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New Zealand Maternity Clinical Indicators

2015

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Contents

List of tables

List of figures

Executive summary

The New Zealand Maternity Clinical Indicators provide information on a series of maternity outcomes which relate to an optimal health outcome. 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 21 indicators covered in this report:

- one applies to women who registered with a lead maternity carer (LMC)
- eight apply to standard primiparae
- eight apply to all women giving birth in New Zealand
- four apply to all babies born in New Zealand.

This is the seventh report in the New Zealand Maternity Clinical Indicators series. It presents data on women giving birth, and babies born in the 2015 calendar year.

From 2009 to 2015, 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
- an increase in the proportion of women with body mass index (BMI) of over 35 at registration
- 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 six 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 a seven-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 every three years.

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 could be measured 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 objectives of the Maternity Clinical Indicators were retained.

The changes were implemented 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 2015*, presents data on the 21 indicators included in the 2013 and 2014 reports. The report covers births in the 2015 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 2016 data.

Overview

This report presents the third year of reporting on the revised indicators, and the seventh edition in the *New Zealand Maternity Clinical Indicators* series (see Table 1 for a list of indicators presented in this publication). The 21 indicators presented in this report are the same as those presented in the 2013 and 2014 reports, with no changes to the criteria and methods used. They were developed by the Ministry of Health 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 ICU and requiring ventilation during the pregnancy or postnatal period	Total number of women admitted to ICU and requiring over 24 hours of mechanical ventilation during admission any time during the pregnancy or postnatal period	Total number of women giving birth
	16	Maternal tobacco use during postnatal period	Total number of women identified as smokers at 2 weeks after birth	Total number of women with smoking status at 2 weeks after birth reported
	17	Women with BMI over 35	Total number of women with BMI over 35	Total number of women with BMI recorded
Live-born babies	18	Preterm birth	Total number of babies born under 37 weeks' gestation	Total number of babies born (live births)

Population	Indicator		Numerator	Denominator
	19	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
	20	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
	21	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

A set of online tables was produced to accompany this report and is available from the Ministry of Health's webpage (www.health.govt.nz/publication/new-zealand-maternity-clinical-indicators-2015). These tables present numbers and rates by:

- indicator, ethnic group and DHB of residence, 2009–2015
- indicator and facility of birth (primary, secondary and tertiary), 2009–2015
- gestation in weeks for indicator 19, 2009–2015.

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

Data for these indicators was extracted from all pregnancies and live-born babies recorded on the National Maternity Collection (MAT) on 16 September 2016. Additional hospital event data for each pregnancy and live-born baby recorded on MAT was extracted from the National Minimum Dataset (NMDS) to supplement the data set.

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

Standard primiparae were identified 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 2015 from MAT. Data from births occurring from 2009 to 2015 has been reextracted 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, the data presented in this edition should not be compared to previous reports. See the accompanying spreadsheets for time-series analysis.

Data integrity

This report has been compiled from data supplied by DHBs and LMCs. District health boards and facilities are individually responsible for ensuring the completeness and quality of data they supply to national collections. Lead maternity carers are contractually responsible for ensuring the accuracy of data they supply on claims for payment. Data quality management has been applied 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

Data is presented in this report in two ways:

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

Numbers and rates

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

Differences in rates by ethnicity or socioeconomic group could be an area of focus for analysis at the DHB level. Some rates are based on small numbers of events and should therefore be treated with caution.

Figures

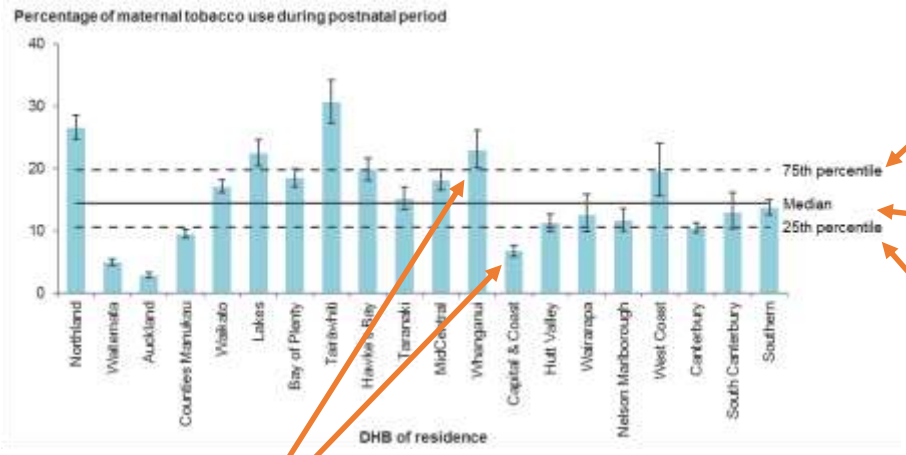
Graphs showing rates by DHB of residence and secondary/tertiary facility of birth are presented for each indicator, except indicators 13–15 due to very small numbers. The median, as well as the 25th and 75th percentiles, are displayed on the graphs to help compare rates between DHBs and facilities. The 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 2.8% and the highest was for Tairawhiti DHB at 30.6%

Notes on 2015 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 2.8% to 30.6%, and facility rates ranged from 1.7% to 31.1%.

Figure 1: Percentage of women identified as smokers during postnatal period (2 weeks after birth), by DHB of residence, 2015



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

75% of DHBs (15 out of 20) have rates below the 75th percentile line

50% of DHBs (10 out of 20) have rates below the 75th percentile line

25% of DHBs (5 out of 20) have rates below the 75th percentile line

95% confidence intervals (error bars) can be used to assist in comparing DHB rates. If the confidence intervals do not overlap, it is reasonable to assume that the difference is not due to chance. For example, the rate for Whanganui DHB can be considered as being 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 2015. See Table 2 for a summary of results, and

Figure 2 for a graph showing rates for each indicator from 2009 to 2015. This figure is also available by DHB and by secondary or tertiary facility in the accompanying online tables. The following analysis is presented 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).

Approximately 15% of women giving birth in New Zealand are considered to be standard primiparae in this publication. 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 2015, ranging from 12.6% (Northland DHB) to 17.2% (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 (22.3% each of Indian and other Asian); 10.9% identified as Māori and 12.3% as Pasifika. About 12.6% of women giving birth at home were standard primiparae, while 15% of women who gave birth at a maternity facility were standard primiparae (Figure 1).

From 2009 to 2015, there was a statistically significant increase in the proportion of standard primiparae who had:

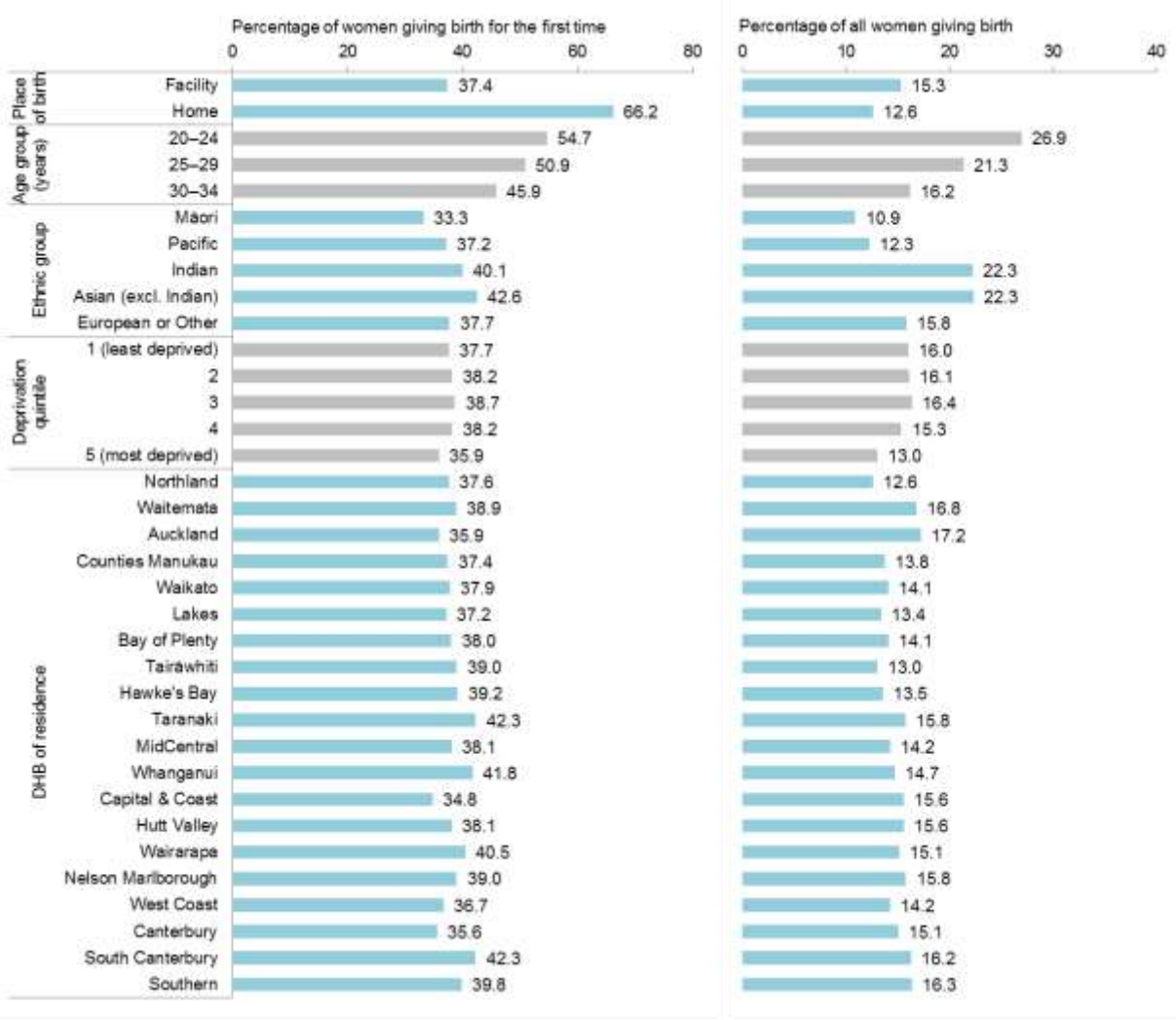
- an instrumental vaginal birth (indicator 3)
- a caesarean section (indicator 4)
- an induction of labour (indicator 5)
- an episiotomy without third- or fourth-degree perineal tear (indicator 7)
- a third- or fourth-degree tear and no episiotomy (indicator 8)
- an episiotomy and a third- or fourth-degree tear (indicator 9).

1 The proportion of women giving birth for the first time (parity = 0) is approximately 40% (ranging from 33% to 48% 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).

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 2015, 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.

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 has increased from 82% of women giving birth in 2009 to 92% of women giving birth in 2015.

Women are also registering earlier with an LMC, with a statistically significant increase in women registering within the first trimester of pregnancy (<13 weeks) from 2009 to 2015.

All women giving birth

Among all women giving birth in 2015, there was a statistically significant increase from 2009 to 2015 in the proportion of women:

- requiring a blood transfusion with a vaginal birth (indicator 12)
- with BMI over 35 (indicator 17).

In contrast, there was a significant decrease from 2009 to 2015 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 2015, 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 2015.

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 low risk women, although definitions of low risk differ between the two countries. 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 Australian counterparts.

Table 2: New Zealand Maternity Clinical Indicator national rates by year, 2009–2015

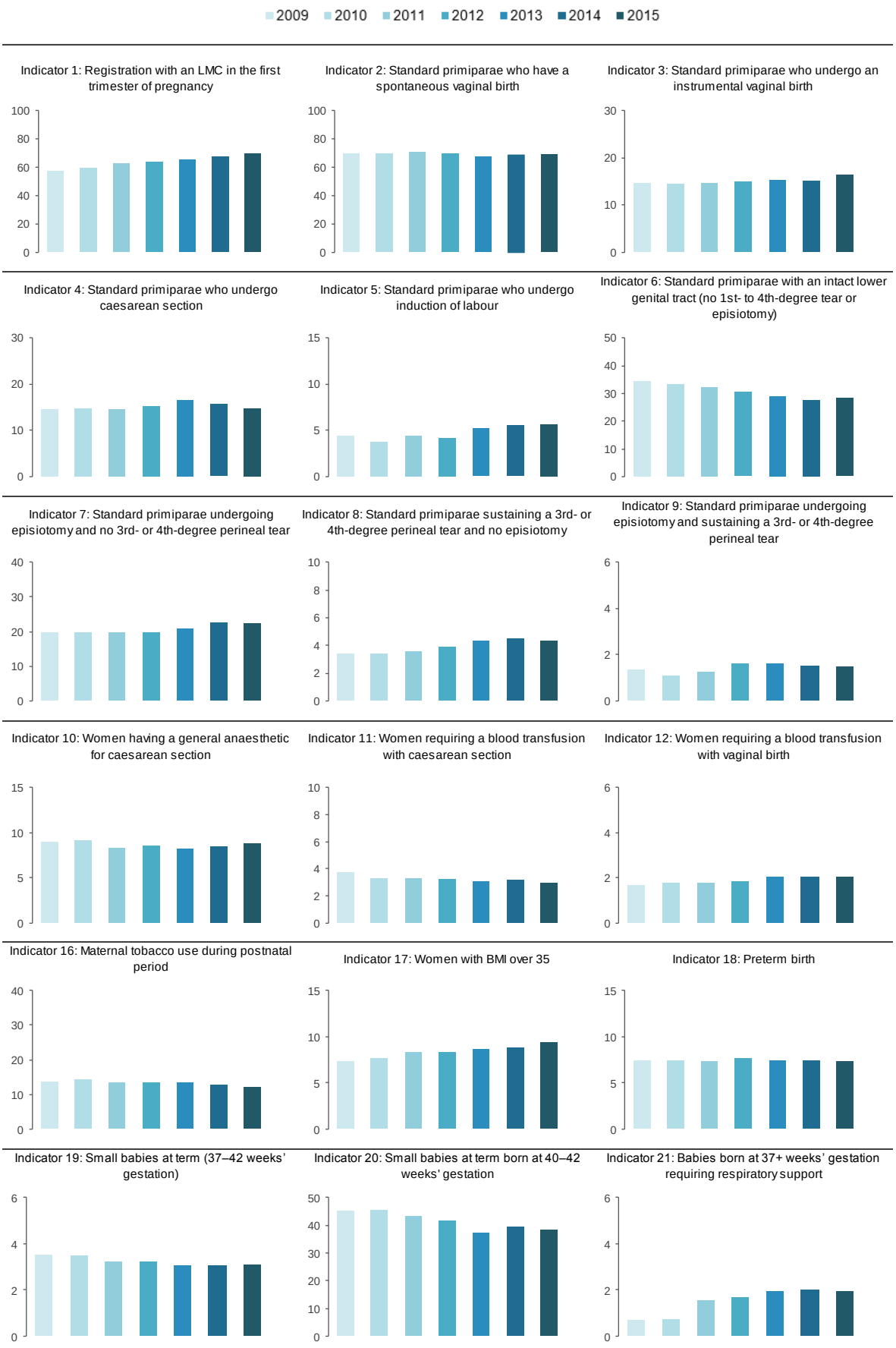
Indicator		2009	2010	2011	2012	2013	2014	2015	From 2009 to 2015 (p-value)[1]
Women registered with an LMC									
1	Registration with an LMC in the first trimester of pregnancy (%)	57.3	59.5	62.5	63.8	65.3	67.7	70.0	↑ (<0.001)
Standard primiparae									
2	Standard primiparae who have a spontaneous vaginal birth (%)	69.6	70.0	70.1	69.9	67.7	68.9	68.7	↓ (0.005)
3	Standard primiparae who undergo an instrumental vaginal birth (%)	14.8	14.5	14.8	14.9	15.2	15.2	16.3	↑ (<0.001)
4	Standard primiparae who undergo caesarean section (%)	14.6	14.8	14.5	15.1	16.5	15.6	14.9	↑ (0.03)
5	Standard primiparae who undergo induction of labour (%)	4.4	3.8	4.4	4.2	5.2	5.6	5.7	↑ (<0.001)
6	Standard primiparae with an intact lower genital tract (no 1st- to 4th-degree tear or episiotomy) (%)	34.6	33.4	32.3	30.4	28.9	27.7	28.3	↓ (<0.001)

Indicator		2009	2010	2011	2012	2013	2014	2015	From 2009 to 2015 (p-value)[1]
7	Standard primiparae undergoing episiotomy and no 3rd- or 4th-degree perineal tear (%)	19.6	19.8	19.8	19.7	21.0	22.7	22.2	↑ (<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	↑ (<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	↑ (0.01)
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	– (0.09)
11	Women requiring a blood transfusion with caesarean section (%)	3.8	3.3	3.3	3.2	3.1	3.2	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	↑ (<0.001)
13	Women with eclampsia at birth admission (numerator)[2]	27	22	17	12	17	18	26	N/A
14	Women having a peripartum hysterectomy (numerator)[2]	51	29	39	49	21	37	30	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	N/A
16	Maternal tobacco use during postnatal period (%)	13.6	14.3	13.4	13.3	13.2	12.8	12.0	↓ (<0.001)
17	Women with BMI over 35 (%)	7.3	7.6	8.3	8.2	8.6	8.8	9.3	↑ (<0.001)
Babies									
18	Preterm birth (%)	7.4	7.4	7.3	7.6	7.4	7.4	7.3	– (0.78)
19	Small babies at term (37–42 weeks' gestation) (%)	3.5	3.5	3.2	3.2	3.0	3.0	3.1	↓ (<0.001)
20	Small babies at term born at 40–42 weeks' gestation (%)	45.2	45.5	43.4	41.4	36.9	39.2	38.4	↓ (<0.001)
21	Babies born at 37+ weeks' gestation requiring respiratory support	0.7	0.7	1.6	1.7	1.9	2.0	1.9	↑ (<0.001)

1 Shows whether there was a statistically significant increase (↑), or decrease (↓), or no statistically significant change (–) in rates from 2009 to 2015. 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, 2009–2015



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 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.

