

New Zealand Maternity Clinical Indicators 2016

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MANATŪ HAUORA



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Executive summary

The New Zealand Maternity Clinical Indicators provide information on a series of maternity outcomes which relate to optimal health outcomes for mothers and their babies. For this report, as with previous reports in this series, the 'standard primipara' definition is used to identify a group of women who are considered to be 'low risk', for whom rates of intervention and outcomes should be similar between units and regions. Of the 20 indicators covered in this report:

- 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
- four apply to all babies born in New Zealand.

This is the eighth report in the New Zealand Maternity Clinical Indicators series. It presents data on women giving birth, and babies born in the 2016 calendar year.

From 2009 to 2016, there was:

- an increase in the proportion of women who registered with an LMC in the first trimester of pregnancy, but variation between regions persists
- a decrease in the proportion of standard primiparae who had a spontaneous vaginal birth, and continued variation between regions
- an increase in the proportion of standard primiparae who had an instrumental birth or a caesarean section
- an increase in the proportion of standard primiparae who had an induction of labour
- a decrease in the proportion of standard primiparae who had an intact perineum and an increase in the proportion who had an episiotomy and/or a third- or fourth-degree tear, and continued variation between regions
- a decrease in the proportion of women who required a blood transfusion with a caesarean section, and an increase for women who required a blood transfusion with a vaginal birth
- a decrease in the proportion of women who smoked during the postnatal period
- a decrease in the proportion of term (37–42 weeks' gestation) babies who were born small
- a decrease in the proportion of small babies at term (37–42 weeks' gestation) who were born at 40–42 weeks' gestation
- an increase in the proportion of babies born at term who required respiratory support.

As the seven previous reports demonstrated, 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 warranting further investigation at a local level. Using the data in this report, DHBs and local maternity stakeholders can expand the scope of their investigations and view trends over an eight-year period.

Introduction

What is a clinical indicator?

A clinical indicator is a measure of 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 (WHA 2007). 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 key 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 at a national level
- 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 that obtainable 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 mothers 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.

It is an expectation of the New Zealand Maternity Standards that the New Zealand Maternity Clinical Indicators are reviewed approximately every three years. In the major review undertaken in 2016, the Expert Working Group recommended deletion of 'BMI over 35' (formerly Indicator 17) because it does not meet the description of a clinical indicator. 'BMI over 35' is a demographic descriptor, and is currently presented in the Report on Maternity series.

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 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 a set of 12 maternity clinical indicators that the Ministry of Health could measure using the available data collections at that time.

Since then, data collections and data quality have improved. In 2013, the National Maternity Monitoring Group reviewed the original indicator set and recommended a range of changes to improve the quality, completeness and scope of the Maternity Clinical Indicators. The original expert working group further reviewed and developed these proposed changes to ensure the 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*
- 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*.

This report, *New Zealand Maternity Clinical Indicators 2016*, presents data on 20 of the 21 indicators included in the 2013–2015 reports. The report covers births in the 2016 calendar year.

In early 2015, the Minister of Health committed to the continuation of the Maternity Quality Initiative, under which the Ministry of Health has committed to continued annual publication of clinical indicators. The next review of the New Zealand Maternity Clinical Indicators will occur prior to the development of the report on 2017 data.

Overview

This report presents the fourth year of reporting on the revised indicators, and the eighth edition in the *New Zealand Maternity Clinical Indicators* series (see Table 1 for a list of indicators presented in this publication). The 20 indicators presented in this report are the same 20 of the 21 as those presented in the 2013–2015 reports, with no changes to criteria and methods. The Ministry of Health developed the indicators in partnership with the New Zealand Maternity Clinical Indicators Expert Working Group.

Table 1: New Zealand Maternity Clinical Indicators

Population	Indicator	Numerator	Denominator
Women registered with an 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

Population	Indicator	Numerator	Denominator	
	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 1st- to 4th-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 3rd- or 4th-degree perineal tear	Total number of standard primiparae undergoing episiotomy and no 3rd- or 4th-degree perineal tear with vaginal birth	Total number of standard primiparae who give birth vaginally
	8	Standard primiparae sustaining a 3rd- or 4th-degree perineal tear and no episiotomy	Total number of standard primiparae sustaining a 3rd- or 4th-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 3rd- or 4th-degree perineal tear	Total number of standard primiparae undergoing episiotomy and sustaining a 3rd- or 4th-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 6 weeks after birth	Total number of women giving birth
Women giving birth	15	Women admitted to Intensive Care Unit 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 2 weeks after birth	Total number of women with smoking status at 2 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

Population	Indicator	Numerator	Denominator
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

The Ministry of Health has produced a set of online tables to accompany this report and published it on its website (www.health.govt.nz/publication/new-zealand-maternity-clinical-indicators-2016). These tables present numbers and rates by:

- indicator, ethnic group and DHB of residence, 2009–2016
- indicator and facility of birth (primary, secondary and tertiary), 2009–2016
- gestation in weeks for indicator 18, 2009–2016.

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). 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

We extracted data for these indicators from all pregnancies and live-born babies recorded on the National Maternity Collection (MAT) on 12 September 2017. We extracted additional hospital event data for each pregnancy and live-born baby recorded on MAT from the National Minimum Dataset.

We have excluded records of babies born at a gestational age of less than 20 weeks and the corresponding records for their mothers from this analysis. We have made all efforts to ensure that the data presented does not include duplicate events. We have counted women giving birth at home as having a spontaneous vaginal birth without an episiotomy.

We identified standard primiparae 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 report primarily pertains to women recorded as having given birth and babies live-born in 2016 from MAT. We have reextracted data from births occurring from 2009 to 2016 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.

Data integrity

We have compiled this report 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. We have applied data quality management at several points in the collection, extraction and reporting of the data presented here. However, errors can occur. Contact the Ministry of Health if you have concerns regarding any of the data or analyses presented here.

Interpretation notes

We present data in this report in two ways:

- by DHB of residence: we intend this data to provide DHBs with information relevant to their usually resident population
- by place of birth: we intend this data to allow monitoring of trends over time at the facility level. We present data for births in secondary and tertiary facilities graphically in the body of this document, and data for births in primary and private facilities and home births in the accompanying online tables.

Numbers and rates

We present rates as raw percentages. We have not standardised rates by age or ethnicity; we have chosen denominators 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 the DHB level. Some rates reflect small numbers of events; treat them with caution.

Figures

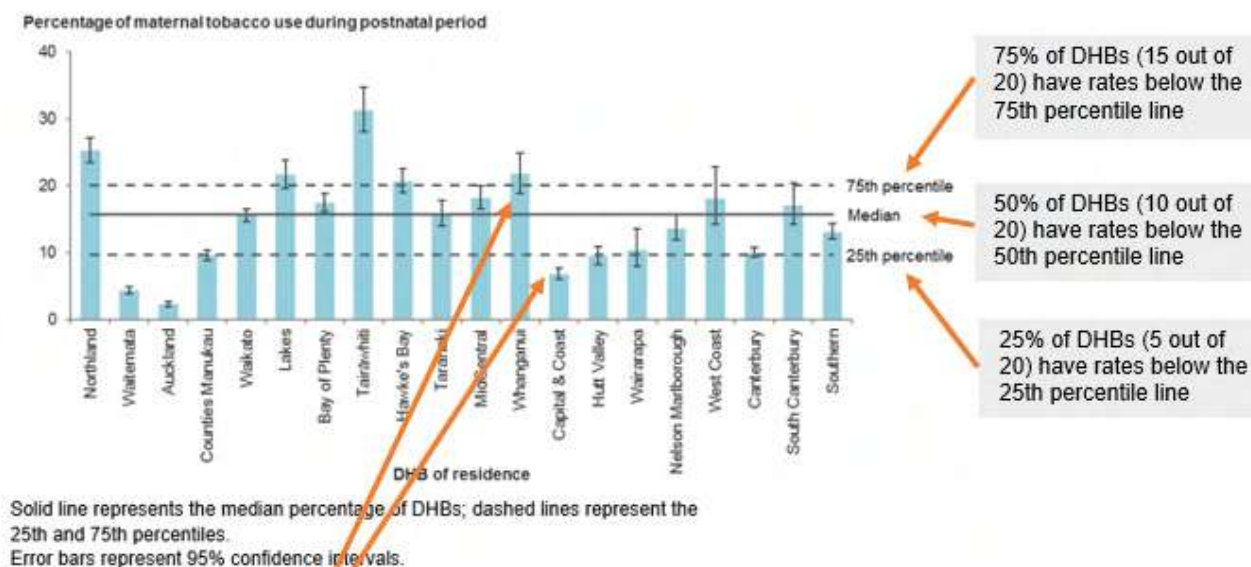
We have presented graphs showing rates by DHB of residence and secondary/tertiary facility of birth for each indicator, except indicators 13–15 due to very small numbers. We have displayed the median, as well as the 25th and 75th percentiles, on the graphs to help compare rates between DHBs and facilities. The following diagram explains some components of the graphs presented in this report.

Graph below shows the range of values described in the notes. In this example, the lowest rate was for Auckland DHB at 2.2% and the highest was for Tairāwhiti DHB at 31.3%

Notes on 2016 data

Rates of maternal tobacco use in the postnatal period (measured at two weeks after birth) varied between DHBs and between secondary and tertiary facility of birth; DHB rates ranged from 2.2% to 31.3%, and facility rates ranged from 1.6% to 32.8%.

Figure 1: Percentage of women identified as smokers during postnatal period (2 weeks after birth), by DHB of residence, 2016



95% confidence intervals (error bars) are provided to assist you when comparing between DHBs or facilities. If the confidence intervals do not overlap, it is reasonable to assume that the difference is not due to chance. For example, it is reasonable to assume that the rate for Whanganui DHB is significantly higher than the rate for Capital & Coast DHB.

Notes on national data

This section highlights how clinical indicator rates at a national level have changed from 2009 to 2016. See Table 2 for a summary of results, and Figure 2 for a graph showing rates for each indicator from 2009 to 2016. This figure is also available by DHB and by secondary or tertiary facility in the accompanying online tables. We present the following analysis by the population considered.

Standard primiparae

A 'standard primipara' is a woman expected to have an uncomplicated pregnancy; intervention and complication rates for such 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 (adapted from Australian Council on Healthcare Standards 2008, p 29).

For the purposes of this publication, we consider approximately 15% of women giving birth in New Zealand to be standard primiparae. These women are a sub-set 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)¹ at term (37–41 weeks' gestation) where the outcome of the birth is a singleton baby, the presentation is cephalic and there have been no recorded obstetric complications that are indications for specific obstetric interventions.

Standard primiparae as a proportion of women giving birth varied across DHBs in 2016, ranging from 12.6% (each for Northland and Tairāwhiti DHBs) to 16.8% (Auckland DHB). The highest proportion (26.9%) of standard primiparous women were aged between 20 and 24 years old. A higher proportion of standard primiparous women identified as Asian (22.1% for Indian and 21.7% for other Asian); 12.2% identified as Pasifika and 10.9% as Māori. About 12.8% of women giving birth at home were standard primiparae, while 15.4% of women who gave birth at a maternity facility were standard primiparae (Figure 1).

There has been some small change in two indicators since 2015: a decrease in instrumental vaginal deliveries among standard primiparae and a decrease in blood transfusion with vaginal births.

From 2009 to 2016, there was a statistically significant increase in the proportion of standard primiparae who had:

- an instrumental vaginal birth (indicator 3)
- a caesarean section (indicator 4)
- an induction of labour (indicator 5)
- an episiotomy without third- or fourth-degree perineal tear (indicator 7)
- a third- or fourth-degree tear and no episiotomy (indicator 8)

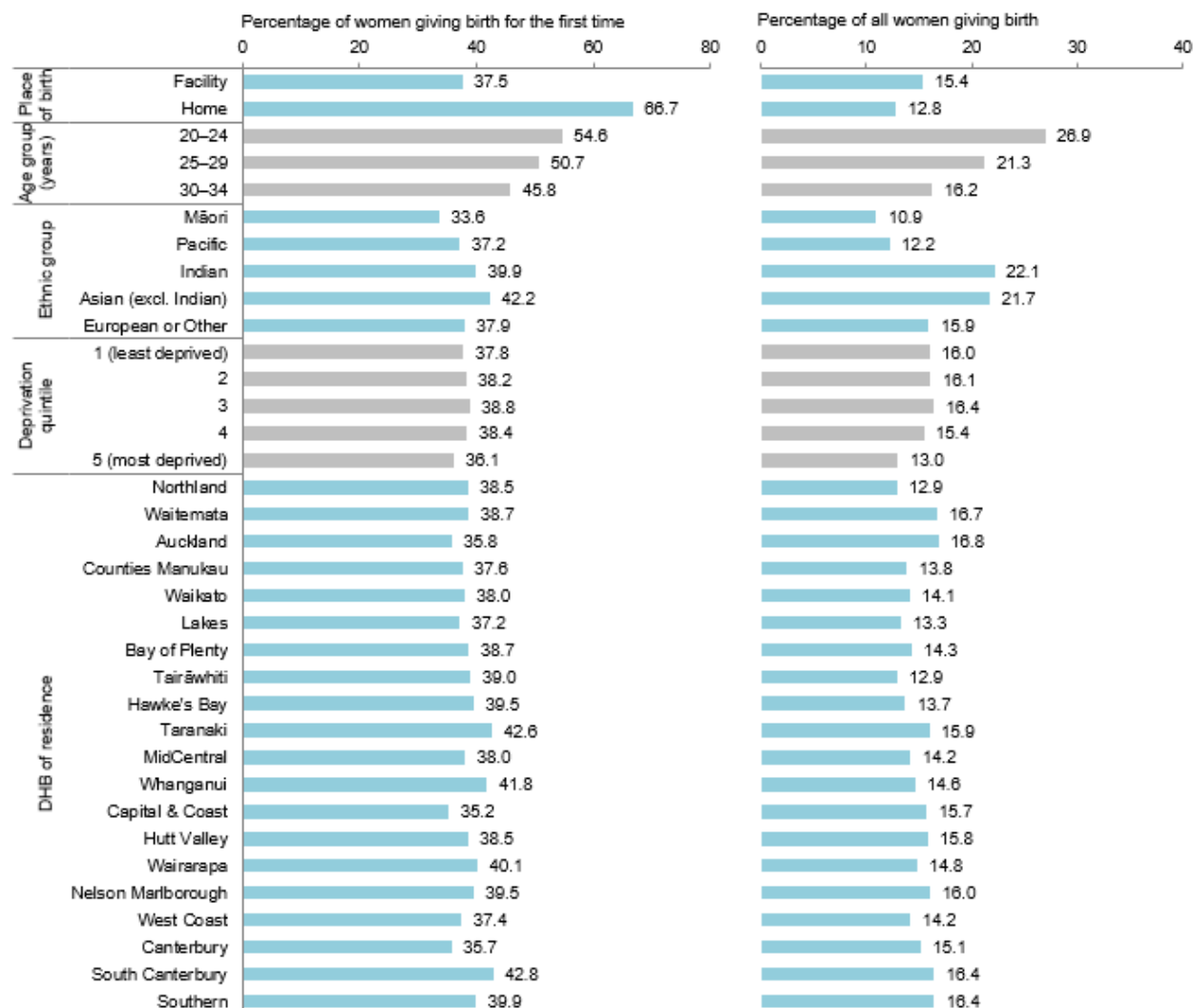
¹ The proportion of women giving birth for the first time (parity = 0) is approximately 40% (ranging from 33% to 47% by DHB of residence). This proportion is lower among women giving birth at home, as 19% of women giving birth at home were having their first baby (ranging from 12% to 27% of home births by DHB of residence).

- an episiotomy and a third- or fourth-degree tear (indicator 9).

Conversely, there was a significant decrease in the proportion of standard primipare who had:

- a spontaneous vaginal birth (indicator 2)
- an intact lower genital tract (indicator 6).

Figure 1: Number of standard primiparae as a proportion of women giving birth for the first time and of all women giving birth in 2016, by place of birth, age group, ethnic group, deprivation quintile and DHB of residence



Note: The number by each bar is the proportion of women who were standard primiparae.

Deprivation quintiles are based on the characteristics of the neighbourhood in which a person resides. They range from 1 (least deprived) to 5 (most deprived).

Approximately equal numbers of the total New Zealand population resides in areas associated with each of the five deprivation quintiles

Women registered with an LMC

The vast majority of women giving birth in New Zealand first register with an LMC for their primary maternity care. This increased from 82% of women giving birth in 2009 to 92% of women giving birth in 2016.

Women are also registering earlier with an LMC; there was a statistically significant increase in women registering within the first trimester of pregnancy (<13 weeks) from 2009 to 2016.

All women giving birth

Among all women giving birth in 2016, there was a statistically significant increase from 2009 to 2016 in the proportion of women requiring a blood transfusion with a vaginal birth (indicator 12).

In contrast, there was a significant decrease from 2009 to 2016 in the proportion of women:

- requiring a blood transfusion with a caesarean section (indicator 11)
- who smoked during the postnatal period (indicator 16).

Babies

From 2009 to 2016, there was a significant decrease in the proportion of:

- term (37–42 weeks' gestation) babies who were born small
- small babies at term (37–42 weeks' gestation) who were born at 40–42 weeks' gestation.

The proportion of term babies requiring respiratory support increased significantly from 2009 to 2016.

International comparisons

International comparisons are often problematic, due to differing methodology, definitions and availability of national data. When compared to Australia, New Zealand appears to have markedly lower rates of obstetric intervention, including among women at low risk of complications, although definitions of low risk differ between the two countries. Rates for other indicators among the total birthing population, including rates of general anaesthetic for caesarean section (indicator 10) and maternal tobacco use (indicator 16), appear similar to their Australian equivalents.

Table 2: New Zealand Maternity Clinical Indicator national rates by year, 2009–2016

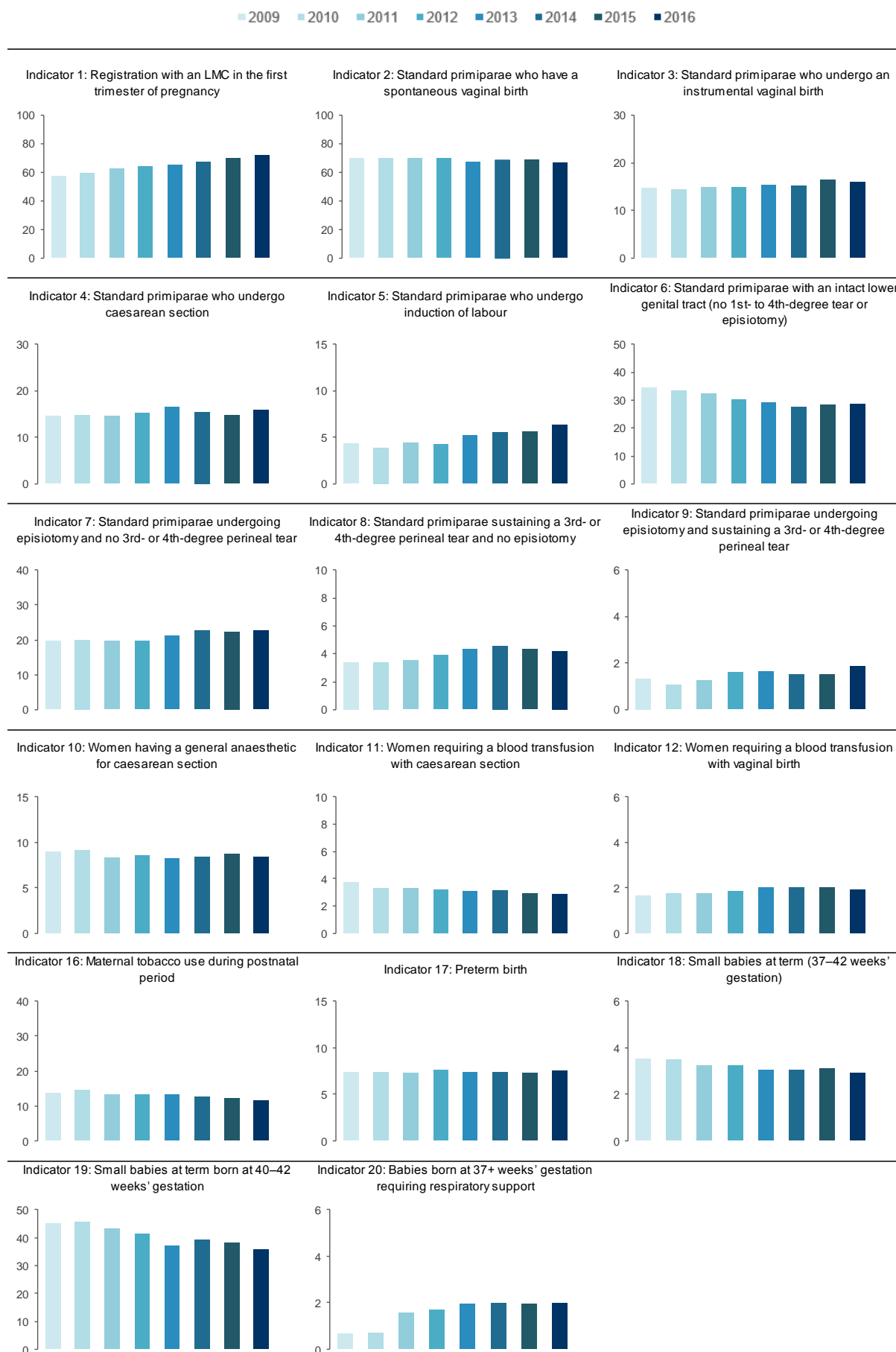
Indicator	2009	2010	2011	2012	2013	2014	2015	2016	From 2009 to 2016 (p-value) ¹
Women registered with an LMC									
1 Registration with an LMC in the first trimester of pregnancy (%)	57.6	59.8	62.8	64.0	65.4	67.8	70.0	71.9	↑ (<0.001)
Standard primiparae									
2 Standard primiparae who have a spontaneous vaginal birth (%)	69.7	70.0	70.0	69.8	67.6	68.9	68.7	67.0	↓ (<0.001)
3 Standard primiparae who undergo an instrumental vaginal birth (%)	14.7	14.5	14.9	14.9	15.3	15.2	16.3	15.9	↑ (<0.001)
4 Standard primiparae who undergo caesarean section (%)	14.6	14.7	14.5	15.1	16.5	15.5	14.9	15.9	↑ (0.002)
5 Standard primiparae who undergo induction of labour (%)	4.4	3.8	4.4	4.2	5.2	5.6	5.7	6.3	↑ (<0.001)
6 Standard primiparae with an intact lower genital tract (no 1st- to 4th-degree tear or episiotomy) (%)	34.7	33.4	32.2	30.3	28.9	27.6	28.3	28.6	↓ (<0.001)

Indicator	2009	2010	2011	2012	2013	2014	2015	2016	From 2009 to 2016 (p-value) ¹
7 Standard primiparae undergoing episiotomy and no 3rd- or 4th-degree perineal tear (%)	19.6	19.9	19.8	19.7	21.0	22.8	22.2	22.7	↑ (<0.001)
8 Standard primiparae sustaining a 3rd- or 4th-degree perineal tear and no episiotomy (%)	3.4	3.4	3.5	3.9	4.3	4.5	4.4	4.2	↑ (<0.001)
9 Standard primiparae undergoing episiotomy and sustaining a 3rd- or 4th-degree perineal tear (%)	1.3	1.1	1.2	1.6	1.6	1.5	1.5	1.8	↑ (<0.001)
Women giving birth									
10 Women having a general anaesthetic for caesarean section (%)	9.0	9.1	8.4	8.6	8.3	8.4	8.8	8.5	– (0.064)
11 Women requiring a blood transfusion with caesarean section (%)	3.8	3.3	3.3	3.2	3.1	3.2	2.9	2.9	↓ (<0.001)
12 Women requiring a blood transfusion with vaginal birth (%)	1.7	1.8	1.8	1.9	2.0	2.1	2.0	1.9	↑ (<0.001)
13 Women with eclampsia at birth admission (numerator) ²	27	22	17	12	17	18	26	29	N/A
14 Women having a peripartum hysterectomy (numerator) ²	51	29	39	49	21	37	30	25	N/A
15 Women admitted to ICU and requiring ventilation during the pregnancy or postnatal period (numerator) ²	19	18	21	12	17	13	16	9	N/A
16 Maternal tobacco use during postnatal period (%)	13.6	14.3	13.4	13.3	13.2	12.8	12.0	11.7	↓ (<0.001)
Babies									
17 Preterm birth (%)	7.4	7.4	7.3	7.6	7.4	7.4	7.3	7.5	– (0.689)
18 Small babies at term (37–42 weeks' gestation) (%)	3.5	3.5	3.2	3.2	3.0	3.0	3.1	2.9	↓ (<0.001)
19 Small babies at term born at 40–42 weeks' gestation (%)	45.3	45.5	43.3	41.4	36.9	39.3	38.4	35.8	↓ (<0.001)
20 Babies born at 37+ weeks' gestation requiring respiratory support	0.7	0.7	1.6	1.7	1.9	2.0	1.9	2.0	↑ (<0.001)

1 Shows whether there was a statistically significant increase (↑), or decrease (↓), or no statistically significant change (–) in rates from 2009 to 2016. Statistical significance was derived using a chi-squared test for trend in proportions, at a 95% significance level for all indicators, except indicators 13–15 due to small numbers.

