New Zealand Maternity Clinical Indicators: background document

Te Whatu Ora
Health New Zealand

This document is available at tewhatuora.govt.nz

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Introduction

The New Zealand Maternity Clinical Indicators series provides information on maternity events that contribute to optimal health outcomes for pregnant women/people and their babies. The 'standard primipara' definition is used to identify a group of pregnant women/people having their first baby who are low risk for obstetric complications and interventions, and for whom rates of intervention and outcomes should be similar between maternity facilities and regions.

Of the 20 indicators covered in this series:

- one applies to pregnant women/people who registered with a lead maternity carer (LMC)
- eight apply to standard primiparae
- seven apply to all pregnant women/people giving birth in Aotearoa New Zealand
- one applies to all babies born in Aotearoa New Zealand
- three apply to babies born at term (between 37 and 41 completed weeks' gestation).

The New Zealand Maternity Clinical Indicators series shows that reported interventions and outcomes for pregnant women/people and babies vary across districts and between individual secondary and tertiary maternity facilities. These findings merit further investigation of data quality and integrity, and variations in local clinical practice management.

Since 2012, the former district health boards (DHBs) (now districts) and maternity stakeholders have used national benchmarked data in their local Maternity Quality and Safety Programmes (MQSP) to identify areas that warrant further local investigation.

What is a clinical indicator?

A clinical indicator measures the clinical management and outcome of health care received by an individual. For each clinical indicator, there should be evidence that confirms the underlying causal relationship between a particular process or intervention and a health outcome (Australian Institute of Health and Welfare (AIHW) 2019). Clinical indicators can enable the quality of care and services to be measured and compared, by describing a performance or health outcome that should occur, and then evaluating whether it has occurred, in a standardised format that enables comparison between services or sites (Mainz 2003).

What are the New Zealand Maternity Clinical Indicators?

The New Zealand Maternity Clinical Indicators show maternity outcomes for each district and maternity facility, to:

- highlight areas where quality and safety could be improved nationally
- support quality improvement by helping districts to identify focus areas for local clinical review of maternity services
- provide a broader picture of maternity outcomes in Aotearoa New Zealand than is possible from maternal and perinatal mortality data alone

- provide standardised (benchmarked) data allowing districts to evaluate their maternity services over time and against the national average
- improve national consistency and quality in maternity data reporting.

The New Zealand Maternity Clinical Indicators are evidence-based and cover a range of procedures and outcomes for pregnant women/people and their babies. Where possible, the indicators are aligned with international maternity indicators to enable international comparison.

Te Whatu Ora develops and publishes the indicators with support from the National Maternity Monitoring Group and the New Zealand Maternity Clinical Indicators Expert Working Group.

Background

In 2010, the Minister of Health directed the Ministry of Health to develop a national quality and safety programme for maternity services, encompassing standards and clinical indicators.

The New Zealand Maternity Clinical Indicators are the result of a collaboration between Te Whatu Ora and maternity stakeholders, representing consumer, midwifery, obstetric, general practice, paediatric and anaesthetic perspectives. In 2011, an expert working group established 12 maternity clinical indicators that Ministry of Health could measure using the available data collections at that time.

The New Zealand Maternity Standards (Ministry of Health 2011) express the expectation that Te Whatu Ora will review the New Zealand Maternity Clinical Indicators approximately every three years.

In 2013, the National Maternity Monitoring Group reviewed the original 12 indicators and recommended changes to improve their quality, completeness and scope. The original expert working group reviewed and developed these proposed changes to ensure they aligned with the original objectives.

The Ministry implemented the changes in two phases:
- improving the quality and completeness of the original 12 indicators and introducing three new indicators in *New Zealand Maternity Clinical Indicators 2012* (Ministry of Health 2014)
- expanding the methodology to count outcomes for pregnant women/people giving birth outside a maternity facility more accurately and introducing six new indicators in *New Zealand Clinical Indicators 2013* (Ministry of Health 2015).

In 2016, the expert working group recommended deleting 'BMI over 35' (formerly maternity clinical indicator 17) as an indicator because it does not meet the description of a clinical indicator. 'BMI over 35' is a demographic descriptor and is presented in the Report on Maternity series: **www.health.govt.nz/nz-health-statistics/health-statistics-and-data-sets/report-maternity-series**

Following each review, Te Whatu Ora applies the updated criteria to historic data back to 2009, to study trends. Therefore, users should always refer to the latest published web tool.