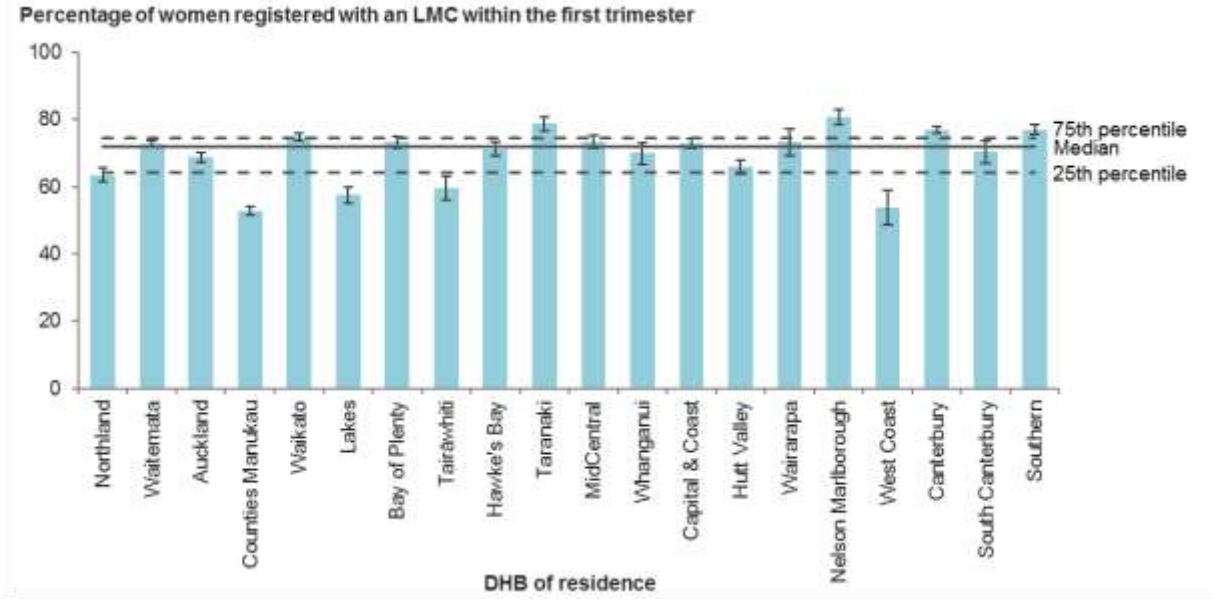
Notes on 2015 data

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 52.9% to 80.9%, and rates by facility of birth ranged from 45.9% to 84.1%. New initiatives in this area, such as the introduction of the Find Your Midwife website (www.findyourmidwife.co.nz) in 2013, 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.

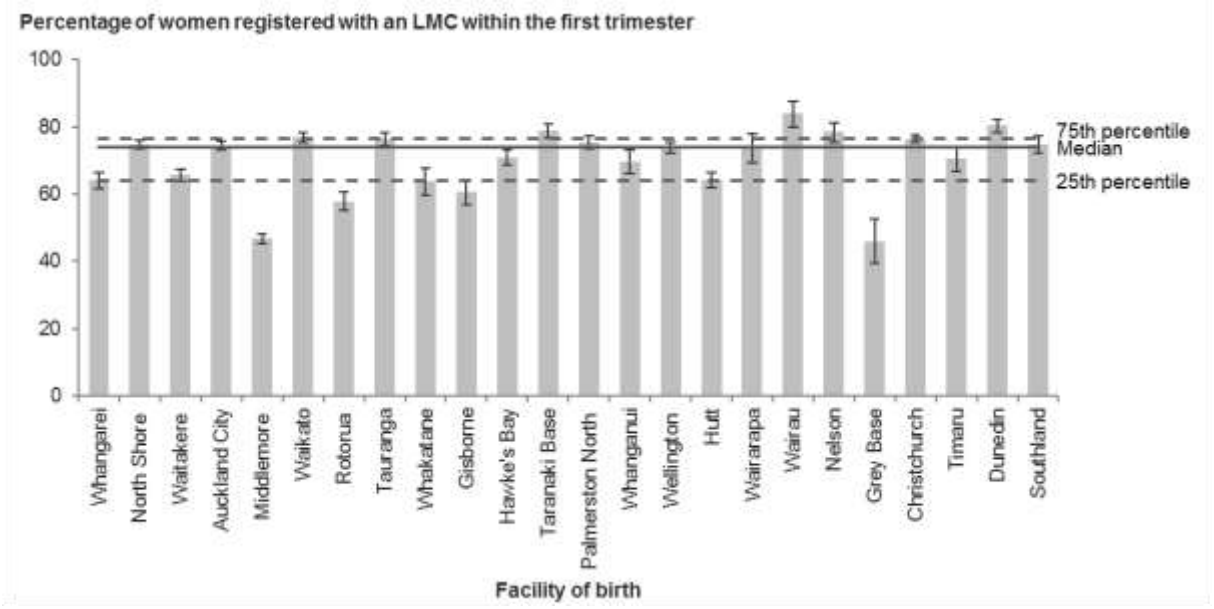
Indicator 1: Registration with an LMC in the first trimester of pregnancy, 2015

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, 2015



Black 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), 2015



Black 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, 2015

DHB of residence	Registered within the first trimester of pregnancy	All registered women	Rate (%)
Northland	1,282	2,017	63.6
Waitemata	5,220	7,181	72.7
Auckland	3,225	4,688	68.8
Counties Manukau	3,409	6,440	52.9
Waikato	3,851	5,141	74.9
Lakes	860	1,494	57.6
Bay of Plenty	2,034	2,776	73.3
Tairāwhiti	439	735	59.7
Hawke's Bay	1,327	1,862	71.3
Taranaki	1,187	1,508	78.7
MidCentral	1,491	2,032	73.4
Whanganui	541	772	70.1
Capital & Coast	2,453	3,363	72.9
Hutt Valley	1,230	1,866	65.9
Wairarapa	338	461	73.3
Nelson Marlborough	999	1,235	80.9
West Coast	186	345	53.9
Canterbury	4,771	6,197	77.0
South Canterbury	463	657	70.5
Southern	2,621	3,401	77.1
Unknown	141	244	-
New Zealand	**38,068**	**54,415**	**70.0**

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, 2015

Place of birth	Registered within the first trimester of pregnancy	All registered women	Rate (%)
Whangarei	881	1,375	64.1
North Shore	2,696	3,605	74.8
Waitakere	1,846	2,808	65.7
Auckland City	4,080	5,482	74.4
Middlemore	2,174	4,651	46.7
Waikato	2,631	3,419	77.0
Rotorua	720	1,245	57.8
Tauranga	1,345	1,759	76.5
Whakatane	337	528	63.8
Gisborne	401	663	60.5
Hawke's Bay	1,221	1,721	70.9
Taranaki Base	1,061	1,346	78.8
Palmerston North	1,333	1,768	75.4
Whanganui	459	658	69.8
Wellington	2,284	3,093	73.8
Hutt	1,138	1,775	64.1
Wairarapa	302	409	73.8
Wairau	311	370	84.1
Nelson	572	729	78.5
Grey Base	100	218	45.9
Christchurch	3,931	5,139	76.5
Timaru	416	589	70.6
Dunedin	1,350	1,679	80.4
Southland	886	1,183	74.9
All secondary and tertiary facilities	**32,475**	**46,212**	**70.3**
All primary facilities	**3,752**	**5,526**	**67.9**
All home births	**1,527**	**2,145**	**71.2**
New Zealand[1]	**38,068**	**54,415**	**70.0**

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. Judicious use of instrumental birth is needed (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 may be affected by instrumental birth, including maternal and perinatal morbidity.

Caesarean section (indicator 4)

The purpose of this indicator is to encourage maternity service providers to evaluate whether caesarean sections were performed 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 2015 data

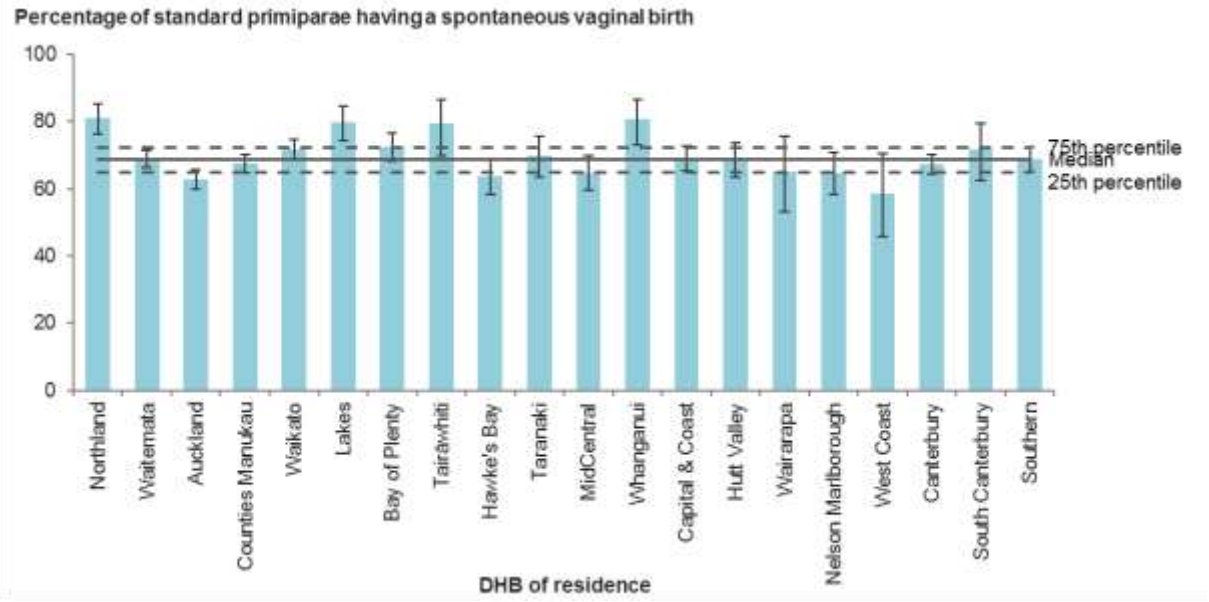
Rates of spontaneous vaginal birth among standard primiparae varied notably between DHBs and between secondary and tertiary facilities in 2014; DHB rates ranged from 58.6% to 81.1% and facility rates ranged from 52.9% to 86.4%. This variation merits further urgent investigation, as it represents significant variation in clinical practice among a clinically comparable cohort.

Rates of instrumental vaginal birth ranged from 4.1% to31.1% between facilities. Caesarean section rates also varied by facility, from 4.5% to 29.8%, and by DHB, from 8.6% to 29.3%. These variations indicate a need for urgent detailed review. 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.

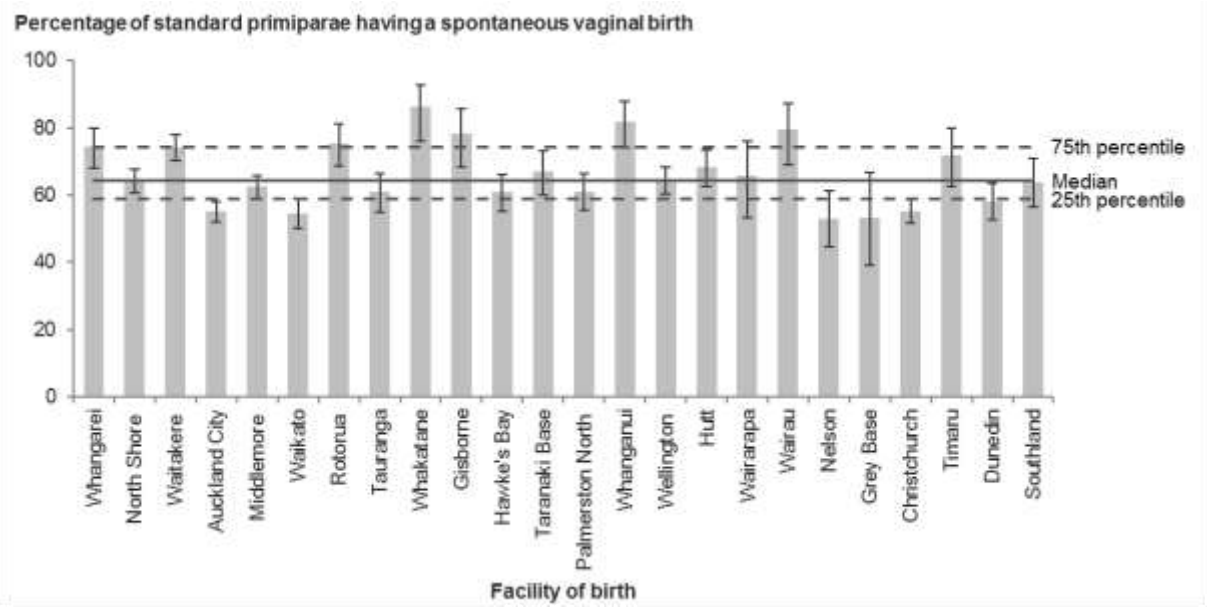
Indicator 2: Spontaneous vaginal birth among standard primiparae, 2015

Figure 5: Percentage of spontaneous vaginal births among standard primiparae, by DHB of residence, 2015



Black 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), 2015



Black 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, 2015

DHB of residence	Spontaneous vaginal births	Standard primiparae	Rate (%)
Northland	236	291	81.1
Waitemata	860	1,248	68.9
Auckland	644	1,026	62.8
Counties Manukau	795	1,177	67.5
Waikato	561	782	71.7
Lakes	183	229	79.9
Bay of Plenty	307	423	72.6
Tairāwhiti	70	88	79.5
Hawke's Bay	208	326	63.8
Taranaki	155	222	69.8
MidCentral	214	330	64.8
Whanganui	105	130	80.8
Capital & Coast	416	601	69.2
Hutt Valley	210	305	68.9
Wairarapa	43	66	65.2
Nelson Marlborough	147	227	64.8
West Coast	34	58	58.6
Canterbury	673	1,001	67.2
South Canterbury	76	106	71.7
Southern	408	593	68.8
Unknown	17	26	-
New Zealand	**6,362**	**9,255**	**68.7**