2 Rates are not presented due to small numbers for these indicators. The numbers presented are the numerator values each year for the indicator.

Figure 2: New Zealand Maternity Clinical Indicator rates by year, 2009–2016



Note: Indicators 13–15 (showing severe maternal morbidity) are not presented as graphs due to very small numbers (see Table 2).

Indicator 1: Registration with an LMC

Rationale and purpose

The Perinatal and Maternal Mortality Review Committee (2012), the National Maternity Monitoring Group (2013) and the Health Select Committee Inquiry into improving child health outcomes and preventing child abuse with a focus on preconception to three years of age (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 recommended in their 2013 annual report that DHBs develop new ways to improve access to LMC services in the first trimester, and profiled a range of activities under way in DHBs.

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.² This indicator supports national and local monitoring of the effectiveness of activities to improve timely registration with an LMC.

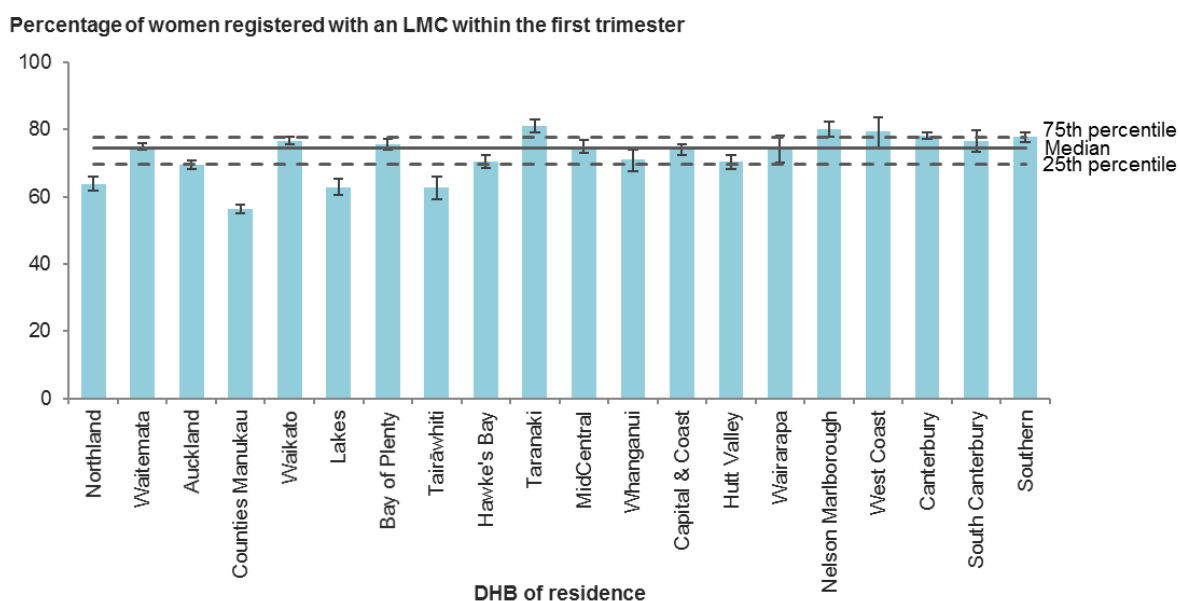
Notes on 2016 data

Rates of registration with an LMC in the first trimester varied between DHBs and between secondary and tertiary facility of birth; rates by DHB of residence ranged from 56.4% to 81.2%, and rates by facility of birth ranged from 49.8% to 83.6%. Initiatives in this area, such as the Counties Manukau DHB video for Pacific women, are expected to increase the rate of women engaging with an LMC in the first trimester of their pregnancy.

² Women who register with a DHB primary maternity service are not counted in this indicator.

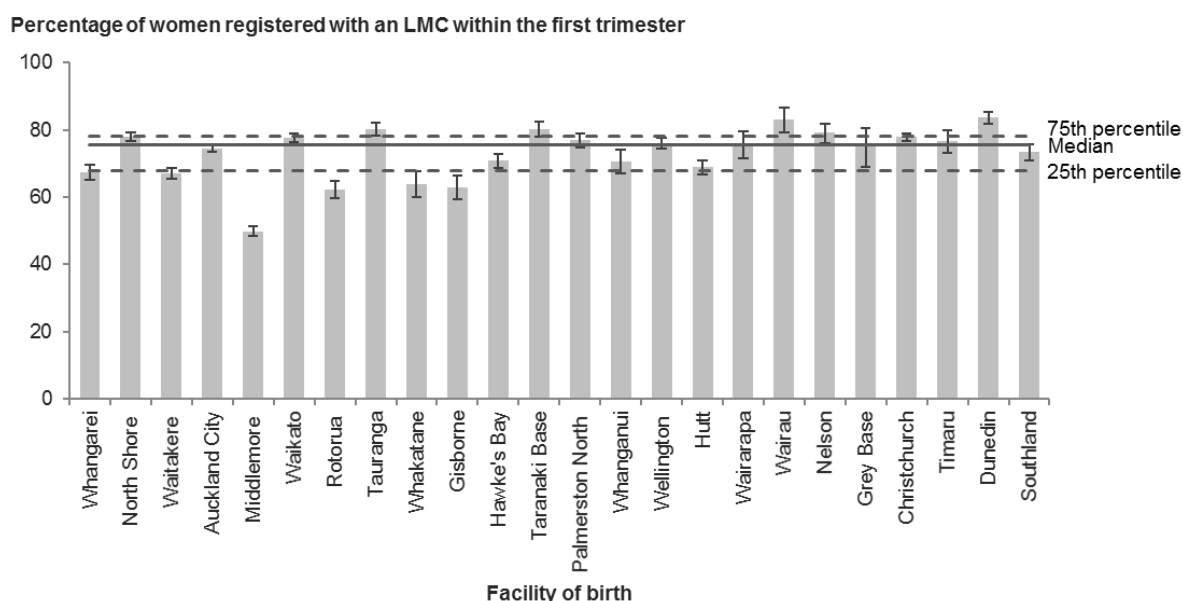
Indicator 1: Registration with an LMC in the first trimester of pregnancy, 2016

Figure 3: Percentage of women who register with an LMC in the first trimester of their pregnancy among all registered women giving birth, by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Figure 4: Percentage of women who register with an LMC in the first trimester of their pregnancy among all registered women giving birth, by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary or tertiary facilities; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Table 3: Number and percentage of women who register with an LMC in the first trimester of their pregnancy among all registered women, by DHB of residence, 2016

DHB of residence	Registered within the first trimester of pregnancy	All registered women	Rate (%)
Northland	1,350	2,112	63.9
Waitemata	5,661	7,557	74.9
Auckland	3,221	4,629	69.6
Counties Manukau	3,675	6,518	56.4
Waikato	3,998	5,212	76.7
Lakes	959	1,525	62.9
Bay of Plenty	2,170	2,870	75.6
Tairāwhiti	485	772	62.8
Hawke's Bay	1,356	1,921	70.6
Taranaki	1,157	1,425	81.2
MidCentral	1,498	1,994	75.1
Whanganui	535	753	71.0
Capital & Coast	2,433	3,286	74.0
Hutt Valley	1,314	1,865	70.5
Wairarapa	340	457	74.4
Nelson Marlborough	1,084	1,352	80.2
West Coast	251	316	79.4
Canterbury	4,906	6,280	78.1
South Canterbury	496	647	76.7
Southern	2,574	3,306	77.9
Unknown	177	310	-
New Zealand	39,640	55,107	71.9

Table 4: Number and percentage of women who register with an LMC in the first trimester of their pregnancy among all registered women, by facility of birth, 2016

Place of birth	Registered within the first trimester of pregnancy	All registered women	Rate (%)
Whangarei	1,007	1,494	67.4
North Shore	2,998	3,843	78.0
Waitakere	1,864	2,778	67.1
Auckland City	4,265	5,726	74.5
Middlemore	2,333	4,684	49.8
Waikato	2,630	3,387	77.6
Rotorua	805	1,292	62.3
Tauranga	1,407	1,752	80.3
Whakatane	376	588	63.9
Gisborne	436	693	62.9
Hawke's Bay	1,288	1,818	70.8
Taranaki Base	1,007	1,255	80.2
Palmerston North	1,328	1,726	76.9
Whanganui	462	654	70.6
Wellington	2,311	3,038	76.1
Hutt	1,227	1,780	68.9
Wairarapa	310	409	75.8
Wairau	337	405	83.2
Nelson	629	795	79.1
Grey Base	163	217	75.1
Christchurch	4,016	5,153	77.9
Timaru	458	597	76.7
Dunedin	1,372	1,641	83.6
Southland	887	1,209	73.4
All secondary and tertiary facilities	33,916	46,934	72.3
All primary facilities	3,869	5,513	70.2
All home births	1,514	2,040	74.2
New Zealand¹	39,640	55,107	71.9

1 Includes women where birth location was unspecified.

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.³ 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 maternal 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, and may wish to consider further local measures that exclude other birth interventions.

Instrumental vaginal birth (indicator 3)

This indicator measures the use of instrumental interventions, that is, vacuum (ventouse) and forceps. The use of instruments is associated with both short-term and long-term complications for the mother and the baby, some of which can be serious. Maternity service providers should use instrumental interventions judiciously (AIHW 2013). If a maternity service provider's rates of intervention are significantly higher than its peer group at a national level, 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 caesarean sections on the right women at the right place and at the right time, 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 a small risk of serious morbidity and mortality for both the mother and the baby remains, and a primary caesarean section can complicate a subsequent pregnancy (AIHW 2013). If a provider's caesarean section rates are significantly different from their peer group at a national level, it should examine its use of caesarean sections among low-risk women.

³ Some indicators do not sum to 100% due to missing data codes for some events.

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 a cascade of further medical interventions (AIHW 2013). Maternity service providers should use this indicator in further investigation of their policies and practices with respect to inducing labour in low-risk women. If a provider's rates of induction of labour are significantly higher than its peer group at a national level, it should review the appropriateness of inductions in this group as well as examine the results of other indicators that can be affected by induction, such as caesarean section and postpartum haemorrhage.

Notes on 2016 data

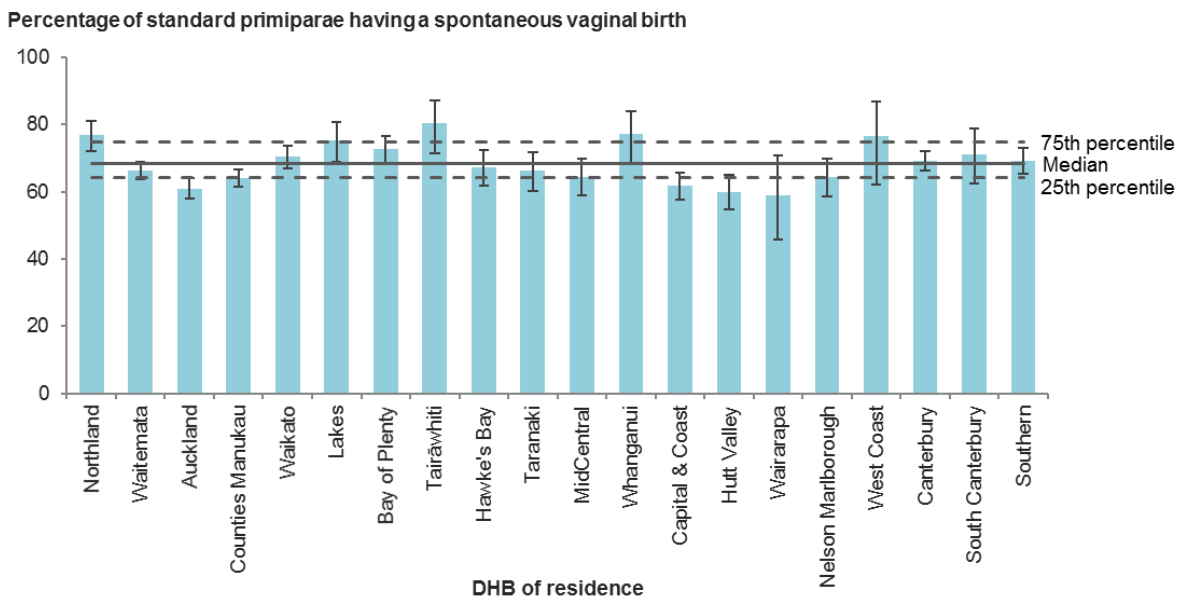
Rates of spontaneous vaginal birth among standard primiparae varied notably between DHBs and between secondary and tertiary facilities in 2016; DHB rates ranged from 58.9% to 80.4% and facility rates ranged from 50.9% to 78.8%. This variation merits further urgent investigation, as it represents significant variation in clinical practice among a clinically comparable cohort.

Rates of instrumental vaginal birth ranged from 6.7% to 30.2% between facilities. Caesarean section rates also varied by facility, from 8.2% to 23.3%, and by DHB, from 10.9% to 22.8%. These variations indicate an urgent need for the relevant DHBs to identify the standard primiparae who had inductions of labour or operative births and undertake multidisciplinary audit to determine whether the interventions were evidence based. District health boards not already reviewing caesarean sections among low-risk women should do so.

Standard primiparae are unlikely to have indications for induction of labour, so rates of induction for this group should be low. District health boards and facilities with rates significantly above the national median should investigate reasons for high induction rates.

Indicator 2: Spontaneous vaginal birth among standard primiparae, 2016

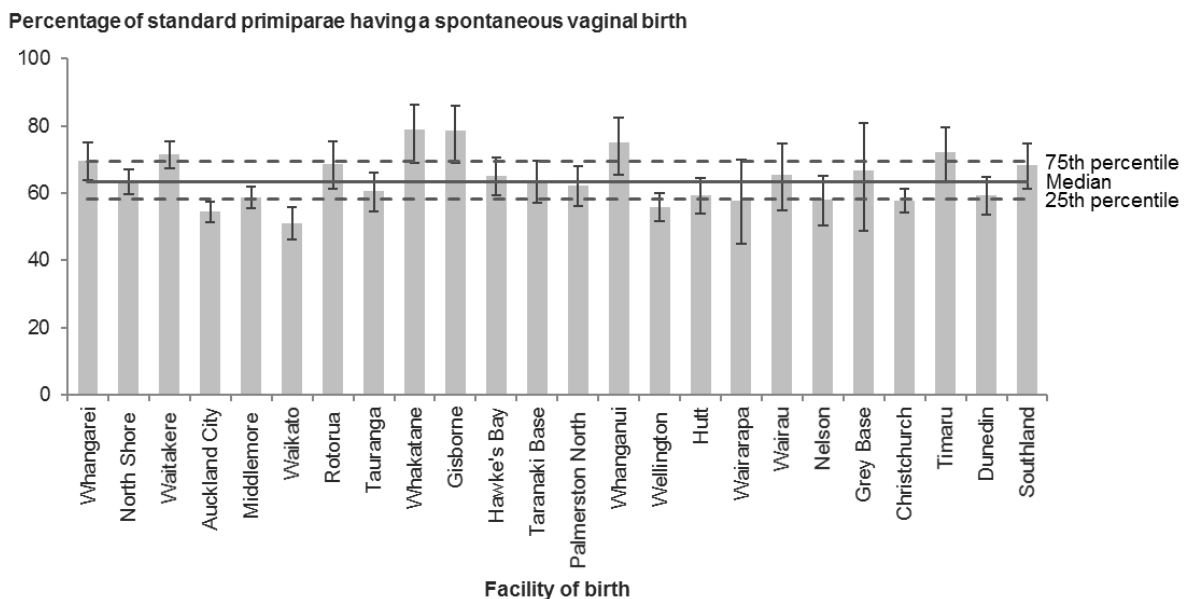
Figure 5: Percentage of spontaneous vaginal births among standard primiparae, by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles.

Error bars represent 95% confidence intervals.

Figure 6: Percentage of spontaneous vaginal births among standard primiparae, by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles.

Error bars represent 95% confidence intervals.

Table 5: Number and percentage of spontaneous vaginal births among standard primiparae, by DHB of residence, 2016

DHB of residence	Spontaneous vaginal births	Standard primiparae	Rate (%)
Northland	260	338	76.9
Waitemata	857	1,290	66.4
Auckland	575	942	61.0
Counties Manukau	806	1,257	64.1
Waikato	530	752	70.5
Lakes	153	203	75.4
Bay of Plenty	333	458	72.7
Tairāwhiti	78	97	80.4
Hawke's Bay	201	298	67.4
Taranaki	163	246	66.3
MidCentral	184	285	64.6
Whanganui	88	114	77.2
Capital & Coast	358	579	61.8
Hutt Valley	208	347	59.9
Wairarapa	33	56	58.9
Nelson Marlborough	177	275	64.4
West Coast	33	43	76.7
Canterbury	686	991	69.2
South Canterbury	82	115	71.3
Southern	396	571	69.4
Unknown	30	37	-
New Zealand	6,231	9,294	67.0

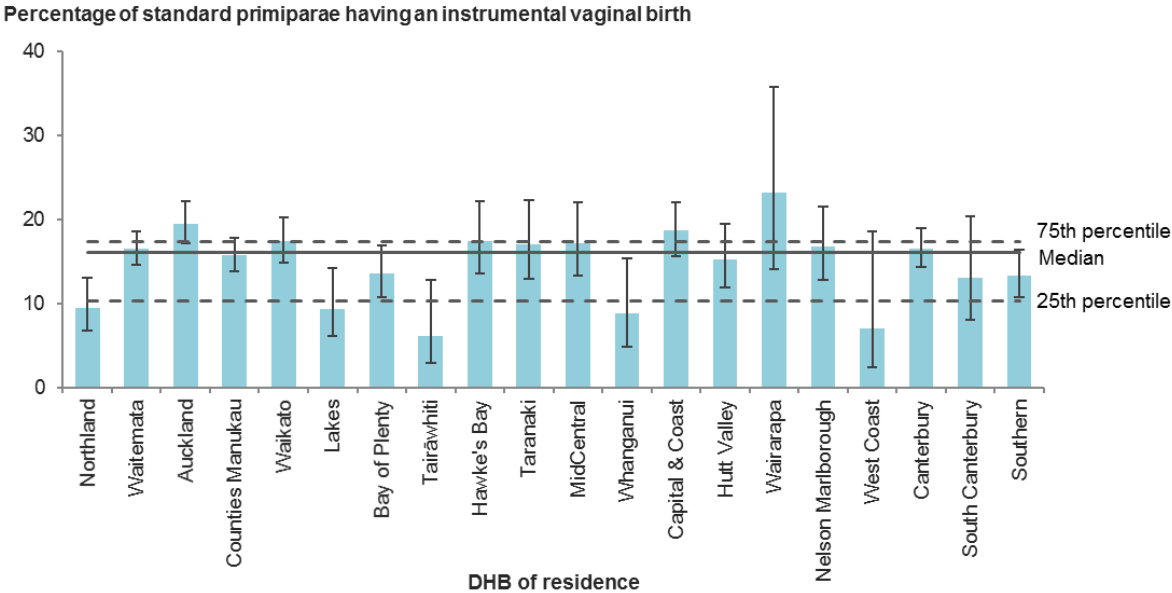
Table 6: Number and percentage of spontaneous vaginal births among standard primiparae, by place of birth, 2016

