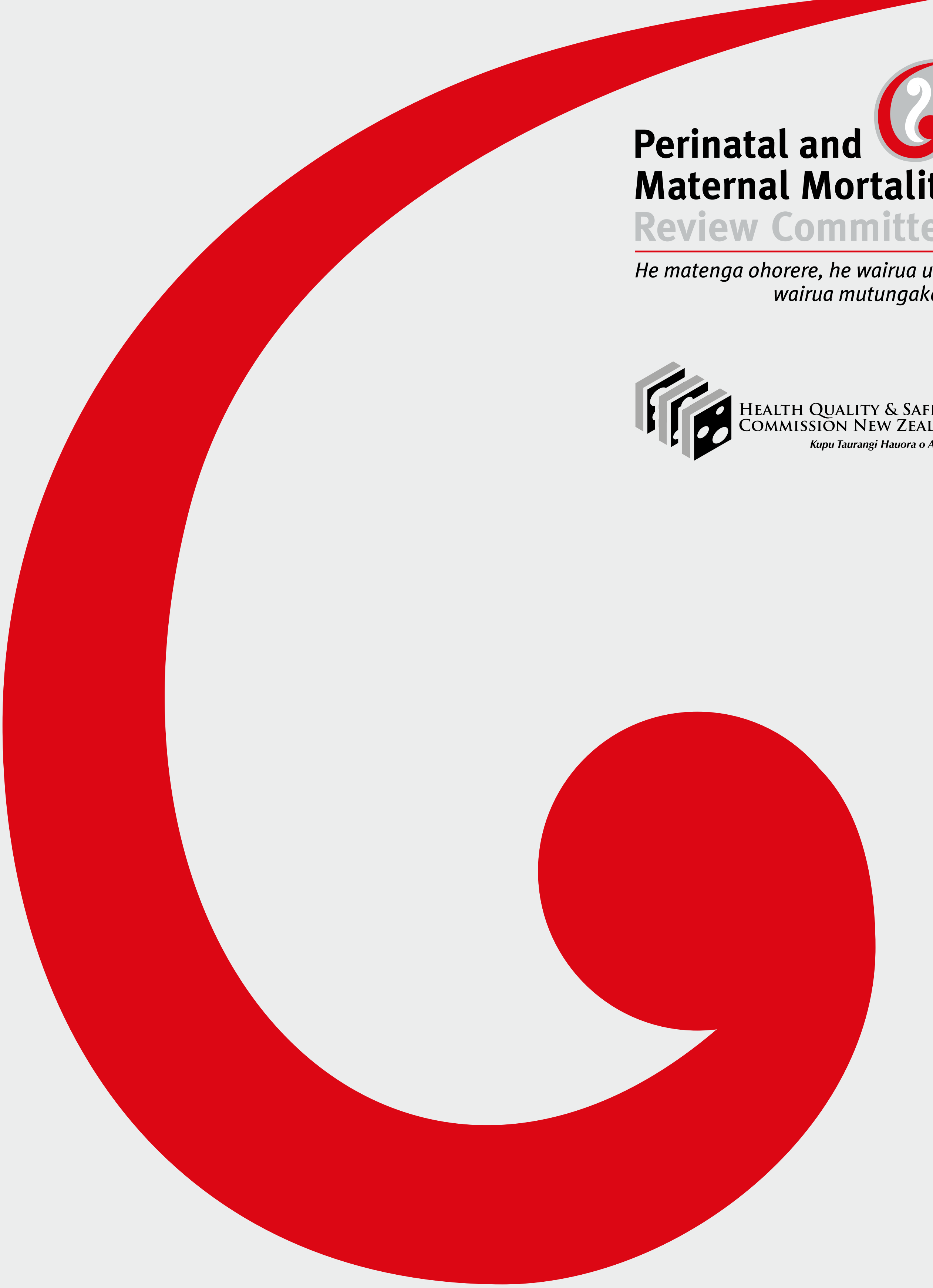


Perinatal and
Maternal Mortality
Review Committee

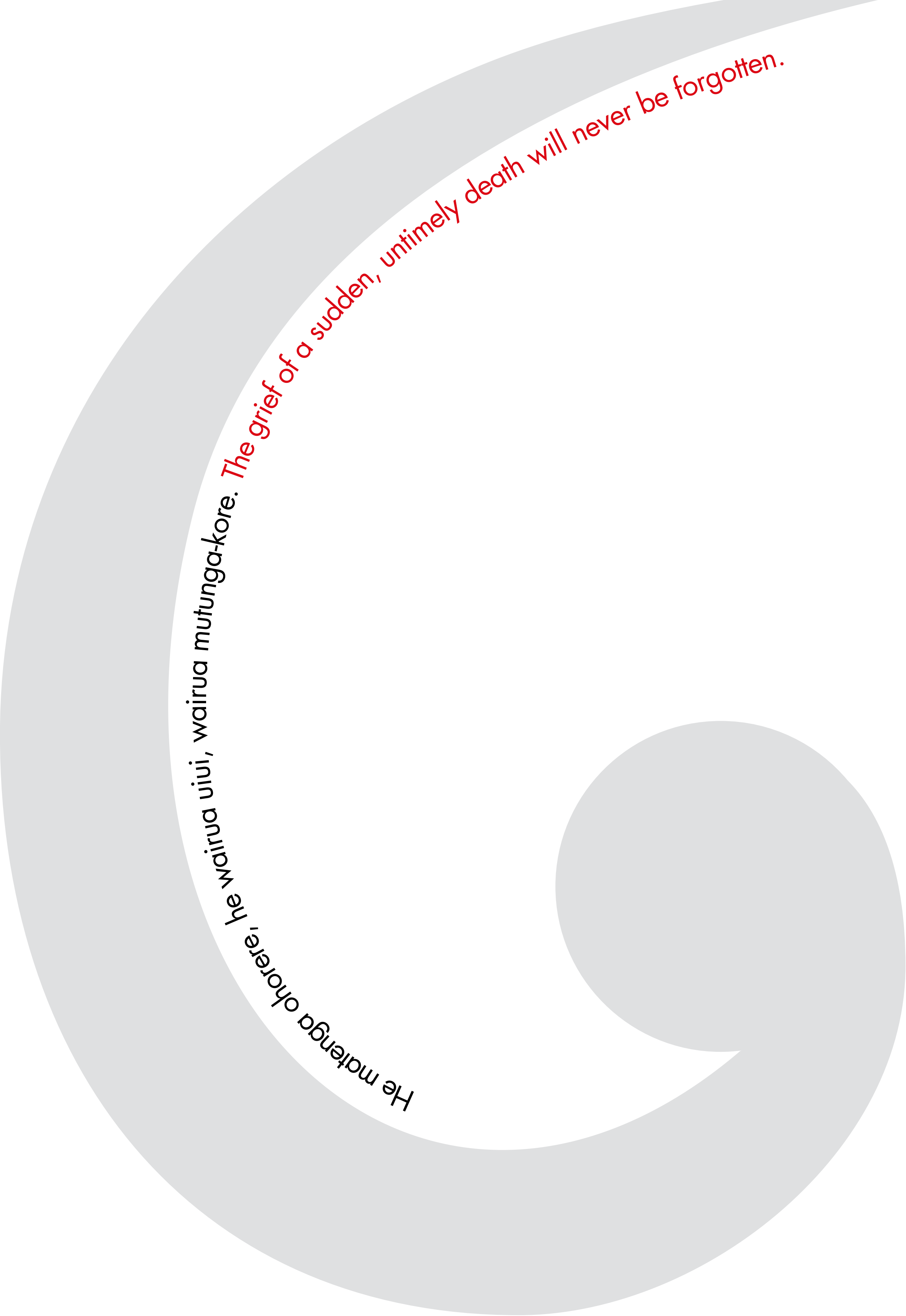
He matenga ohorere, he wairua uiui,
wairua mutungakore

Health Quality & Safety
Commission New Zealand
Kupu Taurangi Hauora o Aotearoa

Whakarāpopototanga Matua o te Pūrongo ā-Tau Tekau mā Toru o te Komiti Arotake Mate Pēpi, Mate Whaea Hoki | Executive Summary of the 13th Annual Report of the Perinatal and Maternal Mortality Review Committee

Te tuku pūrongo mō te mate me te whakamate 2017 | Reporting mortality and morbidity 2017

Mahuru 2019 | September 2019



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

PMMRC. 2019. *Whakarāpopototanga Matua o te Pūrongo ā-Tau Tekau mā Toru o te Komiti Arotake Mate Pēpi, Mate Whaea Hoki | Executive Summary of the 13th Annual Report of the Perinatal and Maternal Mortality Review Committee: Te tuku pūrongo mō te mate me te whakamate 2017 | Reporting mortality and morbidity 2017.* Wellington: Health Quality & Safety Commission.

Published in September 2019 by the Perinatal and Maternal Mortality Review Committee, PO Box 25496, Wellington 6146, New Zealand

ISBN 978-1-98-859910-6 (Print)
ISBN 978-1-98-859911-3 (Online)

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

Rārangi take | Contents

Kupu whakataki | Foreword

The Health Quality & Safety Commission (the Commission) welcomes the 13th report of the Perinatal and Maternal Mortality Review Committee (the PMMRC). This report focuses on the epidemiology of perinatal mortality from 2007 to 2017, maternal mortality from 2006 to 2016, babies with neonatal encephalopathy from 2010 to 2017, and perinatal and maternal mortality and morbidity for the 2017 calendar year.

The PMMRC has again provided us with a rigorous and carefully considered report. I would like to acknowledge the substantial amount of work by the Chair, Mr John Tait, and the PMMRC, and their determination to improve the quality of maternal and perinatal care.