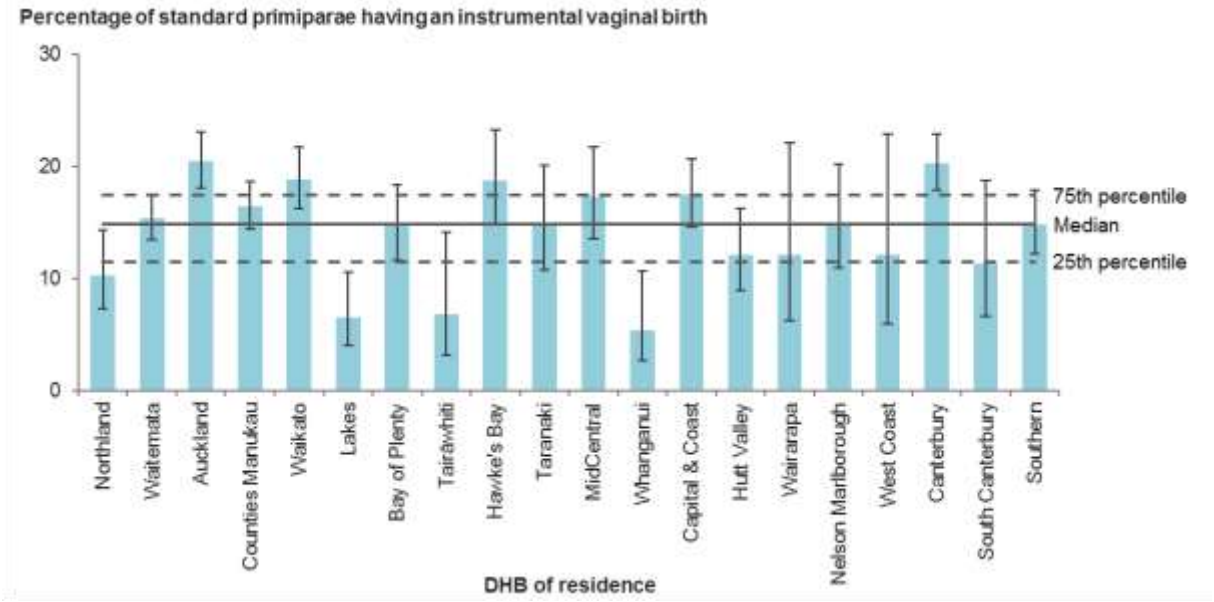
Table 6: Number and percentage of spontaneous vaginal births among standard primiparae, by place of birth, 2015

Place of birth	Spontaneous vaginal births	Standard primiparae	Rate (%)
Whangarei	149	200	74.5
North Shore	422	657	64.2
Waitakere	380	512	74.2
Auckland City	608	1,104	55.1
Middlemore	501	802	62.5
Waikato	256	470	54.5
Rotorua	136	180	75.6
Tauranga	168	276	60.9
Whakatane	57	66	86.4
Gisborne	65	83	78.3
Hawke's Bay	188	309	60.8
Taranaki Base	130	194	67.0
Palmerston North	176	288	61.1
Whanganui	100	122	82.0
Wellington	350	544	64.3
Hutt	200	293	68.3
Wairarapa	42	64	65.6
Wairau	58	73	79.5
Nelson	72	136	52.9
Grey Base	25	47	53.2
Christchurch	409	742	55.1
Timaru	72	100	72.0
Dunedin	175	301	58.1
Southland	108	169	63.9
All secondary and tertiary facilities	**4,847**	**7,732**	**62.7**
All primary facilities	**1,210**	**1,218**	**99.3**
All home births	**305**	**305**	**100.0**
New Zealand[1]	**6,362**	**9,255**	**68.7**

1 Includes women where birth location was unspecified.

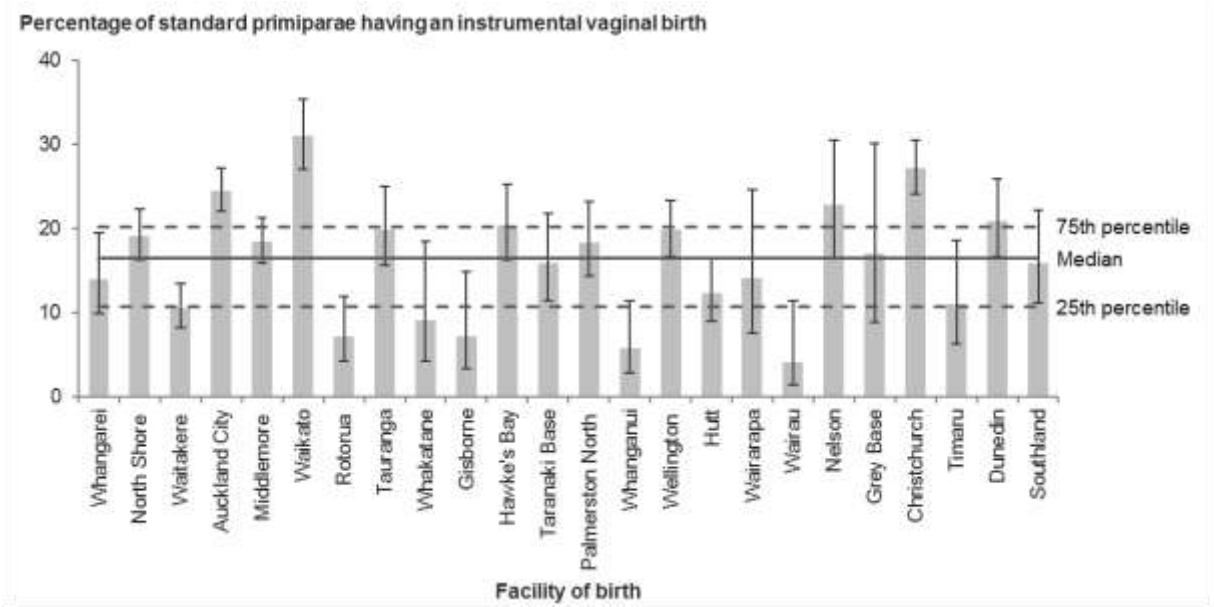
Indicator 3: Instrumental vaginal birth among standard primiparae, 2015

Figure 7: Percentage of instrumental vaginal births among standard primiparae, by DHB of residence, 2015



Black 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), 2015



Black 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, 2015

DHB of residence	Instrumental vaginal births	Standard primiparae	Rate (%)
Northland	30	291	10.3
Waitemata	192	1,248	15.4
Auckland	210	1,026	20.5
Counties Manukau	193	1,177	16.4
Waikato	147	782	18.8
Lakes	15	229	6.6
Bay of Plenty	62	423	14.7
Tairāwhiti	6	88	6.8
Hawke's Bay	61	326	18.7
Taranaki	33	222	14.9
MidCentral	57	330	17.3
Whanganui	7	130	5.4
Capital & Coast	105	601	17.5
Hutt Valley	37	305	12.1
Wairarapa	8	66	12.1
Nelson Marlborough	34	227	15.0
West Coast	7	58	12.1
Canterbury	203	1,001	20.3
South Canterbury	12	106	11.3
Southern	88	593	14.8
Unknown	5	26	-
New Zealand	**1,512**	**9,255**	**16.3**

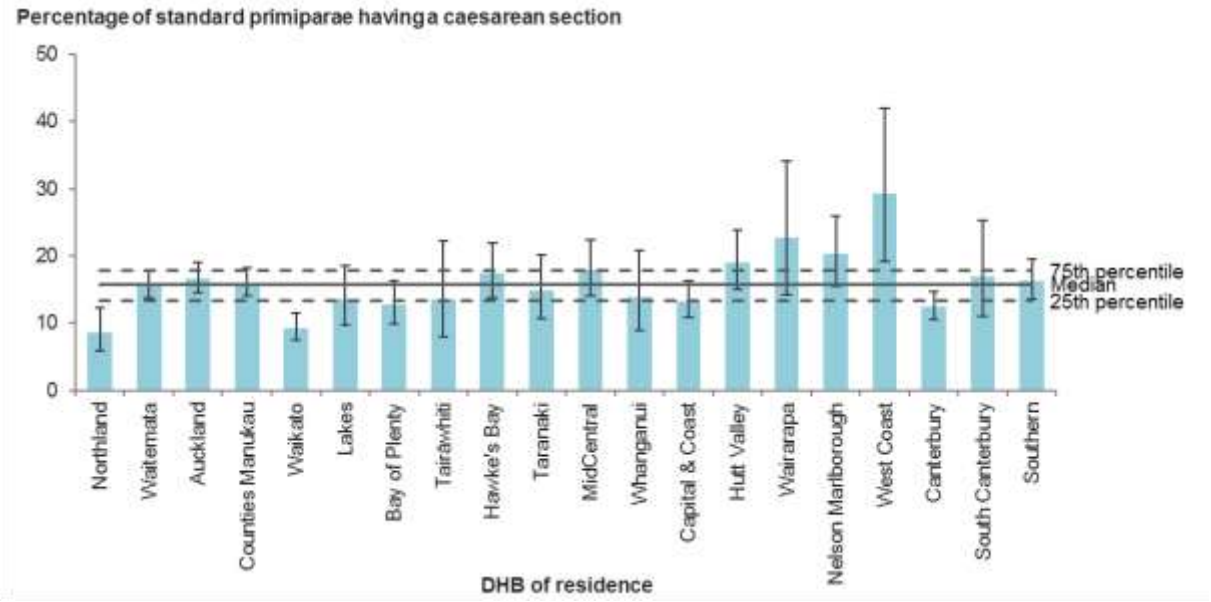
Table 8: Number and percentage of instrumental vaginal births among standard primiparae, by place of birth, 2015

Place of birth	Instrumental vaginal births	Standard primiparae	Rate (%)
Whangarei	28	200	14.0
North Shore	126	657	19.2
Waitakere	54	512	10.5
Auckland City	271	1,104	24.5
Middlemore	148	802	18.5
Waikato	146	470	31.1
Rotorua	13	180	7.2
Tauranga	55	276	19.9
Whakatane	6	66	9.1
Gisborne	6	83	7.2
Hawke's Bay	63	309	20.4
Taranaki Base	31	194	16.0
Palmerston North	53	288	18.4
Whanganui	7	122	5.7
Wellington	108	544	19.9
Hutt	36	293	12.3
Wairarapa	9	64	14.1
Wairau	3	73	4.1
Nelson	31	136	22.8
Grey Base	8	47	17.0
Christchurch	202	742	27.2
Timaru	11	100	11.0
Dunedin	63	301	20.9
Southland	27	169	16.0
All secondary and tertiary facilities	**1,505**	**7,732**	**19.5**
All primary facilities	**7**	**1,218**	**0.6**
All home births	**0**	**305**	**0.0**
New Zealand[1]	**1,512**	**9,255**	**16.3**

1 Includes women where birth location was unspecified.

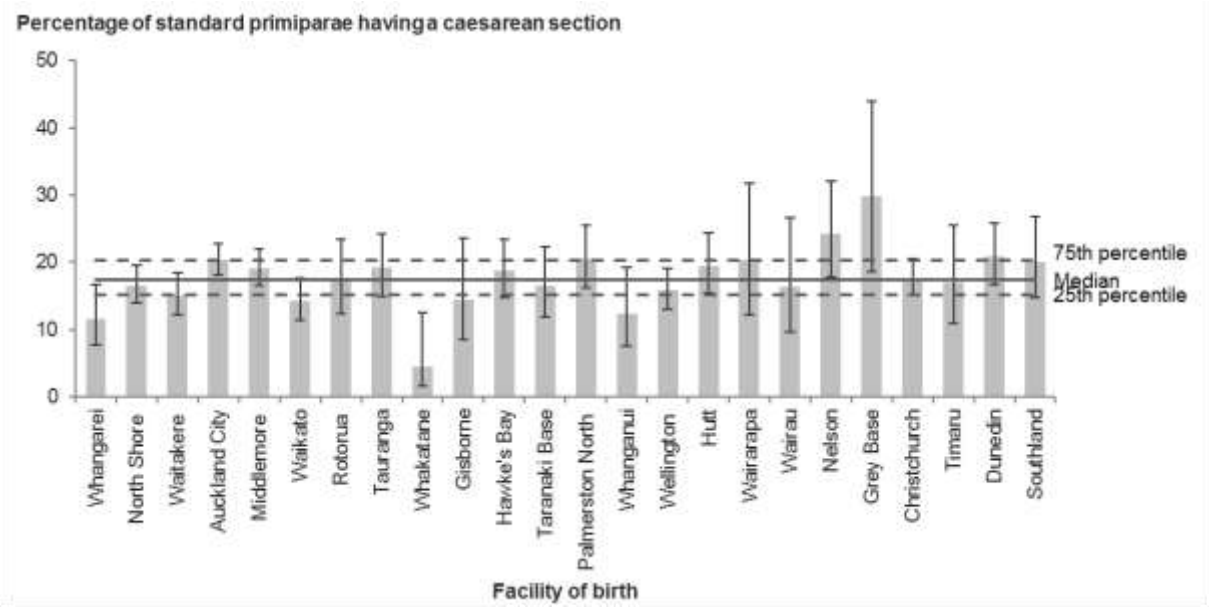
Indicator 4: Caesarean section among standard primiparae, 2015

Figure 9: Percentage of caesarean section deliveries among standard primiparae, by DHB of residence, 2015



Black 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), 2015



Black 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, 2015

DHB of residence	Caesarean sections	Standard primiparae	Rate (%)
Northland	25	291	8.6
Waitemata	195	1,248	15.6
Auckland	171	1,026	16.7
Counties Manukau	189	1,177	16.1
Waikato	73	782	9.3
Lakes	31	229	13.5
Bay of Plenty	54	423	12.8
Tairāwhiti	12	88	13.6
Hawke's Bay	57	326	17.5
Taranaki	33	222	14.9
MidCentral	59	330	17.9
Whanganui	18	130	13.8
Capital & Coast	80	601	13.3
Hutt Valley	58	305	19.0
Wairarapa	15	66	22.7
Nelson Marlborough	46	227	20.3
West Coast	17	58	29.3
Canterbury	125	1,001	12.5
South Canterbury	18	106	17.0
Southern	97	593	16.4
Unknown	4	26	-
New Zealand	**1,377**	**9,255**	**14.9**

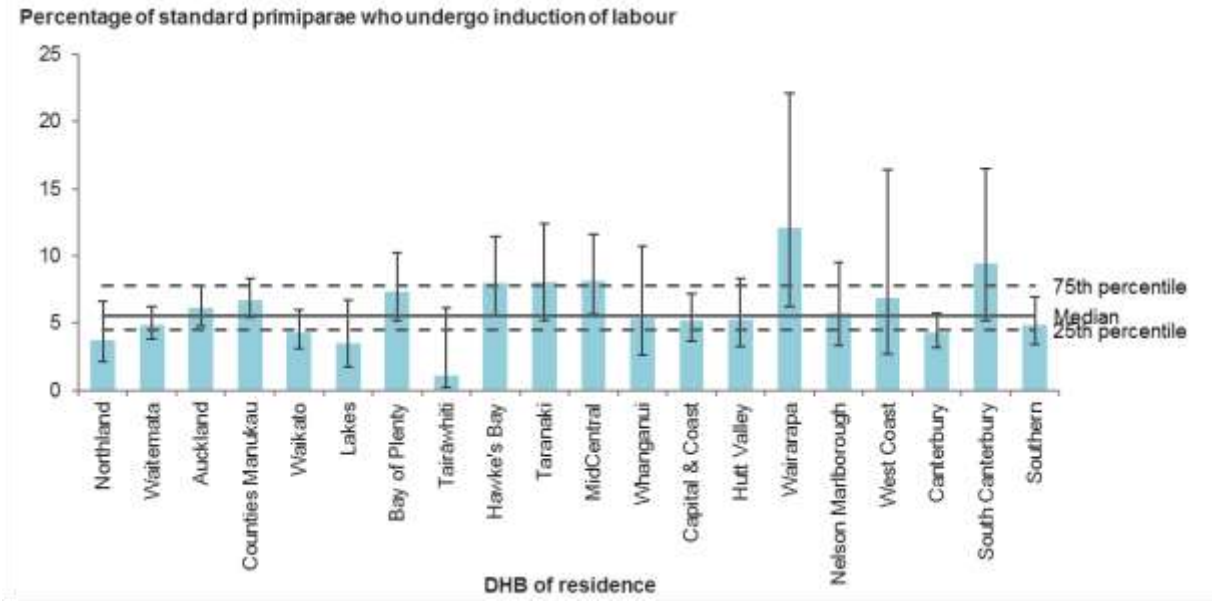
Table 10: Number and percentage of deliveries by caesarean section among standard primiparae, by place of birth, 2015

