

experienced in-work poverty, compared with 5.9% of New Zealand Europeans. Other ethnic groups with higher rates of in-work poverty than New Zealand Europeans were Pacific peoples (9.5%), Asians (9.4%) and MELAA (9.5%).

Poverty can impact on health directly, in that people are unable to afford primary care, unable to pay for prescription medicines and less likely to have health insurance. Indirect ways in which poverty can contribute to poor health outcomes include food insecurity,<sup>29</sup> less access to transport and the stress of living with inadequate resources.<sup>30,31</sup> Lowly paid jobs are also less likely to allow employees the flexibility to have time off work to attend appointments. For those living in rural areas, poverty is compounded by difficulties of geographical access to health care.<sup>32</sup> The stress of living in poverty can affect all facets of life, reducing the control individuals have over their lives. Acting through a number of different pathways, poverty is associated with certain adverse perinatal outcomes, such as pre-eclampsia and preterm birth.<sup>33</sup>

## Body mass index (BMI)

This report uses BMI as a proxy indicator of risk to the health of both the mother and baby. Higher BMI also has implications for the provision of care, as we discussed in our 13th report.<sup>34</sup>

Our analysis of data from both MAT (Table 3.20 and Figure 3.15) and the PMMRC (Table 3.21) shows that mortality from stillbirths, neonatal deaths and perinatal related deaths overall increased with increasing maternal BMI. Due to incomplete matching between the two data sets, some individuals who were in the PMMRC data set were not in MAT, and in other situations individuals in MAT could not be matched to the PMMRC records. Using PMMRC data for maternal BMI (numerator) had the net effect of reducing the number of women in BMI category 30.0–34.9 and increasing the numbers of women in BMI categories 35.0–39.9 and ≥40.0. This suggests that MAT records underestimate true maternal BMI.

<sup>29</sup> Smith C, Parnell WR, Brown RC, et al. 2012. Balancing diet and the budget: food purchasing practices of food-insecure families in New Zealand. *Nutrition & Dietetics* 70: 278–85.

<sup>30</sup> Saunders P. 1998. Poverty and health: exploring the links between financial stress and emotional stress in Australia. *Australian and New Zealand Journal of Public Health* 22(1):11–6.

<sup>31</sup> Carter KN, Kruse K, Blakely T, et al. 2011. The association of food security with psychological distress in New Zealand and any gender differences. *Social Science & Medicine* 72(9): 1463–71.

<sup>32</sup> Pearce J, Witten K, Hiscock R, et al. 2008. Regional and urban–rural variations in the association of neighbourhood deprivation with community resource access: a national study. *Environment and Planning* 40: 2469–89.

<sup>33</sup> Nagahawatte NT, Goldenberg RL. 2008. Poverty, maternal health, and adverse pregnancy outcomes. *Annals of the New York Academy of Sciences* 1136: 80–5.

<sup>34</sup> PMMRC. 2019. *Te Pūrongo ā-Tau Tekau mā Toru o te Komiti Arotake Mate Pēpi, Mate Whaea Hoki | Thirteenth Annual Report of the Perinatal and Maternal Mortality Review Committee: Te tuku pūrongo mā te mate me te whakamate 2017 | Reporting mortality and morbidity 2017*. Wellington: Health Quality & Safety Commission. URL: <https://www.hqsc.govt.nz/assets/PMMRC/Publications/13thPMMRCReport/13thPMMRCAnnualReportWebFINAL.pdf> (accessed 18 September 2020).