I am pleased to learn that the rate of stillbirth has significantly decreased for the period 2007–2017 for babies of both New Zealand European and Māori mothers. Unfortunately, this decrease has not occurred in people of other ethnicities. Rates of perinatal mortality, perinatal related mortality and fetal death have reduced since 2007 for babies of New Zealand European mothers, but there has been no change in these measures for other ethnic groups.

All of us who work in the health sector are responsible for addressing this gap in equity. We need first to understand the differences and the various reasons for these, and then work to redesign our systems to eliminate preventable harm in ways that prioritise the most vulnerable. The Commission’s priority is to shine a light on potential opportunities to advance Māori health outcomes in particular, and outcomes that are both excellent and equitable for everyone, more generally.

I fully support the PMMRC’s vision to promote the recommendations of this report and to follow up and better understand the impact of its previous recommendations. We owe this to the women, babies and their whānau at the centre of this report.

This report would not be possible with the substantial contribution of a dedicated team of people: the local coordinators across Aotearoa/New Zealand who provide the data; Mr John Tait and the PMMRC members; the National Coordination Service at Auckland UniServices; the New Zealand Mortality Review Data Group, the epidemiology team at Otago University; and the mortality review committees’ secretariat staff at the Health Quality & Safety Commission. My sincere thanks goes to you all as you influence system change and improvement across our perinatal and maternity services.

Professor Alan Merry ONZM FRSNZ
Chair, Health Quality & Safety Commission

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

I am honoured to present the 13th Annual Report of the Perinatal and Maternal Mortality Review Committee (the PMMRC).

I would firstly like to acknowledge 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 their stories that allow us to strive for and promote system change to reduce preventable death and deliver greater equity in perinatal and maternal outcomes. Our data show that systems change for Māori mothers and babies and their whānau is urgent.

Therefore, it is my privilege to be the new Chair of the PMMRC and lead this incredibly vital work.

I would like to thank the members of the PMMRC for their ongoing valuable contribution and commitment to improving the outcomes of mothers and babies here in Aotearoa/New Zealand. With three new members, we have increased our expertise in maternity services, Māori health, racial inequality and racism in health, and the importance of data governance and sovereignty. Equally, I would like to acknowledge the monumental work of local coordinators who work with the families and whānau and bring together their experiences. Without your dedication, the work of the PMMRC would not be possible.

With a new Chair and new members, the PMMRC has taken this opportunity to re-establish ourselves and further examine areas where change might be required. It is central to the approach of the PMMRC to highlight inequities evident in maternity services and provide recommendations that can be implemented by the people who are able to directly effect change.

Our new vision and approach for working together across the system prioritises working with bereaved families and whānau, health professionals, policy makers and researchers, with the aim to have greater influence on policy decisions.

> *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.*

The 13th PMMRC report investigates the epidemiology of perinatal mortality, maternal mortality and neonatal encephalopathy. The rate of stillbirth in Aotearoa/New Zealand has reduced significantly since 2007. There has been a reduction of stillborn babies of Māori and New Zealand European mothers; however, this is not the case for other ethnic groups, particularly for babies of Indian women.

There was also some evidence of a decrease in the rate of perinatal mortality, yet this was driven by a decrease in deaths in babies of New Zealand European mothers, with no changes in any other ethnic groups.

Disproportionately, babies of mothers under 20 years of age have higher mortality than most other age groups, as well as Māori women living in New Zealand Index of Deprivation 2013 (NZDep2013) decile 10 areas (the most deprived tenth of the population) experiencing the greatest loss from perinatal related deaths.

The leading cause of perinatal related death continues to be congenital abnormality, followed by spontaneous preterm delivery. It is also unacceptable that suicide is the leading cause of maternal death and is substantially higher than the United Kingdom rate.

We therefore believe the implementation of our recommendations, alongside the monitoring of previous report recommendations, warrant the system changes required to ensure high quality, appropriate and equitable care for all.

This report clearly demonstrates the need to increase our understanding, and research, of the reasons for adverse outcomes in certain groups. The PMMRC recognises the need to co-develop and implement models of care that meet the needs of mothers, through information, support and care, that are acceptable to her. It is important that DHBs monitor key indicators by ethnicity to identify variations in outcome and develop national guidelines for the provision of care of mothers and infants. As a matter of urgency, improvement to the quality of ethnicity data in the National Maternity Collection is needed.

The PMMRC is also delighted to now include the Maternal Morbidity Working Group as a new morbidity subcommittee under the PMMRC. In achieving our vision, it was important to the PMMRC to continue the work of the Maternal Morbidity Working Group following the end of its time-limited contract with the Ministry of Health. The new subcommittee will continue to address systemic factors that may contribute to the severity of the illness, and opportunities for improvement.

It is a privilege to present this report to you.

