

# **New Zealand Maternity Clinical Indicators: background document**

Citation: Ministry of Health. 2020. *New Zealand Maternity Clinical Indicators: background document*. Wellington: Ministry of Health.

Published in October 2020 by the Ministry of Health  
PO Box 5013, Wellington 6140, New Zealand

ISBN 978-1-99-002949-3 (online)  
HP 7480



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# Introduction

The New Zealand Maternity Clinical Indicators series provide information on maternity outcomes that relate to optimal health outcomes for women and their babies. The 'standard primipara' definition is used to identify a group of women who are considered to be low risk for obstetric complications and thus interventions, for whom rates of intervention and outcomes should be similar between maternity units and regions.

Of the 20 indicators covered in this series:

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

The New Zealand Maternity Clinical Indicators series show that reported interventions and outcomes for women and babies vary between district health boards (DHBs) and between individual secondary and tertiary facilities. These findings merit further investigation of data quality and integrity, as well as variations in local clinical practice management.

Since 2012, DHBs and maternity stakeholders have used national benchmarked data in their local maternity quality and safety programmes 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 (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 DHB region and maternity facility.

The purpose of the New Zealand Maternity Clinical Indicators is to:

- highlight areas where quality and safety could be improved nationally
- support quality improvement by helping DHBs to identify focus areas for local clinical review of maternity services
- provide a broader picture of maternity outcomes in New Zealand than from maternal and perinatal mortality data alone
- provide standardised (benchmarked) data allowing DHBs 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 women and their babies. Where possible, the New Zealand Maternity Clinical Indicators are aligned with international maternity indicators to enable international comparison.

The Ministry of Health develops and publishes the New Zealand Maternity Clinical 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 the Ministry of Health 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 the Ministry of Health could measure using the available data collections at that time.

It is an expectation of the New Zealand Maternity Standards (Ministry of Health 2011) that the New Zealand Maternity Clinical Indicators are reviewed approximately every three years.

In 2013, the National Maternity Monitoring Group reviewed the original 12 indicators and recommended changes to improve the quality, completeness and scope of the New Zealand Maternity Clinical Indicators. The original expert working group reviewed and developed these proposed changes to ensure the New Zealand Maternity Clinical Indicators retained their objectives.

The Ministry of Health 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 women 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) 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](http://www.health.govt.nz/nz-health-statistics/health-statistics-and-data-sets/report-maternity-series)

Following each review, the Ministry of Health applies the updated criteria to historic data back to 2009, to study trends. Users should use the current report and dataset.

In early 2015, the Minister of Health committed to the continuation of the Maternity Quality Initiative, under which the Ministry of Health publishes annual maternity clinical indicators.

## Overview

**Table 1: New Zealand Maternity Clinical Indicators**

Population	Indicator	Numerator	Denominator
Women registered with a lead maternity carer (LMC)	1 Registration with an LMC in the first trimester of pregnancy	Total number of women who register with an LMC in the first trimester of their pregnancy	Total number of women 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

Population	Indicator	Numerator	Denominator	
	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
Women giving birth	10	Women having a general anaesthetic for caesarean section	Total number of women having a general anaesthetic for caesarean section	Total number of women who undergo caesarean section
	11	Women requiring a blood transfusion with caesarean section	Total number of women requiring a blood transfusion with caesarean section	Total number of women who undergo caesarean section
	12	Women requiring a blood transfusion with vaginal birth	Total number of women requiring a blood transfusion with vaginal birth	Total number of women who give birth vaginally
	13	Diagnosis of eclampsia at birth admission	Total number of women diagnosed with eclampsia during birth admission	Total number of women giving birth
	14	Women having a peripartum hysterectomy	Total number of women having an abdominal hysterectomy within six weeks after birth	Total number of women giving birth
	15	Women admitted to an intensive care unit (ICU) and requiring ventilation during the pregnancy or postnatal period	Total number of women admitted to ICU and requiring over 24 hours of mechanical ventilation during admission any time during the pregnancy or postnatal period	Total number of women giving birth
	16	Maternal tobacco use during postnatal period	Total number of women identified as smokers at two weeks after birth	Total number of women 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



Population	Indicator	Numerator	Denominator
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

The Ministry of Health has produced a set of online tables to present this data and published it on its website ([www.health.govt.nz/publication/new-zealand-maternity-clinical-indicators-2018](http://www.health.govt.nz/publication/new-zealand-maternity-clinical-indicators-2018)). These tables present numbers and rates by:

- indicator, ethnic group and DHB of residence, 2009–2018
- indicator and facility of birth (primary, secondary and tertiary), 2009–2018
- gestation in weeks for indicator 18, 2009–2018.