Place of birth	Caesarean sections	Standard primiparae	Rate (%)
Whangarei	23	200	11.5
North Shore	109	657	16.6
Waitakere	77	512	15.0
Auckland City	225	1,104	20.4
Middlemore	153	802	19.1
Waikato	67	470	14.3
Rotorua	31	180	17.2
Tauranga	53	276	19.2
Whakatane	3	66	4.5
Gisborne	12	83	14.5
Hawke's Bay	58	309	18.8
Taranaki Base	32	194	16.5
Palmerston North	59	288	20.5
Whanganui	15	122	12.3
Wellington	86	544	15.8
Hutt	57	293	19.5
Wairarapa	13	64	20.3
Wairau	12	73	16.4
Nelson	33	136	24.3
Grey Base	14	47	29.8
Christchurch	131	742	17.7
Timaru	17	100	17.0
Dunedin	63	301	20.9
Southland	34	169	20.1
All secondary and tertiary facilities	**1,377**	**7,732**	**17.8**
All primary facilities	**0**	**1,218**	**0.0**
All home births	**0**	**305**	**0.0**
New Zealand[1]	**1,377**	**9,255**	**14.9**

1 Includes women where birth location was unspecified.

Indicator 5: Induction of labour among standard primiparae, 2015

Figure 11: Percentage of inductions of labour among standard primiparae, by DHB of residence, 2015



Black 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), 2015

Black 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, 2015

DHB of residence	Inductions of labour	Standard primiparae	Rate (%)
Northland	11	291	3.8
Waitemata	61	1,248	4.9
Auckland	63	1,026	6.1
Counties Manukau	79	1,177	6.7
Waikato	34	782	4.3
Lakes	8	229	3.5
Bay of Plenty	31	423	7.3
Tairāwhiti	1	88	1.1
Hawke's Bay	26	326	8.0
Taranaki	18	222	8.1
MidCentral	27	330	8.2
Whanganui	7	130	5.4
Capital & Coast	31	601	5.2
Hutt Valley	16	305	5.2
Wairarapa	8	66	12.1
Nelson Marlborough	13	227	5.7
West Coast	4	58	6.9
Canterbury	43	1,001	4.3
South Canterbury	10	106	9.4
Southern	29	593	4.9
Unknown	3	26	-
New Zealand	**523**	**9,255**	**5.7**

Table 12: Number and percentage of inductions of labour among standard primiparae, by facility of birth (secondary and tertiary facilities), 2015

Place of birth	Inductions of labour	Standard primiparae	Rate (%)
Whangarei	11	200	5.5
North Shore	27	657	4.1
Waitakere	31	512	6.1
Auckland City	93	1,104	8.4
Middlemore	52	802	6.5
Waikato	34	470	7.2
Rotorua	8	180	4.4
Tauranga	20	276	7.2
Whakatane	2	66	3.0
Gisborne	1	83	1.2
Hawke's Bay	25	309	8.1
Taranaki Base	19	194	9.8
Palmerston North	26	288	9.0
Whanganui	4	122	3.3
Wellington	37	544	6.8
Hutt	16	293	5.5
Wairarapa	6	64	9.4
Wairau	6	73	8.2
Nelson	7	136	5.1
Grey Base	4	47	8.5
Christchurch	43	742	5.8
Timaru	9	100	9.0
Dunedin	20	301	6.6
Southland	11	169	6.5
All secondary and tertiary facilities	**512**	**7,732**	**6.6**
All primary facilities	**11**	**1,218**	**0.9**
All home births	**0**	**305**	**0.0**
New Zealand[1]	**523**	**9,255**	**5.7**

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, it should examine these results. Providers should also consider their rates alongside other indicators that can be affected by episiotomies, such as bleeding, infection and maternal morbidity rates, 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 2015 data

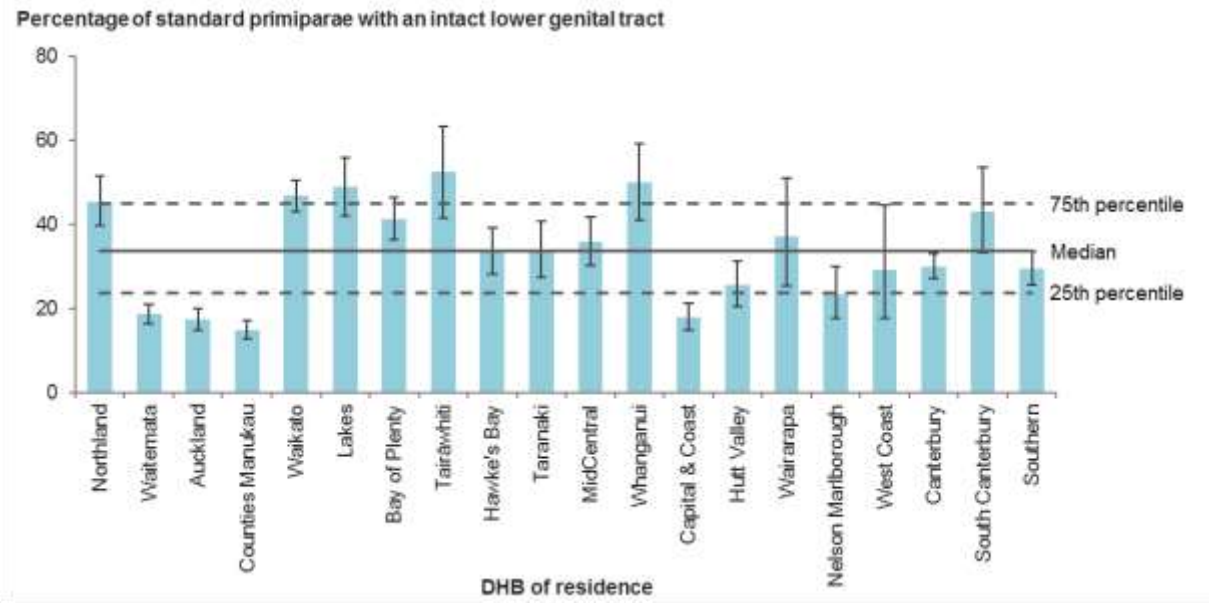
Rates of intact lower genital tract after vaginal birth among standard primiparae ranged from 14.8% to 52.6% across DHBs, and from 6.8% to 55.6% across secondary and tertiary facilities. This regional variation suggests that investigation of both data integrity and local clinical practice is required. Rates of intact lower genital tract appear to have decreased over time since 2009. Further investigation of the causes of this is required, including 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 0% to 31.1% across DHBs, and from 0% to 39.1% across secondary and tertiary facilities. Facilities and DHB's 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 as well as 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.

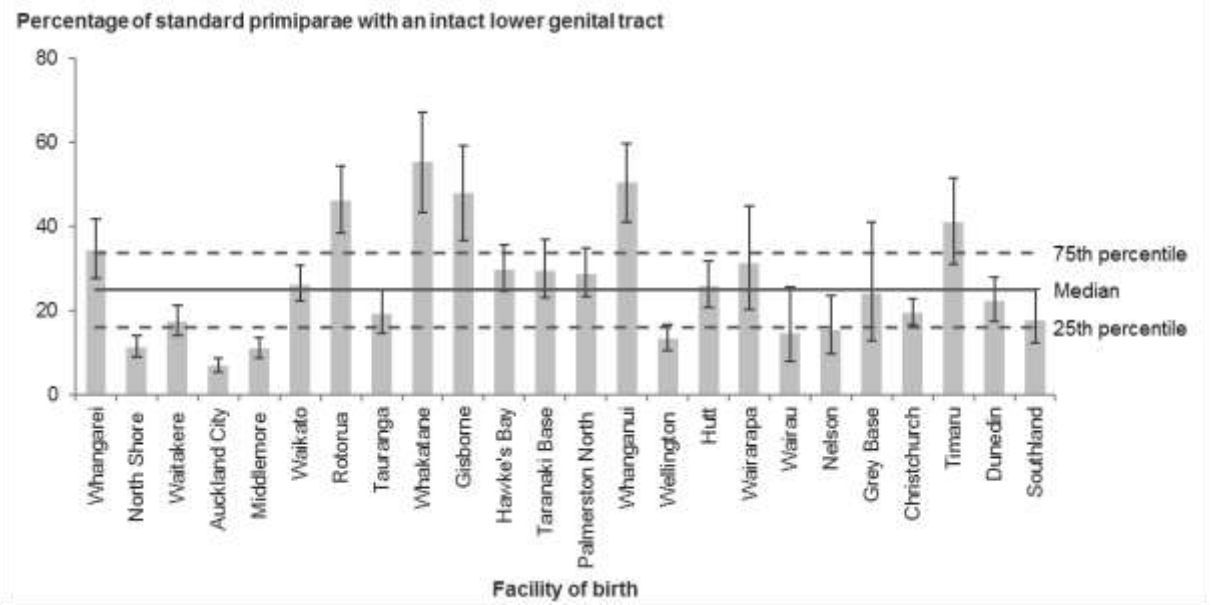
Indicator 6: Intact lower genital tract among standard primiparae giving birth vaginally, 2015

Figure 13: Percentage of standard primiparae giving birth vaginally with intact lower genital tract, by DHB of residence, 2015



Black 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), 2015



Black 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, 2015

DHB of residence	Intact lower genital tract	Standard primiparae giving birth vaginally	Rate (%)
Northland	121	266	45.5
Waitemata	196	1,053	18.6
Auckland	148	855	17.3
Counties Manukau	146	988	14.8
Waikato	332	709	46.8
Lakes	97	198	49.0
Bay of Plenty	152	369	41.2
Tairāwhiti	40	76	52.6
Hawke's Bay	90	269	33.5
Taranaki	64	189	33.9
MidCentral	97	271	35.8
Whanganui	56	112	50.0
Capital & Coast	93	521	17.9
Hutt Valley	63	247	25.5
Wairarapa	19	51	37.3
Nelson Marlborough	42	181	23.2
West Coast	12	41	29.3
Canterbury	263	876	30.0
South Canterbury	38	88	43.2
Southern	146	496	29.4
Unknown	12	22	-
New Zealand	**2,227**	**7,878**	**28.3**

Table 14: Number and percentage of standard primiparae giving birth vaginally with intact lower genital tract, by facility of birth (secondary and tertiary facilities), 2015

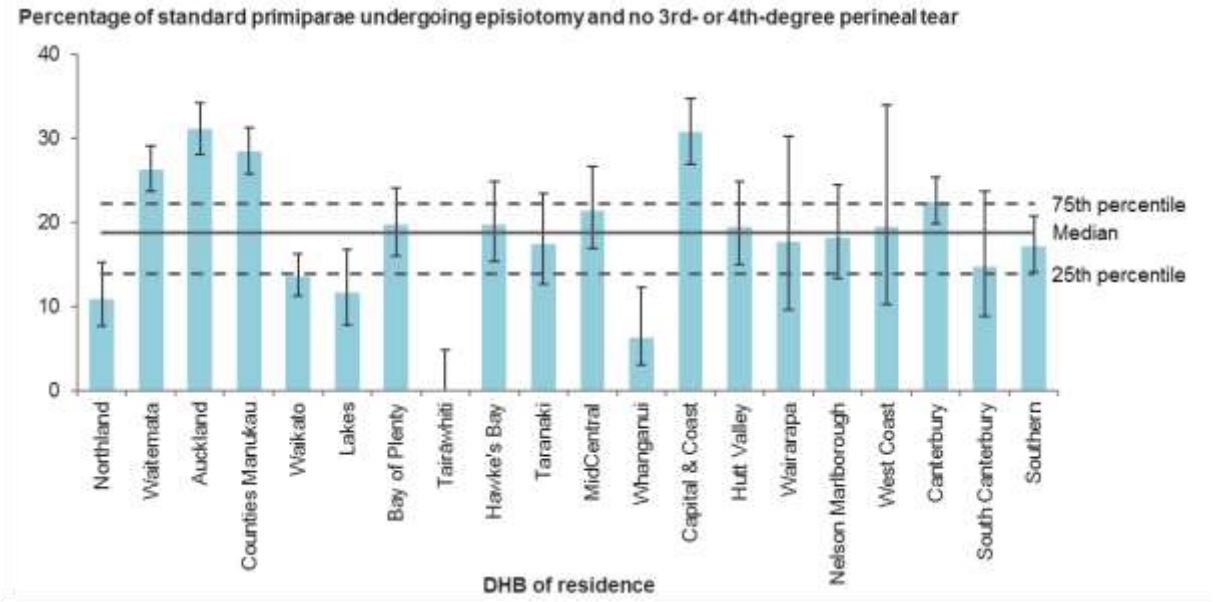
Place of birth	Intact lower genital tract	Standard primiparae giving birth vaginally	Rate (%)
Whangarei	61	177	34.5
North Shore	62	548	11.3
Waitakere	76	435	17.5
Auckland City	60	879	6.8
Middlemore	71	649	10.9
Waikato	106	403	26.3
Rotorua	69	149	46.3
Tauranga	43	223	19.3
Whakatane	35	63	55.6
Gisborne	34	71	47.9
Hawke's Bay	75	251	29.9
Taranaki Base	48	162	29.6
Palmerston North	66	229	28.8
Whanganui	54	107	50.5
Wellington	61	458	13.3
Hutt	61	236	25.8
Wairarapa	16	51	31.4
Wairau	9	61	14.8
Nelson	16	103	15.5
Grey Base	8	33	24.2
Christchurch	120	611	19.6
Timaru	34	83	41.0
Dunedin	53	238	22.3
Southland	24	135	17.8
All secondary and tertiary facilities	**1,262**	**6,355**	**19.9**
All primary facilities	**705**	**1,218**	**57.9**
All home births[1]	**260**	**305**	**85.2**
New Zealand[2]	**2,227**	**7,878**	**28.3**

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.