Place of birth	Spontaneous vaginal births	Standard primiparae	Rate (%)
Whangarei	175	251	69.7
North Shore	422	665	63.5
Waitakere	355	496	71.6
Auckland City	589	1,082	54.4
Middlemore	538	915	58.8
Waikato	216	424	50.9
Rotorua	114	166	68.7
Tauranga	166	274	60.6
Whakatane	67	85	78.8
Gisborne	70	89	78.7
Hawke's Bay	179	275	65.1
Taranaki Base	145	228	63.6
Palmerston North	163	262	62.2
Whanganui	72	96	75.0
Wellington	295	529	55.8
Hutt	192	324	59.3
Wairarapa	33	57	57.9
Wairau	55	84	65.5
Nelson	95	164	57.9
Grey Base	20	30	66.7
Christchurch	420	726	57.9
Timaru	80	111	72.1
Dunedin	170	287	59.2
Southland	125	183	68.3
All secondary and tertiary facilities	4,756	7,803	61.0
All primary facilities	1,187	1,203	98.7
All home births	288	288	100.0
New Zealand¹	6,231	9,294	67.0

1 Includes women where birth location was unspecified.

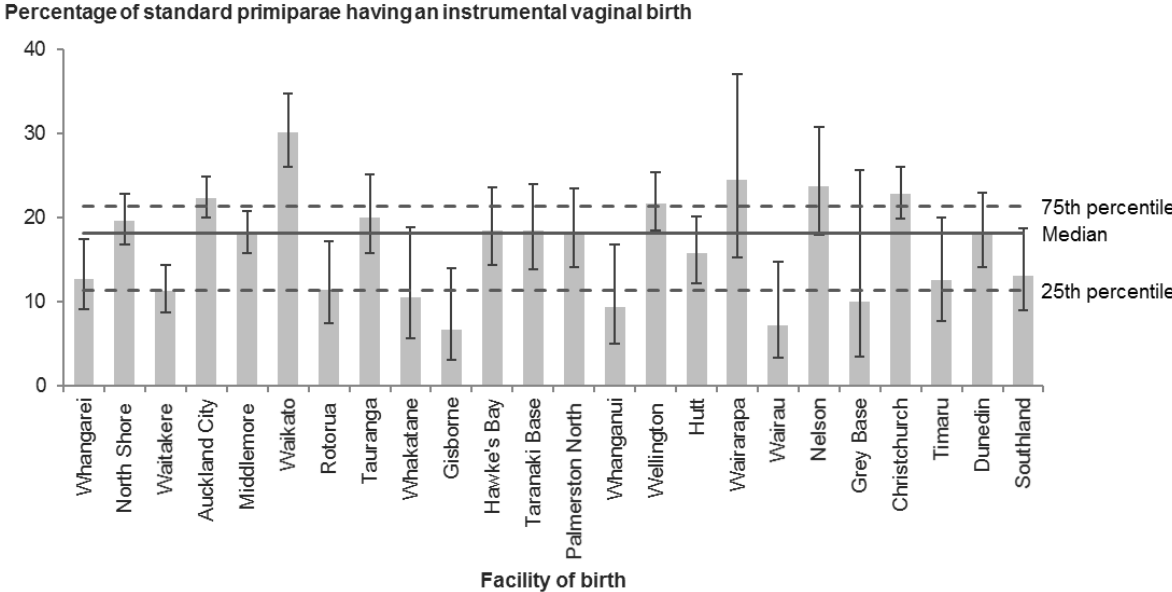
Indicator 3: Instrumental vaginal birth among standard primiparae, 2016

Figure 7: Percentage of instrumental vaginal births among standard primiparae, by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Figure 8: Percentage of instrumental vaginal births among standard primiparae, by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Table 7: Number and percentage of instrumental vaginal births among standard primiparae, by DHB of residence, 2016

DHB of residence	Instrumental vaginal births	Standard primiparae	Rate (%)
Northland	32	338	9.5
Waitemata	213	1,290	16.5
Auckland	184	942	19.5
Counties Manukau	198	1,257	15.8
Waikato	131	752	17.4
Lakes	19	203	9.4
Bay of Plenty	62	458	13.5
Tairāwhiti	6	97	6.2
Hawke's Bay	52	298	17.4
Taranaki	42	246	17.1
MidCentral	49	285	17.2
Whanganui	10	114	8.8
Capital & Coast	108	579	18.7
Hutt Valley	53	347	15.3
Wairarapa	13	56	23.2
Nelson Marlborough	46	275	16.7
West Coast	3	43	7.0
Canterbury	164	991	16.5
South Canterbury	15	115	13.0
Southern	76	571	13.3
Unknown	4	37	-
New Zealand	1,480	9,294	15.9

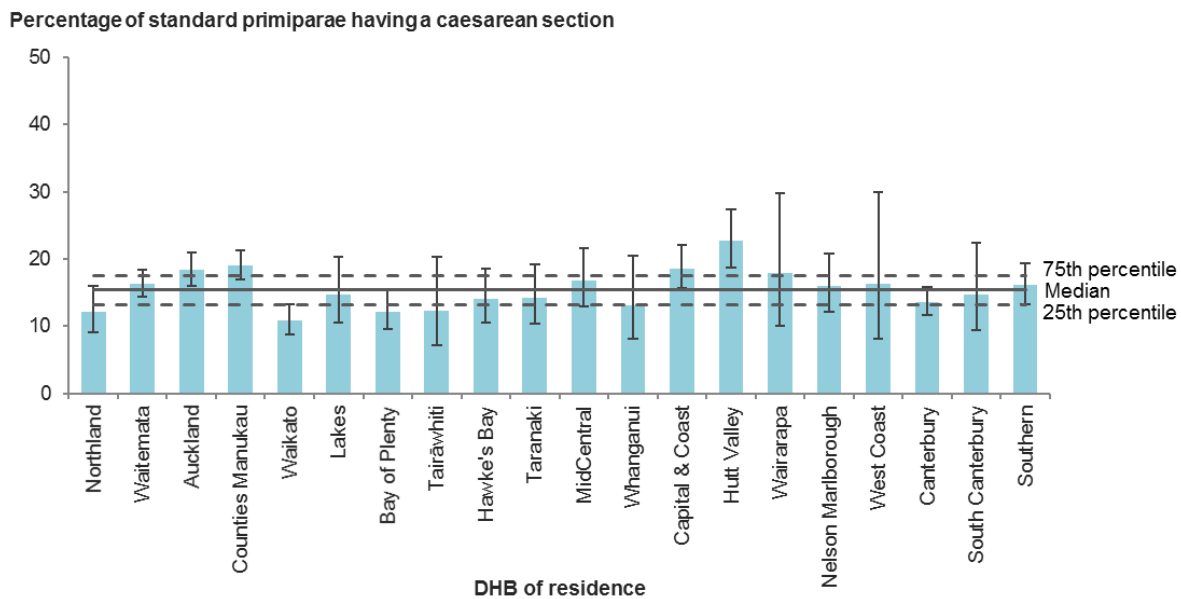
Table 8: Number and percentage of instrumental vaginal births among standard primiparae, by place of birth, 2016

Place of birth	Instrumental vaginal births	Standard primiparae	Rate (%)
Whangarei	32	251	12.7
North Shore	131	665	19.7
Waitakere	56	496	11.3
Auckland City	242	1,082	22.4
Middlemore	166	915	18.1
Waikato	128	424	30.2
Rotorua	19	166	11.4
Tauranga	55	274	20.1
Whakatane	9	85	10.6
Gisborne	6	89	6.7
Hawke's Bay	51	275	18.5
Taranaki Base	42	228	18.4
Palmerston North	48	262	18.3
Whanganui	9	96	9.4
Wellington	115	529	21.7
Hutt	51	324	15.7
Wairarapa	14	57	24.6
Wairau	6	84	7.1
Nelson	39	164	23.8
Grey Base	3	30	10.0
Christchurch	166	726	22.9
Timaru	14	111	12.6
Dunedin	52	287	18.1
Southland	24	183	13.1
All secondary and tertiary facilities	1,478	7,803	18.9
All primary facilities	2	1,203	0.2
All home births	0	288	0.0
New Zealand¹	1,480	9,294	15.9

1 Includes women where birth location was unspecified.

Indicator 4: Caesarean section among standard primiparae, 2016

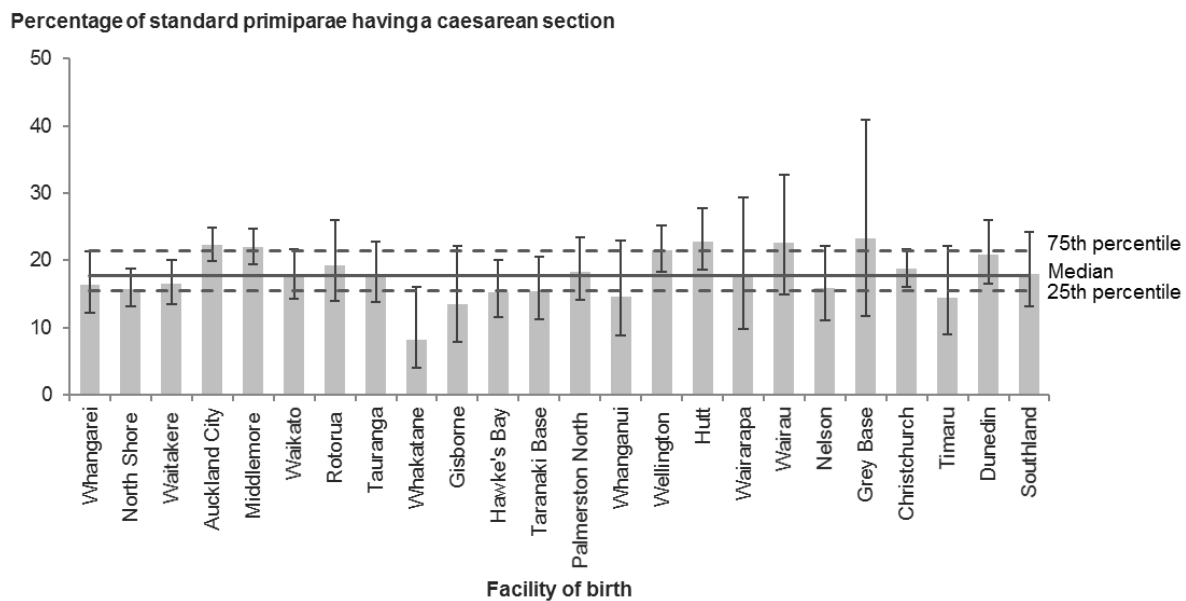
Figure 9: Percentage of caesarean section deliveries among standard primiparae, by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles.

Error bars represent 95% confidence intervals.

Figure 10: Percentage of caesarean section deliveries among standard primiparae, by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles.

Error bars represent 95% confidence intervals.

Table 9: Number and percentage of deliveries by caesarean section among standard primiparae, by DHB of residence, 2016

DHB of residence	Caesarean sections	Standard primiparae	Rate (%)
Northland	41	338	12.1
Waitemata	211	1,290	16.4
Auckland	173	942	18.4
Counties Manukau	239	1,257	19.0
Waikato	82	752	10.9
Lakes	30	203	14.8
Bay of Plenty	56	458	12.2
Tairāwhiti	12	97	12.4
Hawke's Bay	42	298	14.1
Taranaki	35	246	14.2
MidCentral	48	285	16.8
Whanganui	15	114	13.2
Capital & Coast	108	579	18.7
Hutt Valley	79	347	22.8
Wairarapa	10	56	17.9
Nelson Marlborough	44	275	16.0
West Coast	7	43	16.3
Canterbury	135	991	13.6
South Canterbury	17	115	14.8
Southern	92	571	16.1
Unknown	3	37	-
New Zealand	1,479	9,294	15.9

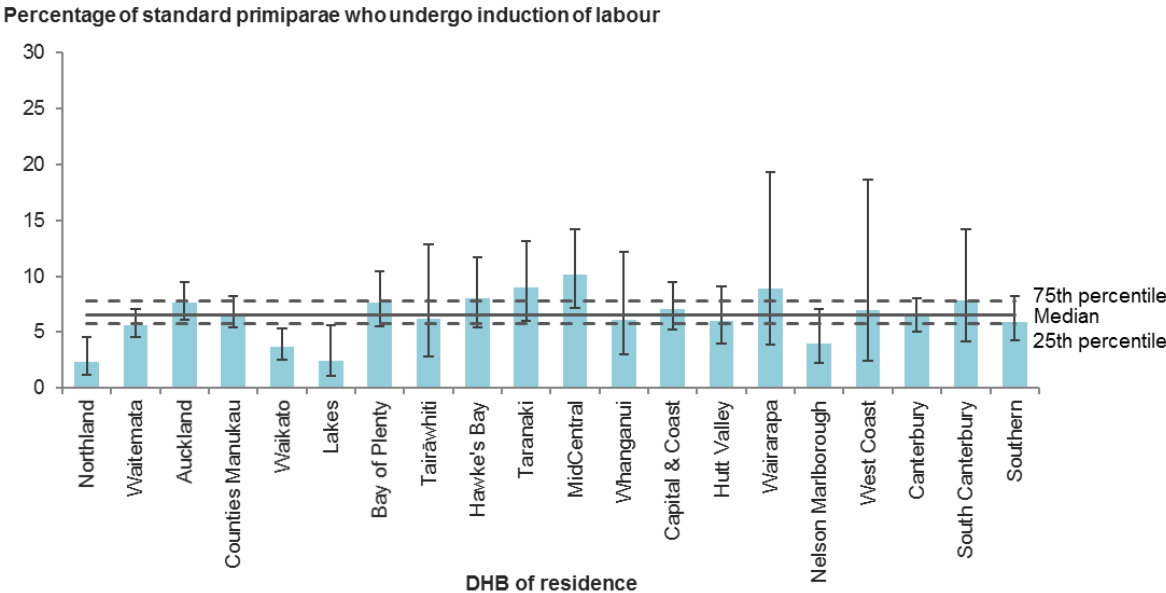
Table 10: Number and percentage of deliveries by caesarean section among standard primiparae, by place of birth, 2016

Place of birth	Caesarean sections	Standard primiparae	Rate (%)
Whangarei	41	251	16.3
North Shore	105	665	15.8
Waitakere	82	496	16.5
Auckland City	241	1,082	22.3
Middlemore	201	915	22.0
Waikato	75	424	17.7
Rotorua	32	166	19.3
Tauranga	49	274	17.9
Whakatane	7	85	8.2
Gisborne	12	89	13.5
Hawke's Bay	42	275	15.3
Taranaki Base	35	228	15.4
Palmerston North	48	262	18.3
Whanganui	14	96	14.6
Wellington	114	529	21.6
Hutt	74	324	22.8
Wairarapa	10	57	17.5
Wairau	19	84	22.6
Nelson	26	164	15.9
Grey Base	7	30	23.3
Christchurch	136	726	18.7
Timaru	16	111	14.4
Dunedin	60	287	20.9
Southland	33	183	18.0
All secondary and tertiary facilities	1,479	7,803	19.0
All primary facilities	0	1,203	0.0
All home births	0	288	0.0
New Zealand¹	1,479	9,294	15.9

1 Includes women where birth location was unspecified.

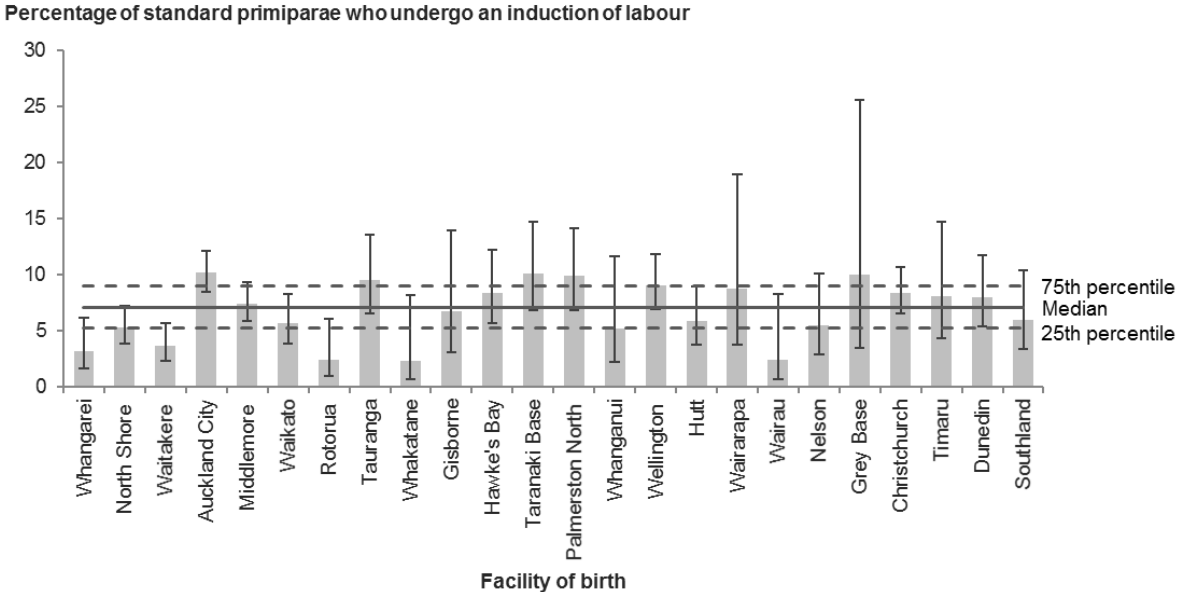
Indicator 5: Induction of labour among standard primiparae, 2016

Figure 11: Percentage of inductions of labour among standard primiparae, by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Figure 12: Percentage of inductions of labour among standard primiparae, by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Table 11: Number and percentage of inductions of labour among standard primiparae, by DHB of residence, 2016

DHB of residence	Inductions of labour	Standard primiparae	Rate (%)
Northland	8	338	2.4
Waitemata	73	1,290	5.7
Auckland	72	942	7.6
Counties Manukau	84	1,257	6.7
Waikato	28	752	3.7
Lakes	5	203	2.5
Bay of Plenty	35	458	7.6
Tairāwhiti	6	97	6.2
Hawke's Bay	24	298	8.1
Taranaki	22	246	8.9
MidCentral	29	285	10.2
Whanganui	7	114	6.1
Capital & Coast	41	579	7.1
Hutt Valley	21	347	6.1
Wairarapa	5	56	8.9
Nelson Marlborough	11	275	4.0
West Coast	3	43	7.0
Canterbury	63	991	6.4
South Canterbury	9	115	7.8
Southern	34	571	6.0
Unknown	1	37	-
New Zealand	581	9,294	6.3

Table 12: Number and percentage of inductions of labour among standard primiparae, by facility of birth (secondary and tertiary facilities), 2016

Place of birth	Inductions of labour	Standard primiparae	Rate (%)
Whangarei	8	251	3.2
North Shore	35	665	5.3
Waitakere	18	496	3.6
Auckland City	110	1,082	10.2
Middlemore	68	915	7.4
Waikato	24	424	5.7
Rotorua	4	166	2.4
Tauranga	26	274	9.5
Whakatane	2	85	2.4
Gisborne	6	89	6.7
Hawke's Bay	23	275	8.4
Taranaki Base	23	228	10.1
Palmerston North	26	262	9.9
Whanganui	5	96	5.2
Wellington	48	529	9.1
Hutt	19	324	5.9
Wairarapa	5	57	8.8
Wairau	2	84	2.4
Nelson	9	164	5.5
Grey Base	3	30	10.0
Christchurch	61	726	8.4
Timaru	9	111	8.1
Dunedin	23	287	8.0
Southland	11	183	6.0
All secondary and tertiary facilities	568	7,803	7.3
All primary facilities	13	1,203	1.1
All home births	0	288	0.0
New Zealand¹	581	9,294	6.3

1 Includes women where birth location was unspecified.

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% and 85% of women who give birth vaginally (WHA 2007). Reasons for perineal trauma are varied, and may reflect either maternal or neonatal issues. Perineal damage can cause women pain and longer-term morbidity. The aim of these indicators is to reduce such trauma and its associated maternal morbidity. This may 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 mother and infant 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 2013). If a provider's rates of episiotomy, particularly among low-risk women, are significantly higher than its peer group at a national level, they should examine these results. Providers should also consider their rates alongside other indicators that can be affected by episiotomies, such as third-degree tears, postpartum haemorrhage, infection and maternal admission to high dependency 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 undertake further investigation of labour management if rates are significantly different from their peer group at a national level. Labour management may include birth position, the use of induction, instrumental delivery and management of second-stage labour.

Notes on 2016 data

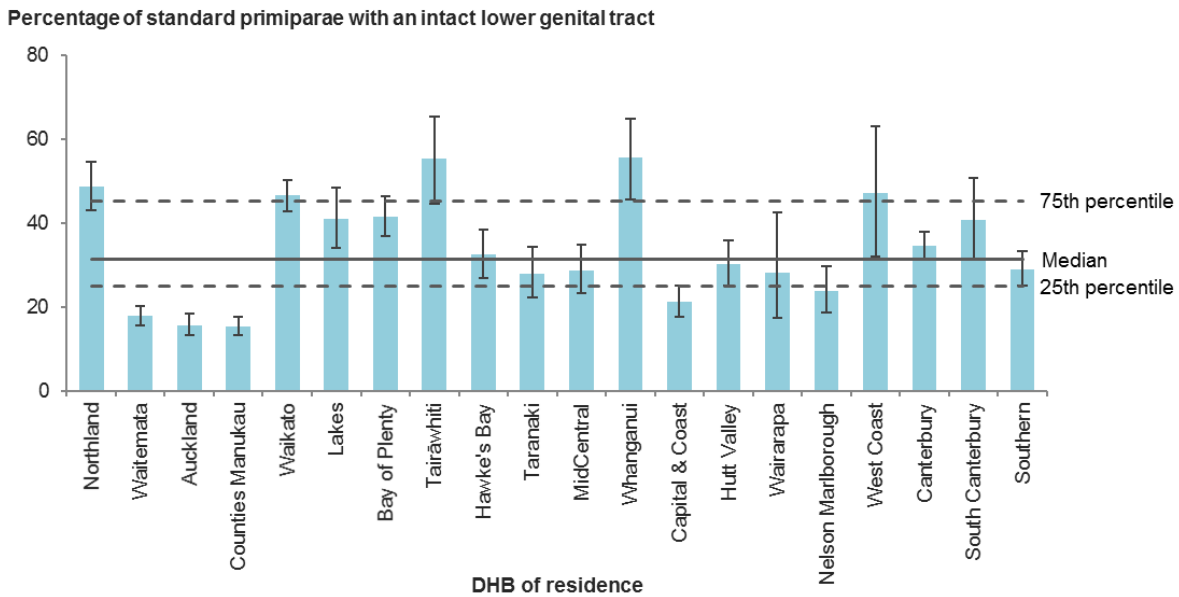
Rates of intact lower genital tract after vaginal birth among standard primiparae ranged from 15.3% to 55.6% across DHBs, and from 8.7% to 53.2% across secondary and tertiary facilities. This regional variation suggests that we should investigate both data integrity and local clinical practice. Rates of intact lower genital tract appear to have decreased over time since 2009. We need to further investigate the causes of this, including through review of coding practices, particularly given there has been no statistically significant increase in the rates of instrumental birth among the same population over this time.