Additionally, a web-based tool is available on the Ministry of Health's website for you to explore the numbers and rates discussed in the report. This includes numbers and rates of each indicator from 2009 to 2018 by ethnic group and DHB of residence, and by facility of birth: [minhealthnz.shinyapps.io/maternity-clinical-indicator-trends](http://minhealthnz.shinyapps.io/maternity-clinical-indicator-trends)

Maps showing rates for each indicator by DHB of residence will be available on the Health Quality & Safety Commission's Atlas of Healthcare Variation ([www.hqsc.govt.nz/atlas](http://www.hqsc.govt.nz/atlas)). The Atlas displays easy-to-use maps, graphs, tables and commentaries that highlight variations by geographic area in the provision and use of specific health services and health outcomes.

## About the data

The Ministry of Health extracts data for these indicators from pregnancies and live-born babies recorded on the National Maternity Collection (MAT) on 22 April 2020. 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 mothers have been excluded from this analysis. The Ministry of Health has made all efforts to ensure that the data presented does not include duplicate events. Women 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 this edition primarily pertains to women recorded as having given birth and babies live-born in 2018 from MAT. Data from births occurring from 2009 to 2017 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 for time-series analysis.

## Standard primiparae

A 'standard primipara' is a woman expected to have an uncomplicated pregnancy; intervention and complication rates for these women should be low and consistent across hospitals and DHBs. Comparing data about standard primiparae (rather than all women giving birth) controls for differences in case mix and increases the validity of inter-hospital comparisons of maternity care (Australian Council on Healthcare Standards 2008,).

We consider approximately 15 percent of women 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 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 (head first) and there have been no recorded obstetric complications that are indications for specific obstetric interventions.

## Data integrity

The New Zealand Maternity Clinical Indicators series is compiled from data supplied by DHBs and LMCs. District health boards and 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. The Ministry of Health 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. Contact the Ministry of Health if you have concerns regarding any of the data or analyses presented in the New Zealand Maternity Clinical Indicators.

## Interpretation notes

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

- by DHB of residence: this data provides DHBs 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 women 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 DHB level. Some rates reflect small numbers of events; 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 on preconception to three years of age* (Health Select Committee 2013) all recommend early engagement with maternity care. The National Institute for Health and Care Excellence (2008) recommends that antenatal care be started in the first trimester and, ideally, by 10 weeks' gestation.

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

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

<sup>1</sup> Women who register with a DHB 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.<sup>2</sup> Their purpose is to encourage maternity service providers to review the appropriateness of these interventions among low-risk women, with the aims of supporting normal birth, improving mothers' 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 women having a spontaneous (non-instrumental) vaginal birth in a low-risk population. 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 women 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 and the baby, some of which can be serious. Maternity service providers should use instrumental interventions judiciously (AIHW 2019).

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.

<sup>2</sup> Some indicators do not add up to 100 percent due to missing data codes for some events.

## Caesarean section (indicator 4)

The purpose of this indicator is to encourage maternity service providers to evaluate whether they performed necessary caesarean sections and to reduce the harm associated with potentially avoidable caesarean sections among low-risk women. Caesarean birth is safer now than in the past and serious complications are uncommon, particularly for healthy women, but there is still a small risk of serious morbidity and mortality for both the woman and the baby (AIHW 2019).

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

## 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, and can be the start of further medical interventions (AIHW 2013).

Maternity service providers should use this indicator to investigate their policies and practices around inducing labour in low-risk women. 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 postpartum haemorrhage.