Overview

Table 1: New Zealand Maternity Clinical Indicators

Population	Indicator		Numerator	Denominator
Pregnant women/people registered with an LMC	1	Registration with an LMC in the first trimester of pregnancy	Total number of pregnant women/people who register with an LMC in the first trimester of their pregnancy	Total number of pregnant women/people who register with an LMC
Standard primiparae	2	Standard primiparae who have a spontaneous vaginal birth	Total number of standard primiparae who have a spontaneous vaginal birth at a maternity facility	Total number of standard primiparae
	3	Standard primiparae who undergo an instrumental vaginal birth	Total number of standard primiparae who undergo an instrumental vaginal birth	Total number of standard primiparae
	4	Standard primiparae who undergo caesarean section	Total number of standard primiparae who undergo caesarean section	Total number of standard primiparae
	5	Standard primiparae who undergo induction of labour	Total number of standard primiparae who undergo induction of labour	Total number of standard primiparae
	6	Standard primiparae with an intact lower genital tract (no first- to fourth-degree tear or episiotomy)	Total number of standard primiparae with an intact lower genital tract with vaginal birth	Total number of standard primiparae who give birth vaginally
	7	Standard primiparae undergoing episiotomy and no third- or fourth-degree perineal tear	Total number of standard primiparae undergoing episiotomy and no third- or fourth-degree perineal tear with vaginal birth	Total number of standard primiparae who give birth vaginally
	8	Standard primiparae sustaining a third- or fourth-degree perineal tear and no episiotomy	Total number of standard primiparae sustaining a third- or fourth-degree perineal tear and no episiotomy with vaginal birth	Total number of standard primiparae who give birth vaginally
	9	Standard primiparae undergoing episiotomy and sustaining a third- or fourth-degree perineal tear	Total number of standard primiparae undergoing episiotomy and sustaining a third- or fourth-degree perineal tear with vaginal birth	Total number of standard primiparae who give birth vaginally
Pregnant women/people giving birth	10	Pregnant women/people having a general anaesthetic for caesarean section	Total number of pregnant women/people having a general anaesthetic for caesarean section	Total number of pregnant women/people who undergo caesarean section
	11	Women/people requiring a blood transfusion with caesarean section	Total number of women/people requiring a blood transfusion with caesarean section	Total number of pregnant women/people who undergo caesarean section
	12	Women/people requiring a blood transfusion with vaginal birth	Total number of women/people requiring a blood transfusion with vaginal birth	Total number of pregnant women/people who give birth vaginally

Population	Indicator		Numerator	Denominator
	13	Diagnosis of eclampsia at birth admission	Total number of pregnant women/people diagnosed with eclampsia during birth admission	Total number of pregnant women/people giving birth
	14	Women/people having a peripartum hysterectomy	Total number of postpartum women/people having an abdominal hysterectomy within six weeks after birth	Total number of pregnant women/people giving birth
	15	Pregnant women/people admitted to an intensive care unit (ICU) and requiring ventilation during the pregnancy or postnatal period	Total number of women/people admitted to ICU and requiring over 24 hours of mechanical ventilation during admission any time during the pregnancy or postpartum period	Total number of pregnant women/people giving birth
	16	Maternal tobacco use during postnatal period	Total number of postpartum women/people identified as smokers at two weeks after birth	Total number of pregnant women/people with smoking status at two weeks after birth reported
Live-born babies	17	Preterm birth	Total number of babies born under 37 weeks' gestation	Total number of babies born (live births)
	18	Small babies at term (37–42 weeks' gestation)	Total number of babies born at 37–42 weeks' gestation with birthweight under the 10th centile for their gestation	Total number of babies born at 37–42 weeks' gestation
	19	Small babies at term born at 40–42 weeks' gestation	Total number of babies born at 40–42 weeks' gestation with birthweight under the 10th centile for their gestation	Total number of babies born at 37–42 weeks' gestation with birthweight under the 10th centile for their gestation
	20	Babies born at 37+ weeks' gestation requiring respiratory support	Total number of babies born at 37+ weeks' gestation requiring over 4 hours of respiratory support	Total number of babies born at 37+ weeks' gestation

Te Whatu Ora has produced an online web tool to present this data and published on the website: **https://www.tewhatuora.govt.nz/our-health-system/data-and-statistics/maternity-clinical-indicators/.** The tables/plots within this web tool tables present numbers and rates from 2009 to the latest available year by:

- Single summary: Indicator rates for a selected indicator by location (either district of residence or facility of birth) and ethnic group.

- Location summary: Rates of all 20 indicators for selected location (either district of residence or facility of birth) and ethnic group.

- Indicator summary: Indicator by selected location (either district of residence or facility of birth) and ethnicity, for selected year or over time.

- Indicator 18 (by gestation): Rates for Indicator 18 (small for gestational age) by gestation in weeks for a selected location (either district of residence or facility of birth).

About the data

Te Whatu Ora extracts data for these indicators from pregnancies and live-born babies recorded on the National Maternity Collection (MAT). Additional hospital event data for each pregnancy and live-born baby recorded on MAT is extracted from the National Minimum Dataset (NMDS).

Records of babies born at a gestational age of less than 20 weeks, and the corresponding records for their birth parent, have been excluded from this analysis. Te Whatu Ora has made all efforts to ensure that the data presented does not include duplicate events. Pregnant women/people giving birth at home are counted as having a spontaneous vaginal birth without an episiotomy.

Standard primiparae are defined using maternal age, gestational age and parity sourced from MAT, and clinical codes sourced from the current birth event, from antenatal events corresponding to the pregnancy, and from a search of historical maternity events held in the NMDS. See 'Appendix 2: Technical notes' for more detail on definitions and code ranges.

The data presented in each annual release of the maternity clinical indicators data pertains to pregnant women/people recorded as having given birth and babies live-born from 2009 to the latest available year from MAT. Data from births occurring for all data from 2009 onwards have been re-extracted using the same methods and criteria to provide an up-to-date time-series view.

As the definitions and data sources used in this report have been revised and may differ from previously published reports in this series, you should not compare the data this edition presents to the data in previous reports. See the accompanying spreadsheets and web tool for time-series analysis.

Standard primiparae

A 'standard primipara' is a woman expected to have an uncomplicated pregnancy. Intervention and complication rates for these pregnant women/people should be low and consistent across hospitals and districts. Comparing data about standard primiparae (rather than all pregnant women/people giving birth) controls for differences in case mix and increases the validity of inter-hospital comparisons of maternity care (Australian Council on Healthcare Standards 2019).

