthweight centile group

Very little change has occurred in the perinatal related mortality rate in singleton babies who have no congenital anomalies and are appropriate or large for gestational age over the last 10 years. However, deaths in small for gestational age babies are trending down (Figure 3.23 and Table 3.31).