# 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 women who give birth vaginally (WHA 2007). Reasons for perineal trauma are varied, and may reflect either maternal, neonatal or clinical management issues. Perineal damage can cause women 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 does not necessarily reflect the level of pain or long-term morbidity a woman 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 and baby appropriately before undertaking an episiotomy. Meta-analysis of randomised controlled trials confirms that judicious use of episiotomy is better practice than routine use of episiotomy (AIHW 2019). If a maternity service provider's rates of episiotomy, particularly among low-risk women, are significantly higher nationally than its peer group, it should examine these results. They should also look at other indicators that can be affected by episiotomies, such as third-degree tears, postpartum haemorrhage, infection and maternal admission to high-dependency units or intensive care units (ICUs), 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 rates are nationally significantly different from their peer group.



# Indicator 10: General anaesthetic for women 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 because it results in less maternal and neonatal morbidity (NICE 2011).

Maternity service providers perform some caesarean sections under general anaesthetic because of factors such as patient preference, as well as in some high-risk cases (such as if a woman has pre-eclampsia) when only general anaesthetic can be used. Maternity service providers are also more likely to use general anaesthetic when they do urgent caesarean sections. Factors affecting this can include the configuration and organisation of obstetric and anaesthetic services (e.g., whether a specialist anaesthetist is on site) and the level of antenatal care a woman 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 evaluate 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 women 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 (Marvides et al 2016). Major blood loss is defined as  $\geq 1000$  mls and can be subdivided into moderate (1001–2000 mls) and severe  $\geq 2000$  mls. Visually estimating blood loss is known to underestimate blood loss; blood collection drapes and the 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 when assessing the severity of PPH.

According to the Australian Council on Healthcare Standards (2008), 'postpartum haemorrhage (PPH) is a potentially life-threatening complication of birth that occurs in about 3–5% of vaginal births [and globally] remains a leading cause of maternal morbidity and mortality'.

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 for 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* (Ministry of Health 2013).

# 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 and her family and is 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 (WHO 2011). Eclampsia 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 to decrease the incidence of eclampsia.

## Peripartum hysterectomy (indicator 14)

Peripartum hysterectomy is a surgical intervention usually only performed to save a woman'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 of a pregnant or postpartum woman is a marker of severe maternal morbidity that does not distinguish by cause. It denotes 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 and her baby, resulting in reduced oxygen and nourishment available to the baby. This increases the risk of babies being born with a low birthweight and 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 women who have continued to smoke during pregnancy and following the birth as well as those who have recommenced smoking following pregnancy and birth.

Improving rates against this indicator will require maternity service providers ensuring they offer tobacco cessation support during pregnancy and into the postnatal period and that meets the needs of local populations. It also requires tobacco cessation services to work closely with LMCs and DHB 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 some 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 disease risk through to adulthood, such as 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 women 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 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 (Arcangeli et al 2012; Lawn et al 2014; Murray et al 2015).

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 women 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, developed and published these growth standards, using the same methodology as the World Health Organization childhood growth standards recommended for use in New Zealand. See [www.health.govt.nz/system/files/documents/pages/factsheet-2-growth-charts-well-child.pdf](http://www.health.govt.nz/system/files/documents/pages/factsheet-2-growth-charts-well-child.pdf).

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

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 at 40 to 42 weeks' gestation.

This indicator is intended to encourage the identification and management of poor fetal growth at term. Evidence and best practice recommends 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

A baby born at term requiring respiratory support is a marker of severe morbidity that does not distinguish by cause and denotes 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 that is 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, to help maternity service providers identify opportunities to prevent or reduce perinatal morbidity.

Data presented for this indicator may reflect variation in reporting practices. District health boards should address this locally; all DHBs should ensure the data they report to the national collections is accurate and complete.

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# Appendices

## Appendix 1: National collections

### Maternity Collection

The Ministry of Health'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 women giving birth and their babies, sourced from the National Minimum Dataset (NMDS)
- lead maternity carer (LMC) claim forms for primary maternity services provided under the Primary Maternity Services Notice 2007
- primary maternity services provided by DHBs to women who do not have a midwife LMC.