We consider approximately 15 percent of women/people giving birth in New Zealand to be standard primiparae. These women are a subset of the general maternity population and so are not representative of birthing women/people in New Zealand.

Standard primiparae in this publication are women aged 20–34 years old at the time of giving birth who are giving birth for the first time (parity = 0) at term (37–41 weeks' gestation) where the outcome of the birth is a singleton baby, the presentation is cephalic (headfirst) and there have been no recorded obstetric complications that are indications for specific obstetric interventions.

Data integrity

Te Whatu Ora compiles the New Zealand Maternity Clinical Indicators series from data supplied by districts, lead maternity carers (LMCs) and other claimants from the Primary

Maternity Services Notice. The districts and their maternity facilities are individually responsible for ensuring the completeness and quality of data they supply to national collections. Lead maternity carers are contractually responsible for ensuring the accuracy of data they supply on claims for payment. Te Whatu Ora has applied data quality management at several points in the collection, extraction and reporting of the data used for the New Zealand Maternity Clinical Indicators. However, errors can occur. Users should contact Te Whatu Ora with any concerns regarding the data or analyses presented in the New Zealand Maternity Clinical Indicators.

Interpretation notes

The data in the New Zealand Maternity Clinical Indicators series is presented in two ways:

- by district of residence: this data provides districts with information relevant to their usually resident population
- by place of birth: this data allows monitoring of trends over time at the facility level.

Numbers and rates

Rates are presented as raw percentages. Rates are not standardised rates by age or ethnicity; denominators are chosen to group pregnant women/people into clinically similar cohorts that would be expected to experience similar birth outcomes (eg, standard primiparae).

Differences in rates by ethnicity or socioeconomic group could be an area of focus for analysis at district level. Some rates reflect small numbers of events thus users should treat them with caution.

Indicator 1:
Registration with a lead maternity carer

Rationale and purpose

The Perinatal and Maternal Mortality Review Committee (2019), the National Maternity Monitoring Group (2019) and the *Inquiry into improving child health outcomes and preventing child abuse, with a focus from preconception to three years of age* (Health Select Committee 2013) all recommend early engagement by the pregnant woman/person with maternity care. The National Institute for Health and Care Excellence (NICE) (2021a) recommends that antenatal care be started in the first trimester and, ideally, by 10 weeks' gestation.

Early engagement with a maternity care provider, ideally an LMC, enables opportunities for screening, education and referral, and begins the primary maternity continuity of care relationship between a woman/pregnant person and their LMC. The National Maternity Monitoring Group (2019) continues to advocate for equitable access to LMC services in the first trimester for all pregnant women/people, recommending districts focus on improving service for Māori, Pacific and Indian pregnant women/people, for pregnant women/people under the age of 20 and for those living in areas of high deprivation.

This indicator monitors the number of pregnant women/people who registered with an LMC in the first trimester of their pregnancy, out of all women/people who gave birth and had an LMC providing their primary maternity care.[1] This indicator supports national and local monitoring of the effectiveness of activities to improve timely registration with an LMC.

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[1]   Woman/pregnant people who register with a district's primary maternity service are not counted in this indicator.

Indicators 2 to 5: Type of birth

Rationale and purpose

Indicators 2 to 5 present data on types of birth among standard primiparae. They compare rates of spontaneous vaginal birth and rates of medical interventions in a low-risk population.[2] Their purpose is to encourage maternity service providers to review the appropriateness of these interventions among low-risk pregnant women/people, with the aims of supporting normal birth, improving parents' experience of maternity care, reducing maternal and perinatal morbidity, and supporting value for money for the health system. The following sections describe the rationale and purpose of the specific indicators.

Spontaneous vaginal birth (indicator 2)

This indicator measures the proportion of standard primipara having a spontaneous (non-instrumental) vaginal birth. This measure includes births for which labour was augmented or induced.

Maternity service providers should review, evaluate and make necessary changes to clinical practice aimed at supporting pregnant women/people to achieve a spontaneous vaginal birth.

Instrumental vaginal birth (indicator 3)

This indicator measures the use of instrumental interventions: that is, vacuum (ventouse) and forceps. Using instruments is associated with short-term and long-term complications for the woman/pregnant person and the baby, some of which can be serious. Maternity service providers should use instrumental interventions judiciously. The decision to conduct an instrumental birth depends on the clinical situation and the principles of informed consent applied prior to embarking on an assisted vaginal birth. It is important to ensure that the woman/pregnant person is aware of the risks and proposed benefits of the procedure (AIHW 2021).

If a maternity service provider's rates of intervention are significantly higher nationally than its peer group, it should examine the use of instrumental birth alongside other indicators that instrumental birth may affect, including maternal and perinatal morbidity.

Caesarean section (indicator 4)

The purpose of this indicator is to encourage maternity service providers to evaluate whether they performed only necessary caesarean sections and to reduce the harm associated with potentially avoidable caesarean sections among low-risk pregnant women/people. Caesarean

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[2]   Some indicators do not add up to 100 percent due to missing data codes for some events.

birth is safer now than in the past and serious complications are uncommon, particularly for healthy pregnant women/people, but there is still a small risk of serious morbidity and mortality for both the woman/pregnant person and the baby (AIHW 2021).

If a maternity service provider's caesarean section rates are significantly different from its peer group nationally, it should examine its use of caesarean sections among low-risk pregnant women/people.