John Tait
Chair, Perinatal and Maternal Mortality Review Committee

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

Tuia i runga, tuia i raro, tuia i roto, tuia i waho, tuia te here tāngata e pae nei, tēnā koutou, tēnā koutou, tēnā koutou katoa – I thread together the forces from above, from below, from within and from what surrounds us, to bind all of us together – I greet you all.

Once again it is my honour to stand on behalf of bereaved parents, families and whānau as a member of the PMMRC. My name is Lisa Paraku, and I hail from the beautiful Coromandel. My daughter Jasmine Lee, born beautiful and still, her five siblings who died in early pregnancy and their two brothers who live bring me to the PMMRC so that together we can work towards our purpose, working together across the system towards zero preventable deaths or harm for all mothers and babies, families and whānau. 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.

To my fellow bereaved parents and whānau, can I offer the following mihi (greeting) to you:

> *Me mihi aroha nui ki a koe me to whānau whānui, my love to you and to your entire family.*
> *E ngā pēpē, moe mai rā. Ki ngā huia kaimanawa 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.*

As a proud wāhine Māori māmā I stand strong in support of **equitable outcomes for all**, a key focus for us at the PMMRC and for our recommendations to our health system. It is time for all of us to be brave and create a system that can serve all peoples, where, when and how they need it.

I am heartened by the mahi (work) being done, and there is more to be done. You will see in our recommendations a consistent message for equitable outcomes for all. It remains a priority that we continue to educate ourselves in the ways of our priority populations – Māori, Pacific, Indian peoples and our young mothers – so that where we sit is not what we see but in fact we can move seats and see and serve a different worldview.

For our bereaved parents, families and whānau we are pleading for **national perinatal bereavement pathways** in the hope that our grief journey can be as gentle as it can be. Within our report you will see our challenge to provide the same level of care, anywhere, anytime, for anyone as the driver for a number of specific recommendations.

I would also like to take this opportunity to acknowledge my Sands NZ and Baby Loss NZ rōpū (groups). These peer-to-peer support groups are often the only service available to parents and families in their communities when our babies have died. Health professionals regularly refer bereaved parents to Sands, a voluntary, non-funded group (as is Baby Loss NZ) who are doing their best to provide as much support to an under-supported section of our population. In a recent survey of Sands bereaved parents, it was noted that overall support from health professionals was good – however, it is important to note that midwives are often not trained nor funded to provide support following the death of a baby, and many provide care in their own time as an extra service to our bereaved parents, families and whānau. To all of those who serve us, I thank you and I extend the wero (challenge) to our health system to recognise and provide more support to these rōpū, which are so very needed.

Mahi is being done between these groups and government at an inter-agency level to work towards better outcomes based upon a ‘whānau pani model’, placing parents at the centre and having levels of care emulating from there. In essence, focusing on a wrap-around of aroha (love) to our bereaved parents. For all those involved, I salute you. The PMMRC mahi has identified improvements needed, and these are some of the groups standing up to do the mahi. After all, ‘he waka eke noa’ – we are all in this together!

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 nunui ki a koutou, many thanks for what you do. This is heavy mahi and mahi that must be done to improve our system, prevent our babies and mothers dying where we can, and create a gentle path when we must walk the path that nobody ever wants to walk, when our loved ones do die. You do this mahi with grace – I acknowledge you and on behalf, I thank you.

Let me share my wish to us all in a section of karakia from my people:

> *E whakamoemiti ana mō tēnei rā*
> *Hei tiritiri mō tātou katoa, mō tātou wairua te hanga tangata kotahi, kia mahitahi ai mō te ao hou tino pai rawa.*
>
> *We give thanks for this day, we will share our views without anger, build our friendships and work together for a better world.*

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 us all.

Nāku iti noa, nā,

Lisa Paraku

Ngā kitenga matua mai i te pūrongo ā-tau 13 o te PMMRC | Key findings from the PMMRC's 13th annual report

Stillbirths

The rate of stillbirths is decreasing, largely driven by a reduction in stillbirths in babies of Māori and New Zealand European women; there was no significant change in any other ethnic group.

Perinatal death prevention

In 2017, nearly

600

babies died from 20 weeks of pregnancy until 27 days of age

20 weeks |◀——▶| **27 days**

Congenital abnormalities are the leading cause of death in babies.

We are asking for mandatory fortification of bread and flour with **folic acid**, as occurs in many other countries around the world.

This has been shown to reduce the number of neural tube defects (a type of congenital abnormality).

Many deaths could be prevented

Early engagement with high-quality, equitable care could prevent many deaths. We need to provide care that is accessible, facilitates all women booking early, and meets the individual needs of the woman and her whānau and family. Groups whose needs are not being met by our current services include Māori, Pacific and Indian women, and mothers under the age of 20 years.

