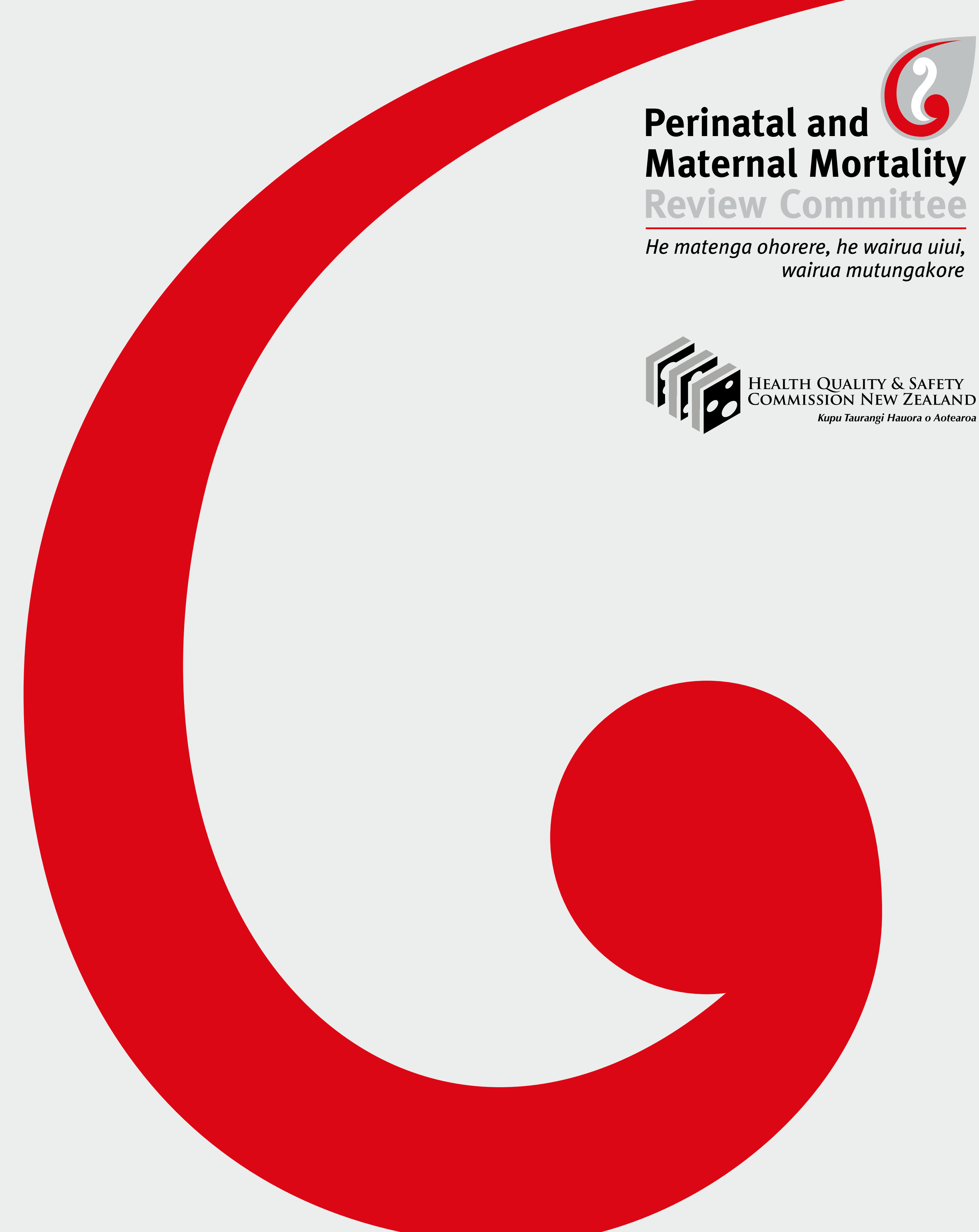


Executive summary of the 14th Annual Report of the Perinatal and Maternal Mortality Review Committee | Whakarāpopototanga Matua o te Pūrongo ā-Tau Tekau mā Whā o te Komiti Arotake Mate Pēpi, Mate Whaea Hoki

Reporting mortality and morbidity 2018 | Te tuku pūrongo mō te mate me te whakamate 2018

February 2021 | Hui-tanguru 2021

He matenga ohorere, he wairua uiui, wairua mutunga-kore. The grief of a sudden, untimely death will never be forgotten.

PMMRC. 2021. *Executive Summary of the 14th Annual Report of the Perinatal and Maternal Mortality Review Committee | Whakarāpopototanga Matua o te Pūrongo ā-Tau Tekau mā Whā o te Komiti Arotake Mate Pēpi, Mate Whaea Hoki: Reporting mortality and morbidity 2018 | Te tuku pūrongo mō te mate me te whakamate 2018.* Wellington: Health Quality & Safety Commission.

Published in February 2021 by the Perinatal and Maternal Mortality Review Committee, PO Box 25496, Wellington 6146, New Zealand

ISBN 978-1-98-859944-1 (Online)

ISBN 978-1-98-859945-8 (Print)

The document is available online at: www.hqsc.govt.nz/our-programmes/mrc/pmmrc

Rārangi take | Contents

Chair’s introduction – Mr John Tait | Te kupu whakataki a te manukura – ko John Tait 2
Parents, whānau, families and communities Ngā mātua, ngā whānau me ngā hapori .. 4
Key findings for the maternity sector from the PMMRC’s 14th annual report | Ngā kitenga matua e pā ana ki te rāngai whakawhānau i te pūrongo ā-tau 14 o te PMMRC . 6
Executive summary | Whakarāpopototanga matua 7
Definitions used by the PMMRC – perinatal related and infant deaths 7
Perinatal mortality 7
Neonatal encephalopathy 8
Maternal mortality 9
Challenge | Wero 11
Strengthening your focus and prioritisation 12
Monitoring by ethnicity for improvement analysis 12
National consensus in the care of preterm births 12
Cultural safety in practice 12
Calling on the Ministry of Health 12
Working together to make change 13
Appendix B: PMMRC recommendations for government departments and agencies 2007–2019 14
Appendix C: PMMRC recommendations for district health boards 2007–2019 19
Appendix D: PMMRC recommendations for health organisations, colleges and regulatory bodies 2007–2019 26
Appendix E: PMMRC recommendations for health practitioners involved in care of pregnant women 2007–2019 29
Appendix F: PMMRC recommendations for researchers 2007–2019 34

Chair’s introduction – Mr John Tait | Te kupu whakataki a te manukura – ko John Tait

Firstly, and most importantly, I would like to recognise the mothers and babies whose lives have been lost, and the families and whānau who bear the grief of losing their loved ones.

It is therefore with the upmost respect and recognition to those mothers and babies that I present the 14th annual report of the Perinatal and Maternal Mortality Review Committee (the PMMRC). The information presented in this report does not begin to demonstrate the lifelong heartache experienced following each one of the deaths included.

It is the aim and belief of the PMMRC that the production of this report will highlight and direct necessary, and urgent, service and system-level changes to reduce these deaths in Aotearoa/New Zealand.

I would like to thank the members of the PMMRC and working groups for their ongoing valuable contribution and commitment to improving the outcomes of all mothers and babies here in Aotearoa/New Zealand. Equally, I would like to acknowledge the significant work of local coordinators both in collecting information on these deaths and supporting the families and whānau through this extrordinarily difficult time. Without the generous contribution of your time and expertise it would not have been possible to produce this report.

I would also like to acknowledge that 2020 was International Year of the Midwife. It is also significant that August 2020 marks the 30th anniversary of the Nurses Amendment Act 1990, which reintroduced autonomous midwifery practice in Aotearoa/New Zealand. We acknowledge the commitment of midwives who are so deeply involved in supporting women, families and whānau through the loss of a child, while navigating their own professional and personal experience.

Each year, the PMMRC report investigates the epidemiology of perinatal mortality, maternal mortality and neonatal encephalopathy, and this year also includes a supplementary document on maternal morbidity (Appendix A). This year’s report shows there has been a significant reduction in deaths overall (perinatal related deaths) in Aotearoa/New Zealand since 2007, as well as a significant reduction in fetal and early neonatal deaths. However, we must not be complacent.

While this report shows a decrease in these deaths, it is unacceptable that, yet again, it is babies of Māori, Pacific and Indian women who are over-represented within the data in this report. Also, it is of great concern to the PMMRC that this inequity could further increase as a result of barriers to accessing care during the response to the COVID-19 pandemic.

Wāhine Māori have statistically significant higher rates of maternal mortality than New Zealand European women. While there were no deaths by suicide in 2018, this remains the single largest cause of maternal death in Aotearoa/New Zealand, with suicide accounting for 44 percent of direct causes of maternal death since 2006.

Therefore, this year we challenge, and call to action, all of us working within the health system, health organisations and health practitioners, to prioritise and implement the recommendations of the PMMRC to ensure quality and equitable maternal and perinatal care is provided. This is desperately needed.