Rates of episiotomy without third- or fourth-degree tear also varied, from 1.2% to 34.7% across DHBs, and from 1.3% to 39.7% across secondary and tertiary facilities. Facilities and DHBs with rates significantly above the median should investigate the reasons for these differences, which could include review of the clinical indications given in specific cases, education and policy review, and identifying the discipline and number of practitioners performing episiotomies.

All DHBs should undertake more detailed local analysis of the relationship between rates of intact perineum, episiotomies and third- and fourth-degree tears.

Indicator 6: Intact lower genital tract among standard primiparae giving birth vaginally, 2016

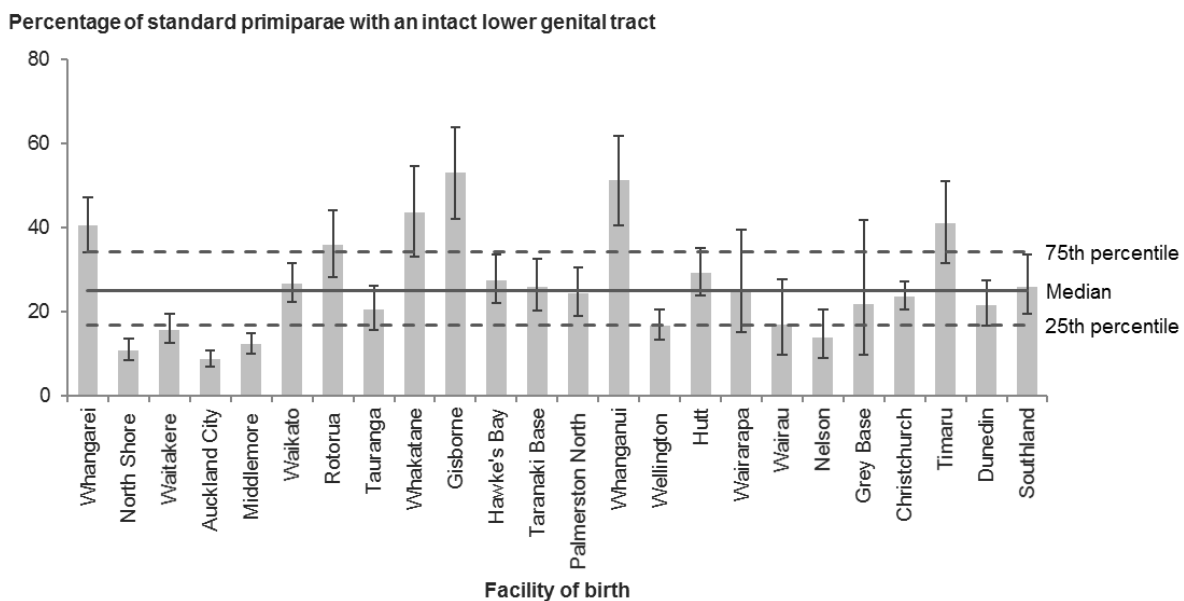
Figure 13: Percentage of standard primiparae giving birth vaginally with intact lower genital tract, by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles.

Error bars represent 95% confidence intervals.

Figure 14: Percentage of standard primiparae giving birth vaginally with intact lower genital tract, by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles.

Error bars represent 95% confidence intervals.

Table 13: Number and percentage of standard primiparae giving birth vaginally with intact lower genital tract, by DHB of residence, 2016

DHB of residence	Intact lower genital tract	Standard primiparae giving birth vaginally	Rate (%)
Northland	145	297	48.8
Waitemata	193	1,079	17.9
Auckland	120	769	15.6
Counties Manukau	156	1,018	15.3
Waikato	312	670	46.6
Lakes	71	173	41.0
Bay of Plenty	167	402	41.5
Tairāwhiti	47	85	55.3
Hawke's Bay	83	256	32.4
Taranaki	59	211	28.0
MidCentral	68	237	28.7
Whanganui	55	99	55.6
Capital & Coast	100	471	21.2
Hutt Valley	81	268	30.2
Wairarapa	13	46	28.3
Nelson Marlborough	55	231	23.8
West Coast	17	36	47.2
Canterbury	296	856	34.6
South Canterbury	40	98	40.8
Southern	139	479	29.0
Unknown	16	34	-
New Zealand	2,233	7,815	28.6

Table 14: Number and percentage of standard primiparae giving birth vaginally with intact lower genital tract, by facility of birth (secondary and tertiary facilities), 2016

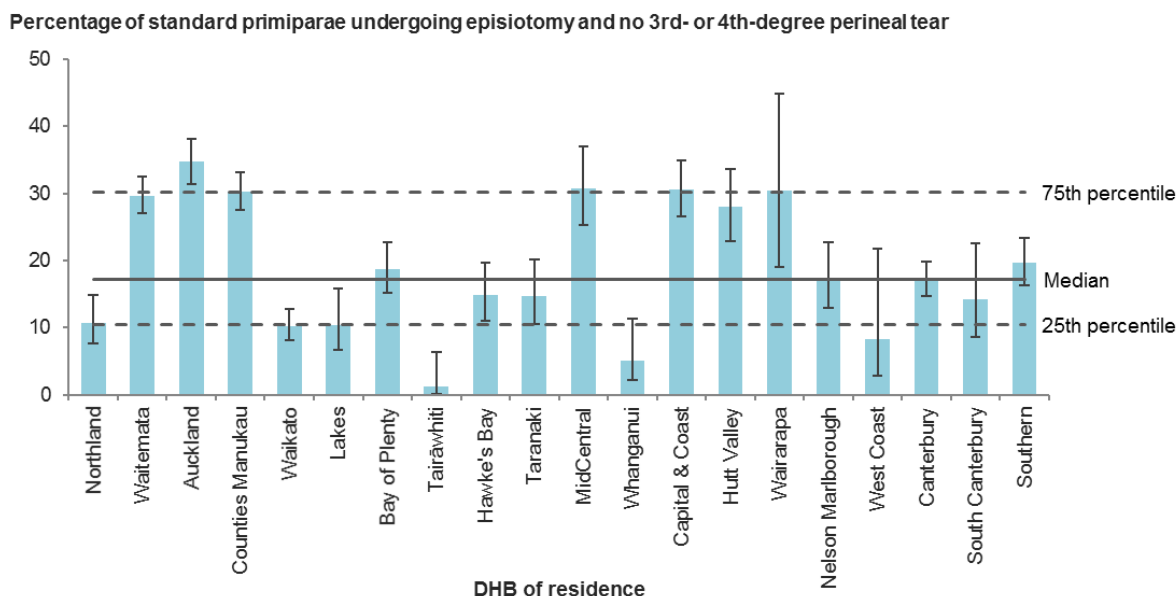
Place of birth	Intact lower genital tract	Standard primiparae giving birth vaginally	Rate (%)
Whangarei	85	210	40.5
North Shore	60	560	10.7
Waitakere	65	414	15.7
Auckland City	73	841	8.7
Middlemore	88	714	12.3
Waikato	93	349	26.6
Rotorua	48	134	35.8
Tauranga	46	225	20.4
Whakatane	34	78	43.6
Gisborne	41	77	53.2
Hawke's Bay	64	233	27.5
Taranaki Base	50	193	25.9
Palmerston North	52	214	24.3
Whanganui	42	82	51.2
Wellington	69	415	16.6
Hutt	73	250	29.2
Wairarapa	12	47	25.5
Wairau	11	65	16.9
Nelson	19	138	13.8
Grey Base	5	23	21.7
Christchurch	140	590	23.7
Timaru	39	95	41.1
Dunedin	49	227	21.6
Southland	39	150	26.0
All secondary and tertiary facilities	1,297	6,324	20.5
All primary facilities	691	1,203	57.4
All home births¹	245	288	85.1
New Zealand²	2,233	7,815	28.6

1 The numerator is derived by subtracting the number of women who were admitted to a maternity facility with a diagnosis of perineal tear within three days of giving birth from the total number of women who gave birth at home. Women who received care for perineal trauma from non-maternity facilities may be included in the numerator. Therefore, the presented rate may be higher than the true rate.

2 Includes women where birth location was unspecified.

Indicator 7: Episiotomy and no third- or fourth-degree tear among standard primiparae giving birth vaginally, 2016

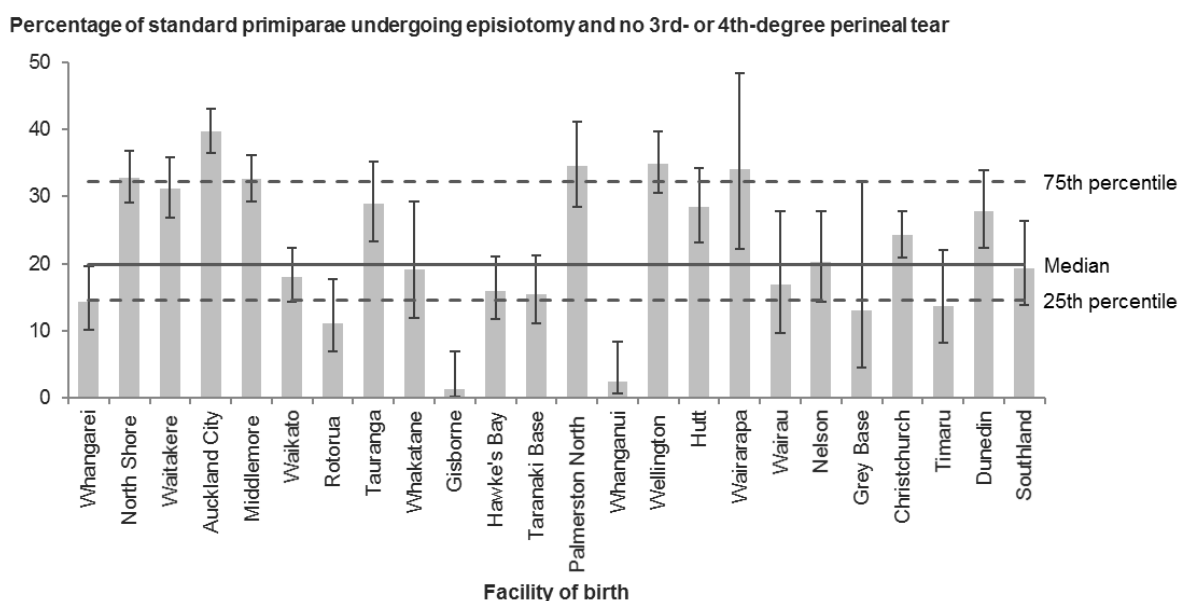
Figure 15: Percentage of standard primiparae giving birth vaginally and undergoing episiotomy without third- or fourth-degree tear, by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles.

Error bars represent 95% confidence intervals.

Figure 16: Percentage of standard primiparae giving birth vaginally and undergoing episiotomy without third- or fourth-degree tear, by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles.

Error bars represent 95% confidence intervals.

Table 15: Number and percentage of standard primiparae giving birth vaginally and undergoing episiotomy without third- or fourth-degree tear, by DHB of residence, 2016

DHB of residence	Episiotomy without 3rd- or 4th-degree tear	Standard primiparae giving birth vaginally	Rate (%)
Northland	32	297	10.8
Waitemata	320	1,079	29.7
Auckland	267	769	34.7
Counties Manukau	309	1,018	30.4
Waikato	69	670	10.3
Lakes	18	173	10.4
Bay of Plenty	75	402	18.7
Tairāwhiti	1	85	1.2
Hawke's Bay	38	256	14.8
Taranaki	31	211	14.7
MidCentral	73	237	30.8
Whanganui	5	99	5.1
Capital & Coast	144	471	30.6
Hutt Valley	75	268	28.0
Wairarapa	14	46	30.4
Nelson Marlborough	40	231	17.3
West Coast	3	36	8.3
Canterbury	147	856	17.2
South Canterbury	14	98	14.3
Southern	94	479	19.6
Unknown	3	34	-
New Zealand	1,772	7,815	22.7

Table 16: Number and percentage of standard primiparae giving birth vaginally and undergoing episiotomy without third- or fourth-degree tear, by facility of birth (secondary and tertiary facilities), 2016

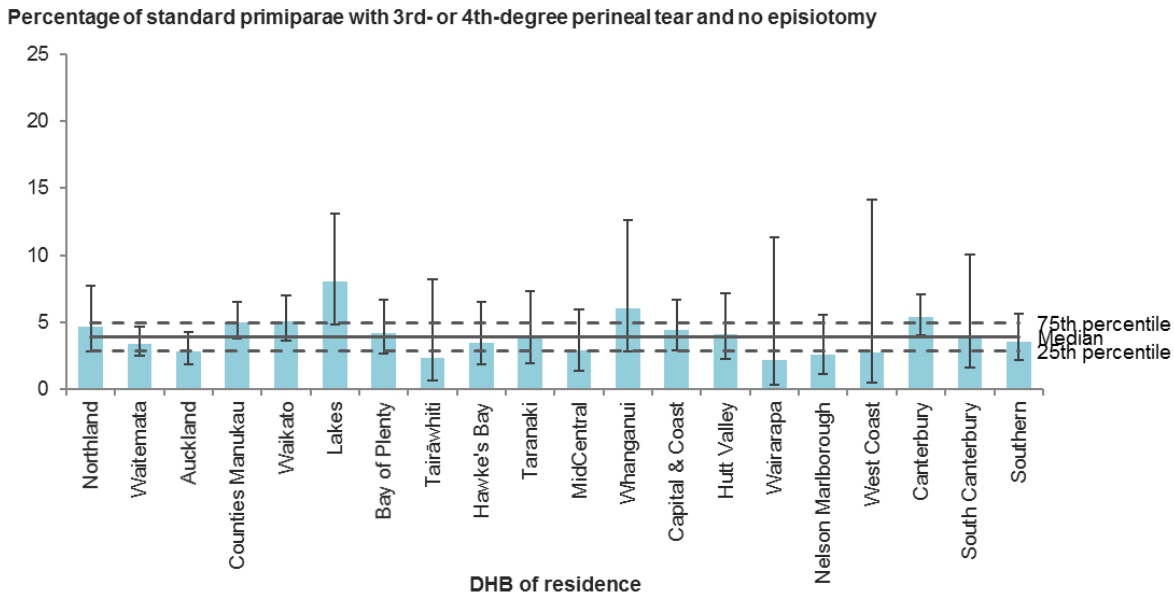
Place of birth	Episiotomy without 3rd- or 4th-degree tear	Standard primiparae giving birth vaginally	Rate (%)
Whangarei	30	210	14.3
North Shore	184	560	32.9
Waitakere	129	414	31.2
Auckland City	334	841	39.7
Middlemore	233	714	32.6
Waikato	63	349	18.1
Rotorua	15	134	11.2
Tauranga	65	225	28.9
Whakatane	15	78	19.2
Gisborne	1	77	1.3
Hawke's Bay	37	233	15.9
Taranaki Base	30	193	15.5
Palmerston North	74	214	34.6
Whanganui	2	82	2.4
Wellington	145	415	34.9
Hutt	71	250	28.4
Wairarapa	16	47	34.0
Wairau	11	65	16.9
Nelson	28	138	20.3
Grey Base	3	23	13.0
Christchurch	143	590	24.2
Timaru	13	95	13.7
Dunedin	63	227	27.8
Southland	29	150	19.3
All secondary and tertiary facilities	1,734	6,324	27.4
All primary facilities	38	1,203	3.2
All home births¹	0	288	0.0
New Zealand²	1,772	7,815	22.7

1 For the purposes of this indicator, all women giving birth at home are counted as having had a spontaneous vaginal birth without an episiotomy. The rate presented may not reflect the true rate due to this assumption.

2 Includes women where birth location was unspecified.

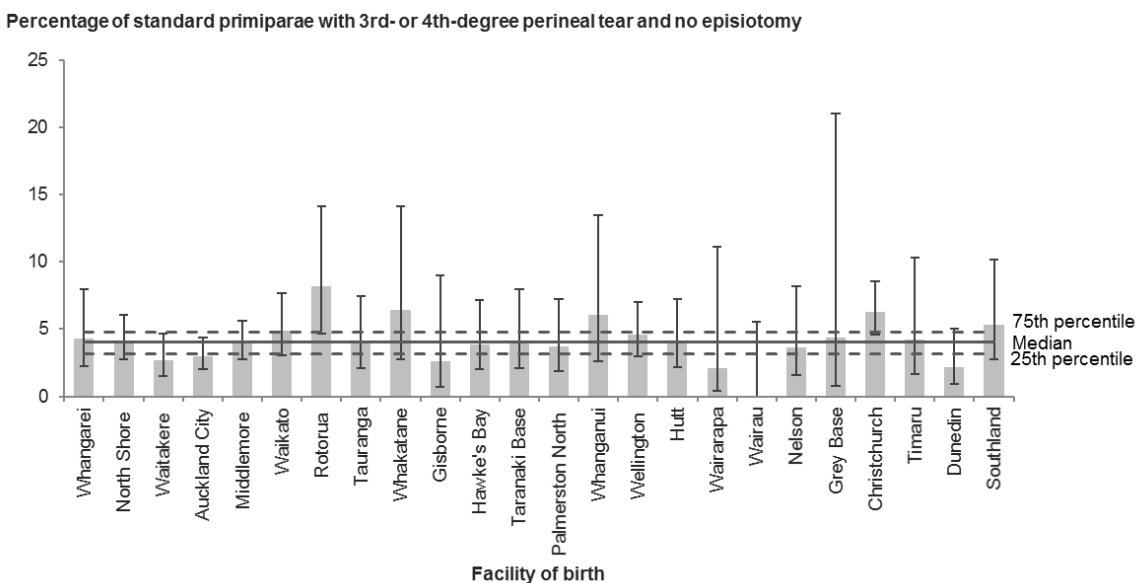
Indicator 8: Third- or fourth-degree tear and no episiotomy among standard primiparae giving birth vaginally, 2016

Figure 17: Percentage of standard primiparae giving birth vaginally sustaining a third- or fourth-degree tear and not undergoing episiotomy, by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Figure 18: Percentage of standard primiparae giving birth vaginally sustaining a third- or fourth-degree tear and not undergoing episiotomy, by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Table 17: Number and percentage of standard primiparae giving birth vaginally sustaining a third- or fourth-degree tear and not undergoing episiotomy, by DHB of residence, 2016

DHB of residence	3rd- or 4th-degree tear without episiotomy	Standard primiparae giving birth vaginally	Rate (%)
Northland	14	297	4.7
Waitemata	37	1,079	3.4
Auckland	22	769	2.9
Counties Manukau	51	1,018	5.0
Waikato	34	670	5.1
Lakes	14	173	8.1
Bay of Plenty	17	402	4.2
Tairāwhiti	2	85	2.4
Hawke's Bay	9	256	3.5
Taranaki	8	211	3.8
MidCentral	7	237	3.0
Whanganui	6	99	6.1
Capital & Coast	21	471	4.5
Hutt Valley	11	268	4.1
Wairarapa	1	46	2.2
Nelson Marlborough	6	231	2.6
West Coast	1	36	2.8
Canterbury	46	856	5.4
South Canterbury	4	98	4.1
Southern	17	479	3.5
Unknown	1	34	-
New Zealand	329	7,815	4.2

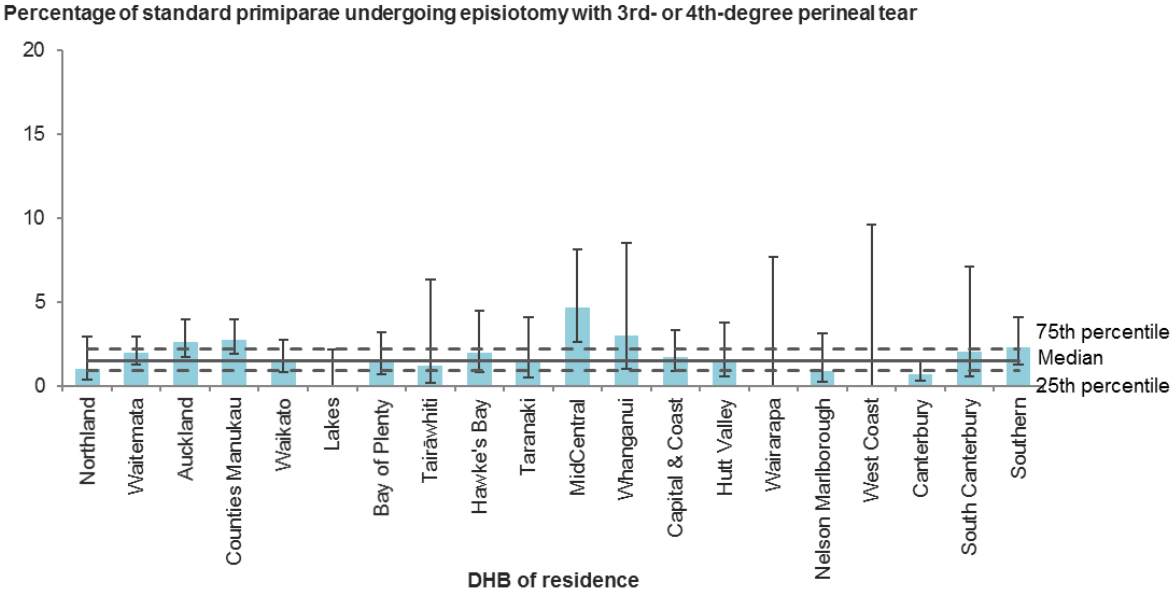
Table 18: Number and percentage of standard primiparae giving birth vaginally sustaining a third- or fourth-degree tear and not undergoing episiotomy, by facility of birth (secondary and tertiary facilities), 2016