Table 3.20: Perinatal related mortality rates (per 1,000 births) by maternal BMI at registration with maternity care 2014–2018 using MAT data\*

Maternal BMI (kg/m <sup>2</sup> )	Total births		Fetal deaths						Neonatal deaths			Perinatal related deaths (total)		
			Termination of pregnancy			Stillbirths								
	N=275,887		n=550			n=1,260			n=655			n=2,465		
	N	%	n	%	Rate	n	%	Rate	n	%	Rate	n	%	Rate
<18.5	7,475	2.7	11	2.0	1.47	20	1.6	2.68	14	2.1	1.88	45	1.8	6.02
18.5–24.9	129,585	47.0	282	51.3	2.18	484	38.4	3.74	254	38.8	1.97	1,020	41.4	7.87
25.0–29.9	71,857	26.0	140	25.5	1.95	363	28.8	5.05	175	26.7	2.45	678	27.5	9.44
30.0–34.9	37,975	13.8	77	14.0	2.03	193	15.3	5.08	117	17.9	3.10	387	15.7	10.19
35.0–39.9	17,965	6.5	25	4.5	1.39	116	9.2	6.46	54	8.2	3.03	195	7.9	10.85
≥40.0	10,520	3.8	14	2.5	1.33	80	6.3	7.60	40	6.1	3.84	134	5.4	12.74
Unknown	510	0.2	<3	x	-	4	0.3	-	<3	x	-	6	0.2	-
Data not supplied to MAT			14			5			-3			16		

\* All data limited to mothers who were registered for care with an LMC (a midwife, obstetrician or GP) claiming from the Section 88 Primary Maternity Services Notice.

BMI = body mass index.

'x' indicates percentage suppressed due to small numbers.

Sources: Numerator: PMMRC's perinatal data extract where matched to MAT data, 2014–2018; Denominator: MAT births 2014–2018.

Table 3.21: Perinatal related mortality rates (per 1,000 births) by maternal BMI at registration with maternity care 2014–2018 using PMMRC and MAT data\*