Induction of labour (indicator 5)

The purpose of this indicator is to benchmark rates of induction of labour in a low-risk population. Induction of labour is associated with risk of fetal distress, uterine hyper-stimulation and postpartum haemorrhage (PPH), and can be the start of further medical interventions (AIHW 2021). The decision to recommend an induction of labour should be supported by the best evidence available and should take into consideration the individual risks and benefits of induction for the woman/pregnant person (Ministry of Health 2019).

Maternity service providers should use this indicator to investigate their policies and practices around inducing labour in low-risk pregnant women/people. If a maternity service provider's rates of induction of labour are significantly higher nationally than its peer group, it should review the appropriateness of inductions in this group. They should also examine the results of other indicators that can be affected by induction, such as caesarean section and PPH.

Indicators 6 to 9: Damage to the lower genital tract

Rationale and purpose

Indicators 6 to 9 cover the degree of damage to the lower genital tract from vaginal birth among standard primiparae. Perineal trauma remains one of the most common complications of childbirth and is thought to affect between 60 percent and 85 percent of pregnant women/people who give birth vaginally (Women's Healthcare Australasia (WHA) 2007). Reasons for perineal trauma are varied, and may reflect either maternal, neonatal or clinical management issues. Perineal damage can cause pregnant women/people pain and longer-term morbidity. The aim of these indicators is to encourage review and practice improvement to reduce trauma and its associated maternal morbidity. Reduced perineal trauma is expected to improve maternal satisfaction and mother−infant bonding by reducing maternal pain and discomfort. The following sections describe the rationale and purpose of the specific indicators.

Intact lower genital tract (indicator 6)

The four categories of perineal tear classification enable a standardised description of perineal damage. Assessing and identifying degrees of perineal damage remains a complex process. A classification of first- or second-degree tear does not necessarily reflect the level of pain or long-term morbidity a woman/pregnant person experiences. This indicator provides a concise measure of all perineal trauma and is intended to encourage further investigation to determine how maternity service providers can improve rates of intact lower genital tract.

Episiotomy (indicator 7)

This indicator aims to encourage further investigation among maternity service providers to ensure that they assess risks to the woman/pregnant person and baby appropriately before undertaking an episiotomy. Meta-analysis of randomised controlled trials (Jiang et al 2017) confirms that judicious use of episiotomy is better practice than routine use of episiotomy (AIHW 2021). If a maternity service provider's rates of episiotomy, particularly among low-risk pregnant women/people, are significantly higher nationally than its peer group, the provider should examine these results. It should also look at other indicators that can be affected by episiotomies, such as third-degree tears, PPH, infection and maternal admission to high-dependency units or intensive care units, to ascertain whether there is any correlation.

Third-and fourth-degree tears (with and without episiotomy) (indicators 8 and 9)

The aim of these indicators is to encourage maternity service providers to consider the rate of tears in conjunction with episiotomy rates, and to investigate labour management if their rates are nationally significantly different from those of their peer group.

Indicator 10: General anaesthetic for pregnant women/people giving birth by caesarean section

Rationale and purpose

Although the risks of general anaesthetic for caesarean section have reduced greatly in recent decades, regional anaesthetic is still safer than general anaesthetic, in that it results in less maternal and neonatal morbidity (NICE 2021b).

Maternity service providers perform some caesarean sections under general anaesthetic because of factors such as patient preference, and in some high-risk cases (such as if a woman/pregnant person has pre-eclampsia) when only general anaesthetic can be used. Maternity service providers are also more likely to use general anaesthetic when they perform urgent caesarean sections. Factors affecting this can include the configuration and organisation of obstetric and anaesthetic services (eg, whether a specialist anaesthetist is on site) and the level of antenatal care a woman/pregnant person has received.

The objective of this indicator is to encourage maternity service providers that have higher-than-average rates of general anaesthetic for caesarean sections to investigate the causes of these higher rates and consider whether they are justified.

Indicators 11 and 12: Blood transfusion during birth admission

Rationale and purpose

These indicators look at how maternity service providers handle excessive blood loss in pregnant women/people who have just given birth, called postpartum haemorrhage (PPH). Obstetric haemorrhage remains one of the leading causes of maternal mortality in developed and developing countries (Mavrides et al 2016). Major blood loss is defined as ≥1000 mls and can be subdivided into moderate (1001–2000 mls) and severe (≥2000 mls). Visually estimation of blood loss is known to underestimate blood loss; blood collection drapes and weighing swabs can improve accuracy. However, studies have shown that this does not significantly reduce the risk of severe PPH. Health professionals are advised to assess clinical signs and symptoms of the woman/pregnant person when assessing the severity of PPH.

A different and (some suggest) more objective measure is whether there is a requirement for blood transfusion due to excessive blood loss during or following birth. This measurement is also not without difficulties. For example, decisions to perform blood transfusions depend on individual levels of patient tolerance, and some patients refuse a transfusion due to religious or other beliefs. However, as a broad measure of excessive blood loss and potential long-term morbidity due to that blood loss, this indicator is a useful measure of severe, life-threatening PPH.

This indicator aims to provide maternity service providers with an indicator of significant blood loss that will stimulate further investigation of clinical management and intervention. All maternity service providers should be familiar with the *National Consensus Guideline for Treatment of Postpartum Haemorrhage / Aratohu Tūtohu ā-Motu mō te Tumahu Ikura Whakawhānau Pēpi* (Ministry of Health 2022).