Place of birth	3rd- or 4th-degree tear without episiotomy	Standard primiparae giving birth vaginally	Rate (%)
Whangarei	9	210	4.3
North Shore	23	560	4.1
Waitakere	11	414	2.7
Auckland City	25	841	3.0
Middlemore	28	714	3.9
Waikato	17	349	4.9
Rotorua	11	134	8.2
Tauranga	9	225	4.0
Whakatane	5	78	6.4
Gisborne	2	77	2.6
Hawke's Bay	9	233	3.9
Taranaki Base	8	193	4.1
Palmerston North	8	214	3.7
Whanganui	5	82	6.1
Wellington	19	415	4.6
Hutt	10	250	4.0
Wairarapa	1	47	2.1
Wairau	0	65	0.0
Nelson	5	138	3.6
Grey Base	1	23	4.3
Christchurch	37	590	6.3
Timaru	4	95	4.2
Dunedin	5	227	2.2
Southland	8	150	5.3
All secondary and tertiary facilities	260	6,324	4.1
All primary facilities	55	1,203	4.6
All home births	14	288	4.9
New Zealand¹	329	7,815	4.2

1 Includes women where birth location was unspecified.

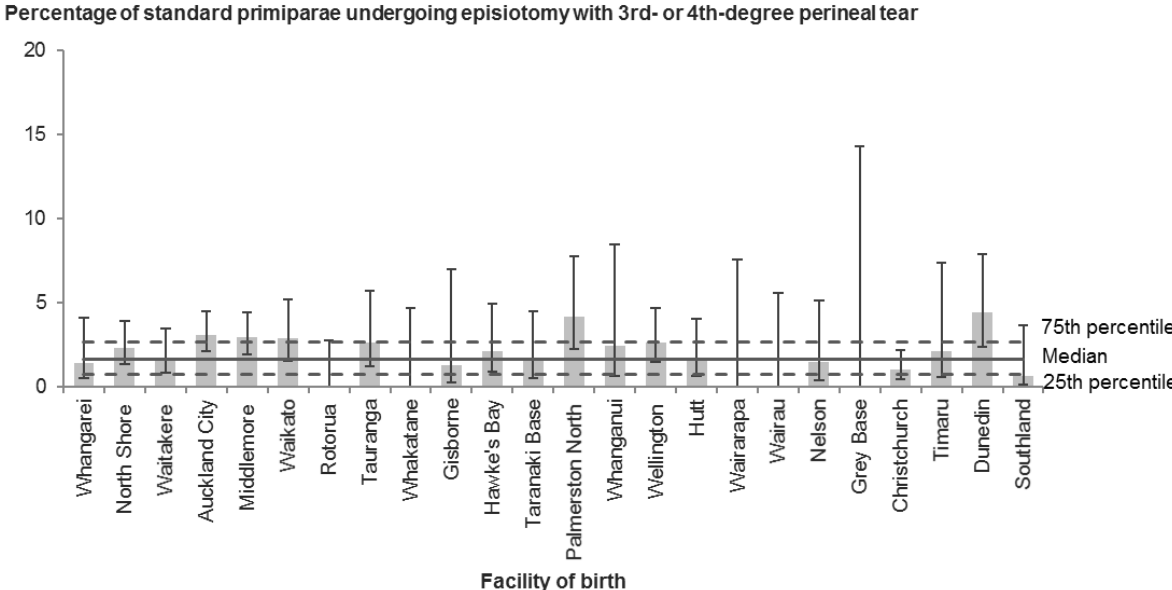
Indicator 9: Episiotomy and third- or fourth-degree tear among standard primiparae giving birth vaginally, 2016

Figure 19: Percentage of standard primiparae giving birth vaginally undergoing episiotomy and sustaining a third- or fourth-degree tear, by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Figure 20: Percentage of standard primiparae giving birth vaginally undergoing episiotomy and sustaining a third- or fourth-degree tear, by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Table 19: Number and percentage of standard primiparae giving birth vaginally undergoing episiotomy and sustaining a third- or fourth-degree tear, by DHB of residence, 2016

DHB of residence	Episiotomy with 3rd- or 4th-degree tear	Standard primiparae giving birth vaginally	Rate (%)
Northland	3	297	1.0
Waitemata	21	1,079	1.9
Auckland	20	769	2.6
Counties Manukau	28	1,018	2.8
Waikato	10	670	1.5
Lakes	0	173	0.0
Bay of Plenty	6	402	1.5
Tairāwhiti	1	85	1.2
Hawke's Bay	5	256	2.0
Taranaki	3	211	1.4
MidCentral	11	237	4.6
Whanganui	3	99	3.0
Capital & Coast	8	471	1.7
Hutt Valley	4	268	1.5
Wairarapa	0	46	0.0
Nelson Marlborough	2	231	0.9
West Coast	0	36	0.0
Canterbury	6	856	0.7
South Canterbury	2	98	2.0
Southern	11	479	2.3
Unknown	0	34	-
New Zealand	144	7,815	1.8

Table 20: Number and percentage of standard primiparae giving birth vaginally undergoing episiotomy and sustaining a third- or fourth-degree tear, by facility of birth (secondary and tertiary facilities), 2016

Place of birth	Episiotomy with 3rd- or 4th-degree tear	Standard primiparae giving birth vaginally	Rate (%)
Whangarei	3	210	1.4
North Shore	13	560	2.3
Waitakere	7	414	1.7
Auckland City	26	841	3.1
Middlemore	21	714	2.9
Waikato	10	349	2.9
Rotorua	0	134	0.0
Tauranga	6	225	2.7
Whakatane	0	78	0.0
Gisborne	1	77	1.3
Hawke's Bay	5	233	2.1
Taranaki Base	3	193	1.6
Palmerston North	9	214	4.2
Whanganui	2	82	2.4
Wellington	11	415	2.7
Hutt	4	250	1.6
Wairarapa	0	47	0.0
Wairau	0	65	0.0
Nelson	2	138	1.4
Grey Base	0	23	0.0
Christchurch	6	590	1.0
Timaru	2	95	2.1
Dunedin	10	227	4.4
Southland	1	150	0.7
All secondary and tertiary facilities	142	6,324	2.2
All primary facilities	2	1,203	0.2
All home births	0	288	0.0
New Zealand¹	144	7,815	1.8

1 Includes women where birth location was unspecified.

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 (Australian Council on Healthcare Standards 2008, p 474).

Maternity service providers will continue to perform a proportion of 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. Providers are more likely to use general anaesthetic when they do caesarean sections urgently; factors affecting this can include the configuration and organisation of obstetric and anaesthetic services (for example, 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 services that have higher-than-average rates of general anaesthetic for caesarean sections to undertake further investigation to determine the causes of these higher rates and evaluate whether they are justified.

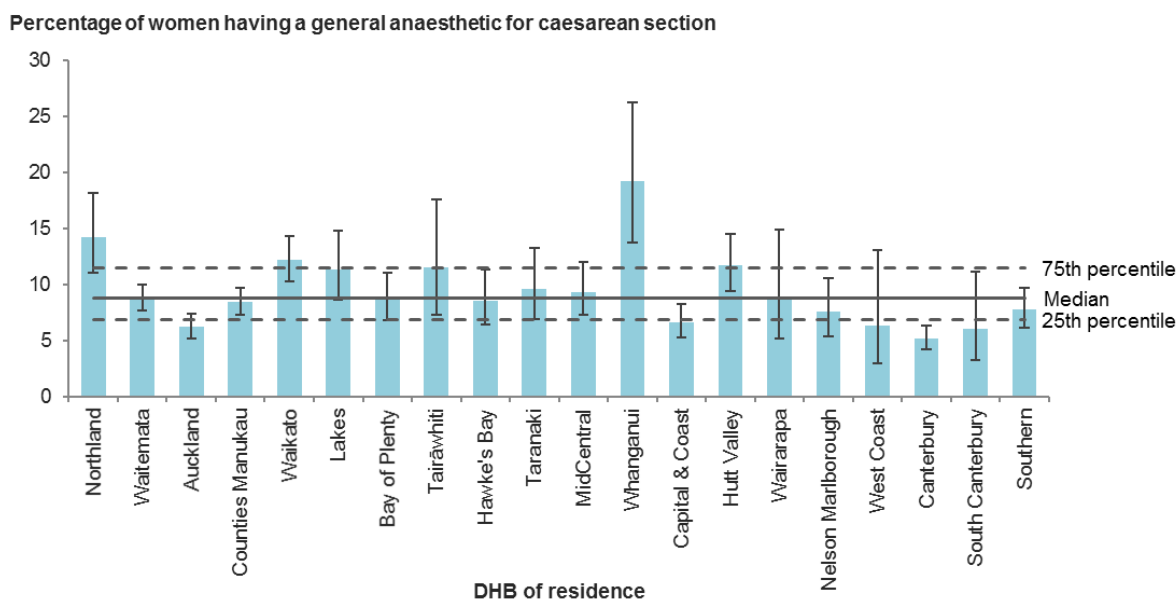
Notes on 2016 data

Rates of general anaesthetic use in caesarean section deliveries ranged from 5.2% to 19.2% across DHBs, and from 5.2% to 18.2% across secondary and tertiary facilities. These rates are based on small numbers, so caution must be used when making comparisons.

All maternity service providers who are outliers should review their rates of general anaesthetic for caesarean sections and consider the impact of the ratio between emergency and elective caesarean section rates. Providers should further investigate the reasons for higher rates of general anaesthetic for emergency caesarean sections, to ensure their practice represents the best possible quality of care for women and their babies.

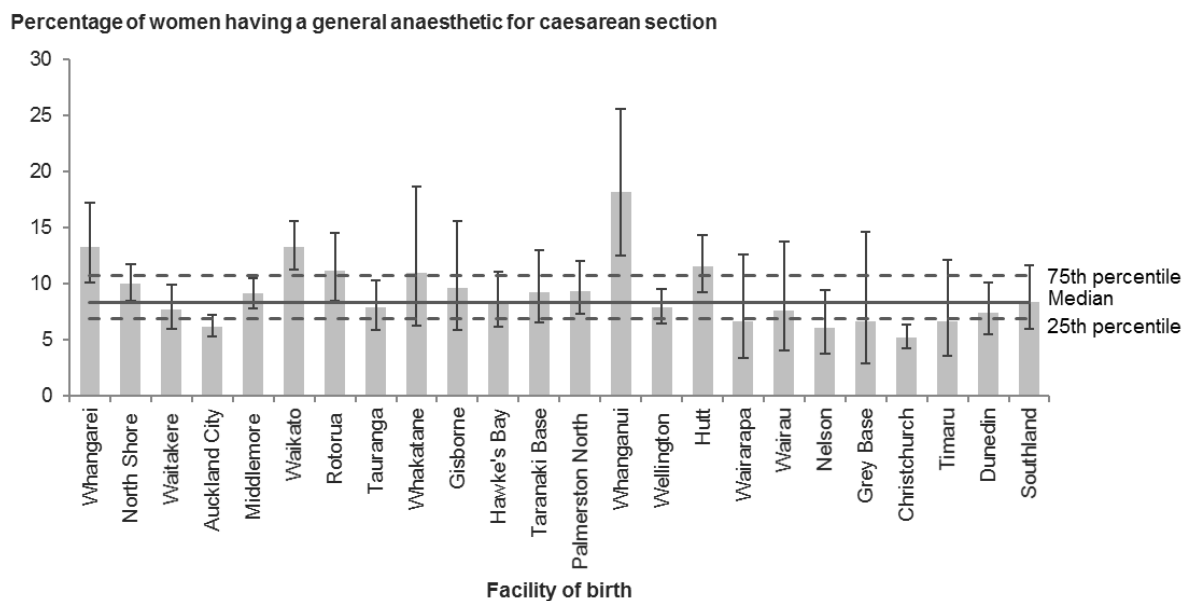
Indicator 10: General anaesthetic for women giving birth by caesarean section, 2016

Figure 21: Percentage of women undergoing a caesarean section under general anaesthetic, by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Figure 22: Percentage of women undergoing a caesarean section under general anaesthetic, by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Table 21: Number and percentage of women undergoing a caesarean section under general anaesthetic, by DHB of residence, 2016

DHB of residence	Caesarean sections under general anaesthetic	All caesarean sections	Rate (%)
Northland	53	372	14.2
Waitemata	203	2,304	8.8
Auckland	115	1,849	6.2
Counties Manukau	181	2,153	8.4
Waikato	121	993	12.2
Lakes	48	422	11.4
Bay of Plenty	58	666	8.7
Tairāwhiti	17	148	11.5
Hawke's Bay	44	512	8.6
Taranaki	32	333	9.6
MidCentral	56	598	9.4
Whanganui	29	151	19.2
Capital & Coast	70	1,055	6.6
Hutt Valley	71	607	11.7
Wairarapa	12	135	8.9
Nelson Marlborough	31	410	7.6
West Coast	6	95	6.3
Canterbury	86	1,660	5.2
South Canterbury	9	148	6.1
Southern	68	875	7.8
Unknown	2	18	-
New Zealand	1,312	15,504	8.5

Table 22: Number and percentage of women undergoing a caesarean section under general anaesthetic, by facility of birth (secondary and tertiary facilities), 2016

Place of birth	Caesarean sections under general anaesthetic	All caesarean sections	Rate (%)
Whangarei	46	346	13.3
North Shore	133	1,328	10.0
Waitakere	54	704	7.7
Auckland City	160	2,582	6.2
Middlemore	160	1,758	9.1
Waikato	129	970	13.3
Rotorua	46	412	11.2
Tauranga	45	573	7.9
Whakatane	11	100	11.0
Gisborne	14	145	9.7
Hawke's Bay	42	505	8.3
Taranaki Base	30	323	9.3
Palmerston North	55	586	9.4
Whanganui	24	132	18.2
Wellington	90	1,145	7.9
Hutt	69	598	11.5
Wairarapa	8	120	6.7
Wairau	9	119	7.6
Nelson	17	282	6.0
Grey Base	5	75	6.7
Christchurch	87	1,681	5.2
Timaru	9	136	6.6
Dunedin	37	497	7.4
Southland	32	381	8.4
All secondary and tertiary facilities	1,312	15,498	8.5
All primary facilities	0	3	0.0
All home births	0	0	0.0
New Zealand¹	1,312	15,504	8.5

1 Includes women where birth location was unspecified.

Indicators 11 and 12: Blood transfusion during birth admission

Rationale and purpose

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' (p 480).

Excessive blood loss is often defined as an amount in excess of 1000 mL, although accuracy of measurement at this level is questionable, especially as the blood loss is often cumulative. 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.

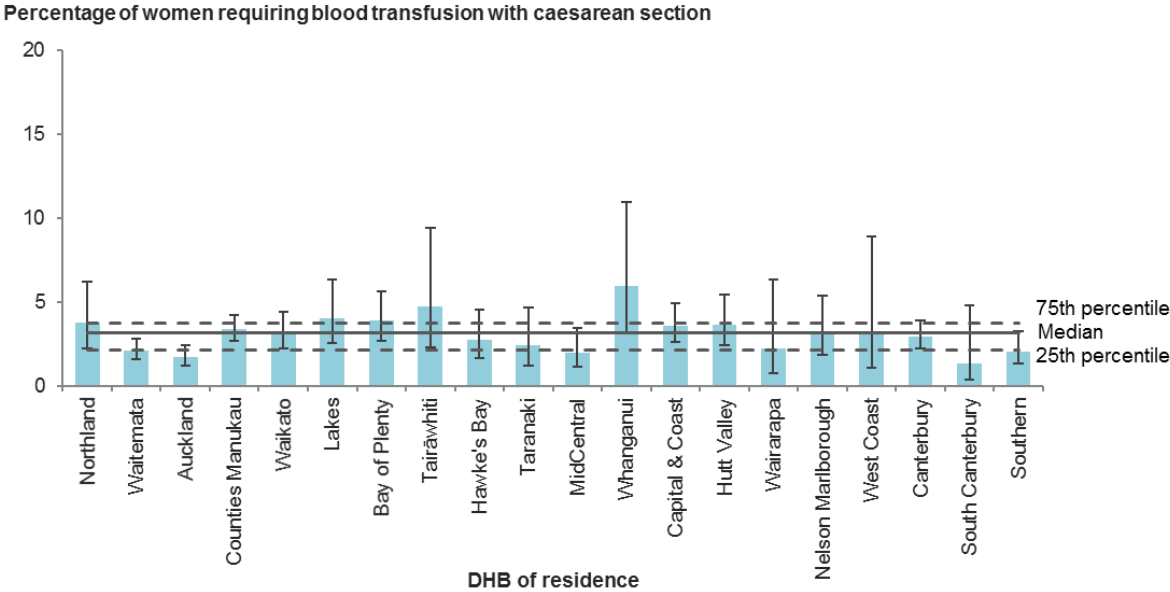
This indicator aims to provide maternity service providers with an indicator of significant blood loss that will stimulate further investigation of clinical management and intervention. All maternity service providers should be familiar with the national consensus guideline for treatment of PPH (Ministry of Health 2013).

Notes on 2016 data

District health boards should investigate the reasons behind the greater variation in rates of blood transfusion with caesarean section and vaginal birth. They need to consider the impact of high elective caesarean section rates on any differences between rates for elective and emergency caesarean sections. Because these indicators are markers for PPH and for management of anaemia, the focus should be on understanding and addressing underlying causes of bleeding, of anaemia.

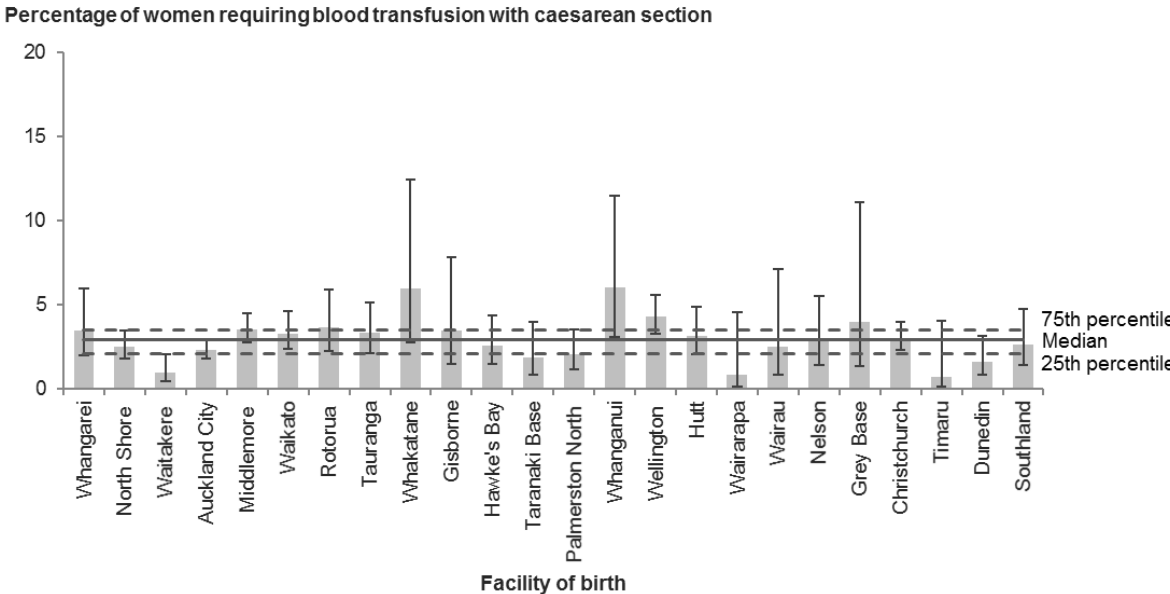
Indicator 11: Blood transfusion during birth admission for caesarean section delivery, 2016

Figure 23: Percentage of women giving birth by caesarean section and undergoing blood transfusion during birth admission, by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Figure 24: Percentage of women giving birth by caesarean section and undergoing blood transfusion during birth admission, by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Table 23: Number and percentage of women giving birth by caesarean section and undergoing blood transfusion during birth admission, by DHB of residence, 2016

DHB of residence	Caesarean sections with blood transfusion	All caesarean sections	Rate (%)
Northland	14	372	3.8
Waitemata	49	2,304	2.1
Auckland	32	1,849	1.7
Counties Manukau	73	2,153	3.4
Waikato	31	993	3.1
Lakes	17	422	4.0
Bay of Plenty	26	666	3.9
Tairāwhiti	7	148	4.7
Hawke's Bay	14	512	2.7
Taranaki	8	333	2.4
MidCentral	12	598	2.0
Whanganui	9	151	6.0
Capital & Coast	38	1,055	3.6
Hutt Valley	22	607	3.6
Wairarapa	3	135	2.2
Nelson Marlborough	13	410	3.2
West Coast	3	95	3.2
Canterbury	49	1,660	3.0
South Canterbury	2	148	1.4
Southern	18	875	2.1
Unknown	2	18	-
New Zealand	442	15,504	2.9

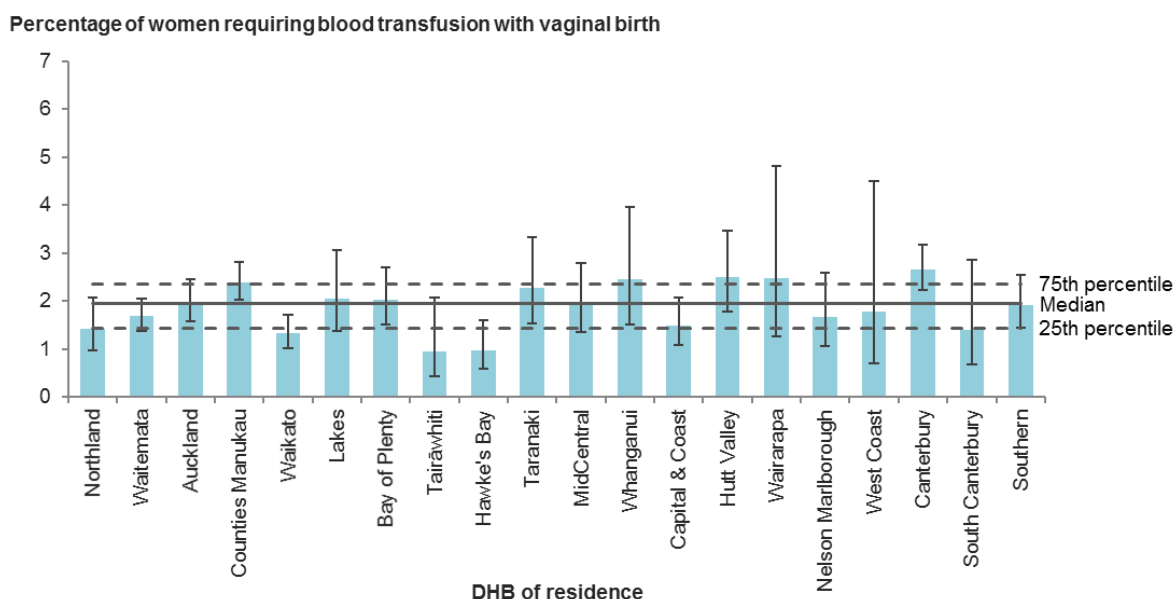
Table 24: Number and percentage of women giving birth by caesarean section and undergoing blood transfusion during birth admission, by facility of birth (secondary and tertiary facilities), 2016