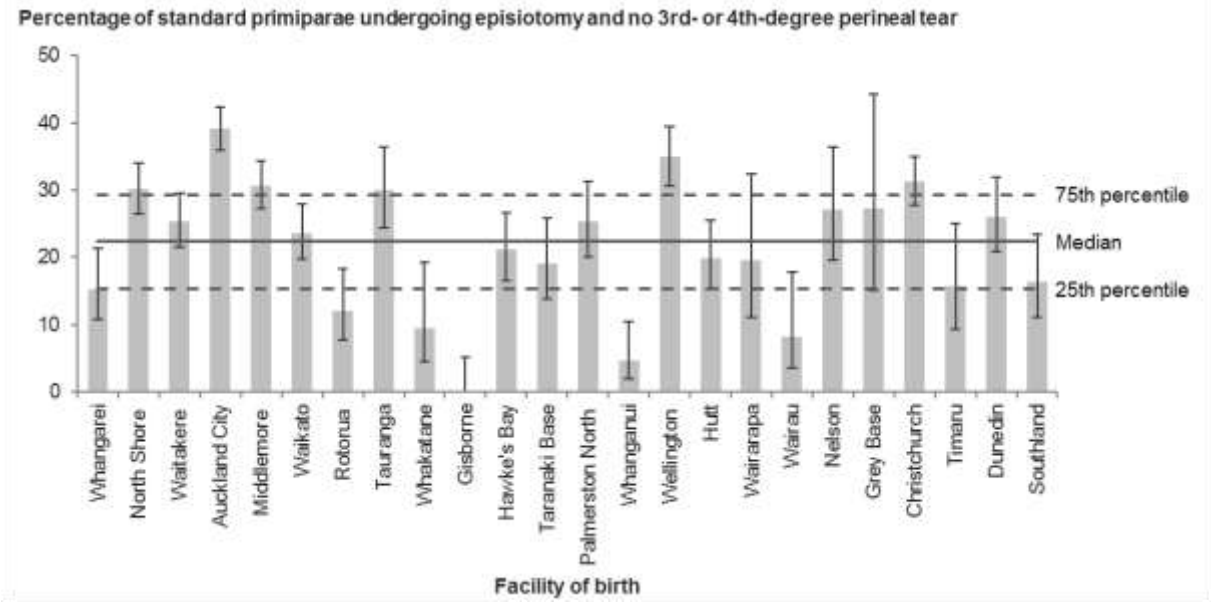
Indicator 7: Episiotomy and no third- or fourth-degree tear among standard primiparae giving birth vaginally, 2015

Figure 15: Percentage of standard primiparae giving birth vaginally and undergoing episiotomy without third- or fourth-degree tear, by DHB of residence, 2015



Black 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), 2015



Black 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, 2015

DHB of residence	Episiotomy without 3rd- or 4th-degree tear	Standard primiparae giving birth vaginally	Rate (%)
Northland	29	266	10.9
Waitemata	277	1,053	26.3
Auckland	266	855	31.1
Counties Manukau	281	988	28.4
Waikato	96	709	13.5
Lakes	23	198	11.6
Bay of Plenty	73	369	19.8
Tairāwhiti	0	76	0.0
Hawke's Bay	53	269	19.7
Taranaki	33	189	17.5
MidCentral	58	271	21.4
Whanganui	7	112	6.3
Capital & Coast	160	521	30.7
Hutt Valley	48	247	19.4
Wairarapa	9	51	17.6
Nelson Marlborough	33	181	18.2
West Coast	8	41	19.5
Canterbury	197	876	22.5
South Canterbury	13	88	14.8
Southern	85	496	17.1
Unknown	3	22	-
New Zealand	**1,752**	**7,878**	**22.2**

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), 2015

Place of birth	Episiotomy without 3rd- or 4th-degree tear	Standard primiparae giving birth vaginally	Rate (%)
Whangarei	27	177	15.3
North Shore	165	548	30.1
Waitakere	110	435	25.3
Auckland City	344	879	39.1
Middlemore	199	649	30.7
Waikato	95	403	23.6
Rotorua	18	149	12.1
Tauranga	67	223	30.0
Whakatane	6	63	9.5
Gisborne	0	71	0.0
Hawke's Bay	53	251	21.1

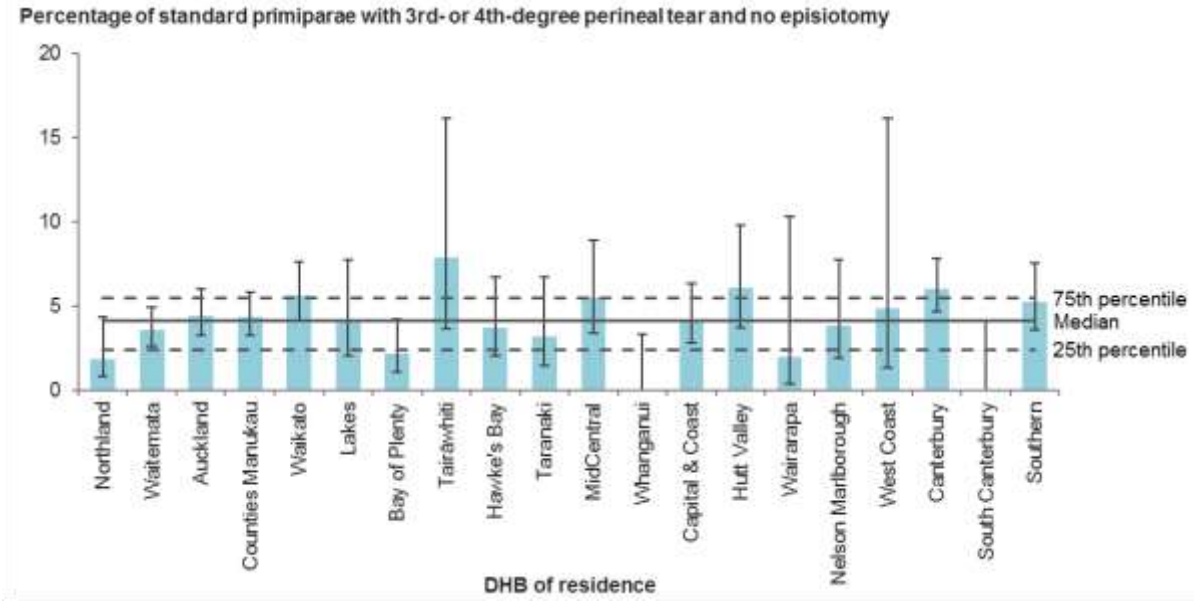
Taranaki Base	31	162	19.1
Palmerston North	58	229	25.3
Whanganui	5	107	4.7
Wellington	160	458	34.9
Hutt	47	236	19.9
Wairarapa	10	51	19.6
Wairau	5	61	8.2
Nelson	28	103	27.2
Grey Base	9	33	27.3
Christchurch	191	611	31.3
Timaru	13	83	15.7
Dunedin	62	238	26.1
Southland	22	135	16.3
All secondary and tertiary facilities	**1,725**	**6,355**	**27.1**
All primary facilities	**27**	**1,218**	**2.2**
All home births[1]	**0**	**305**	**0.0**
New Zealand[2]	**1,752**	**7,878**	**22.2**

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.

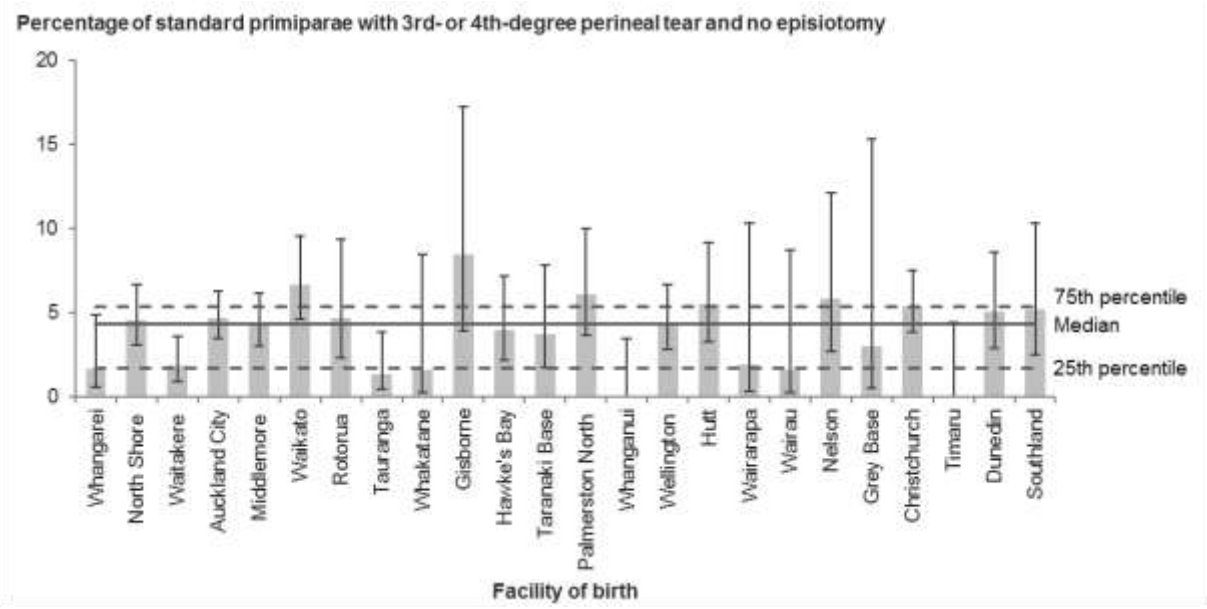
Indicator 8: Third- or fourth-degree tear and no episiotomy among standard primiparae giving birth vaginally, 2015

Figure 17: Percentage of standard primiparae giving birth vaginally sustaining a third- or fourth-degree tear and not undergoing episiotomy, by DHB of residence, 2015



Black 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), 2015



Black 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, 2015

DHB of residence	3rd- or 4th-degree tear without episiotomy	Standard primiparae giving birth vaginally	Rate (%)
Northland	5	266	1.9
Waitemata	38	1,053	3.6
Auckland	38	855	4.4
Counties Manukau	43	988	4.4
Waikato	40	709	5.6
Lakes	8	198	4.0
Bay of Plenty	8	369	2.2
Tairāwhiti	6	76	7.9
Hawke's Bay	10	269	3.7
Taranaki	6	189	3.2
MidCentral	15	271	5.5
Whanganui	0	112	0.0
Capital & Coast	22	521	4.2
Hutt Valley	15	247	6.1
Wairarapa	1	51	2.0
Nelson Marlborough	7	181	3.9
West Coast	2	41	4.9
Canterbury	53	876	6.1
South Canterbury	0	88	0.0
Southern	26	496	5.2
Unknown	1	22	-
New Zealand	**344**	**7,878**	**4.4**

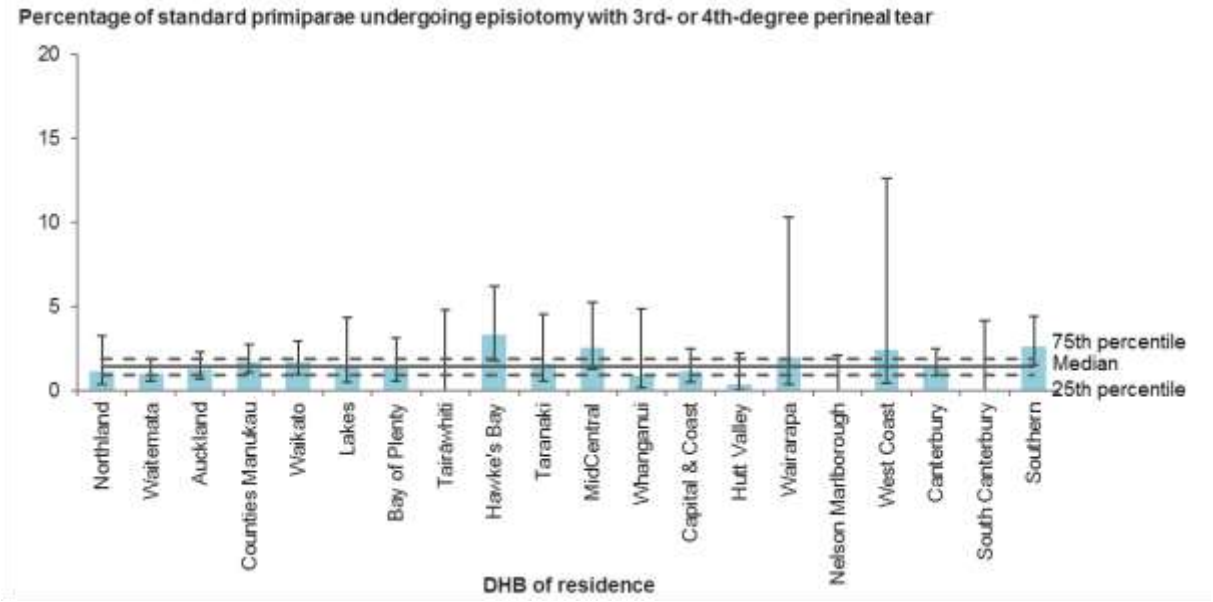
Table 18: Number and percentage of standard primiparae giving birth vaginally sustaining a third- or fourth-degree tear and not undergoing episiotomy, by facility of birth (secondary and tertiary facilities), 2015

Place of birth	3rd- or 4th-degree tear without episiotomy	Standard primiparae giving birth vaginally	Rate (%)
Whangarei	3	177	1.7
North Shore	25	548	4.6
Waitakere	8	435	1.8
Auckland City	41	879	4.7
Middlemore	28	649	4.3
Waikato	27	403	6.7
Rotorua	7	149	4.7
Tauranga	3	223	1.3
Whakatane	1	63	1.6
Gisborne	6	71	8.5
Hawke's Bay	10	251	4.0
Taranaki Base	6	162	3.7
Palmerston North	14	229	6.1
Whanganui	0	107	0.0
Wellington	20	458	4.4
Hutt	13	236	5.5
Wairarapa	1	51	2.0
Wairau	1	61	1.6
Nelson	6	103	5.8
Grey Base	1	33	3.0
Christchurch	33	611	5.4
Timaru	0	83	0.0
Dunedin	12	238	5.0
Southland	7	135	5.2
All secondary and tertiary facilities	**273**	**6,355**	**4.3**
All primary facilities	**60**	**1,218**	**4.9**
All home births	**11**	**305**	**3.6**
New Zealand[1]	**344**	**7,878**	**4.4**

1 Includes women where birth location was unspecified.

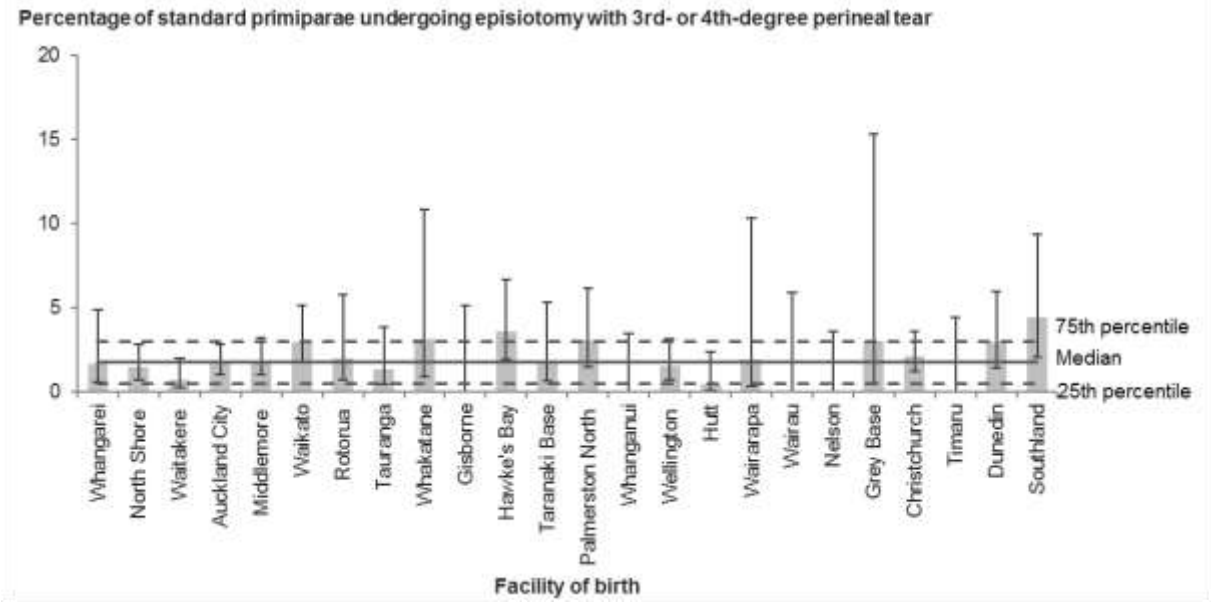
Indicator 9: Episiotomy and third- or fourth-degree tear among standard primiparae giving birth vaginally, 2015

Figure 19: Percentage of standard primiparae giving birth vaginally undergoing episiotomy and sustaining a third- or fourth-degree tear, by DHB of residence, 2015



Black 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), 2015



Black 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, 2015

DHB of residence	Episiotomy with 3rd- or 4th-degree tear	Standard primiparae giving birth vaginally	Rate (%)
Northland	3	266	1.1
Waitemata	11	1,053	1.0
Auckland	11	855	1.3
Counties Manukau	17	988	1.7
Waikato	12	709	1.7
Lakes	3	198	1.5
Bay of Plenty	5	369	1.4
Tairāwhiti	0	76	0.0
Hawke's Bay	9	269	3.3
Taranaki	3	189	1.6
MidCentral	7	271	2.6
Whanganui	1	112	0.9
Capital & Coast	6	521	1.2
Hutt Valley	1	247	0.4
Wairarapa	1	51	2.0
Nelson Marlborough	0	181	0.0
West Coast	1	41	2.4
Canterbury	13	876	1.5
South Canterbury	0	88	0.0
Southern	13	496	2.6
Unknown	0	22	-
New Zealand	**117**	**7,878**	**1.5**

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), 2015

Place of birth	Episiotomy with 3rd- or 4th-degree tear	Standard primiparae giving birth vaginally	Rate (%)
Whangarei	3	177	1.7
North Shore	8	548	1.5
Waitakere	3	435	0.7
Auckland City	15	879	1.7
Middlemore	12	649	1.8
Waikato	12	403	3.0
Rotorua	3	149	2.0
Tauranga	3	223	1.3
Whakatane	2	63	3.2
Gisborne	0	71	0.0
Hawke's Bay	9	251	3.6
Taranaki Base	3	162	1.9
Palmerston North	7	229	3.1
Whanganui	0	107	0.0
Wellington	7	458	1.5
Hutt	1	236	0.4
Wairarapa	1	51	2.0
Wairau	0	61	0.0
Nelson	0	103	0.0
Grey Base	1	33	3.0
Christchurch	13	611	2.1
Timaru	0	83	0.0
Dunedin	7	238	2.9
Southland	6	135	4.4
All secondary and tertiary facilities	**116**	**6,355**	**1.8**
All primary facilities	**1**	**1,218**	**0.1**
All home births	**0**	**305**	**0.0**
New Zealand[1]	**117**	**7,878**	**1.5**

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).