Indicators 13 to 15: Severe maternal morbidity

Rationale and purpose

Maternity systems monitor maternal mortality as an indicator of their safety and quality. However, the number of maternal deaths in any given year is low. The impact of severe morbidity is significant and long term, is of high personal cost to a woman/pregnant person and their family and has a high financial cost to the health system. Monitoring severe morbidity provides a broader picture of the true impact of adverse outcomes in maternity and allows individual maternity units to benchmark whether their rates of severe morbidity are consistent with other units. Cases of severe maternal morbidity should be subject to local multidisciplinary review for quality improvement purposes.

Eclampsia (indicator 13)

Pre-eclampsia is characterised by high blood pressure and protein in the urine during pregnancy and following birth. Pre-eclampsia affects between 2 and 8 percent of pregnancies worldwide. Eclampsia is a serious complication of pre-eclampsia and results in high rates of perinatal and maternal morbidity and mortality (World Health Organization (WHO) 2011). It is considered preventable through early detection and management of pre-eclampsia.

The purpose of this indicator is to encourage local investigation, including case review, into the appropriate diagnosis and management of pre-eclampsia in order to decrease the incidence of eclampsia.

Peripartum hysterectomy (indicator 14)

Peripartum hysterectomy is a surgical intervention usually only performed to save a woman/pregnant person's life, and usually happens when uncontrollable obstetric haemorrhage or extensive uterine rupture complicates birth. It is a marker of severe maternal morbidity and may indicate failings to prevent and manage antecedents such as haemorrhage or prolonged obstructed labour.

The purpose of this indicator is to encourage local investigation, including case review, to reduce the need for this significant surgery.

Mechanical ventilation (indicator 15)

Using mechanical ventilation for more than 24 hours on a pregnant or postpartum woman/person is a marker of severe maternal morbidity that does not distinguish by cause. It indicates a high degree of severity, and its measurement is more sensitive than measuring intensive/special care unit admissions, as it is not dependent on local layout of facilities.

The purpose of this indicator is to encourage local investigation, including case review, to identify opportunities to prevent or reduce severe maternal and perinatal morbidity.

Indicator 16: Maternal tobacco use during postnatal period

Rationale and purpose

Smoking during pregnancy leads to increased carbon monoxide concentration in the blood of the woman/pregnant person and their baby, resulting in reduced oxygen and nourishment available to the baby. This increases the risk of babies being born with a low birthweight and also increases the risk of neonatal mortality, sudden and unexpected death in infancy and long-term respiratory problems for the child (Ministry of Health 2020).

This indicator monitors maternal tobacco use at two weeks postnatal, which identifies the number of pregnant women/people who have continued to smoke during pregnancy and following the birth and those who have recommenced smoking following pregnancy and birth.

Improving rates against this indicator will require maternity service providers to offer tobacco cessation support during pregnancy and into the postnatal period that meets the needs of local populations. It also requires tobacco cessation services to work closely with LMCs and district maternity services.

Indicator 17: Preterm birth

Rationale and purpose

Preterm birth is a significant contributor to perinatal mortality and neonatal morbidity, especially for babies born under 32 weeks' gestation. Preterm birth is among the top causes of death in infants worldwide (WHO 2018).

Preterm birth may have negative consequences, including:

- higher neonatal mortality and morbidity
- long-term effects on babies, such as poorer neurodevelopmental and educational outcomes, more hospital admissions and increased general disease burden in childhood
- greater use of health resources
- long-term effects on risk of disease through to adulthood, including hypertension (high blood pressure) and diabetes.

Spontaneous onset of labour, premature rupture of membranes, antepartum haemorrhage, multiple pregnancy and pregnancy-induced hypertension are the most common causes of preterm birth.

Managing high blood pressure and tobacco use in pregnant women/people may reduce rates of very early preterm birth (28 weeks to 31 completed weeks' gestation (WHO 2018). Clinical decision-making regarding timing of induction and elective (planned) caesarean section affects rates of late preterm birth (37 weeks' gestation or less).

Indicators 18 and 19: Small for gestational age at term

Rationale and purpose

Infants who are born small for gestational age (SGA) are at increased risk of neonatal morbidity and mortality, reduced growth through childhood, lower childhood neurodevelopmental scores, reduced educational attainment and increased lifetime risk for impaired glucose tolerance, including type 2 diabetes, and cardiovascular disease (Anderson et al 2016; Baschat 2014; Crispi et al 2012; Murray et al 2015; Selvaratnam et al 2021).

Placental disease (including that associated with pre-eclampsia) and smoking are common causes of poor fetal growth, leading to babies being diagnosed with SGA. Appropriate management of pregnant women/people at increased risk of SGA (those with a history of SGA, high blood pressure or obesity, and who smoke) may reduce the risk. Detecting poor fetal growth early on may reduce the risk of stillbirth by presenting the opportunity for better surveillance and iatrogenic preterm birth.

Small babies at term (indicator 18)

This indicator measures the proportion of all babies born at term who are small for their gestational age. This is defined as less than the 10th percentile for birthweight on the INTERGROWTH-21st growth charts for gestational ages 37 to 42 weeks. INTERGROWTH-21st is an international network of clinicians and researchers' issues concerning fetal growth, which developed and published these growth standards. They use the same methodology as the WHO childhood growth standards recommended for use in Aotearoa New Zealand (Ministry of Health 2010).