We can and must do better.

John Tait
Chair, Perinatal and Maternal Mortality Review Committee

Parents, whānau, families and communities Ngā mātua, ngā whānau me ngā hapori

E kī ana te kōrero, ahakoa he iti te matakahi, ka pakaru i a ia te tōtara, tihei mauri ora! - A little effort can achieve great things, I exhort the breath of life.

E aku nui, e aku rahi tēnā koutou katoa – special greetings to you all.

Ko wai au? I te taha o tōku māmā, he uri au no Aerana, County Antrim, Ballymena. I te taha o tōku pāpā, he uri au no Pare Hauraki ahau. Ko Pania (Lisa) Paraku tōku ingoa. Kia ora.

Once again, I am humbled to stand on behalf of bereaved whānau and families as a member of the Perinatal and Maternal Mortality Review Committee (the PMMRC). My role is to offer whānau and family voice to spaces that are typically clinical and data driven. This is no small feat.

My beautiful Jasmine Lee was born perfect and still in 2006, and she, along with her five siblings who did not enter the world of light, bring me to this mahi. My own experience has been heavy and varied within our health system and it is important that I stand with our PMMRC rōpū in pursuit of zero preventable deaths or harm for our pēpi and our māmā.

To my fellow bereaved parents, whānau and families, can I offer the following mihi to you: Ko te tūmanako ka nui te aroha ki a koe, ki a kōrua, ki a koutou me ōu whānau hoki, my love to you and to your family.

Ki ngā pēpi kua ngaro ki te pō, moe mai koutou. To our precious ones who have disappeared into the night, rest in peace. I acknowledge our precious babies, our grief and our journey.

I acknowledge those that stand with me in this mahi. My whānau whānui, my whānau at Sands, our Māori māmā rōpū, and Dr Vicky Culling who remains fearless in the collective pursuit of national bereavement care which offers equitable outcomes for our community – ngā mihi nui ki a koutou.

As a proud wāhine Māori standing with three mana wāhine, together with our ngākau Māori who make up the PMMRC, **our wero, our challenge,** has become louder, and more urgent. We can no longer ignore the fact that evidence-based recommendations of the PMMRC are not being prioritised and implemented, year after year after year.

On behalf, I ask – Why? Is this kaupapa not important enough, the health and wellbeing of our precious babies, their mothers? Why are our babies and mothers dying, when in some cases this is preventable? Why are my people the ones most affected, when we hold the right to equitable outcomes under Te Tiriti? Why are our cousins in the Pacific, our young mothers and our friends from India also those most affected?

I then ask – How? How can we engender a collective response that recognises shared space and shared value in order to implement the recommendations of the PMMRC, and where possible, ensure our most precious taonga, our babies and their mothers, can be in the world of light?

How do we dismantel and decolonise our system, standing strong in anti-racism and begin to heal the mamae of historical trauma? The answers have been gifted to us, within the *Hauora Report,*[1] within the Health and Disability System Review, in particular the alternate view,[2] and within our humble recommendations from the PMMRC.

My elders have asked me... 'If not you, then who?' And now I ask the same of you. I share this whakataukī or proverb – *Ma pango, ma whero ka oti te mahi – collectively the work will be done.*

E hoa mā, he kaupapa nui tēnei. My friends, this is such an important kaupapa for us all.

To my fellow PMMRC whānau, e mihi maioha ki a koutou, many thanks for what you do. This is heavy mahi that must be done to achieve equitable outcomes, prevent our babies and mothers dying where we can, and to create a gentle path when our loved ones do die. You do this mahi with grace – I acknowledge you and on behalf, I thank you.

To my fellow bereaved parents, whānau and families we stand with and for you. Our wero and our recommendations inform the system of how to be better. We can do this, and we must, in honour of our precious babies and mothers who have gone before and in service to us all.

Ahakoa he mihi poto tēnei, he mihi aroha.

Nō reira, tēnā koutou, tēnā koutou, tēnā tātou katoa. Although this greeting is short, it is from the heart with love. Therefore, greetings to you all, greetings to us all.

Nāku iti noa, nā,

Lisa Paraku

[1] Wai 2575 Tribunal Report 2019. *HAUORA: Report on Stage One of the Health Services and Outcomes Kaupapa Inquiry*. URL: https://forms.justice.govt.nz/search/Documents/WT/wt_DOC_152801817/Hauora%20W.pdf

[2] See pp 173–6: https://systemreview.health.govt.nz/assets/Uploads/hdsr/health-disability-system-review-final-report.pdf

Key findings for the maternity sector from the PMMRC's 14th annual report
Ngā kitenga matua e pā ana ki te rāngai whakawhānau i te pūrongo ā-tau 14 o te PMMRC

Our Vision

Te mahi tahi puta noa i te pūnaha kia kore rawa ai e mate, e whara ngā māmā me ā rātau pēpi, whānau hoki mai i ngā mate, wharanga rānei ka taea te ārai.

Working together across the system towards zero preventable deaths or harm for all mothers and babies, families and whānau.

Perinatal death prevention

Congenital abnormalities are the leading cause of death in babies.

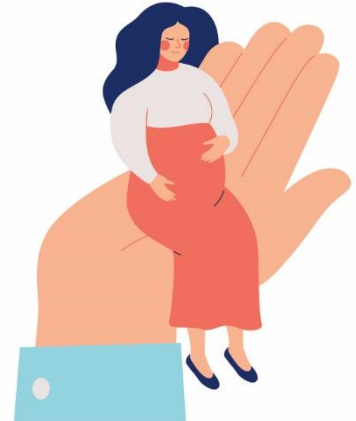
Sadly, in 2018

604

babies died

from 20 weeks of pregnancy until 27 days of age

The PMMRC continues to ask for bread and flour to be supplemented with **folic acid**, as this has been shown to reduce the number of neural tube defects (a type of congential anomaly).



District health boards (DHBs) and primary care providers to provide active navigational support for women to find and register with their lead maternity carer with minimal delay.[1]

Routine early antenatal care should meet clinical and cultural needs and should include attention to modifiable risk factors such as supporting whānau to become smokefree and screening for other health conditions such as diabetes, sexually transmitted infections and urinary tract infections.

After-death care

Around 30% of precious babies who died had a full post-mortem (autopsy) examination afterwards, which is the investigation that provides the fullest possible information for whānau/family about why their baby died.

30% received a full post-mortem

No woman who chose a full post-mortem examination regretted her decision. 10% of women who declined later regretted the loss of opportunity to understand more about their baby's death.[2]

Neonatal encephalopathy

Around three-quarters of babies with neonatal encephalopathy are cooled to help reduce brain damage. To be most effective, **cooling should start with 6 hours of birth** – this only happened for 80% of babies who received cooling.

Recognise the baby who will benefit

Communicate with a tertiary centre

Cool promptly when appropriate

To address the social and cultural determinants of health, the PMMRC supports:

- cultural safety education for clinicians, which is essential
- the recommendations of *He Mana Kōmihana Whakae Tino Rangatiratanga Pou Tarawhao | Māori Commissioning – An alternate view of the New Zealand Health and Disability System Review* final report[3]
- the recommendations of the Welfare Expert Advisory Group report, *Whakamana Tāngata.*[4]

The PMMRC insists that:

- Government should fund the provision of specific maternal mental health services
- the Ministry of Health should resource the co-design of a national perinatal bereavement pathway.

Maternal death

Tragically, on average nearly 10 women die each year either during pregnancy, or soon after the baby is born. Post-mortem helps us to understand how we can improve care in the future.

The PMMRC recommends that a Maternal and Infant Mental Health Network is funded by the Ministry of Health and includes these areas of priority:

- **a stocktake of current mental health services** available across Aotearoa New Zealand for pregnant and recently pregnant women to identify both the strengths of services and gaps or inequity in current services and skills in the workforce
- **a national pathway for accessing maternal mental health services**, including:
  - culturally safe services, including access to kaupapa Māori mental health and maternity services and the provision of appropriate screening
  - care for wāhine/women who are or have been in the mental health system
  - communication and coordination.