A proportion of caesarean sections will continue to be done 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. General anaesthetic is more likely to be used when caesarean sections are done 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.

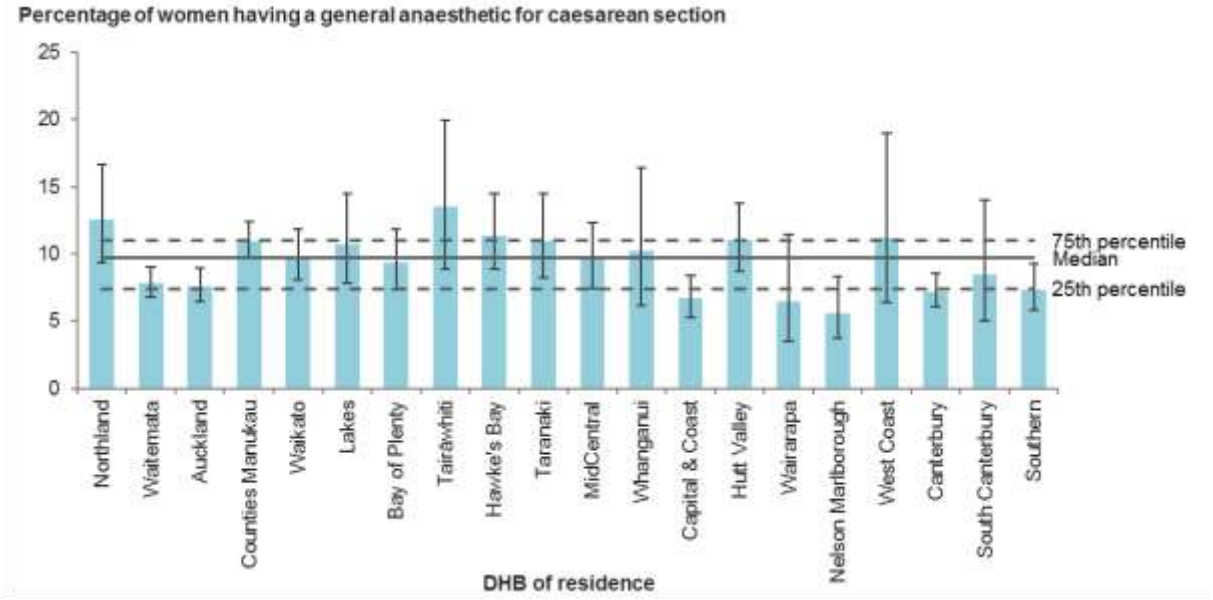
Notes on 2015 data

Rates of general anaesthetic use in caesarean section deliveries ranged from 5.6% to 13.5% across DHBs, and from 5.0%to 17.0% 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 this represents best possible quality of care for the woman and her baby.

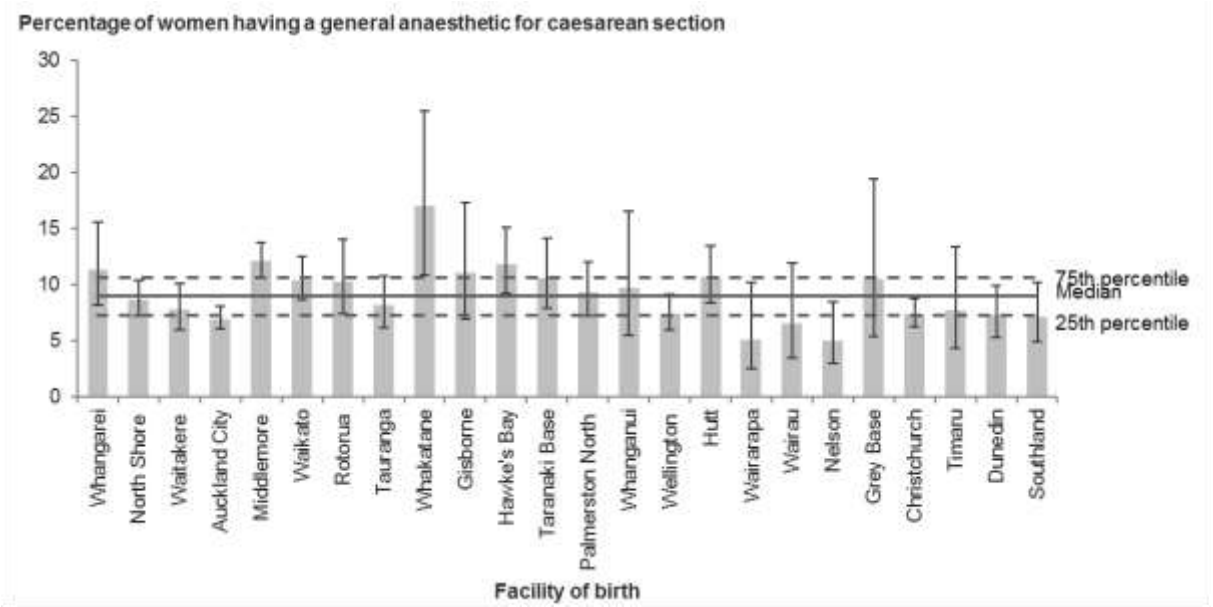
Indicator 10: General anaesthetic for women giving birth by caesarean section, 2015

Figure 21: Percentage of women undergoing a caesarean section under general anaesthetic, by DHB of residence, 2015



Black 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), 2015



Black 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, 2015

DHB of residence	Caesarean sections under general anaesthetic	All caesarean sections	Rate (%)
Northland	40	319	12.5
Waitemata	169	2,161	7.8
Auckland	135	1,770	7.6
Counties Manukau	220	2,006	11.0
Waikato	96	980	9.8
Lakes	36	336	10.7
Bay of Plenty	61	649	9.4
Tairāwhiti	20	148	13.5
Hawke's Bay	55	483	11.4
Taranaki	42	382	11.0
MidCentral	54	563	9.6
Whanganui	14	137	10.2
Capital & Coast	67	999	6.7
Hutt Valley	65	590	11.0
Wairarapa	10	155	6.5
Nelson Marlborough	23	408	5.6
West Coast	11	98	11.2
Canterbury	118	1,637	7.2
South Canterbury	13	153	8.5
Southern	64	870	7.4
Unknown	0	16	-
New Zealand	**1,313**	**14,860**	**8.8**

Table 22: Number and percentage of women undergoing a caesarean section under general anaesthetic, by facility of birth (secondary and tertiary facilities), 2015

Place of birth	Caesarean sections under general anaesthetic	All caesarean sections	Rate (%)
Whangarei	32	281	11.4
North Shore	107	1,230	8.7
Waitakere	51	655	7.8
Auckland City	172	2,467	7.0
Middlemore	202	1,665	12.1
Waikato	100	958	10.4
Rotorua	34	331	10.3
Tauranga	45	550	8.2
Whakatane	17	100	17.0
Gisborne	16	144	11.1
Hawke's Bay	56	471	11.9
Taranaki Base	40	376	10.6
Palmerston North	52	557	9.3
Whanganui	11	113	9.7
Wellington	81	1,091	7.4
Hutt	61	572	10.7
Wairarapa	7	136	5.1
Wairau	9	138	6.5
Nelson	13	258	5.0
Grey Base	8	76	10.5
Christchurch	124	1,666	7.4
Timaru	11	142	7.7
Dunedin	37	508	7.3
Southland	26	365	7.1
All secondary and tertiary facilities	**1,312**	**14,850**	**8.8**
All primary facilities	**1**	**7**	**14.3**
All home births	**0**	**0**	**0.0**
New Zealand[1]	**1,313**	**14,860**	**8.8**

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 toleranceand 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.

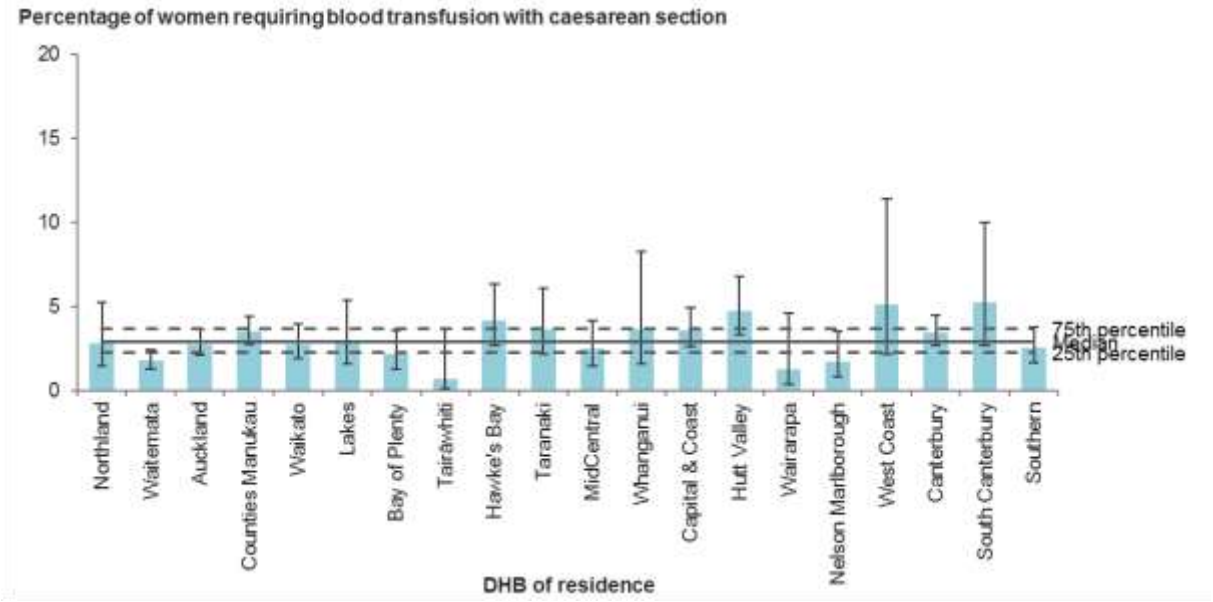
This indicator aims to provide maternity service providers with an indicator of significant blood loss that will stimulate further investigation of clinical management and intervention. All maternity service providers should be familiar with the national consensus guideline for treatment of PPH (Ministry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

Notes on 2015 data

District health boards should investigate the reasons behind the greater variation in rates of blood transfusion with caesarean sections. Because this indicator is a marker for PPH, the focus should be on understanding and addressing underlying causes, rather than addressing the indicator in isolation. All DHBs should ensure local practice aligns with the national consensus guideline for treatment of PPH (Ministry of Health 2013).

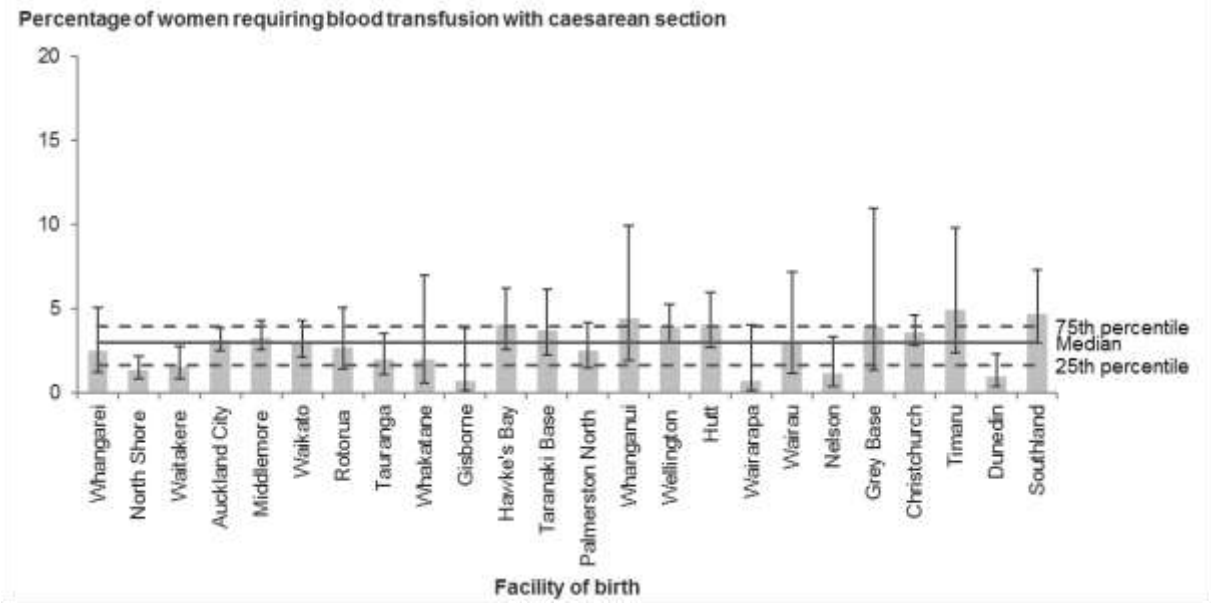
Indicator 11: Blood transfusion during birth admission for caesarean section delivery, 2015

Figure 23: Percentage of women giving birth by caesarean section and undergoing blood transfusion during birth admission, by DHB of residence, 2015



Black 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), 2015



Black 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, 2015

DHB of residence	Caesarean sections with blood transfusion	All caesarean sections	Rate (%)
Northland	9	319	2.8
Waitemata	38	2,161	1.8
Auckland	49	1,770	2.8
Counties Manukau	70	2,006	3.5
Waikato	27	980	2.8
Lakes	10	336	3.0
Bay of Plenty	14	649	2.2
Tairāwhiti	1	148	0.7
Hawke's Bay	20	483	4.1
Taranaki	14	382	3.7
MidCentral	14	563	2.5
Whanganui	5	137	3.6
Capital & Coast	36	999	3.6
Hutt Valley	28	590	4.7
Wairarapa	2	155	1.3
Nelson Marlborough	7	408	1.7
West Coast	5	98	5.1
Canterbury	57	1,637	3.5
South Canterbury	8	153	5.2
Southern	22	870	2.5
Unknown	0	16	-
New Zealand	**436**	**14,860**	**2.9**