The percentage of babies in Aotearoa New Zealand who fall above or below a given percentile on these charts is different from the equivalent percentages on Aotearoa New Zealand population charts and from customised centile charts that are widely used in here.

There is extensive evidence for maternal factors leading to SGA, including smoking, high blood pressure, pre-eclampsia, poorly controlled diabetes, obesity and poor nutrition. This indicator should encourage multidisciplinary review of the prevention and management of poor fetal growth at a population level, with the potential for reducing risk of SGA, morbidity from SGA, and stillbirths.

Small babies at term born at 40 to 42 weeks' gestation (indicator 19)

This indicator measures the proportion of SGA babies at term gestation (37–42 weeks) who were born between 40 to 42 weeks' gestation.

The indicator is intended to encourage the identification and management of poor fetal growth at term. Evidence and best practice recommend the expedited birth of babies identified as SGA once they reach term, and ideally before 40 weeks. This indicator represents the proportion of unrecognised or sub-optimally managed cases.

Indicator 20: Term babies requiring respiratory support

Rationale and purpose

This indicator, recording a birth at term where the baby requires respiratory support, is a marker of severe morbidity that does not distinguish by cause and indicates a high degree of severity. It is a more specific measure of severity than measuring neonatal intensive/special care unit admissions, as it is not dependent on variations in local layout of facilities or admission practices. The underlying factors causing the need for respiratory support at term may be more amenable than those causing respiratory support of the preterm infant, where lung prematurity is the largest driver. Respiratory support in this indicator includes both mechanical and non-invasive ventilation for greater than four hours.

The purpose of this indicator is to encourage local investigation, including case review, of the reasons for the need for respiratory support of term babies. This will help maternity service providers identify opportunities to prevent or reduce perinatal morbidity.

Data presented for this indicator may reflect variation in reporting practices.

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Appendices

Appendix 1: National collections

Maternity Collection

Te Whatu Ora's National Maternity Collection (MAT) provides statistical, demographic and clinical information about selected publicly funded maternity services up to nine months before and three months after a birth. It collates data about each pregnancy that results in birth and each live-born baby separately from:

- inpatient and day-patient health event data during pregnancy, birth and the postnatal period for pregnant women/people giving birth and their babies, sourced from the National Minimum Dataset (NMDS)
- claims for primary maternity services provided under the Primary Maternity Services Notice by LMCs and those providing primary maternity single services
- primary maternity services provided by districts to pregnant women/people who do not have an LMC.

Te Whatu Ora collects the data for administrative purposes (including the funding of maternity services). The collection does not contain details of stillborn babies. The Mortality Collection includes information about stillbirths.

Refer to the data dictionary for more information on the data held in MAT:
www.health.govt.nz/publication/national-maternity-collection-data-dictionary

National Minimum Dataset

The NMDS stores administrative information routinely collected for all publicly funded inpatients of a Aotearoa New Zealand maternity facility (secondary or tertiary hospitals and primary maternity facilities). This information contains demographic and clinical data, including data on diagnoses and the procedures used. The NMDS assigns information using standardised codes that are internationally comparable. The classification system used is the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification. This system is designed for the classification of morbidity and mortality information for statistical, epidemiological and clinical purposes.

Refer to the data dictionary for more information on the data held in the NMDS:
www.health.govt.nz/publication/national-minimum-dataset-hospital-events-data-dictionary

Claims data

The claims data set contains information on pregnant women/people and babies who access primary maternity services provided under the Primary Maternity Services notice pursuant to section 88 of the New Zealand Public Health and Disability Act 2000. Te Whatu Ora receives information from LMC and single service claims; this information includes all pregnant women/people registered with an LMC. Historically, this represents around 93 percent of all pregnant women/people giving birth. Data sourced from claims includes details on registration

with an LMC, as well as other antenatal and postnatal factors (eg, parity, smoking status and breastfeeding status).

District-funded primary maternity services data

This data set contains information (similar to claims data) on pregnant women/people who access district primary maternity services, including from district caseload midwifery teams and district facility based primary midwives.

The extent to which districts are providing primary maternity services varies significantly by region, ranging from districts that do not provide any primary maternity services to districts that provide primary maternity services to at least one-quarter of pregnant women/people giving birth in their region. Not all districts that provide primary maternity services have provided data to MAT.

Appendix 2: Technical notes

Obtaining the data

This publication uses the National Maternity Collection (MAT) as the primary source for identifying all pregnant women/people giving birth and live-born babies as well as the following variables: delivery date, place of birth, age, ethnicity, smoking status, parity, primary maternity care provider, gestation and birthweight.

The MAT primarily sources parity and smoking status data from LMC claims, with additional data from some district's (former DHB's) primary maternity services. This data is therefore only available for pregnant women/people registered with an LMC or with a district primary maternity service (historically about 96 percent of pregnant women/people giving birth).

Indicators 2 to 12 and 20 require additional information that is not available in MAT. Therefore, data from hospital events occurring during the pregnancy and postnatal period was sourced for these pregnant women/people and their babies from the National Minimum Dataset (NMDS).

The NMDS codes hospital events using the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) for diagnoses codes and uses the Australian Classification of Health Interventions (ACHI) for procedure codes. Both ICD-10-AM and ACHI are from the Independent Hospital Pricing Authority, Australia. The NMDS is based on the 6th edition for hospital discharges up to 30 June 2014 and the 8th edition for hospital discharges from 1 July 2014 onwards. From 1 July 2019, diagnoses codes are assigned using the 11th edition of ICD-10-AM.