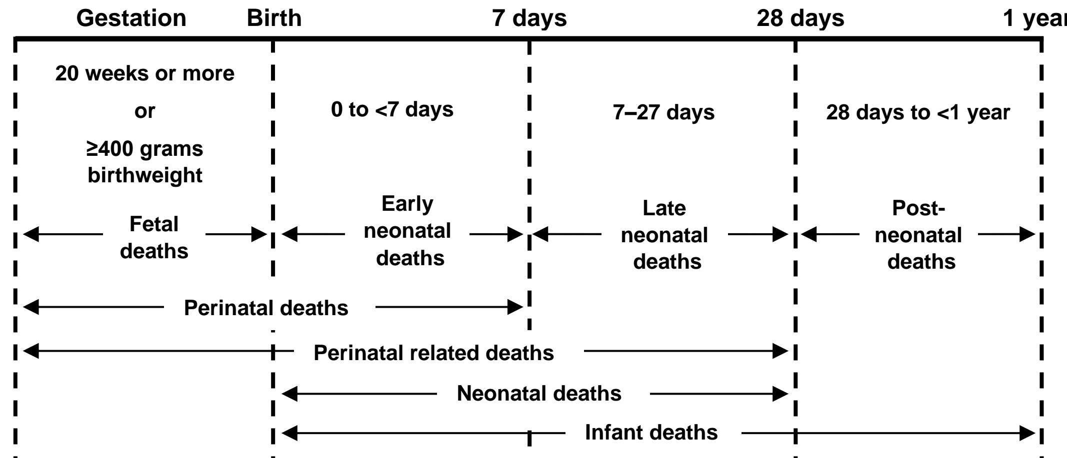
1. Makowharemahihi C, Lawton BA, Cram F, et al. 2014. Initiation of maternity care for young Maori women under 20 years of age. *NZMJ* 127(1393): 52–61.
2. Cronin RS, Li M, Wise M, et al. 2018. Late stillbirth post mortem examination in New Zealand: Maternal decision-making. ANZJOG 58(6): 667–73. URL: https://obgyn.onlinelibrary.wiley.com/doi/10.1111/ajo.12790.
3. See pp 173–6 of https://systemreview.health.govt.nz/assets/Uploads/hdsr/health-disability-system-review-final-report.pdf.
4. Welfare Expert Advisory Group Report. 2019. *Whakamana Tāngata: Restoring dignity to social security in New Zealand.* Wellington: Welfare Expert Advisory Group Report. URL: www.weag.govt.nz/weag-report.

New Zealand Government

Executive summary | Whakarāpopototanga matua

This monitoring report outlines some of the trends in mortality in babies and mothers, and serious morbidity from neonatal encephalopathy. Deaths are usually multifactorial in nature – usually a death has more than one cause. The aim of this work is to monitor trends and look at systems issues that could be modified to prevent future deaths.

Definitions used by the PMMRC – perinatal related and infant deaths



Source: Adapted from New Zealand Health Information Service (2007) and Ministry of Health (2010).[3]

Perinatal mortality

Since 2007, when the Perinatal and Maternal Mortality Review Committee (PMMRC) began collecting data, deaths overall (perinatal related deaths) have reduced significantly. Perinatal mortalities (fetal and early neonatal deaths) decreased significantly among babies of New Zealand European mothers, but not for any other ethnic group.

The decrease in the rate of stillbirths was largely driven by a reduction in stillbirths in babies of New Zealand European women. There was also a statistically significant decrease in stillbirths for babies of Middle Eastern, Latin American, or African (MELAA) women, but no significant change occurred in any other ethnic group.

The rates of terminations of pregnancy and rates of neonatal mortality overall showed no statistically significant changes.

Deaths due to congenital anomalies remain the leading cause of death overall. The rates of perinatal-related mortality in the peripartum period due to hypoxia have decreased significantly since 2007.

Our results show that certain groups are at higher risk of serious adverse outcomes. These include babies of Māori, Pacific and Indian mothers; and babies of mothers aged less than 20 years. Mortality also increased somewhat for babies of mothers aged 40 years and over.

Mortality rates varied significantly by the level of socioeconomic deprivation in the areas where mothers lived, as measured by the New Zealand Index of Deprivation 2013 (NZDep2013). Those mothers living in the most deprived areas (quintile 5) were statistically

---

[3] New Zealand Health Information Service. 2007. *Fetal and Infant Deaths 2003 & 2004*.Wellington: Ministry of Health.

Ministry of Health. 2010. *Fetal and Infant Deaths 2006*. Wellington: Ministry of Health.

significantly more likely to lose a baby from stillbirth, neonatal death and perinatal related death overall, compared with those living in any other quintile. This variation in mortality rates by deprivation was most marked for deaths due to spontaneous preterm labour or rupture of membranes.

Our data suggest that the National Maternity Collection (MAT) data set[4] underestimates maternal body mass index (BMI). However, regardless of whether we use MAT or PMMRC data, the mortality rates from stillbirth, neonatal death and perinatal related death overall increase with increasing maternal BMI.

Rates of mortality from stillbirth, neonatal death and perinatal related death overall were higher for babies of women who were smoking at the time of registration with a lead maternity carer (LMC) compared with those who were not. Smoking is a significant and modifiable risk factor of perinatal loss. When women are appropriately supported to quit, outcomes clearly improve in relation to some risk factors for mortality, such as spontaneous preterm birth and small for gestational age. Effective smoking cessation programmes do exist, and investment in appropriate programmes designed to reduce this modifiable risk factor should be supported.

Mortality rates were higher for small for gestational age babies than those who were appropriate or large for gestational age. In particular, babies with a birthweight in the 5th customised centile group or below have substantially higher mortality rates than the other centile groups.

Overall, around 41% of babies who died had optimal investigation into the cause(s) of their death, meaning that their death was investigated through post-mortem, karyotype confirming chromosomal abnormality or clinical examination or investigation confirming the diagnosis. Around half of terminations of pregnancy had 'optimal' investigation, whereas under 40% of stillbirths and neonatal deaths did. There were some variations between prioritised ethnic groups in both the rate of offering of post-mortem and the rate of uptake if offered.

Local review of cases showed that a number of deaths had potentially avoidable aspects. Review findings indicated contributory factors were present in just under one quarter of perinatal related deaths. Barriers to access and/or barriers to engagement with care were the most common type of contributory factor; others that the reviews considered were organisational and/or management factors, and personnel factors.

Neonatal encephalopathy

Neonatal encephalopathy (NE) is a clinically defined syndrome of disturbed neurological function within the first week after birth in an infant born from 35 weeks' gestation, manifested by difficulty in initiating and maintaining respiration, depression of tone and reflexes, subnormal level of consciousness and often seizures.[5]

The rate of NE cases per 1,000 term births fluctuated from year to year, with a high of 1.38 per 1,000 live births in 2012 and a low of 1.00 in 2014. Between the years 2010 and 2018, the rate has not shown a statistically significant trend up or down.

Babies of primiparous women had the highest rates of NE, and those rates were statistically significantly higher than for babies of multiparous women regardless of parity. The rates of

[4] The MAT data set is the primary source of information for publicly funded maternity care in Aotearoa/New Zealand.

[5] Nelson KB, Leviton A. 1991. How much of neonatal encephalopathy is due to birth asphyxia? *American Journal of Diseases of Children* 145(11): 1325–31.

NE varied by gestational age at birth, with higher rates for those at the extreme ends of term pregnancies. Babies with lower birthweight had higher rates of NE; those under 2,500g had the highest rate.

Overall, 77% of babies had cooling therapy, with the proportion slightly higher for babies with moderate NE. The rates of cooling were the same for babies of Māori mothers as for those with New Zealand European mothers.

Mortality was much higher in babies with severe NE, among whom 60% died, compared with 2% of babies with moderate NE.

Maternal mortality

Maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy (miscarriage, termination[6] or birth), irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.

The PMMRC collected information on a total of 126 maternal deaths during pregnancy or within 42 days postpartum over the period 2006–2018, as well as on another 28 coincidental maternal deaths. The number of maternal deaths has fluctuated substantially over this time. Although the trend is not statistically significant, the total number of maternal deaths followed a general downward pattern over the study period.

The incidence of maternal death increased with age, with the highest rates among those aged 40 years and over (39.2 per 100,000 maternities). In our analysis of the incidence of maternal deaths by prioritised ethnic group, wāhine Māori had statistically significantly higher rates than New Zealand European women. There was a general pattern of increasing mortality with increasing deprivation, when measured by NZDep2013. However, this pattern was not statistically significant (p=0.11).

There were 68 direct[7] and 50 indirect[8] maternal deaths[9] over the study period 2006–2018 inclusive. The single largest cause of maternal death in Aotearoa/New Zealand was suicide, which accounted for 30 deaths during this time (44% of direct causes). The next leading cause was amniotic fluid embolism (AFE), which caused 14 deaths (11.1%).

Suicide continues to be the leading cause of maternal death in Aotearoa/New Zealand and particularly affects wāhine Māori. PMMRC strongly recommends making targeted investment in maternal mental health a key priority for funding by the Ministry of Health. Maternal wellbeing, the development of culturally appropriate maternal screening tools and treatment for women and their babies continue to be areas in urgent need of investment, alongside addressing the wider societal drivers of suicide. Investment should prioritise populations who would benefit the most, such as ngā māma Māori, and be informed by research findings about when women most need that support.

---

[6] Termination of pregnancy is the interruption of an ongoing pregnancy (whether the baby was stillborn or live born). This report includes only termination of pregnancy from 20 weeks' gestation in the perinatal section. For maternal mortality, a maternal death following termination of pregnancy at any gestational age is included.