Place of birth	Caesarean sections with blood transfusion	All caesarean sections	Rate (%)
Whangarei	12	346	3.5
North Shore	33	1,328	2.5
Waitakere	7	704	1.0
Auckland City	59	2,582	2.3
Middlemore	62	1,758	3.5
Waikato	32	970	3.3
Rotorua	15	412	3.6
Tauranga	19	573	3.3
Whakatane	6	100	6.0
Gisborne	5	145	3.4
Hawke's Bay	13	505	2.6
Taranaki Base	6	323	1.9
Palmerston North	12	586	2.0
Whanganui	8	132	6.1
Wellington	49	1,145	4.3
Hutt	19	598	3.2
Wairarapa	1	120	0.8
Wairau	3	119	2.5
Nelson	8	282	2.8
Grey Base	3	75	4.0
Christchurch	51	1,681	3.0
Timaru	1	136	0.7
Dunedin	8	497	1.6
Southland	10	381	2.6
All secondary and tertiary facilities	442	15,498	2.9
All primary facilities	0	3	0.0
All home births	0	0	0.0
New Zealand¹	442	15,504	2.9

1 Includes women where birth location was unspecified.

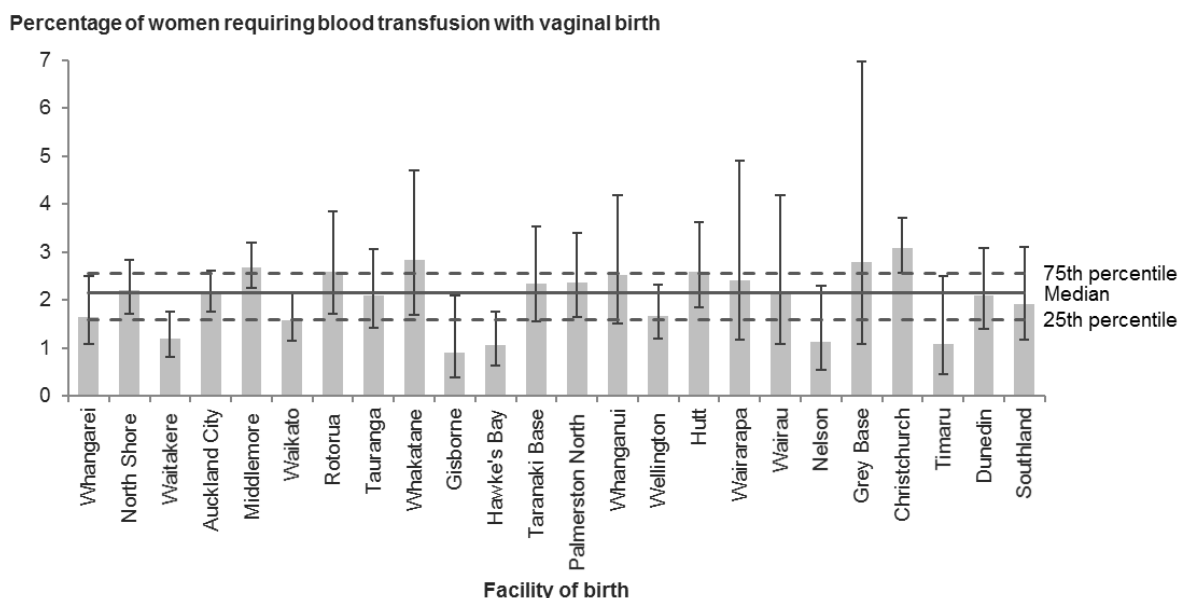
Indicator 12: Blood transfusion during birth admission for vaginal birth, 2016

Figure 25: Percentage of women giving birth vaginally and undergoing blood transfusion during birth admission, by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles.
 Error bars represent 95% confidence intervals.

Figure 26: Percentage of women giving birth vaginally and undergoing blood transfusion during birth admission, by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles.
 Error bars represent 95% confidence intervals.

Table 25: Number and percentage of women giving birth vaginally and undergoing blood transfusion during birth admission, by DHB of residence, 2016

DHB of residence	Vaginal births with blood transfusion	All vaginal births	Rate (%)
Northland	27	1,892	1.4
Waitemata	95	5,631	1.7
Auckland	80	4,059	2.0
Counties Manukau	146	6,093	2.4
Waikato	58	4,360	1.3
Lakes	23	1,123	2.0
Bay of Plenty	45	2,224	2.0
Tairāwhiti	6	629	1.0
Hawke's Bay	15	1,544	1.0
Taranaki	25	1,102	2.3
MidCentral	29	1,481	2.0
Whanganui	16	650	2.5
Capital & Coast	36	2,399	1.5
Hutt Valley	34	1,360	2.5
Wairarapa	8	323	2.5
Nelson Marlborough	19	1,138	1.7
West Coast	4	224	1.8
Canterbury	124	4,645	2.7
South Canterbury	7	502	1.4
Southern	47	2,442	1.9
Unknown	7	408	-
New Zealand	851	44,229	1.9

Table 26: Number and percentage of women giving birth vaginally and undergoing blood transfusion during birth admission, by facility of birth (secondary and tertiary facilities), 2016

Place of birth	Vaginal births with blood transfusion	All vaginal births	Rate (%)
Whangarei	21	1,276	1.6
North Shore	59	2,660	2.2
Waitakere	26	2,163	1.2
Auckland City	99	4,602	2.2
Middlemore	122	4,537	2.7
Waikato	40	2,523	1.6
Rotorua	23	891	2.6
Tauranga	25	1,194	2.1
Whakatane	14	493	2.8
Gisborne	5	552	0.9
Hawke's Bay	15	1,406	1.1
Taranaki Base	22	938	2.3
Palmerston North	29	1,221	2.4
Whanganui	14	554	2.5
Wellington	35	2,087	1.7
Hutt	33	1,273	2.6
Wairarapa	7	290	2.4
Wairau	8	371	2.2
Nelson	7	621	1.1
Grey Base	4	143	2.8
Christchurch	108	3,494	3.1
Timaru	5	464	1.1
Dunedin	24	1,149	2.1
Southland	16	832	1.9
All secondary and tertiary facilities	761	35,734	2.1
All primary facilities	50	5,715	0.9
All home births	20	2,043	1.0
New Zealand¹	851	44,229	1.9

1 Includes women where birth location was unspecified.

Indicators 13 to 15: Severe maternal morbidity

Rationale and purpose

Maternity systems have long monitored 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, of high personal cost to a woman and her family and of high financial cost to the health system. Monitoring severe morbidity allows a view of a larger, but still limited, set of cases that might provide a broader picture of the true impact of adverse outcomes in maternity in New Zealand and allow individual units to benchmark whether their rates of severe morbidity are consistent with those in other units. Cases of severe maternal morbidity should be subject to local multidisciplinary review for quality improvement purposes.

Eclampsia (indicator 13)

Pre-eclampsia is a disorder of pregnancy characterised by high blood pressure and protein in the urine. Pre-eclampsia affects between 2% and 8% 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 drive local investigation, including case review, into the appropriate diagnosis and management of pre-eclampsia with a view to decreasing 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 when uncontrollable obstetric haemorrhage or extensive uterine rupture complicates birth. It is a marker of severe maternal morbidity, and may indicate the failure of upstream interventions to prevent and manage antecedents such as haemorrhage or prolonged obstructed labour. The purpose of this indicator is to drive local investigation including case review to reduce the need for this significant surgery.

Mechanical ventilation (indicator 15)

Mechanical ventilation for greater 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 measurement of intensive/special care unit admissions, as it is not dependent on local layout of facilities. The purpose of this indicator is to drive local investigation including case review of the reasons for mechanical ventilation of a pregnant or postpartum woman to identify opportunities to prevent or reduce severe maternal and perinatal morbidity.

Notes on 2016 data

Of women giving birth in 2016:

- 29 were diagnosed with eclampsia during the birth admission
- 25 had a peripartum hysterectomy
- 9 were admitted to ICU and required over 24 hours of mechanical ventilation at some time during their pregnancy or postnatal period.

District health boards with cases pertaining to these indicators should investigate each case to confirm the accuracy of the data and to determine whether there were opportunities for prevention.

Indicator 13: Diagnosis of eclampsia during birth admission, 2016

Table 27: Number and percentage of women diagnosed with eclampsia during birth admission, by DHB of residence, 2016

DHB of residence	Diagnosis of eclampsia during birth admission	All women giving birth
Northland	0	2,264
Waitemata	3	7,935
Auckland	5	5,908
Counties Manukau	2	8,246
Waikato	2	5,353
Lakes	0	1,545
Bay of Plenty	0	2,890
Tairāwhiti	0	777
Hawke's Bay	1	2,056
Taranaki	1	1,435
MidCentral	5	2,079
Whanganui	0	801
Capital & Coast	2	3,454
Hutt Valley	2	1,967
Wairarapa	0	458
Nelson Marlborough	2	1,548
West Coast	0	319
Canterbury	0	6,305
South Canterbury	0	650
Southern	4	3,317
Unknown	0	426
New Zealand	29	59,733

Table 28: Number and percentage of women diagnosed with eclampsia during birth admission, by facility of birth (secondary and tertiary facilities), 2016

Place of birth	Diagnosis of eclampsia during birth admission	All women giving birth
Whangarei	0	1,622
North Shore	2	3,988
Waitakere	0	2,867
Auckland City	5	7,184
Middlemore	4	6,295
Waikato	2	3,493
Rotorua	0	1,303
Tauranga	0	1,767
Whakatane	0	593
Gisborne	0	697
Hawke's Bay	1	1,911
Taranaki Base	1	1,261
Palmerston North	5	1,807
Whanganui	0	686
Wellington	2	3,232
Hutt	1	1,871
Wairarapa	0	410
Wairau	1	490
Nelson	1	903
Grey Base	0	218
Christchurch	0	5,175
Timaru	0	600
Dunedin	3	1,646
Southland	1	1,213
All secondary and tertiary facilities	29	51,232
All primary facilities	0	5,718
All home births	0	2,043
New Zealand¹	29	59,733

1 Includes women where birth location was unspecified.

Indicator 14: Peripartum hysterectomy, 2016

Table 29: Number and percentage of women having a peripartum hysterectomy, by DHB of residence, 2016

DHB of residence	Peripartum hysterectomy	All women giving birth
Northland	1	2,264
Waitemata	6	7,935
Auckland	1	5,908
Counties Manukau	2	8,246
Waikato	3	5,353
Lakes	2	1,545
Bay of Plenty	0	2,890
Tairāwhiti	0	777
Hawke's Bay	3	2,056
Taranaki	1	1,435
MidCentral	2	2,079
Whanganui	0	801
Capital & Coast	0	3,454
Hutt Valley	1	1,967
Wairarapa	0	458
Nelson Marlborough	1	1,548
West Coast	0	319
Canterbury	1	6,305
South Canterbury	0	650
Southern	1	3,317
Unknown	0	426
New Zealand	25	59,733

Table 30: Number and percentage of women having a peripartum hysterectomy, by facility of birth (secondary and tertiary facilities), 2016

Place of birth	Abdominal hysterectomy within 6 weeks of birth	All women giving birth
Whangarei	1	1,622
North Shore	1	3,988
Waitakere	1	2,867
Auckland City	5	7,184
Middlemore	2	6,295
Waikato	4	3,493
Rotorua	1	1,303
Tauranga	0	1,767
Whakatane	0	593
Gisborne	0	697
Hawke's Bay	3	1,911
Taranaki Base	0	1,261
Palmerston North	2	1,807
Whanganui	0	686
Wellington	3	3,232
Hutt	0	1,871
Wairarapa	0	410
Wairau	0	490
Nelson	0	903
Grey Base	0	218
Christchurch	1	5,175
Timaru	0	600
Dunedin	1	1,646
Southland	0	1,213
All secondary and tertiary facilities	25	51,232
All primary facilities	0	5,718
All home births	0	2,043
New Zealand¹	25	59,733

1 Includes women where birth location was unspecified.

Indicator 15: Mechanical ventilation during pregnancy or postnatal period, 2016

Table 31: Number and percentage of women admitted to ICU and requiring over 24 hours of mechanical ventilation any time during the pregnancy or postnatal period, by DHB of residence, 2016

DHB of residence	ICU admission with over 24 hours of mechanical ventilation	All women giving birth
Northland	0	2,264
Waitemata	3	7,935
Auckland	0	5,908
Counties Manukau	1	8,246
Waikato	2	5,353
Lakes	0	1,545
Bay of Plenty	0	2,890
Tairāwhiti	1	777
Hawke's Bay	0	2,056
Taranaki	0	1,435
MidCentral	0	2,079
Whanganui	0	801
Capital & Coast	0	3,454
Hutt Valley	1	1,967
Wairarapa	0	458
Nelson Marlborough	0	1,548
West Coast	0	319
Canterbury	1	6,305
South Canterbury	0	650
Southern	0	3,317
Unknown	0	426
New Zealand	9	59,733

Table 32: Number and percentage of women admitted to ICU and requiring over 24 hours of mechanical ventilation any time during the pregnancy or postnatal period, by facility of birth (secondary and tertiary facilities), 2016

Place of birth	ICU admission with over 24 hours of mechanical ventilation	All women giving birth
Whangarei	0	1,622
North Shore	0	3,988
Waitakere	0	2,867
Auckland City	4	7,184
Middlemore	0	6,295
Waikato	2	3,493
Rotorua	0	1,303
Tauranga	0	1,767
Whakatane	0	593
Gisborne	0	697
Hawke's Bay	0	1,911
Taranaki Base	0	1,261
Palmerston North	0	1,807
Whanganui	0	686
Wellington	1	3,232
Hutt	0	1,871
Wairarapa	0	410
Wairau	0	490
Nelson	0	903
Grey Base	0	218
Christchurch	1	5,175
Timaru	0	600
Dunedin	0	1,646
Southland	0	1,213
All secondary and tertiary facilities	8	51,232
All primary facilities	0	5,718
All home births	1	2,043
New Zealand¹	9	59,733

1 Includes women where birth location was unspecified.

Indicator 16: Maternal tobacco use during postnatal period

Rationale and purpose

Smoking during pregnancy leads to increased carbon monoxide concentration in the blood of both the mother and her baby, resulting in reduced oxygen and nourishment available to the baby. This increases the risk of babies being born with a low birth weight and increases the risk of neonatal mortality, sudden and unexpected death in infancy and long-term respiratory problems for the child (The Quit Group 2004).

This indicator monitors maternal tobacco use at two weeks postnatal, which potentially identifies the number of women who have continued to smoke during pregnancy and following the birth as well as those who have re-commenced smoking following the birth. We can use this indicator to identify how we can support women and families to stop smoking'.

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

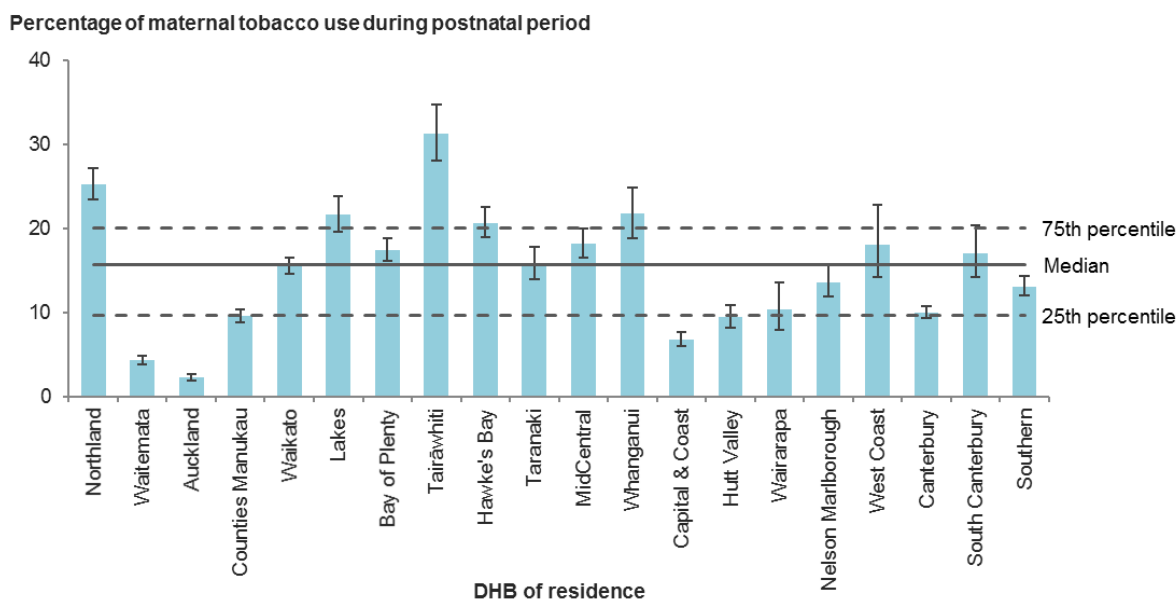
Notes on 2016 data

Rates of maternal tobacco use in the postnatal period (measured at two weeks after birth) varied between DHBs and between secondary and tertiary facility of birth; DHB rates ranged from 2.2% to 31.3%, and facility rates ranged from 1.6% to 32.8%. District health boards and facilities with higher rates should undertake further investigation into their provision of appropriate smoking cessation services and development of new initiatives to support smoking cessation among pregnant and postpartum women, particularly among population groups known to have high rates of tobacco use.

This indicator currently presents tobacco use information from women registered with an LMC or a DHB primary maternity service. Completeness of this data varies between DHBs. From 2009 to 2016, completeness ranged from 54% to 97% of all women giving birth (over 90% complete for 15 DHBs).

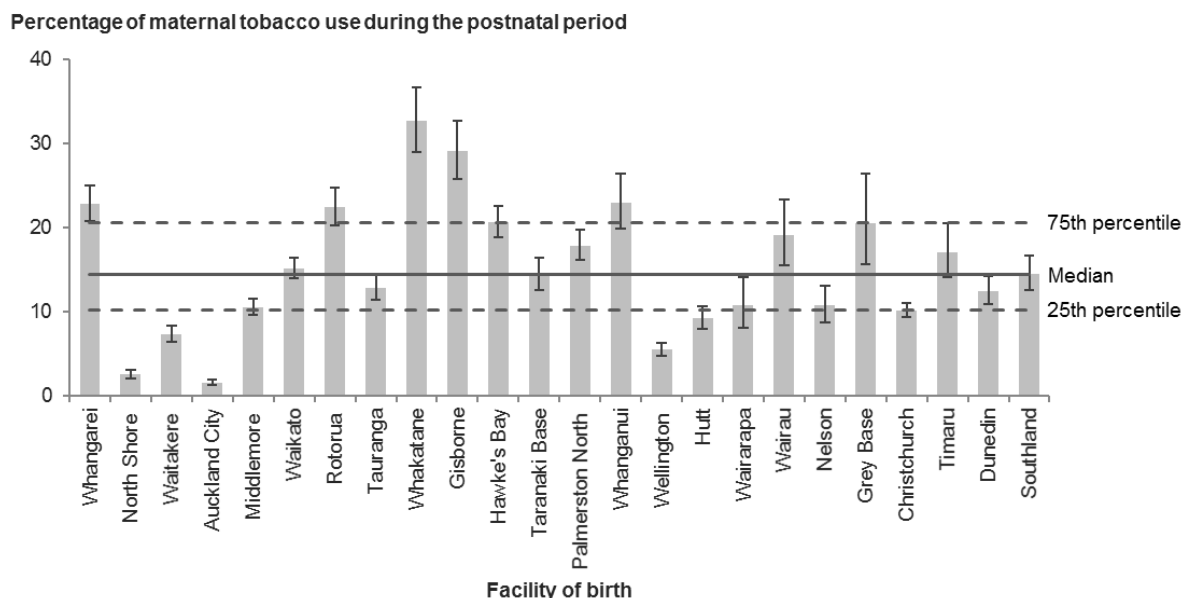
Indicator 16: Maternal tobacco use during postnatal period, 2016

Figure 27: Percentage of women identified as smokers during postnatal period (2 weeks after birth), by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Figure 28: Percentage of women identified as smokers during postnatal period (2 weeks after birth), by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Table 33: Number and percentage of women identified as smokers during postnatal period (2 weeks after birth), by DHB of residence, 2016

DHB of residence	Women identified as smokers at 2 weeks after birth	All women with reported smoking status at 2 weeks after birth	Rate (%)
Northland	529	2,097	25.2
Waitemata	325	7,543	4.3
Auckland	122	5,472	2.2
Counties Manukau	586	6,130	9.6
Waikato	786	5,067	15.5
Lakes	322	1,488	21.6
Bay of Plenty	491	2,815	17.4
Tairāwhiti	232	741	31.3
Hawke's Bay	405	1,961	20.7
Taranaki	223	1,412	15.8
MidCentral	351	1,933	18.2
Whanganui	158	727	21.7
Capital & Coast	221	3,255	6.8
Hutt Valley	174	1,829	9.5
Wairarapa	47	453	10.4
Nelson Marlborough	179	1,315	13.6
West Coast	56	309	18.1
Canterbury	621	6,206	10.0
South Canterbury	97	569	17.0
Southern	418	3,188	13.1
Unknown	45	286	-
New Zealand	6,388	54,796	11.7

Table 34: Number and percentage of women identified as smokers during postnatal period (2 weeks after birth), by facility of birth (secondary and tertiary facilities), 2016

Place of birth	Women identified as smokers at 2 weeks after birth	All women with reported smoking status at 2 weeks after birth	Rate (%)
Whangarei	340	1,489	22.8
North Shore	97	3,813	2.5
Waitakere	197	2,697	7.3
Auckland City	106	6,722	1.6
Middlemore	449	4,257	10.5
Waikato	497	3,278	15.2
Rotorua	284	1,266	22.4
Tauranga	222	1,721	12.9
Whakatane	190	580	32.8
Gisborne	194	665	29.2
Hawke's Bay	379	1,831	20.7
Taranaki Base	179	1,243	14.4
Palmerston North	301	1,683	17.9
Whanganui	145	632	22.9
Wellington	163	2,976	5.5
Hutt	162	1,755	9.2
Wairarapa	44	408	10.8
Wairau	75	391	19.2
Nelson	83	774	10.7
Grey Base	44	214	20.6
Christchurch	517	5,085	10.2
Timaru	89	520	17.1
Dunedin	200	1,600	12.5
Southland	167	1,150	14.5
All secondary and tertiary facilities	5124	46,750	11.0
All primary facilities	903	5,427	16.6
All home births	246	2,020	12.2
New Zealand¹	6,388	54,796	11.7

1 Includes women where birth location was unspecified.

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 2013).