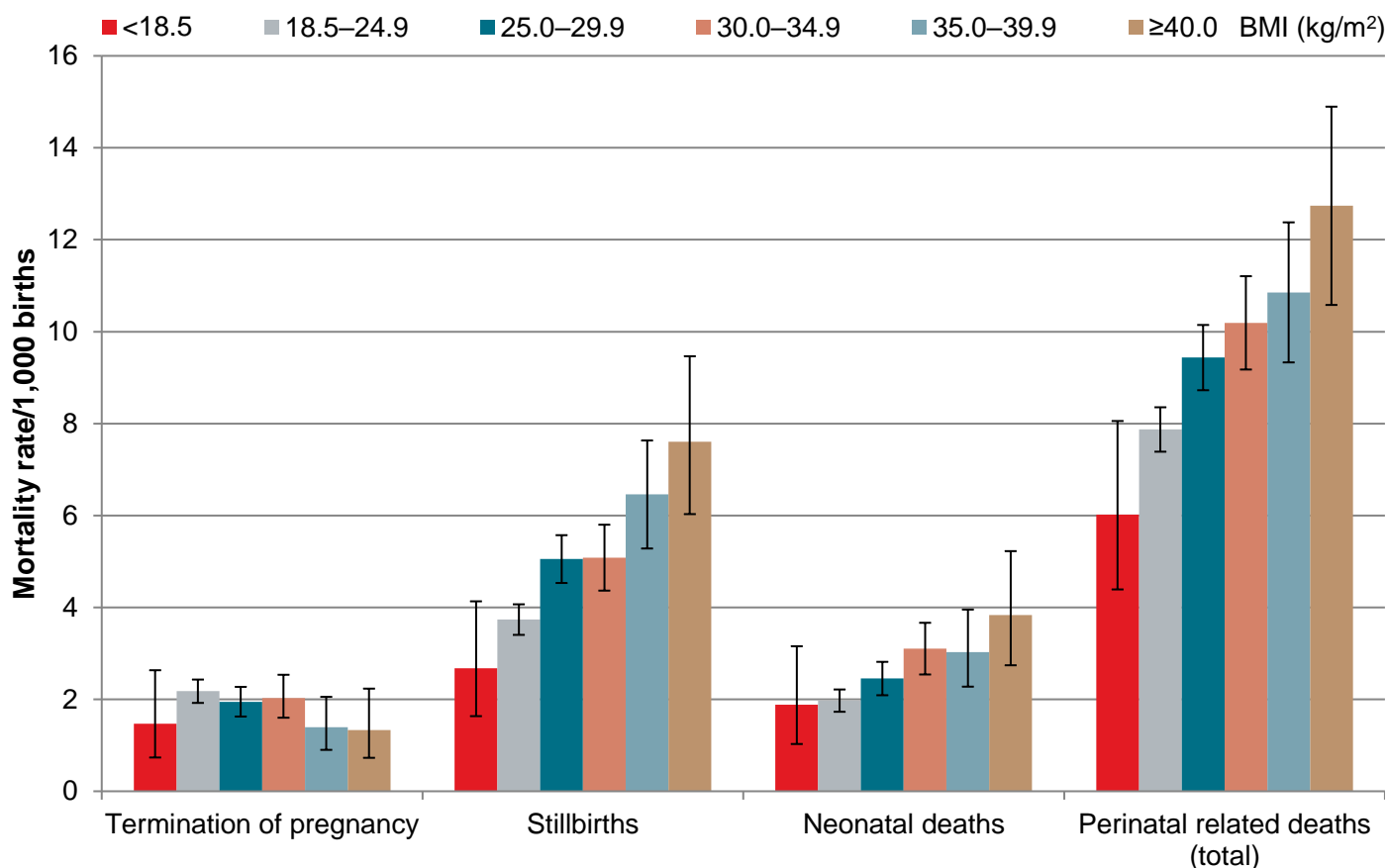
Maternal BMI (kg/m <sup>2</sup> )	Total births		Fetal deaths						Neonatal deaths			Perinatal related deaths		
			Termination of pregnancy			Stillbirths								
	N=275,887		n=564			n=1,265			n=652			n=2,481		
	N	%	n	%	Rate	n	%	Rate	n	%	Rate	n	%	Rate
<18.5	7,475	2.7	11	2.0	1.47	22	1.7	2.94	11	1.7	1.48	44	1.8	5.89
18.5–24.9	129,585	47.0	283	50.2	2.18	479	37.9	3.70	261	40.0	2.03	1,023	41.2	7.89
25.0–29.9	71,857	26.0	147	26.1	2.05	354	28.0	4.93	171	26.2	2.40	672	27.1	9.35
30.0–34.9	37,975	13.8	76	13.5	2.00	198	15.7	5.21	102	15.6	2.71	376	15.2	9.90
35.0–39.9	17,965	6.5	22	3.9	1.22	120	9.5	6.68	59	9.0	3.31	201	8.1	11.19
≥40.0	10,520	3.8	19	3.4	1.81	87	6.9	8.27	43	6.6	4.13	149	6.0	14.16
Unknown	510	0.2	6	1.1	-	5	0.4	-	5	0.8	-	16	0.6	-

\* All data limited to mothers who were registered for care with an LMC (a midwife, obstetrician or GP) claiming from the Section 88 Primary Maternity Services Notice.

BMI = body mass index.

Sources: Numerator: PMMRC's perinatal data extract 2014–2018; Denominator: MAT births 2014–2018.

Figure 3.15: Perinatal related death rates (per 1,000 births, with 95% CIs) by maternal BMI\* 2014–2018



\* All data limited to mothers who were registered for care with an LMC (a midwife, obstetrician or GP) claiming from the Section 88 Primary Maternity Services Notice.

BMI = body mass index.

Sources: Numerator: PMMRC’s perinatal data extract where matched to MAT data, 2014–2018; Denominator: MAT births 2014–2018.

### Parity

Overall, mortality rates showed a U-shaped curve by parity, with the highest rates for primiparous women (women having their first baby after 20 weeks’ gestation, also referred to as ‘parity 0’) and multiparous women with four or more previous babies. This was largely driven by the high rate of stillbirths. Rates of neonatal death were statistically significantly higher for primiparous women compared with women with one previous baby. Terminations of pregnancy showed no statistically significant variation in mortality by parity (Figure 3.16 and Table 3.22).