Women who become smokefree prior to 16 weeks gestation are shown to have the same outcomes of spontaneous premature birth and small for gestational age, as non-smokers. **Smoking cessation programmes with incentives have been shown to be effective in pregnancy and should be widely utilised.**[1]

After-death care

> *Me mihi aroha nui ki a koe me to whānau whānui,*
> *my love to you and to your entire family.*
> *E ngāpēpē, moe mai rā. Ki ngā huia kaimanawa*
> *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.*
>
> *- Lisa Paraku, bereaved māmā*

About half of the babies who died had a post-mortem or karyotype performed to see why they died.

A New Zealand study reported on interviews with 169 mothers who gave birth to a stillborn baby after 28 weeks of pregnancy.

58.5% Agree to post-mortem

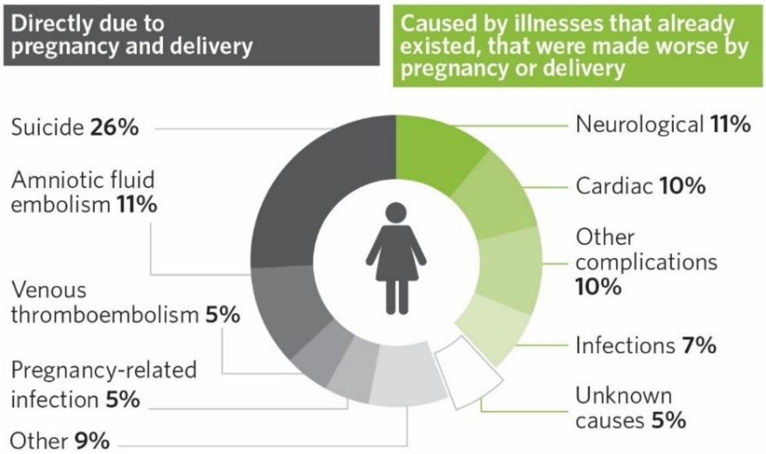
0% **No mother (0 of 99) who agreed to a post-mortem regretted her decision.**[2]

We are working with other organisations to make the grief journey as gentle as it can be through the development of a national bereavement care pathway.

Maternal death

On average
nearly 10 women die
each year either during pregnancy, or soon after the baby is born.

Causes of death in 2006 to 2017



Directly due to pregnancy and delivery

Suicide **26%**
Amniotic fluid embolism **11%**
Venous thromboembolism **5%**
Pregnancy-related infection **5%**
Other **9%**

Caused by illnesses that already existed, that were made worse by pregnancy or delivery

Neurological **11%**
Cardiac **10%**
Other complications **10%**
Infections **7%**
Unknown causes **5%**

We are asking for better support for mothers at all stages of pregnancy and afterwards, to make care better and easier to access.

We are also asking for better support if things don't go to plan.

---

1. McCowan L, Dekker GA, Chan E, et al. 2009. Spontaneous preterm birth and small for gestational age infants in women who stop smoking early in pregnancy: prospective cohort study. *BMJ* 338: b1081 doi: 10.1136/bmj.b1081.

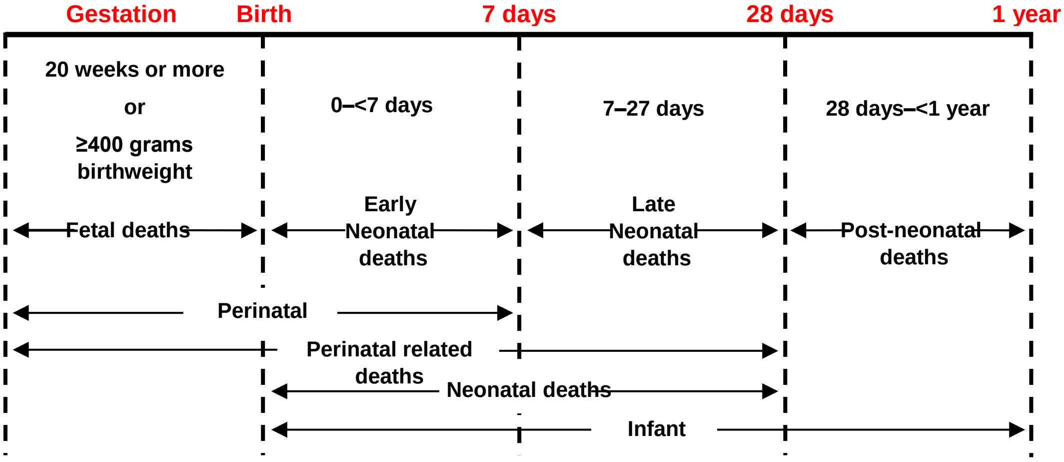
2. Cronin R, Li M, Wise M, et al. 2018. Late stillbirth post mortem examination in New Zealand: maternal decision-making. *Aust NZ J Obstet Gyn* 58(6): 667–73.