Preterm birth may have a number of 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 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.

Management of maternal hypertension and tobacco use may reduce rates of early preterm birth. Clinical decision-making regarding timing of induction and elective caesarean section affects rates of late preterm birth.

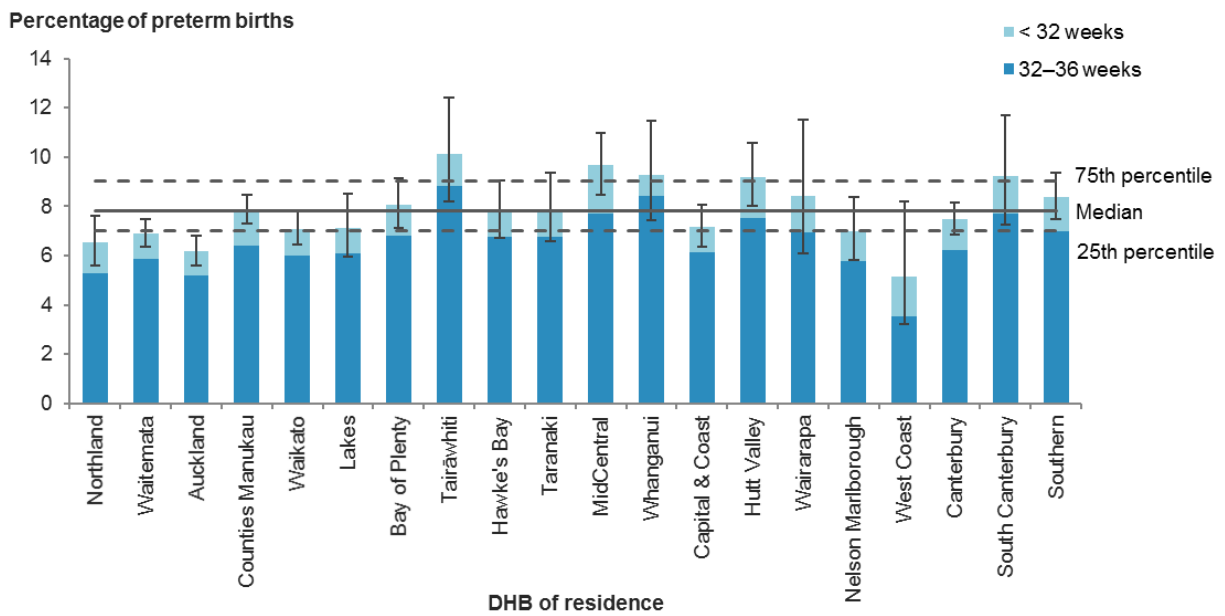
Recent investigation by the National Maternity Monitoring Group found that rates of preterm birth at 34 and 35 weeks' gestation remained fairly constant over the four years from 2008 to 2011. However, preterm births at 36 weeks' gestation have increased. This may represent changes in planned preterm births. The National Maternity Monitoring Group recommends that all DHBs should audit preterm births in their region; particularly births at 34, 35 and 36 weeks (National Maternity Monitoring Group 2015 Annual Report - Pg 28 -30).

Notes on 2016 data

Overall rates of preterm birth (< 37 weeks' gestation) varied between DHBs, ranging from 5.2% to 10.1%, and varied more widely between secondary and tertiary facilities, ranging from 0.5% to 11.5%. The latter variation is likely to reflect clinical decision-making on place of birth for women in preterm labour and at risk of iatrogenic preterm birth.

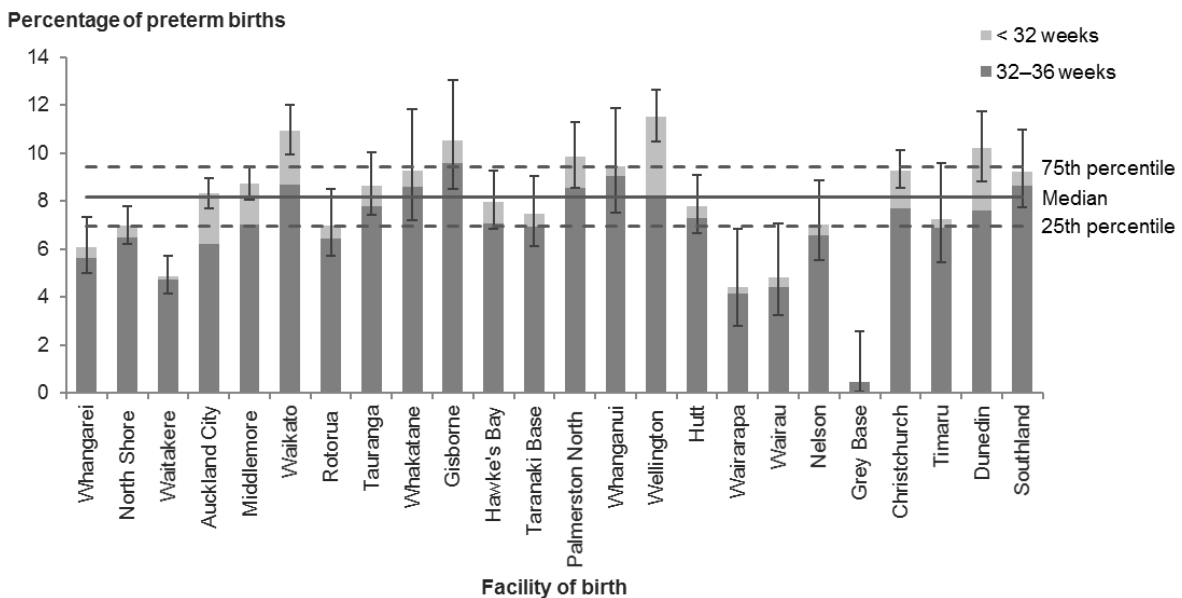
Indicator 17: Preterm births, 2016

Figure 29: Percentage of preterm births, by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Figure 30: Percentage of preterm births, by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Table 35: Number and percentage of preterm births, by DHB of residence, 2016

DHB of residence	Babies born under 37 weeks' gestation			All babies born (live births)	Rate (%)
	< 32 weeks	32–36 weeks	Total		
Northland	28	120	148	2,269	6.5
Waitemata	83	468	551	7,988	6.9
Auckland	59	310	369	5,961	6.2
Counties Manukau	119	533	652	8,304	7.9
Waikato	58	325	383	5,406	7.1
Lakes	16	95	111	1,555	7.1
Bay of Plenty	37	197	234	2,897	8.1
Tairāwhiti	10	70	80	791	10.1
Hawke's Bay	22	140	162	2,075	7.8
Taranaki	16	98	114	1,448	7.9
MidCentral	41	161	202	2,090	9.7
Whanganui	7	68	75	809	9.3
Capital & Coast	36	214	250	3,491	7.2
Hutt Valley	33	150	183	1,987	9.2
Wairarapa	6	28	34	404	8.4
Nelson Marlborough	19	90	109	1,557	7.0
West Coast	5	11	16	310	5.2
Canterbury	79	396	475	6,347	7.5
South Canterbury	10	51	61	660	9.2
Southern	46	235	281	3,352	8.4
Unknown	5	17	22	363	-
New Zealand	735	3,777	4,512	60,064	7.5

Table 36: Number and percentage of preterm births, by facility of birth (secondary and tertiary facilities), 2016

Place of birth	Babies born under 37 weeks' gestation			All babies born (live births)	Rate (%)
	< 32 weeks	32–36 weeks	Total		
Whangarei	7	93	100	1,646	6.1
North Shore	19	264	283	4,056	7.0
Waitakere	4	137	141	2,895	4.9
Auckland City	153	453	606	7,283	8.3
Middlemore	108	449	557	6,385	8.7
Waikato	80	305	385	3,519	10.9
Rotorua	7	85	92	1,317	7.0
Tauranga	15	140	155	1,793	8.6
Whakatane	4	52	56	604	9.3
Gisborne	7	68	75	711	10.5
Hawke's Bay	18	137	155	1,942	8.0
Taranaki Base	7	88	95	1,272	7.5
Palmerston North	24	157	181	1,840	9.8
Whanganui	3	63	66	697	9.5
Wellington	113	267	380	3,298	11.5
Hutt	10	138	148	1,897	7.8
Wairarapa	1	17	18	408	4.4
Wairau	2	22	24	498	4.8
Nelson	4	60	64	913	7.0
Grey Base	0	1	1	215	0.5
Christchurch	83	403	486	5,233	9.3
Timaru	2	42	44	608	7.2
Dunedin	43	126	169	1,658	10.2
Southland	7	106	113	1,225	9.2
All secondary and tertiary facilities	721	3,673	4,394	51,913	8.5
All primary facilities	8	53	61	5,736	1.1
All home births	3	41	44	2,041	2.2
New Zealand¹	735	3,777	4,512	60,064	7.5

1 Includes babies without a birth location recorded.

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).

Placental disease (including that associated with pre-eclampsia) and smoking are common causes of poor fetal growth leading to SGA babies. Appropriate management of women at increased risk of SGA (those with a past history of SGA, hypertension or obesity, and those who smoke) may reduce the risk. Timely detection of poor fetal growth in those women with or without risk factors for SGA may reduce the risk of stillbirth by presenting the opportunity for enhanced surveillance and iatrogenic preterm birth.

Small babies at term (indicator 18)

This indicator measures the proportion of all babies born at term gestation who are small for their gestational age. This is defined as less than the 10th percentile for birthweight on the INTERGROWTH-21 growth charts for gestational ages 37 to 42 weeks. INTERGROWTH-21, an international consortium on issues concerning fetal growth, developed and published these growth standards, using the same methodology as the WHO childhood growth standards (www.health.govt.nz/system/files/documents/pages/factsheet-2-growth-charts-well-child.pdf) recommended for use in New Zealand. The percentage of babies within New Zealand that fall above or below a given percentile on these charts will be different from the equivalent percentages on New Zealand population charts and from customised centile charts which are widely used in New Zealand.

There is extensive evidence for maternal factors leading to SGA, including smoking, hypertension, pre-eclampsia, poorly controlled diabetes, obesity and poor nutrition. We intend this indicator to drive 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 stillbirth.

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

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

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

Notes on 2016 data

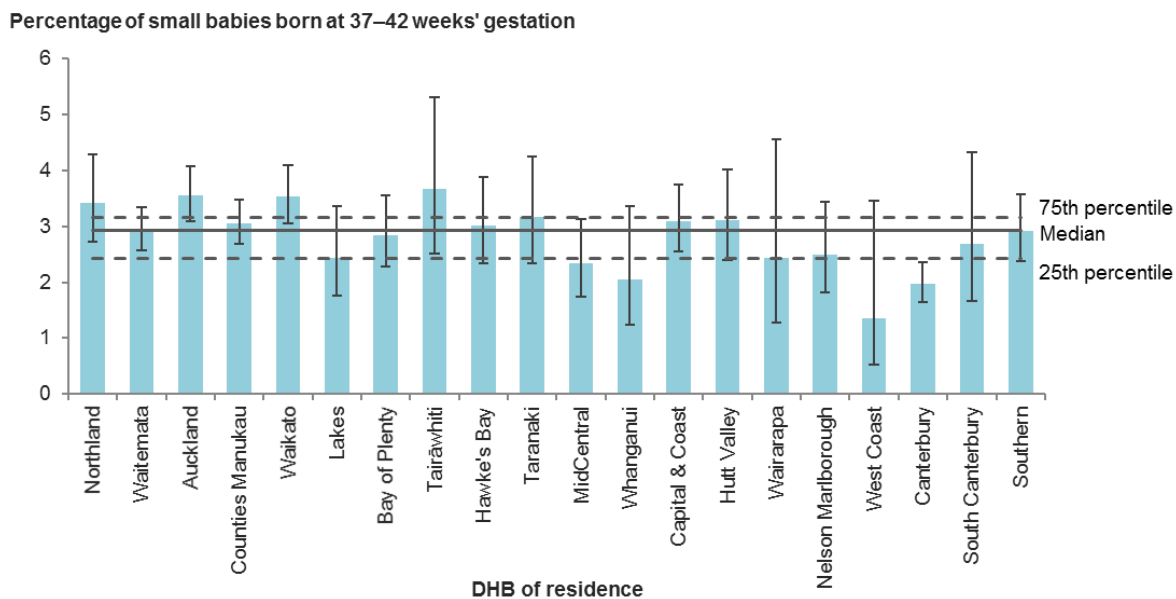
Of all babies born at 37–42 weeks' gestation, the proportion of SGA babies was generally low, but varied two-fold across the DHBs, ranging from 1.4% to 3.7%, and from 1.9% to 4.5% across secondary and tertiary facilities.

Of all SGA babies who were born at 37–42 weeks' gestation, the proportion of those who were born at 40–42 weeks' gestation ranged widely from 0.0% to 52.4% between DHBs, and from 0.0% to 56.3% across secondary and tertiary facilities. These rates were based on small numbers (in both numerator and denominator), so use caution when making comparisons.

Nevertheless, DHBs with high rates of SGA babies born at 40–42 weeks' gestation should consider whether investigation may lead to earlier detection of babies that are at significantly increased risk of stillbirth and perinatal compromise.

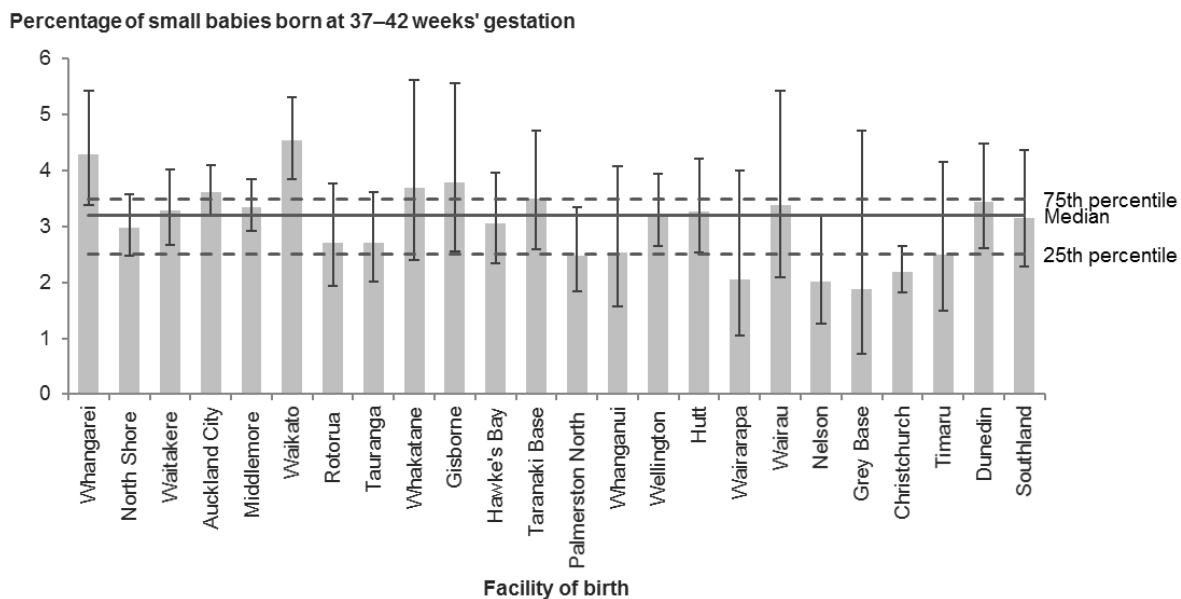
Indicator 18: Small babies at term (37–42 weeks' gestation), 2016

Figure 31: Percentage of small babies at term (37–42 weeks' gestation), by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles.
Error bars represent 95% confidence intervals.

Figure 32: Percentage of small babies at term (37–42 weeks' gestation), by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles.
Error bars represent 95% confidence intervals.

Table 37: Number and percentage of small babies at term (37–42 weeks' gestation), by DHB of residence, 2016

DHB of residence	Babies born at 37–42 weeks' gestation with birthweight under the 10th centile for their gestation	Babies born at 37–42 weeks' gestation	Rate (%)
Northland	72	2,112	3.4
Waitemata	218	7,422	2.9
Auckland	198	5,581	3.5
Counties Manukau	233	7,624	3.1
Waikato	176	4,983	3.5
Lakes	35	1,440	2.4
Bay of Plenty	75	2,640	2.8
Tairāwhiti	26	711	3.7
Hawke's Bay	57	1,895	3.0
Taranaki	42	1,330	3.2
MidCentral	44	1,883	2.3
Whanganui	15	733	2.0
Capital & Coast	100	3,235	3.1
Hutt Valley	56	1,802	3.1
Wairarapa	9	370	2.4
Nelson Marlborough	36	1,442	2.5
West Coast	4	294	1.4
Canterbury	115	5,856	2.0
South Canterbury	16	596	2.7
Southern	89	3,060	2.9
Unknown	3	286	-
New Zealand	1,619	55,295	2.9

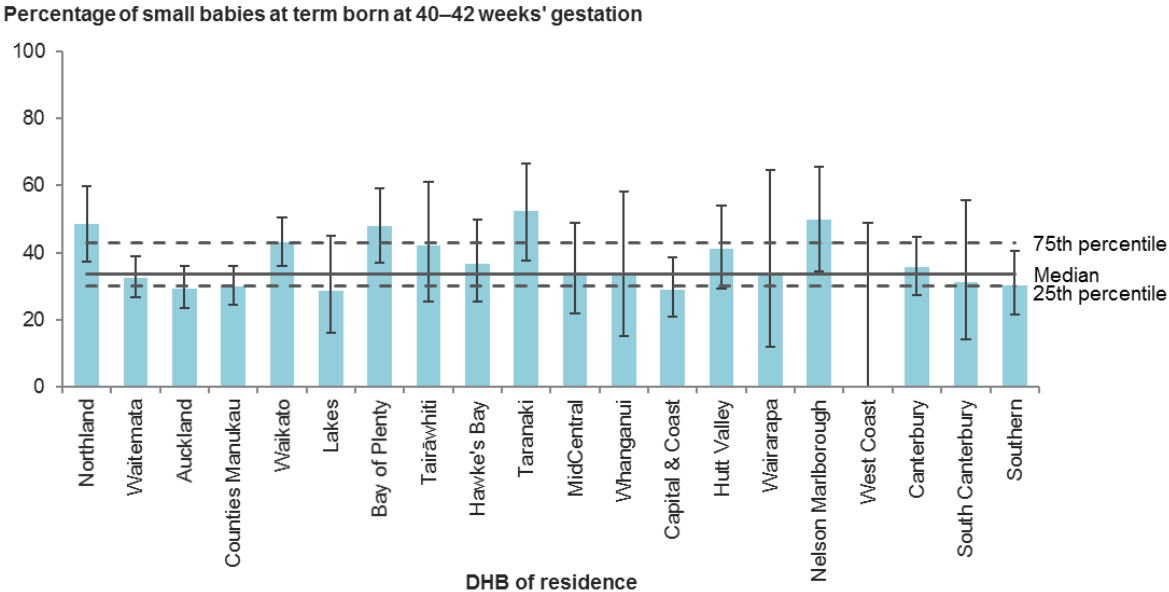
Table 38: Number and percentage of small babies at term (37–42 weeks' gestation), by facility of birth (secondary and tertiary facilities), 2016

Place of birth	Babies born at 37–42 weeks' gestation with birthweight under the 10th centile for their gestation	Babies born at 37–42 weeks' gestation	Rate (%)
Whangarei	66	1,542	4.3
North Shore	112	3,772	3.0
Waitakere	90	2,748	3.3
Auckland City	241	6,670	3.6
Middlemore	194	5,806	3.3
Waikato	141	3,118	4.5
Rotorua	33	1,225	2.7
Tauranga	44	1,630	2.7
Whakatane	20	544	3.7
Gisborne	24	636	3.8
Hawke's Bay	54	1,772	3.0
Taranaki Base	41	1,175	3.5
Palmerston North	41	1,656	2.5
Whanganui	16	631	2.5
Wellington	94	2,916	3.2
Hutt	57	1,747	3.3
Wairarapa	8	390	2.1
Wairau	16	473	3.4
Nelson	17	848	2.0
Grey Base	4	214	1.9
Christchurch	104	4,743	2.2
Timaru	14	562	2.5
Dunedin	51	1,488	3.4
Southland	35	1,111	3.2
All secondary and tertiary facilities	1,517	47,417	3.2
All primary facilities	100	5,643	1.8
All home births	2	1,932	0.1
New Zealand¹	1,619	55,295	2.9

1 Includes babies where birth location was unspecified.

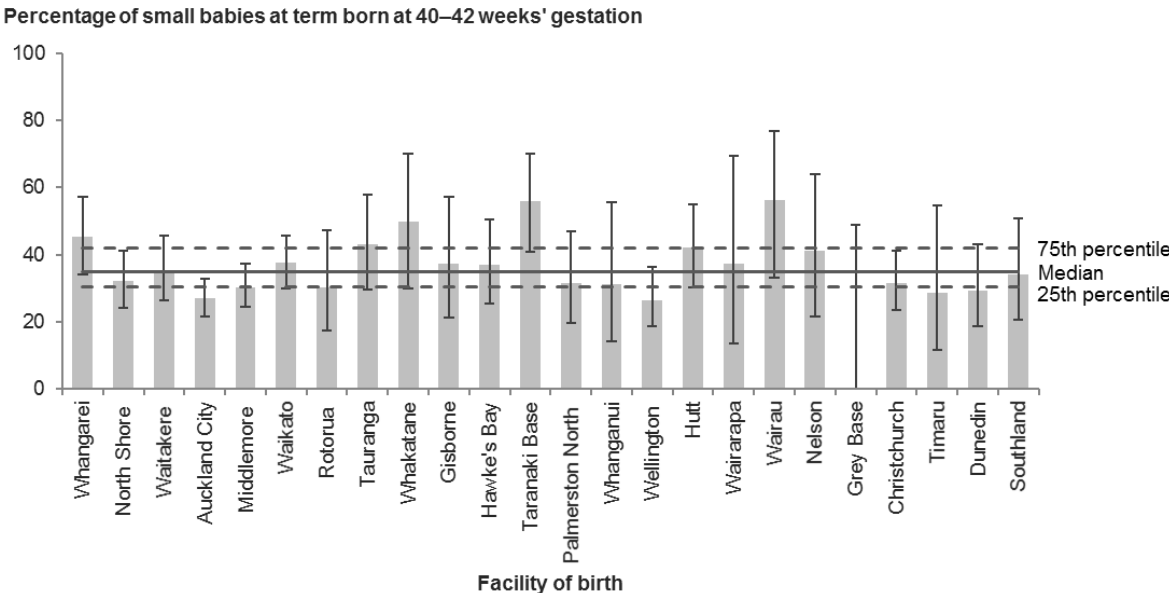
Indicator 19: Small babies at term born at 40–42 weeks' gestation, 2016