[7] Direct maternal deaths are those that result from obstetric complications of the pregnant state (pregnancy, labour or puerperium) from interventions, omissions or incorrect treatment or from a chain of events resulting from the above.

[8] Indirect maternal deaths are those that result from previous existing disease or disease that developed during pregnancy and was not due to direct obstetric causes but that was aggravated by the physiologic effects of pregnancy.

[9] For another eight maternal deaths, the cause is as yet unknown.

The COVID-19 outbreak in 2020 has impacted on maternity care in a number of ways. Supply of contraceptives has been and continues to be unreliable.[10] Whānau were not able to attend hospital births and the maternity sector was challenged with the need to care for people giving birth while following recommendations to stay out of hospital as much as possible. We will take these conditions into account when examining 2020 data and reporting on them in 2022.

[10] PHARMAC. 2020. Oral contraceptives: Supply updates. Wellington: PHARMAC Te Pātaka Whaioranga. URL: https://www.pharmac.govt.nz/information-for/enquiries/oral-contraceptives-supply-updates/ (accessed 18 August 2020).

Challenge | Wero

Year after year, the Perinatal and Maternal Mortality Review Committee (PMMRC) reports show inequity continues and no significant progress is being made to reduce mortality and morbidity for whānau Māori, Pasifika families, Indian families and those living in areas of high deprivation. Now the COVID-19 pandemic and its response are likely to amplify those shortcomings.

While PMMRC acknowledges the hard work and determination of the sector and its contribution to a significant reduction in perinatal death overall, the inequities that remain are significant and unacceptable.

Therefore, this year, our wero, our challenge to you – the decision-makers and leaders of the health system, and all health organisations and practitioners – is to give priority to implementing the recommendations of the PMMRC.

Implementation of the PMMRC recommendations remains critical to achieving high-quality, equitable maternal and perinatal care and outcomes.

Achieving such care and outcomes will require you to:

- **meaningfully honour the health sector's responsibilities to Te Tiriti o Waitangi**
- **strengthen your focus and prioritisation to accelerate the implementation of PMMRC recommendations, with the aim of achieving equitable outcomes for Māori mothers and babies.**

Urgent action, centred in equity, is required to help reduce the loss and grief that families and whānau are experiencing as a result of preventable death in Aotearoa/New Zealand.

Since 2007, the PMMRC has made numerous recommendations to drive service- and system-level change. Yet, despite the health sector's commitment to it, the data show that this change has only benefited some groups and remains elusive for many who have greater need.

We absolutely should be better supporting these parents and whānau, as they are bearing the grief of the death of their baby […] ~ Dr Vicki Culling, perinatal and infant loss educator

We all have a responsibility to the women and their babies, families and whānau whose lives and deaths are represented in the PMMRC data to promptly implement recommendations to reduce the perinatal and maternal deaths that are preventable and avoidable. In 2018 alone, reviews identified preventable contributory factors that impacted on 79 perinatal related deaths.

Strengthening your focus and prioritisation

Of utmost concern to the PMMRC are the frequent barriers to accessing care, differential quality of maternity of care, stagnant rates of perinatal death and alarmingly higher rates of maternal suicide that Māori whānau are experiencing. We ask and challenge you all to prioritise recommendations that create a Tiriti-compliant system where it is safe for Māori women to give birth in Aotearoa/New Zealand.

Monitoring by ethnicity for improvement analysis

To meet this challenge, district health boards (DHBs) must invest resource into monitoring key maternity indicators for Māori and other ethnic groups to identify variations between them, and then identify areas for quality improvement based on this analysis. Quality improvement projects must be co-developed so that models of care meet the needs of these populations.

National consensus in the care of preterm births

It is important that DHBs follow the national consensus statement specifically on the care of mother and baby(ies) at periviable gestations[11] published in 2019.

Preterm birth continues to be the leading cause of neonatal death, and Māori babies are over-represented in these deaths. Care for these babies needs to occur in one of Aotearoa/New Zealand's six tertiary neonatal centres, meaning more than one third of families will need to access care away from home. The sector must support whānau and families to access this care, including with transport and accommodation for whānau from outside the tertiary neonatal centres.

Cultural safety in practice

All health organisations must require staff to practise cultural safety standards. Action is needed to address the lack of consideration of cultures and religions outside of western and Christian norms.

Calling on the Ministry of Health

The Ministry of Health plays a critical role in making resources available to support health practitioners, health organisations and district health boards to implement these recommendations.

In upholding its responsibilities under Te Tiriti o Waitangi, the Ministry of Health needs to ensure that Māori have an equal voice in decision-making and the development of health policy, process and practice in order to achieve equitable health outcomes. The Ministry also has a significant role to play in working with, and influencing, other government agencies to do the same, and in this way accelerate progress across the wider determinants of health.

[11] New Zealand Child and Youth Clinical Networks. 2019. *National Consensus Statement on the care of mother and baby(ies) at periviable gestations*. URL: https://www.starship.org.nz/guidelines/new-zealand-consensus-statement-on-the-care-of-mother-and-baby-ies-at/ (accessed 24 November 2020).

It would be misleading to conclude that failures in the health system are the reason for all the disparities. Sub-standard housing, poor education, unemployment, low incomes, cultural alienation, alienation from land, and frank discrimination have all contributed to the problem. In that respect, a whole-of-society remedy must be sought ~ Sir Mason Durie

The PMMRC calls on the Ministry of Health to prioritise:

- the need for investment in maternal and infant mental health
- the development of a high-quality, appropriate and equitable national perinatal bereavement pathway
- aligning ethnicity data collected and included in all data sets with the *Health Information Standards Organisation (HISO) Ethnicity Data Protocols* (Ministry of Health 2017).[12]

Working together to make change

To support the implementation of the recommendations of the PMMRC, Appendices B–F list recommendations that are yet to be fully implemented.

Approximately half of the recommendations made over the past 13 years are yet to be fully implemented. Much work remains to be done.

The recommendations have been grouped into five key areas: health practitioners, DHBs, colleges and regulatory bodies, government and research recommendations. Our aim in taking this approach is to make it easier for you to understand where you can make an impact.

We hope that this information also enables you to support the work of your colleagues and organisations and that, in owning these responsibilities together, we can make the greatest and most valuable impact towards changing the outcomes of women and their babies, families and whānau.

Ngā mihi nui ki a koutou katoa.

Mr John Tait
Chair, Perinatal and Maternal Mortality Review Committee

[12] Ministry of Health. 2017. *HISO 10001:2017 Ethnicity Data Protocols*. Wellington: Ministry of Health.

Appendix B: PMMRC recommendations for government departments and agencies 2007–2019

The table below is a subset of recommendations yet to be implemented and made by the PMMRC since its first report in 2007. The recommendations are aimed at government departments and agencies. The reports referenced in the third column are all available on the Health Quality & Safety Commission's website at: www.hqsc.govt.nz/our-programmes/mrc/pmmrc/publications-and-resources.

It is vital that government ensures adequate funding and infrastructure to enable DHBs and clinicians to implement PMMRC recommendations. While there has been significant work towards implementing recommendations, further priority must be given to them because a number of preventable deaths continue to occur.

This table is one of five (see also Appendices C–F), each directed towards different areas of maternity services and governing bodies. Government departments and agencies need to view the recommendations below alongside the other tables.

Importantly, we must all continue to support the work of our colleagues and organisations in owning these responsibilities. Together, we can make the greatest and most valuable impact towards changing the outcomes of women and their babies, families and whānau.

		PMMRC recommendations yet to be fully implemented
Perinatal mortality	Antenatal care/screening	**URGENT RECOMMENDATION**: All women should commence maternity care before 10 weeks, for the following reasons: • opportunity to offer screening for congenital abnormalities, sexualy transmitted infections, family violence, and maternal mental health: and to refer as appropriate • education around nutrition (including appropriate weight gain), smoking, alcohol and drug use, and other at risk behaviours • recognition of underlying medical conditions with referral for secondary care as appropriate • identification of vunerable women at increase risk of perinatal related mortality. *(Fifth Annual Report, 2011)*
		As smoking is a significant modifiable risk factor for both stillbirth and neonatal death, every effort must be made to encourage women to engage in effecttive smoking cessation programmes prior to, during and after pregnancy *(Eighth Annual Report, 2014)*