Health Quality & Safety Commission New Zealand
Kupu Taurangi Hauora o Aotearoa
New Zealand Government

Whakarāpopototanga matua | Executive summary

This 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 not just one thing causes a death. The aim of this work is to monitor trends and look at systems issues that could be modified to prevent future deaths. To do this, good information is vital. For this reason, the PMMRC is recommending that our routinely collected data systems are improved to better capture information on risk factors for all pregnant women and to ensure that our ethnicity data are accurate and complete. The PMMRC is also recommending some areas for further research, as there are still many unanswered questions about factors that might contribute to a death, particularly for some population groups. In addition, we need to develop models of care that better meet the needs of the mothers, babies, and whānau, families and communities that we serve.

Definitions used by the PMMRC



(Adapted from New Zealand Health Information Service 2007 and Ministry of Health 2010.)

Perinatal mortality

Since 2007, when the PMMRC began collecting data, there has not been a significant reduction in deaths overall. However, there was a decrease in the rate of stillbirths. This was largely driven by a reduction in stillbirths in babies of Māori and New Zealand European women; there was no significant change in any other ethnic group.

There was a significant decrease in perinatal mortalities (fetal and early neonatal deaths) seen in babies of New Zealand European mothers, but not for any other ethnic group.

There were no statistically significant changes in rates for neonatal mortality overall; however, there was a significant increase in deaths in babies of Pacific women.

Deaths due to congenital abnormalities remain the leading cause of death overall.

Our results show that there are groups 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, with some increase in mortality for those aged 40 years and over.

Mortality rates varied significantly by area deprivation, as measured by the New Zealand Index of Deprivation 2013 (NZDep2013). Those mothers living in the most deprived areas (quintile 5) were statistically significantly more likely to lose a baby from stillbirth, neonatal death, and 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 delivery.

Our data suggest that the National Maternity Collection (MAT) data set[1] provides an underestimate of maternal body mass index (BMI). However, regardless of whether MAT or PMMRC data are used, there is a clear increase in mortality from stillbirths, neonatal deaths and perinatal related deaths overall with increasing maternal BMI.

Mortality from stillbirths, neonatal deaths and perinatal related deaths (total) were higher in women who were smoking at the time of registration with a lead maternity carer (LMC) compared with those who were not. Given the significance of smoking as a risk factor, the clear improvement in outcomes when women are able to quit, and that effective smoking cessation programmes do exist, resource should be invested in reducing this modifiable risk factor.

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

Overall, approximately half of babies who died had optimal investigation into the cause(s) of their death, defined here as post-mortem or karyotype confirming chromosomal abnormality or clinical examination/investigation confirming the diagnosis. This was higher for terminations of pregnancy and stillbirths, and less for neonatal deaths. There were some variations in both the rate of offering of post-mortem and the rate of uptake if offered, by prioritised ethnic group.

Local review of cases showed there were a number of deaths that had potentially avoidable aspects. Contributory factors were thought to be present in just under one third of perinatal related deaths (excluding termination of pregnancy). Contributory factors were characterised by organisational and/or management factors, personnel factors, and barriers to access. Of these, barriers to access was the most common contributory factor cited.

Neontal 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.

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. However, between the years 2010 and 2017, the rate has not shown a statistically significant trend up or down.

Babies of primiparous women had the highest rates of NE, being statistically significantly higher than women with one, two, three or four or more babies. There was variation in the rates of NE by gestational age at birth, with those at the extreme ends of term pregnancies having higher rates.

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

Overall, 77% of babies were cooled,[2] with a slightly higher proportion of babies with moderate NE being cooled. The rates of cooling for babies of Māori mothers were the same as for babies of New Zealand European mothers. Mortality was much higher in babies with severe NE, with 61% of babies dying, compared with 2% of babies with moderate NE. Of those babies with NE who survived, nearly half of those with moderate NE had a normal physical examination on discharge or transfer, compared with 15% of those with severe NE.

Maternal mortality

Maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy (miscarriage, termination[3] 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 number of maternal deaths has fluctuated substantially over the time period 2006–2017, with a range from 3.3 deaths per 100,000 to 24.4 deaths per 100,000 maternities. There is some evidence of a reduction in the total number of maternal deaths over the time period.

The incidence of maternal death increased with age, with those aged 40 years and over having the highest rate (42.2 per 100,000 maternities). Women residing in the most deprived areas (NZDep2013 quintile 5) had the highest rate of mortality; there was some evidence of a statistically significant association between risk of death and increasing deprivation ($p=0.02$). When examined by prioritised ethnicity, Māori women, until recently, had higher mortality rates than New Zealand European women. However, over the past four years their mortality rate has reduced and is currently similar to that for New Zealand European women. Over the time period 2006–2017 there is some evidence of a statistically significant reduction in deaths for wāhine Māori ($p=0.04$).

There were 66 direct maternal and 44 indirect maternal deaths over the 12-year study period 2006–2017 inclusive. The single largest cause of maternal death in Aotearoa/New Zealand is suicide, with 30 deaths during this time (45%). The next leading causes were amniotic fluid embolism and neurological conditions, which caused 13 deaths (11.2%) each.