Some maternity events (pregnant women/people giving birth in hospital and live babies born in hospital) are impacted by changes in the 11th edition clinical coding standards, as follows.

Place of birth

The 11th edition has changed coding of out-of-hospital births where the placenta is delivered in hospital with or without assistance. Some births previously counted as out-of-hospital births are now counted as hospital births. This means the data may show an increase in births in secondary and tertiary facilities, but this may be due to the change in coding standards rather than a true increase.

Birth type

The 11th edition reclassified birth type groupings. The coding changes and impacts on the data in this web tool are as follows.

- Coding of obstetric manoeuvres (eg, McRoberts) without use of forceps or vacuum extraction has changed. Some births previously categorised as spontaneous vaginal births are now categorised as assisted births. The data may show an increase in assisted births, but this may be due to the change in coding standards rather than a true increase.
- Coding of failed forceps or vacuum extraction and subsequent spontaneous vaginal birth has changed. Some births previously categorised as spontaneous vaginal births are now categorised as assisted births. The data is expected to show an increase in assisted births, but this may be due to the change in coding standards rather than a true increase.

- Coding of caesarean section type (classical / lower uterine segment (LUS)) and indication (elective or planned/emergency or unplanned) has changed. Caesarean sections where classical or LUS is not documented are now coded as 'caesarean section, not elsewhere

classified,' where previously they were categorised as LUS. Some births categorised as elective (planned) caesarean sections are now categorised as emergency (unplanned) caesarean sections. For these reasons, the data is expected to show an increase in emergency (unplanned) caesareans, but this may be due to the change in coding standards rather than a true increase.

The next section provides the relevant clinical and procedure codes.

Clinical codes and definitions

Standard primiparae: a group of pregnant women/people considered to be clinically comparable and expected to require low levels of obstetric intervention. This report defines standard primiparae as pregnant women/people recorded in MAT who meet all the following criteria:

- gave birth at a maternity facility or had a home birth[3]
- are aged between 20 and 34 years (inclusive) at birth
- are pregnant with a single baby presenting in labour in cephalic position (see Tables A1 and A2)
- have no known prior pregnancy of 20 weeks and over gestation
- give birth to a live or stillborn baby at term gestation: between 37 and 41 weeks inclusive (based on gestational age recorded for the baby and exclusion criteria in Table A3)
- have no recorded obstetric complications in the present pregnancy that are indications for specific obstetric interventions (see Table A4).

Table A1: Singleton birth exclusion criteria

Clinical code	Description
O300–O309	Multiple gestation
O318	Other complications specific to multiple gestation
O325*	Maternal care for multiple gestation
O632	Delayed delivery of second or subsequent fetus in multiple delivery
O840–O849**	Multiple delivery
Z372–Z377	Outcome of delivery − twins or multiple

* Deleted in the 11th edition of ICD-10-AM.

** Introduced in the 8th edition of ICD-10-AM.

Table A2: Cephalic presentation exclusion criteria

Clinical code	Description
9047000*	Spontaneous breech delivery
9047001	Assisted breech delivery
9047002	Assisted breech delivery with forceps to after-coming head
9047003	Breech extraction
9047004	Breech extraction with forceps to after-coming head
9047005**	Spontaneous breech delivery

[3] Place of birth is designated as 'home' if there was an LMC claim for home birth supplies and no corresponding record for a birth at a maternity facility.

| O640−O649 | Labour and delivery affected by malposition and malpresentation of fetus |

* Deleted in the 11th edition of ICD-10-AM.

** Introduced in the 11th edition of ICD-10-AM.

Table A3: Duration of pregnancy (gestation exclusion criteria)

Clinical code	Description
O090−O095	Duration of pregnancy under 37 weeks
O48	Prolonged pregnancy
O601	Preterm spontaneous labour with preterm delivery

Table A4: Obstetric complications exclusion criteria

Clinical code	Description
O10*	Pre-existing hypertension in pregnancy, childbirth and the puerperium
O11−O16	Hypertension, proteinuria, pre-eclampsia, eclampsia
O240−O249	Diabetes mellitus and intermediate hyperglycaemia in pregnancy, childbirth and the puerperium
O360, O361, O363, O364, O365	Maternal care for other known or suspected fetal problems
O411, O420−O429	Infection of the amniotic sac/membranes or premature rupture of membranes
O450–O459, O460−O469, O48	Premature separation of placenta, antepartum haemorrhage, prolonged pregnancy

* Introduced in the 11th edition of ICD-10-AM.

Spontaneous vaginal birth: the birth of a baby without obstetric intervention (ie, without caesarean section, forceps or vacuum (ventouse)), identified by the presence of a spontaneous vaginal birth clinical code with no concurrent instrumental/caesarean section code (see Table A5 below). Spontaneous vaginal births may include births where labour has been induced or augmented. Pregnant women/people giving birth at home are counted as having had a spontaneous vaginal birth.