		URGENT RECOMMENDATION: We strongly recommend to the Government/Ministry for Primary Industries that folic acid fortification of bread be mandatory to reduce both mortality and serious morbidity from neural tube defects *(Thirteenth Annual Report, 2013)*
		Strategies to improve awareness of antenatal care services and increase access among women who are isolated for social, economic, cultural or language reasons should be developed *(Third Annual Report, 2009)*
	Guidelines	The PMMRC recommends a review of epilepsy in the Guidelines for Consultation with Obstetric and Related Medical Services (Referral Guidelines). *(Ninth Annual Report, 2015)*
	Data collection	The Ministry of Health should continue to support and fund DHBs and lead maternity carers (LMCs) in their collection of complete perinatal mortality statistics*. (Third Annual Report, 2009)*
		As a matter of urgency, the Ministry of Health update the National Maternity Collection (MAT), including the ethnicity data as identified by the parents in the birth registration process *(Eleventh Annual Report, 2017 and Ninth Annual Report, 2015)*
		The national Maternity Collection (MAT), linked to birth registration ethnicity data, be available for use by the mortality review committees. Access to these data would allow PMMRC to report the independent associations between ethnicity, maternal age, socioeconomic status and perinatal related death, adjusting for smoking and maternal body mass index *(Seventh Annual Report, 2013)*
		The PMMRC recommend the Ministry of Health: • urgently require DHBs to provide complete and accurate registration data to the MAT dataset (as required of LMCs providing services to pregnant women in order to receive funding for those services). Specifically, this should include women who present for birthing at DHB facilities without previous antenatal LMC registration and women who are provided primary maternity care by DHB maternity services • require that the MAT dataset include complete registration and antenatal data on live and stillborn babies from 20 weeks gestation (including terminations for pregnancy). *(Eleventh Annual Report, 2011)*
	Mothers less than 20 years	Maternity and primary care providers need to be aware of the increasing risk of perinatal mortality for mothers under 20 years of age in New Zealand. Inequity in perinatal mortality for babies born to mothers under 20 years of age needs to be actively addressed. The PMMRC recommends the Ministry of Health and DHBs: • develop, in consultation with young mothers, acceptable and safe methods for mothers under 20 years of age to access and engage with care in order to achieve equitable health outcomes

		• identify and adequately resource evidence-based solutions to address risks for mothers under 20 years of age, paying attention to smoking cessation, screening and treatment for infections, screening for fetal growth restriction, and providing adequate information about the causes and symptoms of preterm labour • consider how they can support LMCs caring for mothers aged under 20 years. *(Twelfth Annual Report, 2018)*
	Preterm birth	The PMMRC recommends the Ministry of Health establish a multidisciplinary working group to review current evidence for implementation of a preterm birth prevention program such as that implemented in Western Australia, taking care to: • identify and adequately resource evidence-based solutions • ensure equitable access to screening and/or treatment for priority populations • ensure that priority populations have a voice in the development of health policy, process and practice in order to achieve equitable health outcomes • ensure that the outcomes of any implemented program, including equity of access, are evaluated. *(Twelfth Annual Report, 2018)*

		Birth in a tertiary centre is associated with improved outcomes for preterm babies at the lower limits of viability (prior to 25 weeks gestation). The PMMRC recommends the Ministry of Health leads the development of a national consensus pathway for the care of women in preterm labour or requiring delivery prior to 25 weeks gestation. The PMMRC recommends this pathway includes:
		• ensuring that all groups of women (irrespective of ethnicity, age, socioeconomic status or place of residence) are offered and provided the same level of care
		• strategies for secondary units for management of women in threatened or early preterm labour, or who require delivery, prior to 25 weeks gestation. Including:
		  ○ administration of corticosteroids and magnesium sulphate
		  ○ timely transfer from primary and secondary units to tertiary units
		  ○ management of babies inadvertently born in their units at the lower limits of viability
		• ensuring that priority populations have a voice in the development of health policy, process and practice in order to achieve equitable health outcomes
		• guidance on monitoring that care provision is equitable by ethnicity, age, socioeconomic status and place of residence. *(Twelfth Annual Report, 2018)*

		URGENT RECOMMENDATION: There is a need to recognise the independent impact of socioeconomic deprivation on perinatal death, specifically on preterm birth, which after congenital abnormality is the leading cause of perinatal death. Addressing the impact of poverty requires wider societal commitment as has been highlighted in the recent

		health select committee report on improving child health outcomes. The PMMRC supports the implementation of the recommendations. The report can be found at https://www.parliament.nz/en/pb/sc/reports/document/50DBSCH_SCR6007_1/inquiry-into-improving-child-health-outcomes-and-preventing *(Eight Annual Report, 2014)*
	SUDI prevention	The PMMRC recommends that the Ministry of Health and DHBs have a responsibility to ensure that midwifery staffing ratios and staffing acuity tools: • enable active observation of mothers and babies who are undertaking skin-to-skin contact in the postnatal inpatient period • allow for the identification of, and additional needs of, mothers who have increased risk factors for sudden unexpected death in infancy (SUDI). *(Twelfth Annual Report, 2018)*
Neonatal encephalopathy		The Neonatal Encephalopathy Working Group (NEWG) and PMMRC support the development of a guideline for the investigation and management of neonatal encephalopathy *(Eighth Annual Report, 2014)*
Maternal mortality	Maternal mental health	**URGENT RECOMMENDATION:** The PMMRC recommends that a Maternal and Infant Mental Health Network is funded by the Ministry of Health and that the network then determine an achievable work stream by the end of 2018 detailing work to be completed by the end of 2020, to include as potential areas of priority: a. a stocktake of current mental health services available across New Zealand for pregnant and recently pregnant women to identify both the strengths of services and gaps or inequity in current services and skills in the workforce b. a national pathway for accessing maternal mental health services, including: • cultural appropriateness to ensure of service access and provision • appropriate screening • care for women with a history of mental illness • communication and coordination. *(Twelfth Annual Report, 2018)*
		That a Perinatal and Infant Mental Health Network be established to provide an interdisciplinary and national forum to discuss perinatal mental health issues *(Tenth Annual Report, 2016)*
		A comprehensive perinatal and infant mental health service should include: • screening and assessment • timely interventions including case management, transition planning and referrals • access to respite care and specialist inpatient care for mothers and babies

		• consultaiton and liaison services within the health system and with other agencies for example, primary care and termination of pregnancy services. *(Sixth Annual Report, 2012)*
	Mortality review committees Māori caucus relating to maternal mental health	Improve awareness and responsiveness to the increased risk for Māori women. *(Eleventh Annual Report, 2017)*
Support for parents, families and whānau		**URGENT RECOMMENDATION:** The Ministry of Health should resource, support and facilitate the development of a national perinatal bereavement pathway with key stakeholders, including governmental and non-governmental organisations, to ensure high-quality, appropriate and equitable care for all. *(Thirteenth Annual Report, 2019)*
		Develop and improve the provision of perinatal pathology services with regards to accessibility, training and appropriateness and ensure quality and equitable services are available across the country. *(First Annual Report, 2007 and Second Annual Report, 2008)*

Appendix C: PMMRC recommendations for district health boards 2007–2019

The table below is a subset of recommendations yet to be implemented made by the PMMRC since its first report in 2007. These recommendations are aimed towards district health boards (DHBs). The reports referenced in the third column are all available on the Health Quality & Safety Commission's website at: www.hqsc.govt.nz/our-programmes/mrc/pmmrc/publications-and-resources.

While there has been significant work towards implementing recommendations, further priority must be given to them because a number of preventable deaths continue to occur.

This table is one of five (see also Appendices A and D–F), each directed towards different areas of maternity services and governing bodies. It is important that DHBs view the below recommendations alongside Appendix E recommendations for health practitioners. This is to ensure that DHBs, through good systems and processes, can effectively support clinicians to implement PMMRC recommendations.

Importantly, we must all continue to support the work of our colleagues and organisations in owning these responsibilities. Together, we can make the greatest and most valuable impact towards changing the outcomes of women and their babies, families and whānau.

		PMMRC recommendations yet to be fully implemented
		DHBs should demonstate that they have co-developed and implemented models of care that meet the needs of mothers of Indian ethnicity. *(Thirteenth Annual Report, 2019)*
		That all maternity care providers identify women with modifiable risk factors for perinatal related death and work individually and collectivley to address these strategies to address modifiable risk factors include: • Improving update of periconceptual folate • Pre-pregnancy care for known medical disease such as diabetes • Access to antenatal care • Accurate height and weight measurement in pregnancy with advice on ideal weight gain • Prevention and appropriate management of multiple pregnancy • Smoking cessation • Antenatal recognition and management of threatened preterm labour • Following evidence based recommendations for indications for induction of labour • Advice to women and appropriate management of decreased fetal movements.