Given that suicide is the leading cause of maternal death, it is imperative that comprehensive action is taken. There are currently screening guidelines during the antenatal and post-natal period; however, their use is variable. Difficulties arise when mild to moderate illness is diagnosed, as maternal mental health service provision is variable within Aotearoa/New Zealand, with particularly limited resources for women with mild to moderate illness. A previous review of maternal suicide in wāhine Māori made a number of recommendations around early recognition of risk factors, comprehensive assessment and active follow-up.[4]

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[2] Cooling refers to therapeutic hypothermia (33.0–35.0ºC) used for hypoxic ischaemic encephalopathy (HIE) of term or near-term newborns to reduce possible neurological handicap. (Definition taken from: Ergenekon E. 2016. Therapeutic hypothermia in neonatal intensive care unit: Challenges and practical points. *Journal of Clinical Neurology* 5(1): 8–17).

[3] Termination of pregnancy is the interruption of an ongoing pregnancy (whether the baby was stillborn or live born). This report only includes termination of pregnancy from 20 weeks' gestation.

[4] PMMRC. 2017. *Eleventh Annual Report of the Perinatal and Maternal Mortality Review Committee: Reporting mortality 2015*. URL: https://www.hqsc.govt.nz/assets/PMMRC/Publications/2017_PMMRC_Eleventh_Annual_Report.pdf (accessed 2 September 2019).

While some gains have been made since 2007, further improvements must be made. PMMRC's vision is to work together with mothers, families and whānau, health professionals, policymakers and researchers to ensure that all women have access to high quality care that meets their needs.

Ngā tūtohinga | Recommendations

Research recommendation

1. 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.

   Evidence

   There is evidence that Indian women are at higher risk of gestational diabetes than women of other ethnic groups. However, this does not explain all the variation in mortality for babies of Indian women.

   Justification

   In Aotearoa/New Zealand, babies of Indian women have the highest mortality rates for perinatal related death and stillbirths.

Delivery of care recommendations

2. District health boards (DHBs) should demonstrate that they have co-developed and implemented models of care that meet the needs of mothers of Indian ethnicity.

   Evidence

   Babies of women of Indian ethnicity have increased mortality from stillbirth and perinatal related mortality.

   Justification

   Models of care that increase acceptability of and access to services should be investigated to reduce avoidable mortality.

3. 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.

   Justification

   Subgroups, particularly minority groups, of the population are likely to experience worse outcomes than others. If their outcomes are not specifically monitored, poor outcomes can go unnoticed.

Perinatal mortality and morbidity

4. The Ministry of Health should resource, support and facilitate the development of a national guideline for the provision of care of mothers and infants facing delivery at <25 weeks gestational age to ensure high-quality, appropriate and equitable care for all.

   Justification

   Babies born at the cusp of human viability (<25 weeks gestational age) represent a unique and complex patient group. The provision of high-quality care to mother and baby needs to be tailored to their specific individual needs: best practice includes recognition of both palliative care and intensive care support of the newborn.

5. 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.

Justification

Provision of bereavement care across DHBs is inconsistent for bereaved families and whānau.

Neonatal encephalopathy

6. The PMMRC recommends that DHBs provide 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 lead maternity carers (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.
    a. This education includes risk assessment for babies throughout pregnancy as well as intrapartum observations.
    b. The aims include strengthening of supervision and support to promote professional judgement, interdisciplinary conversations and reflective practice.
7. 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.[5]

    Justification

    SAC reviews can be a useful tool for identifying systems issues that can be modified to reduce the chance of further harm. Having a third-party assessment of the quality of the review will help DHBs to fully utilise this opportunity for improvement.
8. 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*.[6] Parents should be advised that not all treatment claims are accepted.

    Evidence

    Currently there is little consistency as to which babies with NE are notified to ACC for assessment of a treatment injury claim.

    Justification

    Quality of life for the baby and their family or whānau may differ considerably depending on whether their condition is covered by ACC.

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[5] Health Quality & Safety Commission. 2019. *Maternity Severity Assessment Code (SAC) examples 2018–19*. URL: https://www.hqsc.govt.nz/our-programmes/adverse-events/publications-and-resources/publication/2938/ (accessed 6 August 2019).

[6] Accident Compensation Corporation. 2019. *Treatment Injury Claim Lodgement Guide*. URL: https://www.acc.co.nz/assets/provider/405074f420/treatment-injury-claim-lodgement-guide.pdf (accessed 12 August 2019).