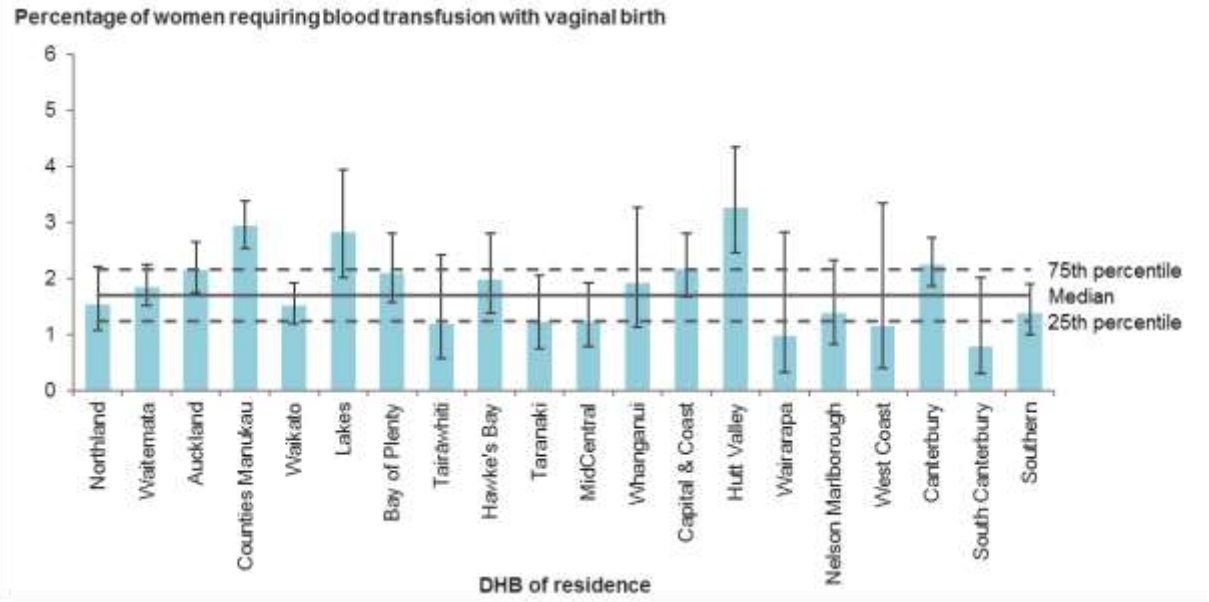
Table 24: Number and percentage of women giving birth by caesarean section and undergoing blood transfusion during birth admission, by facility of birth (secondary and tertiary facilities), 2015

Place of birth	Caesarean sections with blood transfusion	All caesarean sections	Rate (%)
Whangarei	7	281	2.5
North Shore	17	1,230	1.4
Waitakere	10	655	1.5
Auckland City	77	2,467	3.1
Middlemore	55	1,665	3.3
Waikato	29	958	3.0
Rotorua	9	331	2.7
Tauranga	11	550	2.0
Whakatane	2	100	2.0
Gisborne	1	144	0.7
Hawke's Bay	19	471	4.0
Taranaki Base	14	376	3.7
Palmerston North	14	557	2.5
Whanganui	5	113	4.4
Wellington	43	1,091	3.9
Hutt	23	572	4.0
Wairarapa	1	136	0.7
Wairau	4	138	2.9
Nelson	3	258	1.2
Grey Base	3	76	3.9
Christchurch	60	1,666	3.6
Timaru	7	142	4.9
Dunedin	5	508	1.0
Southland	17	365	4.7
All secondary and tertiary facilities	**436**	**14,850**	**2.9**
All primary facilities	**0**	**7**	**0.0**
All home births	**0**	**0**	**0.0**
New Zealand[1]	**436**	**14,860**	**2.9**

1 Includes women where birth location was unspecified.

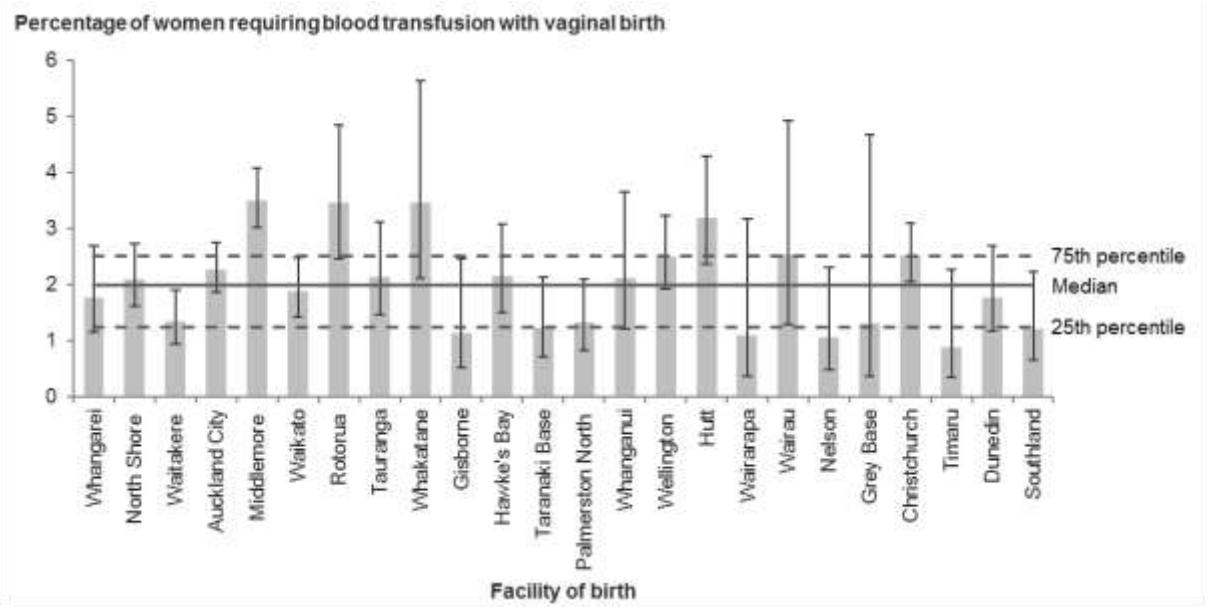
Indicator 12: Blood transfusion during birth admission for vaginal birth, 2015

Figure 25: Percentage of women giving birth vaginally and undergoing blood transfusion during birth admission, by DHB of residence, 2015



Black 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), 2015



Black 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, 2015

DHB of residence	Vaginal births with blood transfusion	All vaginal births	Rate (%)
Northland	28	1,820	1.5
Waitemata	100	5,400	1.9
Auckland	89	4,130	2.2
Counties Manukau	182	6,199	2.9
Waikato	65	4,309	1.5
Lakes	33	1,170	2.8
Bay of Plenty	45	2,142	2.1
Tairāwhiti	7	592	1.2
Hawke's Bay	30	1,518	2.0
Taranaki	14	1,132	1.2
MidCentral	19	1,545	1.2
Whanganui	13	676	1.9
Capital & Coast	55	2,535	2.2
Hutt Valley	45	1,376	3.3
Wairarapa	3	307	1.0
Nelson Marlborough	14	1,008	1.4
West Coast	3	260	1.2
Canterbury	103	4,574	2.3
South Canterbury	4	507	0.8
Southern	35	2,545	1.4
Unknown	4	340	-
New Zealand	**891**	**44,085**	**2.0**

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), 2015

Place of birth	Vaginal births with blood transfusion	All vaginal births	Rate (%)
Whangarei	21	1,182	1.8
North Shore	53	2,519	2.1
Waitakere	30	2,235	1.3
Auckland City	100	4,411	2.3
Middlemore	163	4,643	3.5
Waikato	48	2,546	1.9
Rotorua	32	922	3.5
Tauranga	26	1,217	2.1
Whakatane	15	433	3.5
Gisborne	6	525	1.1
Hawke's Bay	29	1,345	2.2
Taranaki Base	12	976	1.2
Palmerston North	17	1,288	1.3
Whanganui	12	568	2.1
Wellington	55	2,198	2.5
Hutt	41	1,285	3.2
Wairarapa	3	274	1.1
Wairau	8	315	2.5
Nelson	6	564	1.1
Grey Base	2	152	1.3
Christchurch	88	3,488	2.5
Timaru	4	450	0.9
Dunedin	21	1,181	1.8
Southland	10	822	1.2
All secondary and tertiary facilities	**802**	**35,539**	**2.3**
All primary facilities	**65**	**5,756**	**1.1**
All home births	**14**	**2,150**	**0.7**
New Zealand[1]	**891**	**44,085**	**2.0**

1 Includes women where birth location was unspecified.

Indicators 13 to 15: Severe maternal morbidity

Rationale and purpose

Maternal mortality has long been monitored as an indicator of maternity system safety and quality. However, the number of maternal deaths in any given year is low. 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 2015 data

Of women giving birth in 2015:

- 26 were diagnosed with eclampsia during the birth admission
- 30 had a peripartum hysterectomy
- 16 were admitted to an intensive care unit (ICU) and required over 24 hours of mechanical ventilation at some time during their pregnancy or postnatal period.

District health boards with cases should investigate each case to determine if there were opportunities for prevention.

Indicator 13: Diagnosis of eclampsia during birth admission, 2015

Table 27: Number and percentage of women diagnosed with eclampsia during birth admission, by DHB of residence, 2015

DHB of residence	Diagnosis of eclampsia during birth admission	All women giving birth
Northland	1	2,139
Waitemata	5	7,561
Auckland	2	5,900
Counties Manukau	3	8,205
Waikato	2	5,289
Lakes	1	1,506
Bay of Plenty	0	2,791
Tairāwhiti	0	740
Hawke's Bay	2	2,001
Taranaki	0	1,514
MidCentral	0	2,108
Whanganui	0	813
Capital & Coast	1	3,534
Hutt Valley	1	1,966
Wairarapa	2	462
Nelson Marlborough	2	1,416
West Coast	0	358
Canterbury	2	6,211
South Canterbury	2	660
Southern	0	3,415
Unknown	0	356
New Zealand	**26**	**58,945**

Table 28: Number and percentage of women diagnosed with eclampsia during birth admission, by facility of birth (secondary and tertiary facilities), 2015

Place of birth	Diagnosis of eclampsia during birth admission	All women giving birth
Whangarei	1	1,463
North Shore	3	3,749
Waitakere	1	2,890
Auckland City	2	6,878
Middlemore	4	6,308
Waikato	2	3,504
Rotorua	1	1,253
Tauranga	0	1,767
Whakatane	0	533
Gisborne	0	669
Hawke's Bay	2	1,816
Taranaki Base	0	1,352
Palmerston North	0	1,845
Whanganui	0	681
Wellington	2	3,289
Hutt	1	1,857
Wairarapa	1	410
Wairau	1	453
Nelson	1	822
Grey Base	0	228
Christchurch	2	5,154
Timaru	2	592
Dunedin	0	1,689
Southland	0	1,187
All secondary and tertiary facilities	**26**	**50,389**
All primary facilities	**0**	**5,763**
All home births	**0**	**2,150**
New Zealand[1]	**26**	**58,945**

1 Includes women where birth location was unspecified.

Indicator 14: Peripartum hysterectomy, 2015

Table 29: Number and percentage of women having a peripartum hysterectomy, by DHB of residence, 2015

DHB of residence	Peripartum hysterectomy	All women giving birth
Northland	1	2,139
Waitemata	1	7,561
Auckland	6	5,900
Counties Manukau	6	8,205
Waikato	2	5,289
Lakes	1	1,506
Bay of Plenty	0	2,791
Tairāwhiti	2	740
Hawke's Bay	0	2,001
Taranaki	0	1,514
MidCentral	0	2,108
Whanganui	1	813
Capital & Coast	3	3,534
Hutt Valley	1	1,966
Wairarapa	0	462
Nelson Marlborough	0	1,416
West Coast	0	358
Canterbury	4	6,211
South Canterbury	1	660
Southern	1	3,415
Unknown	0	356
New Zealand	**30**	**58,945**

Table 30: Number and percentage of women having a peripartum hysterectomy, by facility of birth (secondary and tertiary facilities), 2015

Place of birth	Abdominal hysterectomy within 6 weeks of birth	All women giving birth
Whangarei	1	1,463
North Shore	0	3,749
Waitakere	1	2,890
Auckland City	6	6,878
Middlemore	6	6,308
Waikato	2	3,504
Rotorua	1	1,253
Tauranga	0	1,767
Whakatane	0	533
Gisborne	2	669
Hawke's Bay	0	1,816
Taranaki Base	0	1,352
Palmerston North	0	1,845
Whanganui	1	681
Wellington	3	3,289
Hutt	1	1,857
Wairarapa	0	410
Wairau	0	453
Nelson	0	822
Grey Base	0	228
Christchurch	5	5,154
Timaru	0	592
Dunedin	0	1,689
Southland	1	1,187
All secondary and tertiary facilities	**30**	**50,389**
All primary facilities	**0**	**5,763**
All home births	**0**	**2,150**
New Zealand[1]	**30**	**58,945**

1 Includes women where birth location was unspecified.

Indicator 15: Mechanical ventilation during pregnancy or postnatal period, 2015

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, 2015

DHB of residence	ICU admission with over 24 hours of mechanical ventilation	All women giving birth
Northland	1	2,139
Waitemata	0	7,561
Auckland	4	5,900
Counties Manukau	2	8,205
Waikato	1	5,289
Lakes	0	1,506
Bay of Plenty	0	2,791
Tairāwhiti	0	740
Hawke's Bay	0	2,001
Taranaki	0	1,514
MidCentral	0	2,108
Whanganui	0	813
Capital & Coast	0	3,534
Hutt Valley	2	1,966
Wairarapa	0	462
Nelson Marlborough	0	1,416
West Coast	0	358
Canterbury	3	6,211
South Canterbury	1	660
Southern	2	3,415
Unknown	0	356
New Zealand	**16**	**58,945**

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), 2015

Place of birth	ICU admission with over 24 hours of mechanical ventilation	All women giving birth
Whangarei	1	1,463
North Shore	0	3,749
Waitakere	0	2,890
Auckland City	5	6,878
Middlemore	1	6,308
Waikato	3	3,504
Rotorua	0	1,253
Tauranga	0	1,767
Whakatane	0	533
Gisborne	0	669
Hawke's Bay	0	1,816
Taranaki Base	0	1,352
Palmerston North	0	1,845
Whanganui	0	681
Wellington	0	3,289
Hutt	0	1,857
Wairarapa	0	410
Wairau	0	453
Nelson	0	822
Grey Base	0	228
Christchurch	3	5,154
Timaru	1	592
Dunedin	1	1,689
Southland	1	1,187
All secondary and tertiary facilities	**16**	**50,389**
All primary facilities	**0**	**5,763**
All home births	**0**	**2,150**
New Zealand[1]	**16**	**58,945**

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. This indicator can be used to identify support needs of women and families in terms of support to stop smoking.

Improving 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.