		All DHBs should report the availablitiy and uptake of relevant services in their annual clinical report to ensure that these strategies are embedded and to identify areas for improvements. *(Ninth Annual Report, 2015)*
		URGENT RECOMMENDATION: There is a need to recognise the independent impact of socioeconomic deprivation on perinatal death, specifically on preterm birth, which after congenital abnormality is the leading cause of perinatal death. Addressing the impact of poverty requires wider societal commitment as has been highlighted in the recent health select committee report on improving child health outcomes. The PMMRC supports the implementation of the recommendations. The report can be found at https://www.parliament.nz/en/pb/sc/reports/document/50DBSCH_SCR6007_1/inquiry-into-improving-child-health-outcomes-and-preventing *(Eighth Annual Report, 2014)*
		For the management of suspected ectopic pregnancies, the PMMRC recommends DHB gynaecology services have: • Clear pathways/processess for primary care regarding early pregnancy management. Clear hospital guidelines for assessment of the collapsed woman of reproductive age that include the differential diagnosis of ectopic pregnancy. Collapse due to ectopic pregnancy requires rapid assessment and surgical management. *(Thirteenth Annual Report, 2019)*
		Strategies to improve awareness of antenatal care services and increase access among women who are isolated for social, economic, cultural or language reasons should be developed. *(Third Annual Report, 2009)*
	Communication and coordination	Pregnant women who are admitted to hospital for medical conditions not related to pregnancy need to have specific referral pathways for perinatal care *(Fifth Annual Report, 2011)*
	Education	**URGENT RECOMMENDATION:** The PMMRC recommends that regulatory bodies require cultural competency training of all individuals working across all areas of the maternity and neonatal workforce. Training should address awareness of, and strategies to reduce and minimise the impact of, implicit bias and racism. *(Twelfth Annual Report, 2018)*
		The PMMRC recommends that DHBs provide free interdisciplinary fetal surveillance education for all clinicians involved in intrapartum care on a triennial basis. This is to be provided free for staff and at no cost to LMCs. The PMMRC encourages the Midwifery Council, the New Zealand College of Midwives (NZCOM) and Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) to work with DHBs in the implementation of this recommendation:

		• this education includes risk assessment for babies throughout pregnancy as well as intrapartum observations. The aims include strengthening of supervision and support to promote professional judgement, interdisciplinary conversations and reflective practice. *(Thirteenth Annual Report, 2019 and Ninth Annual Report, 2015)*
		Offer education to all clinicians so they are proficient at screening women, and are aware of local services and pathways to care for the following: • family violence • smoking • alcohol and other substance use. *(Ninth Annual Report, 2015)*
		All clinicians involved in the care of pregnant women should undertake regular multidisciplinary training in management of obstetric emergencies. *(Tenth Annual Report, 2016 and Fifth Annual Report, 2011)*
		Maternity and primary care providers need to be aware of the increasing risk of perinatal mortality for mothers under 20 years of age in New Zealand. Inequity in perinatal mortality for babies born to mothers under 20 years of age needs to be actively addressed. The PMMRC recommends the Ministry of Health and DHBs: • develop, in consultation with young mothers, acceptable and safe methods for mothers under 20 years of age to access and engage with care in order to achieve equitable health outcomes • identify and adequately resource evidence-based solutions to address risks for mothers under 20 years of age, paying attention to smoking cessation, screening and treatment for infections, screening for fetal growth restriction, and providing adequate information about the causes and symptoms of preterm labour consider how they can support LMCs caring for mothers aged under 20 years. *(Twelfth Annual Report, 2018)*
	Mothers less than 20 years	Maternity services for teenage mothers need to address this increased risk by the provision of services that specifically meet their needs, paying attention to: • Commencing maternity care before 10 weeks • Smoking cessation prevention of preterm birth (including smoking cessation, sexually transmitted infection screening and treatment, urinary tract infection screening and treatment) and screening for fetal growth restricition using regular fundal height measurement on customised growth charts

		• Providing appropriate antenatal education *(Fifth Annual Report, 2011)*
		DHBs make available appropriate information, including appropriate counselling for parents, families and whānau about birth outcomes prior to 25 weeks gestation to enable shared decision making and planning of active care or palliative care options. *(Twelfth Annual Report, 2018)*
	Preterm birth	DHB maternity services audit the rates of antenatal corticosteroid administration, including repeat doses when indicated, to mothers of neonates live born at less than 34 weeks gestation, including autditing whether administation is equitable by ethnicity, DHB of residence, and maternal age. *(Twelfth Annual Report, 2018)*
		The PMMRC recommends that LMCs and DHBs ensure that every baby will have access to a safe sleep place on discharge from the hospital or birth unit, or at home, that is their own place of sleep, on their back and with no pillow. If they do not have access to a safe sleep place, then a wahakura or Pēpi-Pod must be made available for the baby's use prior to discharge from hospital. *(Twelfth Annual Report, 2018)*
	SUDI prevention	The PMMRC recommends that DHBs have a responsibility to ensure that midwifery staffing ratios and staffing acuity tools: • Enable active observation of mothers and babies who are undertaking skin-to-skin contact in the postnatal inpatient period. Allow for the identification of, and additional needs of, mothers who have increased risk factors for sudden unexpected death in infancy (SUDI). *(Twelfth Annual Report, 2018)*
		Clinicans and LMCs should be encouraged to collect accurate ethnicity details at the time of booking. *(Fourth Annual Report, 2010)*
	Data collection	It is recommended that mothers who experience Intrapartum stillbirth, Intrapartum deaths of babies at term without obvious congenital abnormality are encouraged to have full investigation, including a post-mortem examination *(Third Annual Report, 2009)*
	Post-mortem	All neonatal encephalopathy (NE) cases need to be considered for a Severity Assessment Code (SAC) rating. Neonatal hypoxic brain injury resulting in permanent brain damage (or permanent and severe loss of function) should be rated as SAC 1. Those who received cooling with as yet undetermined outcome should be rated as SAC 3. *(Thirteenth Annual Report, 2019)*

Neonatal encephalopathy		All babies with NE, regardless of severity, should have a multidisciplinary discussion about whether to refer to the Accident Compensation Corporation (ACC) for consideration for cover as a treatment injury, using ACC's Treatment Injury Claim Lodgement Guide. Parents should be advised that not all treatment claims are accepted. All clinicians involved in the care of pregnant women should undertake regular multidisciplinary training in management of obstetric emergencies. *(Tenth Annual Report, 2016 and Fifth Annual Report, 2011)*
		DHBs with rates of neonatal encephalopathy significantly higher than the national rate review or continue to review, the higher rate of neonatal encephalopathy in their area and identify areas for improvement. *(Twelfth Annual Report, 2018 and Eleventh Annual Report, 2017 and Tenth Annual Report, 2016)*
		URGENT RECOMMENDATION: Widespread multidiscipinary education is required on the recognition of neonatal encephalopathy with a particular emphasis on babies with evidence of neonatal asphyxia (eg, babies who required resuscitation) for all providers of care for babies in the immediate postpartum period. This should include: • Recognition of babies at increased risk by their history • Signs suggestive of encephalopathy Knowledge of clinical pathways to induce cooling if required *(Ninth Annual Report, 2015)*
		All DHBs should undertake local review of cases of neonatal encephalopathy to identify area for improvement in care including adequacy of resuscitation and cooling. *(Eighth Annual Report, 2014)*
		Women with pre-existing medical conditions (such as epilepsy, hypertension or mental health) should have individualised pre-conceptual counselling about their condition and the medication they are taking. Health professionals providing care to these women need to communicate the importance of continuing their medication in pregnancy, if appropriate, and to advise women to seek early medical review. *(Seventh Annual Report, 2013)*
Maternal mortality	Antenatal care/screening	Women with complex medical conditions require a multidisciplinary approach to care, often across more than one DHB. Each woman requiring such care should be assigned a key clinician to facilitate her care. *(Third Annual Report, 2009)*
		Women who are unstable or clinically unwell should be cared for in the most appropriate place within each unit in order for close observation to occur. When observations are abnormal, clear documentation, early review by a senior clinican and development of a detailed management plan are required. *(Eighth Annual Report, 2014)*

	Communication and coordination	Pregnant women who are admitted to hospital for medical conditions that are not related to pregnancy need to have specific referral pathways for perinatal care. *(Fifth Annual Report, 2011)*
		Women with serious pre-existing medical conditions require a multidisciplinary management plan for the pregnancy, birth and postpartum period. This plan must be communicated to all relevant caregivers. *(Eighth Annual Report, 2014)*
		A comprehensive perinatal and infant mental health service includes: • Screening and assessment • Timely interventions including case management, transition planning and referrals • Access to respite care and specialist inpatient care for mothers and babies. Consultation and liaison services within the health system and with other agencies for example, primary care and termination of pregnancy services. *(Sixth Annual Report, 2012)*
	Maternal mental health	Termination of pregnancy services should undertake holistic screening for maternal mental health and family violence and provide appropriate support and referral. *(Sixth Annual Report, 2012)*
		At first contact with services women should be asked: • Are you currently receiving, or have you ever received treatment for a serious mental illness such as severe depression, bipolar disorder, schizophrenia or psychosis? • Have you ever had treatment from a psychiatrist or specialist mental health team in the past? • Do you have a family history of mental illness including perinatal mental illness? Women with a previous history of serious affective disorder or other psychoses should be referred in pregnancy for psychiatric assessment and management even if they are well. Regular monitoring and support is recommended for at least three months following delivery. *(Fifth Annual Report, 2011)*
		Improve awareness and responsiveness to the increased risk for Māori women. *(Eleventh Annual Report, 2017)*
	Mortality review committees Māori caucus relating to maternal mental health	All providers of maternity, obstetric, mental health and maternal mental health services should improve their systems, guidelines and professional development to ensure that they are responsive to the identified increased risk for Māori women. *(Eleventh Annual Report, 2017)*
		Māori women who have a history of serious mental illness and are currently well should be referred to specialist mental health services for a mental health birth plan, and monitored closely by their maternity care provider +/- mental health services. Where such a woman has a miscarriage, the GP should be notified