The Ministry of Health collects these sources 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](http://www.health.govt.nz/publication/national-maternity-collection-data-dictionary)

### National Minimum Dataset

The Ministry of Health's National Minimum Dataset (NMDS) stores administrative information routinely collected for all publicly funded inpatients of a New Zealand maternity facility (hospitals and birthing units). 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](http://www.health.govt.nz/publication/national-minimum-dataset-hospital-events-data-dictionary)

## Lead maternity carer claims data

The LMC claims dataset contains information on women and babies who access primary maternity services provided under Section 88 of the New Zealand Public Health and Disability Act 2000. The Ministry of Health receives information through LMC claim forms; this information includes all women registered with an LMC. This represented 93 percent of all women giving birth. Data sourced from LMC claim forms includes details on registration with an LMC, as well as other antenatal and postnatal factors (eg, parity, smoking status and breastfeeding status).

## District health board-funded primary maternity services data

This data set contains information (similar to LMC claims data) on women who access DHB primary maternity services, including DHB caseload midwives, DHB primary midwifery teams and shared care arrangements.

The extent of primary maternity services DHBs are providing varies significantly by DHB, ranging from DHBs that do not currently provide any primary maternity services, to DHBs that provide primary maternity services to at least one-quarter of their women giving birth. Not all DHBs 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 women 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 claim forms, with additional data from some DHB primary maternity services. This data is therefore only available for women registered with an LMC or with a DHB primary maternity service (96 percent of women giving birth in 2018).

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 women 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. 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. The next section provides the relevant clinical and procedure codes.

## Clinical codes and definitions

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

- gave birth at a maternity facility or had a home birth<sup>3</sup>
- 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).

<sup>3</sup> 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.

**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 twin, triplet, etc
O840–O849*	Multiple delivery
Z372–Z377	Outcome of delivery – twins or multiple

\* 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
O640–O649	Labour and delivery affected by malposition and malpresentation of fetus

**Table A3: Duration of pregnancy (gestation exclusion criteria)**

Clinical code	Description
O090–O095	Duration of pregnancy under 37 weeks
O48	Prolonged pregnancy
O601	Preterm labour and delivery

**Table A4: Obstetric complications exclusion criteria**

Clinical code	Description
O10–O16	Hypertension, proteinuria, pre-eclampsia, eclampsia
O240–O249	Diabetes mellitus in pregnancy
O360, O361, O363, O364, O365	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



**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). Spontaneous vaginal births may include births where labour has been induced or augmented. Women 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
9046800–9046804	Forceps delivery
9046900	Vacuum extraction with delivery
1652000–1652003	Caesarean section

\* Introduced in the 8th 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). Instrumental vaginal births do not include failed attempts at forceps or vacuum extraction (see Table A6).

**Table A6: Excluded delivery procedure codes**

Clinical code	Description
9046805	Failed forceps
9046901	Failed vacuum extraction

**Caesarean section:** an operative birth through an abdominal incision. This definition includes emergency and elective, 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). Women 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) and a caesarean section clinical code (see Table A5).

**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) 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) 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) 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

**Mechanical ventilation required during pregnancy or postnatal period:** identified by any hospital admission during the pregnancy or postnatal period where the woman 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’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.

## Other technical notes

**Facility graphs:** facility graphs present maternity events occurring in primary, secondary and tertiary maternity facilities (hospitals), while DHB graphs present maternity events by DHB of residence and include births at all maternity facilities (including primary facilities). The aim of this is to enable the comparison of births for which clinicians have access to similar clinical facilities and interventions. Take care when making comparisons, because many primary units deal with only a small number of maternity events, meaning that in many cases differences between rates will not be statistically significant.

**Presentation of confidence intervals:** the error bars on the charts in this document represent 95 percent confidence intervals for the sample proportion, which have been calculated using the Wilson score (see Newcombe 1998).

**Southern DHB data:** in May 2010, Otago and Southland DHBs were merged into a single entity, Southern DHB, which began reporting to the Ministry of Health National Collections in 2011. This series presents all relevant data under ‘Southern DHB’.

**Christchurch and Christchurch Women’s data:** from 1 July 2009 maternity events that had previously been reported as occurring in Christchurch Women’s Hospital were reported as occurring in Christchurch Hospital. This change represents a change in the way the data is

reported, rather than a change in patient care. For the purposes of this report, Christchurch Women's Hospital and Christchurch Hospital events have been summed and reported as 'Christchurch'.