Table A5: Delivery type codes

Clinical code	Description
O80	Single spontaneous delivery
O81	Single delivery by forceps and vacuum extractor
O82	Single delivery by caesarean section
O83*	Other assisted single delivery
O840*	Multiple delivery, all spontaneous
O841*	Multiple delivery, all by forceps and vacuum extractor
O842*	Multiple delivery, all by caesarean section
O848*	Other multiple delivery
O849*	Multiple delivery, unspecified
9046700	Spontaneous vertex delivery
9046701**	Spontaneous delivery of placenta, not elsewhere classified

9047701**	Assisted vertex delivery
9046800−9046804	Forceps rotation and delivery
9046806**	Forceps delivery, unspecified
9046900	Vacuum assisted delivery
1652000−1652003	Caesarean section
1652004**	Elective caesarean section, not elsewhere classified
1652005**	Emergency caesarean section, not elsewhere classified

*   Introduced in the 8th edition of ICD-10-AM.

**   Introduced in the 11th edition of ICD-10-AM.

Instrumental vaginal birth: a vaginal birth requiring instrumental assistance with no concurrent clinical code indicating a caesarean section. Interventions include forceps and/or vacuum (ventouse) extraction (see Table A5 above). Instrumental vaginal births do not include failed attempts at forceps or vacuum extraction (see Table A6 below).

Table A6: Excluded delivery procedure codes

Clinical code	Description
9046805	Failed forceps delivery
9046901	Failed vacuum assisted delivery

Caesarean section: an operative birth through an abdominal incision. This definition includes emergency (unplanned) and elective (planned), lower segment and classical caesarean sections, and it is identified by the presence of any caesarean section clinical code (see Table A5).

Induction of labour: an intervention to stimulate the onset of labour by pharmacological or other means, identified by induction of labour clinical codes (see Table A7).

Table A7: Induction procedure codes

Clinical code	Description
9046500	Medical induction of labour, oxytocin
9046501	Medical induction of labour, prostaglandin
9046502	Other medical induction of labour
9046503	Surgical induction of labour by artificial rupture of membranes
9046504	Other surgical induction of labour
9046505	Medical and surgical induction of labour

Intact lower genital tract: identified by an absence of clinical codes indicating an episiotomy or a tear of any degree (first to fourth and including 'was unspecified' degree) (see Table A8).

Episiotomy: an incision of the perineal tissue surrounding the vagina at the time of birth to facilitate delivery, identified by the presence of an episiotomy clinical code (see Table A8). Pregnant women/people giving birth at home were counted as having had a spontaneous vaginal birth without an episiotomy.

Third- and fourth-degree tear: a third- or fourth-degree perineal laceration during birth, identified by the presence of a third- or fourth-degree tear clinical code (see Table A8) in a hospital admission within three days after birth.

Table A8: Episiotomy and/or perineal tear codes

Clinical code	Description
9047200	Episiotomy
O700	First-degree perineal laceration during delivery
O701	Second-degree perineal laceration during delivery
O702	Third-degree perineal laceration during delivery
O703	Fourth-degree perineal laceration during delivery
O709	Perineal laceration during delivery, was unspecified
9048100	Suture of first- or second-degree tear of perineum
1657300	Suture of third- or fourth-degree tear of perineum

General anaesthetic for a caesarean section birth: identified by the presence of a general anaesthetic clinical code (see Table A9 below) and a caesarean section clinical code (see Table A5 above).Table A9: General anaesthetic procedure code

Clinical code	Description
92514XX	General anaesthesia

Blood transfusion during birth admission: identified by clinical codes for selected blood transfusion procedures (see Table A10 below) in a hospital admission within three days after birth.

Table A10: Blood transfusion procedure codes

Clinical code	Description
1370601	Administration of whole blood
1370602	Administration of packed cells
1370603	Administration of platelets
9206000	Administration of autologous blood
9206200	Administration of other serum
9206300	Administration of blood expander
9206400	Administration of other blood product

Diagnosis of eclampsia at birth admission: identified by the presence of an eclampsia clinical code (see Table A11 below) during birth admission.

Table A11: Eclampsia codes

Clinical code	Description
O150	Eclampsia in pregnancy
O151	Eclampsia in labour
O152	Eclampsia in the puerperium
O159	Eclampsia, was unspecified as to time period

Diagnosis of peripartum hysterectomy: identified by the presence of an abdominal hysterectomy clinical code (see Table A12 below) in a hospital admission within six weeks after birth.

Table A12: Peripartum hysterectomy codes

Clinical code	Description
3565300	Subtotal abdominal hysterectomy
3565301	Total abdominal hysterectomy
3565304*	Total abdominal hysterectomy with removal of adnexa

*   Deleted in the 11th edition of ICD-10-AM.

Mechanical ventilation required during pregnancy or postnatal period: identified by any hospital admission during the pregnancy or postnatal period where the woman/pregnant person was in an intensive care unit and required more than 24 hours of mechanical ventilation.

First trimester registration with an LMC: applicable where date of registration with an LMC is within the first 12 completed weeks of pregnancy, based on the woman/pregnant person's estimated date of delivery reported at registration.

Preterm birth: the birth of a live-born baby between 20 weeks 0 days and 36 weeks 6 days of gestation.

Small for gestational age: applies to babies born with birthweight below the 10th percentile for their gestational age, based on smoothed centile tables for birthweight according to gestational age from the INTERGROWTH-21st project (see Table A13).

Table A13: 10th centile birthweight for male and female babies according to gestational age

Gestational age (weeks)	Male (kg)	Female (kg)
37	2.38	2.33
38	2.57	2.50
39	2.73	2.65
40	2.88	2.78
41	3.01	2.89
42	3.12	2.98

Source: Villar et al 2014.

Respiratory support during birth admission: applies to a baby requiring more than four hours of mechanical ventilation or of continuous positive airway pressure during a hospital admission within three days after birth.