		immediately and an explicity process for early follow up that includes a review of mental health status agreed with GP. *(Eleventh Annual Report, 2017)*
		Where Māori women exhibit symptoms suggesting serious mental illness or distress, an urgent mental health assessment, including consultant psychiatrist review and consultation with perinatal mental health services, on the same day these symptoms are first noted should be undertaken. *(Eleventh Annual Report, 2017)*
		Primary care (GPs, FPA), LMCs, TOP services, alcohol and drug services, and secondary and tertiary providers of maternity, obstetric, mental health, and maternal mental health services should improve their systems, guidelines and professional development to ensure that they are responsive to the identified increased risk for Māori women. *(Eleventh Annual Report, 2017)*
		Communication and coordination between primary care (GPs, FPA), LMCs, TOP services, alcohol and drug services, and secondary providers of maternity, obstetric, mental health, and maternal mental health services should be improved and enhanced using a variety of means including but not limited to case management, integrated notes systems, and electronic transfer of information. *(Eleventh Annual Report, 2017)*
		The PMMRC recommends that DHBs with rates of perinatal related mortality and neonatal encephalopathy significantly higher than the national rate review, or continue to review, the higher rater of mortality in their area and idenitfy areas for improvement. *(Twelfth Annual Report, 2018 and Eleventh Annual Report, 2017 and Tenth Annual Report, 2016)*
Auditing		**URGENT RECOMMENDATION:** DHBs should monitor key maternity indicators by ethnic group to identify variations in outcomes. They should then improve areas where there are differences in outcome. *(Thirteenth Annual Report, 2019)*
		Further research is warranted to understand the higher rate of perinatal related mortality in the Counties Manukau region. *(Third Annual Report, 2009)*

Appendix D: PMMRC recommendations for health organisations, colleges and regulatory bodies 2007–2019

The table below is a subset of recommendations yet to be implemented made by the PMMRC since its first report in 2007. These recommendations are aimed towards health organisations, colleges and regulatory bodies. The reports referenced in the third column are all available on the Health Quality & Safety Commission's website at: www.hqsc.govt.nz/our-programmes/mrc/pmmrc/publications-and-resources.

While there has been significant work towards implementing recommendations, further priority must be given to them because a number of preventable deaths continue to occur.

This table is one of five (see also Appendices A–C and E–F), each directed towards different areas of maternity services and governing bodies. It is important that health organisations view the below recommendations alongside Appendix E recommendations for health practitioners. This is to ensure that health organisations, through good systems and education, can effectively support clinicians to implement PMMRC recommendations.

Importantly, we must all continue to support the work of our colleagues and organisations in owning these responsibilities. Together, we can make the greatest and most valuable impact towards changing the outcomes of women and their babies, families and whānau.

		PMMRC recommendations yet to be fully implemented
Perinatal mortality	*Antenatal care/screening*	The PMMRC recommends that DHBs provide free interdisciplinary fetal surveillance education for all clinicians involved in intrapartum care on a triennial basis. This is to be provided free for staff and at no cost to LMCs. The PMMRC encourages the Midwifery Council, the New Zealand College of Midwives (NZCOM) and Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) to work with DHBs in the implementation of this recommendation: • This education includes risk assessment for babies throughout pregnancy as well as intrapartum observations. • The aims include strengthening of supervision and support to promote professional judgement, interdisciplinary conversations and reflective practice. *(Thirteenth Annual Report, 2019 and Ninth Annual Report, 2015)*
		The PMMRC endorses all recommendations of the audit of congenital abnormalities. Key recomendations from the audit include: • all primary care providers (if first contact of a pregnant woman with the health service) should offer first trimester screening and facilitate expeditious registration • achieving optimal use of preconceptual folate by young women in New Zealand requires a policy for foritification of bread • the National Screening Unit review the cost benefit of the current algorithms in the first and second trimester screening programme, so they are calibrated for maximal sensitivitiy for all chromosomal abnormalities • the National Screening Unit review false negative screening tests • the New Zealand National Maternal Fetal Medicine Network regularly audit time from referral to review to ensure that the majority of women are seen within seven days as recommended. *(Seventh Annual Report, 2013)*
	Education	**URGENT RECOMMENDATION:** The PMMRC recommends that regulatory bodies require cultural competency training of all individuals working across all areas of the maternity and neonatal workforce. Training should address awareness of, and strategies to reduce and minimise the impact of, implicit bias and racism. *(Twelfth Annual Report, 2018)*

Neonatal encephalopathy		**URGENT RECOMMENDATION:** Widespread multidisciplinary education is required on the recognition of neonatal encephalopathy with a particular emphasis on babies with evidence of neonatal asphyxia (eg. babies who required resuscitation) for all providers of care for babies in the immediate postpartum period. This should include: • Recognition of babies at increased risk by their history • Signs suggestive of encephalopathy • Knowledge of clinical pathways to induce cooling if required. *(Ninth Annual Report, 2015)*
		The Neonatal Encephalopathy Working Group (NEWG) and PMMRC support the development of a guideline for the investigation and management of neonatal encephalopathy *(Eighth Annual Report, 2014)*
Maternal mortality	*Mortality review committees Māori caucus relating to maternal mental health*	**URGENT RECOMMENDATION:** Improved awareness and responsiveness to the increased risk for Māori women *(Eleventh Annual Report, 2017)*
		URGENT RECOMMENDATION: Primary care (GPs, FPA), LMCs, TOP services, alcohol and drug services, and secondary and tertiary providers of maternity, obstetric, mental health, and maternal mental health services should improve their systems, guidelines and professional development to ensure that they are responsive to the identified increased risk for Māori women. *(Eleventh Annual Report, 2017)*

Appendix E: PMMRC recommendations for health practitioners involved in care of pregnant women 2007–2019

The table below is a subset of recommendations yet to be implemented made by the PMMRC since its first report in 2007. These recommendations are aimed towards health practitioners involved in the care of pregnant women. The reports referenced in the third column are all available on the Health Quality & Safety Commission's website at: www.hqsc.govt.nz/our-programmes/mrc/pmmrc/publications-and-resources.

While there has been significant work towards implementing recommendations, further priority must be given to them because a number of preventable deaths continue to occur.

This table is one of five (see also Appendices A–D and F), each directed towards different areas of maternity services and governing bodies. It is important that government departments, agencies and DHBs fund, develop and maintain effective systems and processes to enable health practitioners to implement these recommendations.

Importantly, we must all continue to support the work of our colleagues and organisations in owning these responsibilities. Together, we can make the greatest and most valuable impact towards changing the outcomes of women and their babies, families and whānau.

		PMMRC recommendations yet to be fully implemented
Perinatal mortality	Antenatal care/ screening	That all maternity care providers identify women with modifiable risk factors for perinatal related death and work individually and collectively to address these. Strategies to address modifiable risk factors include: • Improving update of periconceptual folate • Pre-pregnancy care for known medical disease such as diabetes • Access to antenatal care • Accurate height and weight measurement in pregnancy with advice on ideal weight gain • Prevention and appropriate management of multiple pregnancy • Smoking cessation • Antenatal recognition and management of threatened preterm labour • Following evidence based recommendations for indications for induction of labour

		• Advice to women and appropriate management of decreased fetal movements. All DHBs should report the availability and uptake of relevant services in their annual clinical report to ensure that these strategies are embedded and to identify areas for improvements. *(Ninth Annual Report, 2015)*
		URGENT RECOMMENDATION: All women should commence maternity care before 10 weeks, for the following reasons: • Opportunity to offer screening for congenital abnormalities, sexualy transmitted infections, family violence, and maternal mental health: and to refer as appropriate • Education around nutrition (including appropriate weight gain), smoking, alcohol and drug use, and other at risk behaviours • Recognition of underlying medical conditions with referral for secondary care as appropriate • Identification of vunerable women at increase risk of perinatal related mortality. *(Fifth Annual Report, 2011)*
		If small for gestational age (SGA) is confirmed by ultrasound at term, timely delivery is recommended. *(Sixth Annual Report, 2012)*
		Pregnant women should consult their midwife, general practitioner or specialist services as soon as symptoms of influenza like illness develop or if other family members are unwell to allow: • Referral to hospital for assessment if there are symptoms of respiratory compromise due to influenza that is, worsening shortness of breath, espeically at rest, productive cough, pleuritic chest pain, haemoptysis • Prescription of antiviral medication. *(Fifth Annual Report, 2011*)
	Communication and coordination	Pregnant women who are admitted to hospital for medical conditions not related to pregnancy need to have specific referral pathways for perinatal care. *(Fifth Annual Report, 2011)*
	Data collection	Clinicans and LMCs should be encourage to collect accurate ethnicity details at the time of booking. *(Fourth Annual Report, 2010)*
	Education	All clinicians involved in the care of pregnant women should undertake regular multidisciplinary training in management of obstetric emergencies and resuscitation. *(Tenth Annual Report, 2016 and Fifth Annual Report, 2011)*
		Maternity services for teenage mothers need to address this increased risk by the provision of services that specifically meet their needs, paying attention to: • Commencing maternity care before 10 weeks