Figure 33: Percentage of small babies at term born at 40–42 weeks' gestation, by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Figure 34: Percentage of small babies at term born at 40–42 weeks' gestation, by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Table 39: Number and percentage of small babies at term born at 40–42 weeks' gestation, by DHB of residence, 2016

DHB of residence	Babies born at 40–42 weeks' gestation with birthweight under the 10th centile for their gestation	Babies born at 37–42 weeks' gestation with birthweight under the 10th centile for their gestation	Rate (%)
Northland	35	72	48.6
Waitemata	71	218	32.6
Auckland	58	198	29.3
Counties Manukau	70	233	30.0
Waikato	76	176	43.2
Lakes	10	35	28.6
Bay of Plenty	36	75	48.0
Tairāwhiti	11	26	42.3
Hawke's Bay	21	57	36.8
Taranaki	22	42	52.4
MidCentral	15	44	34.1
Whanganui	5	15	33.3
Capital & Coast	29	100	29.0
Hutt Valley	23	56	41.1
Wairarapa	3	9	33.3
Nelson Marlborough	18	36	50.0
West Coast	0	4	0.0
Canterbury	41	115	35.7
South Canterbury	5	16	31.3
Southern	27	89	30.3
Unknown	3	3	-
New Zealand	579	1,619	35.8

Table 40: Number and percentage of small babies at term born at 40–42 weeks' gestation, by facility of birth (secondary and tertiary facilities), 2016

Place of birth	Babies born at 40–42 weeks' gestation with birthweight under the 10th centile for their gestation	Babies born at 37–42 weeks' gestation with birthweight under the 10th centile for their gestation	Rate (%)
Whangarei	30	66	45.5
North Shore	36	112	32.1
Waitakere	32	90	35.6
Auckland City	65	241	27.0
Middlemore	59	194	30.4
Waikato	53	141	37.6
Rotorua	10	33	30.3
Tauranga	19	44	43.2
Whakatane	10	20	50.0
Gisborne	9	24	37.5
Hawke's Bay	20	54	37.0
Taranaki Base	23	41	56.1
Palmerston North	13	41	31.7
Whanganui	5	16	31.3
Wellington	25	94	26.6
Hutt	24	57	42.1
Wairarapa	3	8	37.5
Wairau	9	16	56.3
Nelson	7	17	41.2
Grey Base	0	4	0.0
Christchurch	33	104	31.7
Timaru	4	14	28.6
Dunedin	15	51	29.4
Southland	12	35	34.3
All secondary and tertiary facilities	516	1,517	34.0
All primary facilities	62	100	62.0
All home births	1	2	50.0
New Zealand¹	579	1,619	35.8

1 Includes babies where birth location was unspecified.

Indicator 20: Term babies requiring respiratory support

Rationale and purpose

Respiratory support for a baby born at term 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 measurement of neonatal intensive/special care unit admissions, as it is not dependent on variations in local layout of facilities and in admission practices. The underlying factors driving the need for respiratory support at term may be more amenable than those driving respiratory support of the preterm infant, where prematurity is the largest driver. Respiratory support in this indicator includes both mechanical and non-invasive ventilation where the sum of both is greater than four hours.

The purpose of this indicator is to drive local investigation, including case review, of the reasons for the need for respiratory support of term babies to identify opportunities to prevent or reduce perinatal morbidity.

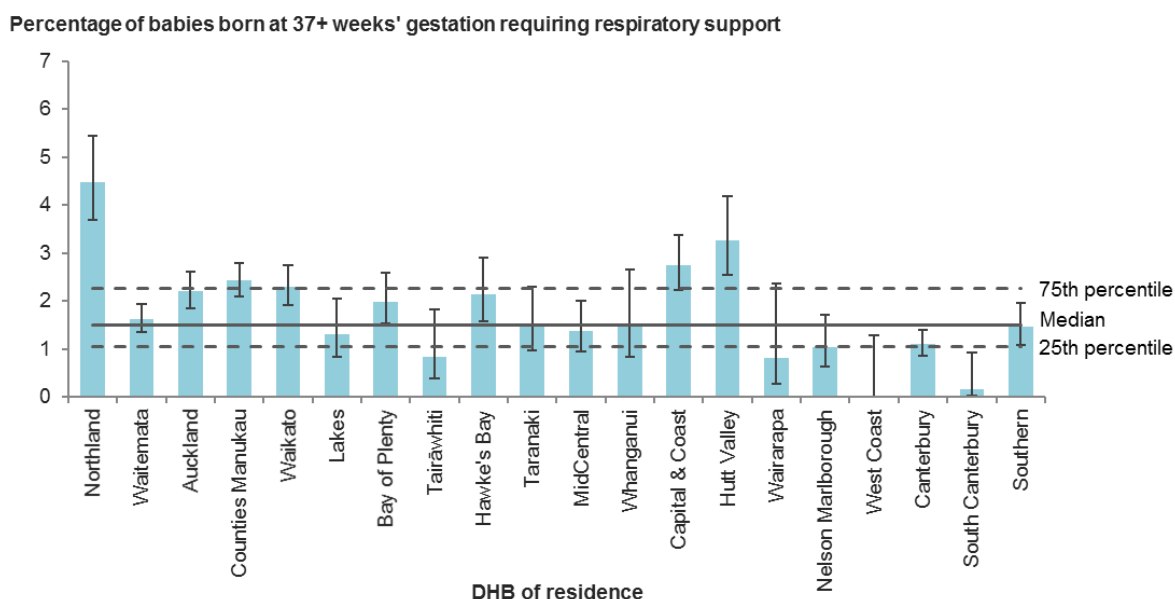
Data presented for this indicator may reflect variation in reporting practices regarding respiratory support for babies. District health boards should address this locally; all DHBs should ensure data they report to the national collections is accurate and complete.

Notes on 2016 data

There was considerable variation in the rate of babies born at term (37+ weeks' gestation) requiring respiratory support, ranging from 0.0% to 4.5% across the DHBs, and from 0.0% to 5.6% across secondary and tertiary facilities. This warrants further investigation at the local level.

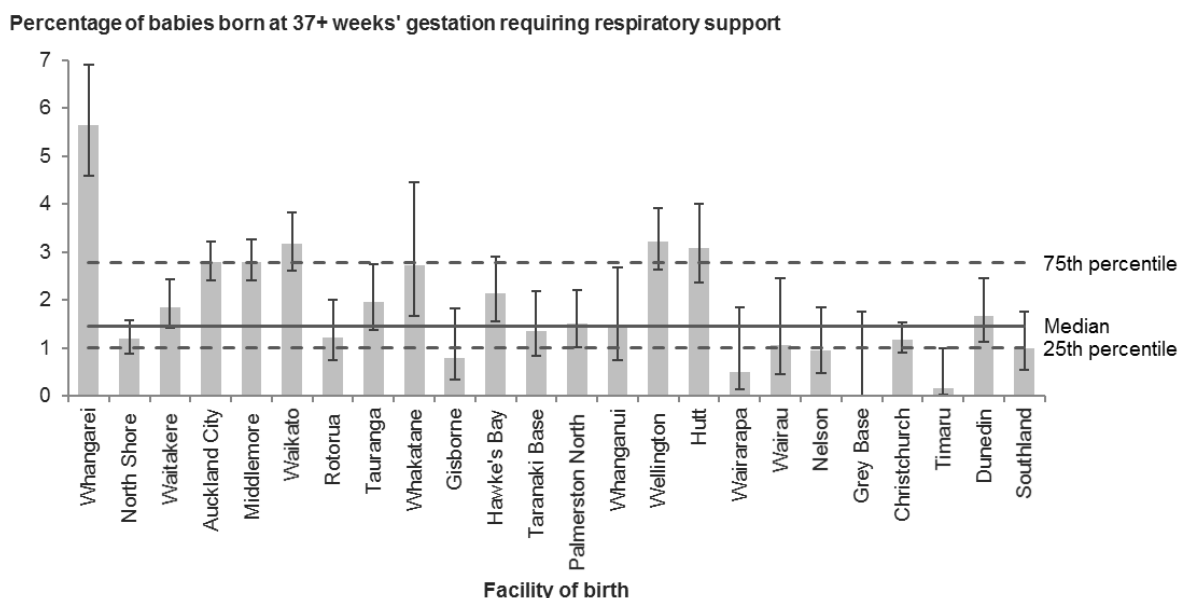
Indicator 20: Babies born at 37+ weeks' gestation requiring respiratory support, 2016

Figure 35: Percentage of babies born at 37+ weeks' gestation requiring respiratory support, by DHB of residence, 2016



Solid line represents the median percentage of DHBs; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Figure 36: Percentage of babies born at 37+ weeks' gestation requiring respiratory support, by facility of birth (secondary and tertiary facilities), 2016



Solid line represents the median percentage of secondary and tertiary facilities; dashed lines represent the 25th and 75th percentiles. Error bars represent 95% confidence intervals.

Table 41: Number and percentage of babies born at 37+ weeks' gestation requiring respiratory support, by DHB of residence, 2016

DHB of residence	Babies born at 37+ weeks' gestation requiring over 4 hours of respiratory support	Babies born at 37+ weeks' gestation	Rate (%)
Northland	95	2,119	4.5
Waitemata	121	7,431	1.6
Auckland	123	5,587	2.2
Counties Manukau	185	7,632	2.4
Waikato	115	5,014	2.3
Lakes	19	1,444	1.3
Bay of Plenty	53	2,658	2.0
Tairāwhiti	6	711	0.8
Hawke's Bay	41	1,906	2.2
Taranaki	20	1,333	1.5
MidCentral	26	1,886	1.4
Whanganui	11	734	1.5
Capital & Coast	89	3,240	2.7
Hutt Valley	59	1,804	3.3
Wairarapa	3	370	0.8
Nelson Marlborough	15	1,445	1.0
West Coast	0	294	0.0
Canterbury	65	5,870	1.1
South Canterbury	1	599	0.2
Southern	45	3,070	1.5
Unknown	8	289	-
New Zealand	1,100	55,436	2.0

Table 42: Number and percentage of babies born at 37+ weeks' gestation requiring respiratory support, by facility of birth (secondary and tertiary facilities), 2016

Place of birth	Babies born at 37+ weeks' gestation requiring over 4 hours of respiratory support	Babies born at 37+ weeks' gestation	Rate (%)
Whangarei	87	1,544	5.6
North Shore	45	3,772	1.2
Waitakere	51	2,749	1.9
Auckland City	186	6,674	2.8
Middlemore	163	5,812	2.8
Waikato	99	3,128	3.2
Rotorua	15	1,225	1.2
Tauranga	32	1,634	2.0
Whakatane	15	548	2.7
Gisborne	5	636	0.8
Hawke's Bay	38	1,781	2.1
Taranaki Base	16	1,177	1.4
Palmerston North	25	1,657	1.5
Whanganui	9	631	1.4
Wellington	94	2,918	3.2
Hutt	54	1,749	3.1
Wairarapa	2	390	0.5
Wairau	5	473	1.1
Nelson	8	848	0.9
Grey Base	0	214	0.0
Christchurch	56	4,745	1.2
Timaru	1	564	0.2
Dunedin	25	1,489	1.7
Southland	11	1,112	1.0
All secondary and tertiary facilities	1,042	47,470	2.2
All primary facilities	38	5,668	0.7
All home births	15	1,990	0.8
New Zealand¹	1,100	55,436	2.0

1 Includes babies where birth location was unspecified.

References

- AIHW National Perinatal Epidemiology and Statistics Unit and AIHW. 2013. *National core maternity indicators. Cat. no. PER 58*. Canberra: Australian Institute of Health and Welfare.
- Arcangeli T, Thilaganathan B, Hooper R, et al. 2012. Neurodevelopmental delay in small babies at term: a systematic review. *Ultrasound in Obstetrics and Gynecology* 40: 267–75.
- Australian Council on Healthcare Standards. 2008. *Australasian Clinical Indicator Report: 2001–2008: Determining the potential to improve quality of care: 10th edition*. Ultimo, NSW: Australian Council on Healthcare Standards.
- Health Select Committee. 2013. Inquiry into improving child health outcomes and preventing child abuse, with a focus from preconception until three years of age. URL: www.parliament.nz/en-nz/pb/sc/documents/reports/50DBSCH_SCR6007_1/inquiry-into-improving-child-health-outcomes-and-preventing (accessed 20 January 2018).
- Lawn JE, Blencowe H, Oza S, et al. 2014. Every newborn: progress, priorities, and potential beyond survival. *Lancet* 384: 189–205.
- Leddy MA, Power ML, Schulkin J. 2008. The Impact of Maternal Obesity on Maternal and Fetal Health. *Reviews in Obstetrics and Gynecology* 1(4): 170–8.
- Mainz J. 2003. Defining and classifying clinical indicators for quality improvement. *International Journal for Quality in Health Care* 15(6): 523–30. DOI: <http://dx.doi.org/10.1093/intqhc/mzg081> (accessed 20 January 2018).
- Ministry of Health. 2012. *Guidelines for Consultation with Obstetric and Related Medical Services (Referral Guidelines)*. Wellington: Ministry of Health.
- Ministry of Health. 2011. *New Zealand Maternity Clinical Indicator – Series* <http://www.health.govt.nz/nz-health-statistics/health-statistics-and-data-sets/new-zealand-maternity-clinical-indicators-series>.
- Ministry of Health. 2013. *National Consensus Guideline for Treatment of Postpartum Haemorrhage*. Wellington: Ministry of Health.
- Ministry of Health. 2015. *Report on Maternity, 2015*. Wellington: Ministry of Health.
- National Maternity Monitoring Group. 2013. *Annual Report 2013*. Wellington: National Maternity Monitoring Group.
- Newcombe RG. 1998. Two-sided confidence intervals for the single proportion: Comparison of seven methods. *Statistics in Medicine* 17: 857–72.
- NICE. 2008. *Antenatal Care for Uncomplicated Pregnancies. NICE Guideline C62*. London: National Institute for Health and Care Excellence. URL: www.nice.org.uk/guidance/CG62/chapter/Introduction (accessed 20 January 2018).
- Perinatal and Maternal Mortality Review Committee. 2015. *Ninth Annual Report of the Perinatal and Maternal Mortality Review Committee: Reporting mortality 2013*. Wellington: Health Quality & Safety Commission.
- The Quit Group. 2004. *Smoking and Pregnancy*. URL: [The Quit Group. Smoking and Pregnancy. URL: https://quit.org.nz/reasons-to-quit/smoking-and-pregnancy](http://www.quit.org.nz/reasons-to-quit/smoking-and-pregnancy) (accessed 20 January 2018).
- Villar J, Ismail LC, Victora CG, et al. 2014. International standards for newborn weight, length, and head circumference by gestational age and sex: the Newborn Cross-Sectional Study of the

INTERGROWTH-21st Project. *Lancet* 384(9946): 857–68. DOI: [http://dx.doi.org/10.1016/S0140-6736\(14\)60932-6](http://dx.doi.org/10.1016/S0140-6736(14)60932-6) (accessed 20 January 2018).

WHA. 2007. *Findings from the Core Maternity Indicators Project Funded by the Australian Council on Safety and Quality in Health Care and Sponsored by the Department of Health, Western Australia*. Turner, ACT: Women's Hospitals Australasia.

WHO. 2011. *Recommendations for Prevention and Treatment of Pre-eclampsia and Eclampsia*. Geneva: World Health Organization.

WHO. 2013. *Preterm Birth Factsheet*. URL: www.who.int/mediacentre/factsheets/fs363/en/index.html (accessed 20 January 2018).

Appendices

Appendix 1: National Maternity Collection

The Ministry of Health's National Maternity Collection 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.⁴

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 (www.health.govt.nz/publication/national-maternity-collection-data-dictionary) for more information on the data held in the National Maternity Collection.

National Minimum Dataset

The NMDS stores administrative information routinely collected for all publicly funded inpatients of a New Zealand maternity facility (hospitals and birthing units). This information contains a large amount of demographic and clinical data, including data on diagnoses and the procedures used. The NMDS assigns information 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 (ICD-10-AM). This system is designed for the classification of morbidity and mortality information for statistical, epidemiological and clinical purposes. Refer to the data dictionary (www.health.govt.nz/publication/national-minimum-dataset-hospital-events-data-dictionary) for more information on the data held in the NMDS.

Lead Maternity Carer claims data

The LMC claims data set 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 92% of all women giving birth in 2016. 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, breastfeeding status).

⁴ Collection of this data set (from 2014 onwards) is under way but is incomplete at this time. We have included data currently available in the National Maternity Collection in this publication.

DHB-funded primary maternity services data

Collection of this data set is under way. 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 the National Maternity Collection.⁵

Once complete, this data set will increase the scope of information the Ministry holds on women (and their babies) who access primary maternity services.

5 From 2009 to 2015, approximately 87% of women giving birth registered to receive primary maternity care with an LMC and 8% registered to receive care from a DHB primary maternity service. Provision of care was unknown for 5% of women giving birth. It is expected that most of these women received care from the respective DHB primary maternity services (not yet reporting), but some may not have received any primary maternity care (Ministry of Health 2015).

Appendix 2: Technical notes

Obtaining the data

This publication uses the National Maternity Collection as the primary source for identifying all women giving birth and live-born babies. We extracted variables used to identify the women and babies from the National Maternity Collection, as well as the following variables: delivery date, place of birth, age, ethnicity, smoking status, parity, primary maternity care provider, gestation and birthweight.

The National Maternity Collection 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% of women giving birth in 2015).

Indicators 2–12 and 20 require additional information that is not available in the National Maternity Collection. Therefore, we identified and extracted hospital events occurring during the pregnancy and postnatal period 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). It used 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 codes.

Clinical codes and definitions

Standard primiparae: a group of mothers considered to be clinically comparable and expected to require low levels of obstetric intervention. This report defines standard primiparae as women recorded in the National Maternity Collection (MAT) who meet all of the following inclusions:

- gave birth at a maternity facility or had a home birth⁶
- 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).

⁶ 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 (ICD-10-AM)	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 (ICD-10-AM)	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 (ICD-10-AM)	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 (ICD-10-AM)	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. We counted women giving birth at home as having had a spontaneous vaginal birth.

Table A5: Delivery type codes

Clinical code (ICD-10-AM)	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 (ICD-10-AM)	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 (ICD-10-AM)	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). We counted women giving birth at home 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 (ICD-10-AM)	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 (ICD-10-AM)	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 (ICD-10-AM)	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 (ICD-10-AM)	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 (ICD-10-AM)	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 a Lead Maternity Carer (LMC): 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 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 over 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: all facility graphs in this report present maternity events occurring in secondary and tertiary maternity facilities (hospitals) only, 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. The accompanying online tables provide data for individual primary facilities. 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% 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 report includes 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, we have summed Christchurch Women's Hospital and Christchurch Hospital events.

Appendix 3: Catchment areas

The primary, secondary and tertiary maternity facilities that reported births between 2009 and 2016 are listed by DHB region (of location) in the table below. Figure A1 presents their geographical locations.

DHB	Tertiary facility ¹	Secondary facility ²	Primary facility ³
Northland	Auckland City	Whangarei	Bay of Islands Dargaville (closed) Hokianga Health Kaitaia
Waitemata		North Shore Waitakere	Helensville Warkworth Wellsford
Auckland			Birthcare Auckland
Counties Manukau	Middlemore		Botany Downs Papakura Pukekohe
Waikato	Waikato		Birthcare Huntly Matariki (closed) Pohlen Trust Rhoda Read (closed) River Ridge Taumarānui Te Awamutu Te Kuiti Thames Tokoroa Waihi Waterford
Lakes		Rotorua	Taupo
Bay of Plenty		Tauranga Whakatane	Bethlehem Murupara Opotiki
Tairāwhiti		Gisborne	Ngati Porou Hauora
Taranaki		Taranaki Base	Elizabeth R (closed) Hawera
Hawke's Bay	Wellington	Hawke's Bay Regional	Wairoa
MidCentral		Palmerston North	Dannevirke Horowhenua
Whanganui		Whanganui	Otaihape Waimarino
Capital & Coast			Kāpiti Kenepuru
Hutt Valley		Hutt	
Wairarapa		Wairarapa	
Nelson Marlborough		Wairau Nelson	Golden Bay Motueka

DHB	Tertiary facility ¹	Secondary facility ²	Primary facility ³
West Coast	Christchurch	Grey Base	Buller Reefton
Canterbury			Akaroa (closed) Ashburton Burwood (closed) Darfield Kaikoura Lincoln Rangiora St George's Waikari (closed)
South Canterbury		Timaru	
Southern		Dunedin Southland	Charlotte Jean Clutha Dunstan (closed) Gore Lakes District Lumsden Maniototo (closed) Oamaru Tuatapere Winton

1 A facility that provides a multidisciplinary specialist team for women and babies with complex or rare maternity needs; for example, babies with major fetal disorders requiring prenatal diagnostic and fetal therapy services, or women with obstetric histories that significantly increase the risks during pregnancy, labour and delivery (for example, those who have already had two placental abruptions). This includes neonatal ICUs.

2 A facility that provides additional care during the antenatal, labour and birth, and postnatal periods for women and babies who experience complications and who have a clinical need for either specialist consultation or transfer.

3 A facility that does not have inpatient secondary maternity services or 24-hour on-site availability of specialist obstetricians, paediatricians and anaesthetists. This includes birthing units.

Figure A1: Maternity facilities in New Zealand by DHB and facility type (2009–2016)