Maternal

9. For the management of suspected ectopic pregnancies, the Perinatal and Maternal Mortality Review Committee (the PMMRC) recommends:
   a. DHB gynaecology services have:
      i. clear pathways/processes for primary care regarding early pregnancy management
      ii. 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.
   b. the Royal Australian and New Zealand College of Radiologists endorse and promote the New Zealand Obstetric Ultrasound Guidelines being published by the Ministry of Health that suggest reporting wording to include the following information:

      > *An ectopic pregnancy cannot be excluded on this ultrasound alone. Please interpret scan with βhCG [beta human chorionic gonadotropin] using advice from gynaecology service or based on gynaecological protocols for PUL [pregnancy of unknown location].*[7]

   c. primary care use gynaecology pathways and consult with gynaecology services when an ultrasound cannot confirm an intrauterine pregnancy to help interpret beta human chorionic gonadotropin (βhCG) results and scan findings and guide ongoing management.

   Justification

   Deaths due to ruptured ectopic pregnancy are highly preventable. Deaths have occurred in the 10-day interval between scans, and therefore current practice needs to be improved.

Previous recommendations yet to be fully implemented

1. As a matter of urgency, the Ministry of Health improves the completion and quality of the ethnicity data in the National Maternity Collection (MAT), through consistent transfer of baby ethnicity from the birth certificate, and the transfer of mother ethnicity from the baby's birth certificate into MAT.

   Evidence

   During the years 2007–2017, 51% of babies in the MAT data set did not have an ethnic group recorded. In addition to the use of MAT for reports such as this, MAT is the primary data source used for the Ministry of Health's Annual Report of Maternity.[8]

   Justification

   d. Ethnicity as recorded on the birth certificate is most likely to be accurate for both the baby and parents, as it is completed by parents. It is therefore more likely to reflect the parental self-identified ethnicity, and provide the best information about the baby's ethnicity.

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[7] Ministry of Health. 2019. *New Zealand Obstetric Ultrasound Guidelines: consultation document*. URL: https://consult.health.govt.nz/nsu/obstetric-ultrasound-guidelines/ (accessed 14 August 2019).

[8] Ministry of Health. 2019. National Maternity Collection. URL: https://www.health.govt.nz/nz-health-statistics/national-collections-and-surveys/collections/national-maternity-collection (accessed 2 September 2019).

e. This is consistent with the Ministry of Health’s Ethnicity Data Protocols,[9] which outline the importance of collecting high-quality ethnicity data, the need to collect data regularly, and the requirement for ethnicity data to be collected directly from individuals. This is vital for the current government goals of reducing inequity and improving child wellbeing.

2. As a matter of urgency, the Ministry of Health requires DHBs to provide data for women who receive DHB-led antenatal care, and for this to be uploaded into MAT in its entirety.

Evidence

Women who receive antenatal care from their DHB can differ considerably from those who receive non-DHB LMC care.

Justification

In order to accurately calculate mortality rates for risk factors for different population groups, precise denominator data are required.

3. Government should fund the provision of specific maternal mental health services in order to provide holistic screening for maternal mental illness, intimate partner violence and family violence, and provide appropriate services and support.

f. For terminations of pregnancy, written discharge information should include contact information for support services and inform women that a follow-up visit is funded.

Evidence

Suicide is the leading cause of maternal death in Aotearoa/New Zealand.

Justification

Review of suicide deaths showed mental illness, intimate partner violence and family violence were frequent experiences in those women who died by suicide.[10]

4. 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.

Evidence

There is strong and convincing evidence that mandatory fortification of food with folic acid unequivocally reduces the prevalence of neural tube defects, and the benefits of this outweigh any potential adverse effects.[11]

Justification

g. Congenital abnormalities, particularly neural tube defects, are a significant contributor to terminations of pregnancy.

h. There is significant lifelong morbidity and mortality risk to babies from neural tube defects.

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[9] Ministry of Health. 2017. *HISO 10001:2017 Ethnicity Data Protocols*. URL: https://www.health.govt.nz/publication/hiso-100012017-ethnicity-data-protocols (accessed 5 July 2019).

[10] PMMRC. 2017. *Eleventh Annual Report of the Perinatal and Maternal Mortality Review Committee: Reporting mortality 2015*. URL: https://www.hqsc.govt.nz/assets/PMMRC/Publications/2017_PMMRC_Eleventh_Annual_Report.pdf (accessed 2 September 2019).

[11] Office of the Prime Minister’s Chief Science Advisor and the Royal Society Te Apārangi. 2018. *The health benefits and risks of folic acid fortification of food.* URL: https://www.pmcsa.org.nz/wp-content/uploads/The-health-benefits-and-risks-of-folic-acid-fortification-of-food.pdf (accessed 14 August 2018).

5. Until bread and flour fortification is implemented, and as an interim measure, folic acid should be provided free. This is not a suitable long-term measure. Fifty percent of pregnancies are unplanned; therefore, this method is less effective than fortification of bread and flour.
6. DHBs should demonstrate that they have co-developed and implemented models of care that meet the needs of mothers under 20 years of age.

   Evidence

   Babies of women under 20 years of age have increased mortality from stillbirth and neonatal mortality.

   Justification

   Models of care that increase acceptability of and access to services should be investigated to reduce avoidable mortality.