		• Smoking cessation prevention of preterm birth (including smoking cessation, sexually transmitted infection screening and treatment, urinary tract infection screening and treatment) and screening for fetal growth restricition using regular fundal height measurement on customised growth charts • Providing appropriate antenatal education. *(Fifth Annual Report, 2011)*
	SUDI prevention	The PMMRC recommends that LMCs and DHBs ensure that every baby will have access to a safe sleep place on discharge from the hospital or birth unit, or at home, that is their own place of sleep, on their back and with no pillow. If they do not have access to a safe sleep place, then a wahakura or Pēpi-Pod must be made available for the baby's use prior to discharge from hospital. *(Twelfth Annual Report, 2018)*
Neonatal encephalopathy		All neonatal encephalopathy (NE) cases need to be considered for a Severity Assessment Code (SAC) rating. Neonatal hypoxic brain injury resulting in permanent brain damage (or permanent and severe loss of function should be rated as SAC 1. Those who received cooling with as yet undermined outcome should be rated as SAC 3. *(Thirteenth Annual Report, 2019)*
		For all babies diagnosed with NE a multidisciplinary discussion about whether to refer to the Accident Compensation Corporation (ACC) for consideration for cover as a treatment injury, using ACC's Treatment Injury Claim Lodgement Guide, should be arranged. Parents should be advised that not all treatment claims are accepted. *(Thirteenth Annual Report, 2019)*
		If neonatal encephalopathy is clinically suspected in the immediate hours after birth, early consultation with a neonatal paediatrician is recommended in order to avoid a delay in commencing cooling. *(Sixth Annual Report, 2012)*
		Cord gases should be performed on all babies born with an Apgar 7 at one minute. *(Sixth Annual Report, 2012)*
Maternal mortality	Antenatal care/screening	Women with serious pre-existing medical conditions require a multidisciplinary management plan for the pregnancy, birth and postpartum period. This plan must be communicated to all relevant caregivers. *(Eighth Annual Report, 2014)*
		Women who are unstable or clinically unwell should be cared for in the most appropriate place within each unit in order for close observation to occur. When observations are abnormal, clear documentation, early review by a senior clinican and development of a detailed management plan are required. *(Eighth Annual Report, 2014)*
		Women with pre-existing medical conditions (such as epilepsy, hypertension or mental health) should have individualised pre-conceptual counselling about their condition and the medication they are taking. Health

		professionals providing care to these women need to communicate the importance of continuing their medication in pregnancy, if appropriate, and to advise women to seek early medical review. *(Seventh Annual Report, 2013)*
		Pregnant women who are admitted to hospital for medical conditions not related to pregnancy need to have specific referral pathways for perinatal care *(Fifth Annual Report, 2011)*
	Communication and coordination	Women with complex medical conditions require a multidisciplinary approach to care, often across more than one DHB. Each woman requiring such care should be assigned a key clinician to facilitate her care. *(Third Annual Report, 2009)*
	Maternal mental health	A comprehensive perinatal and infant mental health service should include: • Screening and assessment • Timely interventions including case management, transition planning and referrals • Access to respite care and specialist inpatient care for mothers and babies. Consultation and liaison services within the health system and with other agencies for example, primary care and termination of pregnancy services. *(Sixth Annual Report, 2012)*
		Termination of pregnancy services should undertake holistic screening for maternal mental health and family violence and provide appropriate support and referral. *(Sixth Annual Report, 2012)*
		At first contact with services women should be asked: • Are you currently receiving, or have you ever received treatment for a serious mental illness such as severe depression, bipolar disorder, schizophrenia or psychosis • Have you ever had treatment from a psychiatrist or specialist mental health team in the the past? • Do you have a family history of mental illness including perinatal mental illness? Women with a previous history of serious affective disorder or other psychoses should be referred in pregnancy for psychiatric assessment and management even if they are well. Regular monitoring and support is recommended for at least three months following delivery. *(Fifth Annual Report, 2011)*

	Mortality review committees Māori caucus relating to maternal mental health	Improved awareness and responsiveness to the increased risk for Māori women. *(Eleventh Annual Report, 2017)*
		Communication and coordination between primary care (GPs, FPA), LMC's TOP services, alcohol and drug services, and secondary providers of maternity, obstetric, mental health and maternal mental health services should be improved and enhanced using a variety of means including but not limited to case management, integrated notes systems, and electronic transfer to information. *(Eleventh Annual Report, 2017)*
		Primary care (GPs, PA) LMCs, TOP services, alcohol and drug services and secondary and tertiary providers of maternity, obstetric, mental health and maternal mental health services should improve their systems, guidelines and professional development to ensure that they are responsive to the identified increased risk for Māori women. *(Eleventh Annual Report, 2017)*
		Where Māori women exhibit symptoms suggesting serious mental illness or distress, an urgent mental health assessment, including consultant psychiatrist review and consultation with perinatal mental health services, on the same day these symptoms are first noted should be undertaken. *(Eleventh Annual Report, 2017)*
		Comprehensive assessment of risk factors for all Māori women, including those seeking a TOP, should be undertaken at diagnosis of pregnancy and/or on first presentation for antenatal care. *(Eleventh Annual Report, 2017)*
		Māori women who have a history of serious mental illness and are currently well should be referred to specialist mental health services for a mental health birth plan, and monitored closely by their maternity care provider +/- mental health services. Where such a woman has a miscarriage, the GP should be notified immediately and an explicit process for early follow up that includes a review of mental health status agreed with GP. *(Eleventh Annual Report, 2017)*
		The referring doctor of women who undergo a TOP is expected to provide a free post-TOP follow up consultation 10–14 days after the procedure. The referring doctor should actively follow up Māori women referred for TOP to ensure this consultation is completed and review mental health status during this consultation *(Eleventh Annual Report, 2017)*
		Clinicans are reminded that mental illness can deteriorate very rapidly in pregnancy and the postnatal period, and that suicide is the most common cause of maternal death in New Zealand at this time *(Fifth Annual Report, 2011)*

Appendix F: PMMRC recommendations for researchers 2007–2019

The table below is a subset of recommendations yet to be implemented made by the PMMRC since its first report in 2007. These recommendations are aimed towards researchers. The reports referenced in the third column are all available on the Health Quality & Safety Commission's website at: www.hqsc.govt.nz/our-programmes/mrc/pmmrc/publications-and-resources.

While there has been significant work towards implementing recommendations, further priority must be given to them because a number of preventable deaths continue to occur.

This table is one of five (see also Appendices A–E), each directed towards different areas of maternity services and governing bodies. While the below recommendations have been made directly to researchers, there are many recommendations included in Appendices B–E, where barriers to implementation could generate valuable research. It is worthwhile viewing the below recommendations alongside the other appendices.

Importantly, we must all continue to support the work of our colleagues and organisations in owning these responsibilities. Together, we can make the greatest and most valuable impact towards changing the outcomes of women and their babies, families and whānau.

PMMRC recommendations relating to research
Collectively, we need to increase our understanding of the reasons for adverse outcomes in certain groups. For example, within Aotearoa/New Zealand and internationally, we have an incomplete understanding of what puts women and babies of Indian ethnicity at increased risk. *(Thirteenth Annual Report, 2019)*
Research on the best model of care for teenage pregnant mothers in New Zealand should be undertaken with a view to reducing stillbirth and neonatal death. *(Fifth Annual Report, 2011)*
Key stakeholders in provision of health and social services to women at risk should work together to identify existing research on: • Reasons for barriers to engagement with maternity care • Interventions to address barriers to engagement with maternity care. *(Fifth Annual Report, 2011)*

Possible causes for the increase in perinatal-related death of babies born to Pacific women, Māori women, women under the age of 20 and over the age of 40, and women who live in areas of high socioeconomic deprivation should be researched. This information is necessary in order to develop appropriate strategies to reduce these possibly preventable deaths. *(Fourth Annual Report, 2010)*
Strategies to improve awareness of antenatal care services and increase access among women who are isolated for social, economic, cultural or language reasons should be developed. *(Third Annual Report, 2009)*