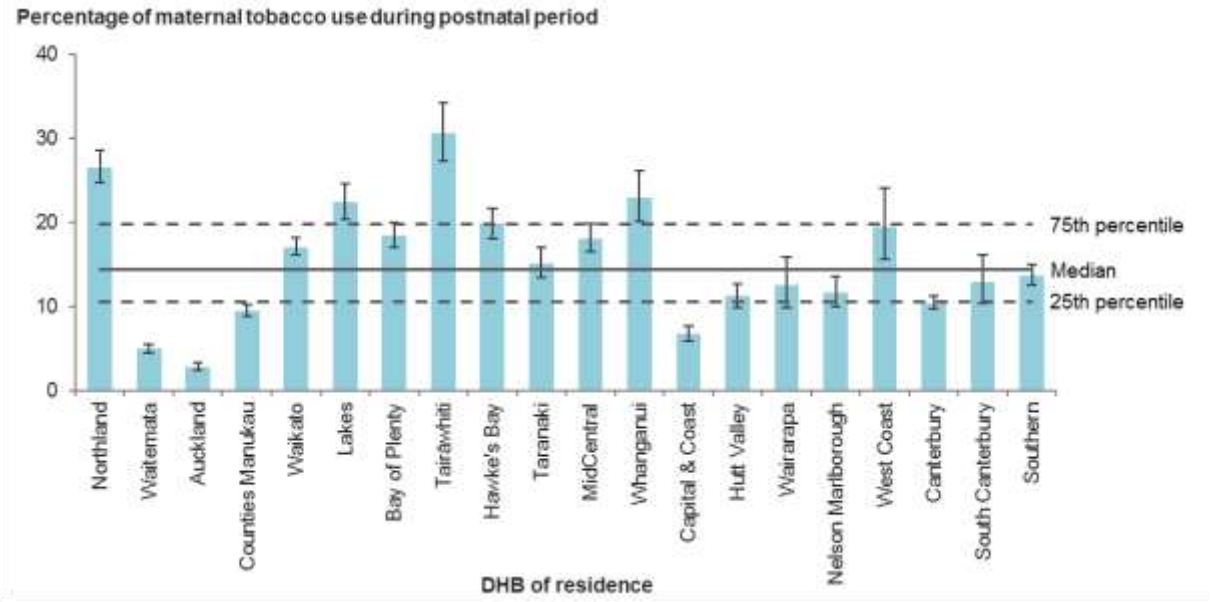
Notes on 2015 data

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 2.8% to 30.6%, and facility rates ranged from 1.7% to 31.1%. 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, ranging from 49% to 97% of all women giving birth (over 90% complete for 13 DHBs).

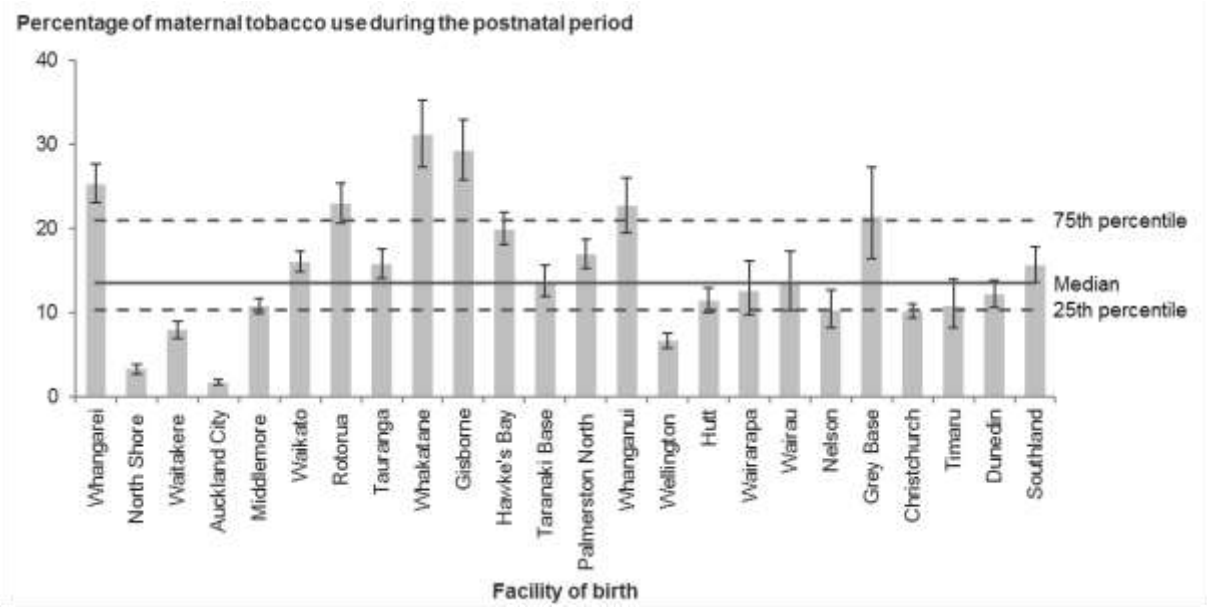
Indicator 16: Maternal tobacco use during postnatal period, 2015

Figure 27: Percentage of women identified as smokers during postnatal period (2 weeks after birth), by DHB of residence, 2015



Black 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), 2015



Black 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, 2015

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	524	1,971	26.6
Waitemata	364	7,265	5.0
Auckland	153	5,488	2.8
Counties Manukau	617	6,486	9.5
Waikato	859	5,023	17.1
Lakes	326	1,455	22.4
Bay of Plenty	502	2,721	18.4
Tairāwhiti	209	682	30.6
Hawke's Bay	365	1,840	19.8
Taranaki	224	1,480	15.1
MidCentral	354	1,954	18.1
Whanganui	169	735	23.0
Capital & Coast	222	3,302	6.7
Hutt Valley	208	1,855	11.2
Wairarapa	57	454	12.6
Nelson Marlborough	140	1,203	11.6
West Coast	66	338	19.5
Canterbury	637	6,112	10.4
South Canterbury	67	516	13.0
Southern	454	3,308	13.7
Unknown	38	227	-
New Zealand	**6,555**	**54,415**	**12.0**

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), 2015

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	338	1,335	25.3
North Shore	119	3,617	3.3
Waitakere	220	2,771	7.9
Auckland City	108	6,480	1.7
Middlemore	497	4,611	10.8
Waikato	532	3,311	16.1
Rotorua	279	1,215	23.0
Tauranga	273	1,732	15.8
Whakatane	160	514	31.1
Gisborne	180	615	29.3
Hawke's Bay	338	1,694	20.0
Taranaki Base	181	1,326	13.7
Palmerston North	287	1,695	16.9
Whanganui	143	631	22.7
Wellington	202	3,024	6.7
Hutt	202	1,770	11.4
Wairarapa	51	405	12.6
Wairau	48	359	13.4
Nelson	73	711	10.3
Grey Base	46	215	21.4
Christchurch	514	5,067	10.1
Timaru	49	453	10.8
Dunedin	200	1,645	12.2
Southland	178	1,137	15.7
All secondary and tertiary facilities	**5,218**	**46,333**	**11.3**
All primary facilities	**1,002**	**5,461**	**18.3**
All home births	**244**	**2,103**	**11.6**
New Zealand[1]	**6,555**	**54,415**	**12.0**

1 Includes women where birth location was unspecified.

Indicator 17: Maternal obesity

Rationale and purpose

Maternal obesity (where obesity is defined as a BMI of 30+) can result in negative outcomes for both women and fetuses. The maternal risks during pregnancy include gestational diabetes and pre-eclampsia. The fetus is at risk for stillbirth and congenital anomalies. Obesity in pregnancy can also affect health later in life for both mother and child. For women, these risks include heart disease and hypertension. Offspring have increased risks of future obesity and heart disease. Women and their offspring are also at increased risk for diabetes (Leddy et al 2008).

A BMI of 35+ in early pregnancy is associated with a number of pregnancy and birth complications and perinatal conditions. The risk of complications and perinatal conditions increases further for women with a BMI of 40+ (Cedergen 2004).

The *Guidelines for Consultation with Obstetric and Related Medical Services (Referral Guidelines)* (Ministry of Health 2012) recommend providers refer for consultation all women with a BMI over 35 and transfer clinical responsibility to specialist services for all women with a BMI over 40.

District health boards with high rates of women with obesity, and in particular with a BMI over 35, should consider strategies for prevention and reduction of obesity within their population and provide sufficient resources to ensure that high-quality services are available for women who are obese during pregnancy.

Notes on 2015 data

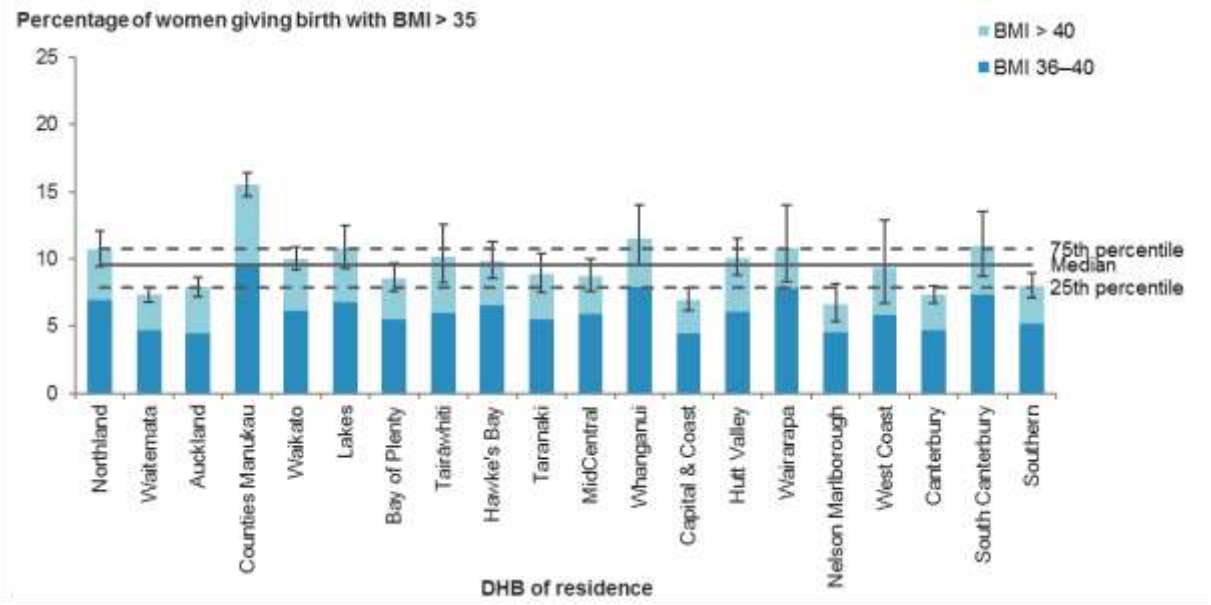
Rates of women giving birth with BMI over 35 at registration varied between DHBs, ranging from 6.6% to 15.5%.

Data presented for this indicator may reflect variation in practices regarding measurement and recording of maternal height and weight and is impacted by the gestation at registration

This indicator currently presents BMI data collected from women registered with an LMC or a DHB primary maternity service. Completeness of this data varies between DHBs, ranging from 55% to 99% of all women giving birth (over 90% complete for 15 DHBs).

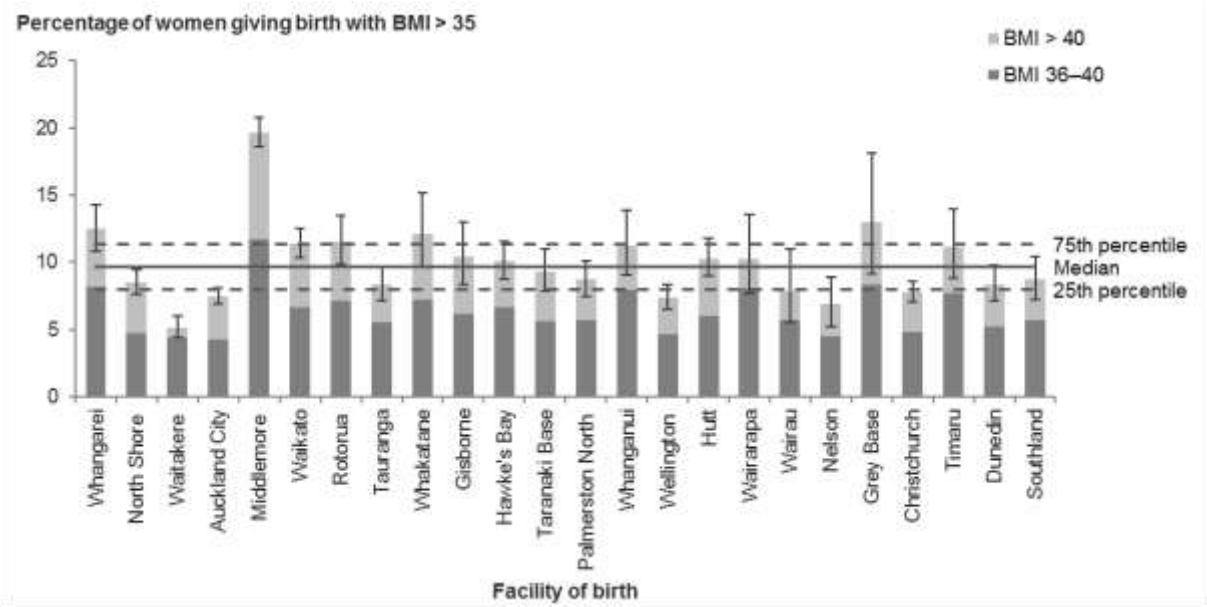
Indicator 17: Women with BMI over 35, 2015

Figure 29: Percentage of women giving birth with BMI over 35 at registration, by DHB of residence, 2015



Black 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 women giving birth with BMI over 35 at registration, by facility of birth (secondary and tertiary facilities), 2015



Black 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 women giving birth with BMI over 35 at registration, by DHB of residence, 2015

DHB of residence	Women with BMI > 35 at registration			All women with reported BMI	Rate (%)
	36–40	> 40	Total		
Northland	146	78	224	2,090	10.7
Waitemata	349	197	546	7,440	7.3
Auckland	256	194	450	5,705	7.9
Counties Manukau	654	412	1,066	6,873	15.5
Waikato	315	199	514	5,138	10.0
Lakes	101	60	161	1,493	10.8
Bay of Plenty	152	85	237	2,772	8.5
Tairāwhiti	44	31	75	735	10.2
Hawke's Bay	123	62	185	1,878	9.9
Taranaki	83	50	133	1,503	8.8
MidCentral	120	57	177	2,029	8.7
Whanganui	61	28	89	770	11.6
Capital & Coast	152	84	236	3,405	6.9
Hutt Valley	113	74	187	1,860	10.1
Wairarapa	36	14	50	461	10.8
Nelson Marlborough	56	26	82	1,234	6.6
West Coast	20	12	32	343	9.3
Canterbury	292	163	455	6,192	7.3
South Canterbury	48	23	71	649	10.9
Southern	178	94	272	3,400	8.0
Unknown	9	4	13	241	-
New Zealand	**3,308**	**1,947**	**5,255**	**56,211**	**9.3**

Table 36: Number and percentage of women giving birth with BMI over 35 at registration, by facility of birth (secondary and tertiary facilities), 2015

Place of birth	Women with BMI > 35 at registration			All women with reported BMI	Rate (%)
	36–40	> 40	Total		
Whangarei	116	61	177	1,418	12.5
North Shore	175	138	313	3,676	8.5
Waitakere	126	20	146	2,834	5.2
Auckland City	288	218	506	6,760	7.5
Middlemore	582	394	976	4,964	19.7
Waikato	227	162	389	3,415	11.4
Rotorua	89	55	144	1,245	11.6
Tauranga	97	49	146	1,756	8.3
Whakatane	38	26	64	528	12.1
Gisborne	41	28	69	663	10.4
Hawke's Bay	115	59	174	1,728	10.1
Taranaki Base	75	50	125	1,343	9.3
Palmerston North	100	54	154	1,766	8.7
Whanganui	52	22	74	657	11.3
Wellington	145	87	232	3,135	7.4
Hutt	107	75	182	1,769	10.3
Wairarapa	33	9	42	409	10.3
Wairau	21	8	29	370	7.8
Nelson	33	17	50	728	6.9
Grey Base	18	10	28	216	13.0
Christchurch	246	154	400	5,132	7.8
Timaru	45	20	65	583	11.1
Dunedin	88	52	140	1,678	8.3
Southland	67	36	103	1,183	8.7
All secondary and tertiary facilities	**2,924**	**1,804**	**4,728**	**47,956**	**9.9**
All primary facilities	**278**	**95**	**373**	**5,577**	**6.7**
All home births	**71**	**35**	**106**	**2,143**	**4.9**
New Zealand[1]	**3,308**	**1,947**	**5,255**	**56,211**	**9.3**

1 Includes women where birth location was unspecified.

Indicator 18: 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, 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.

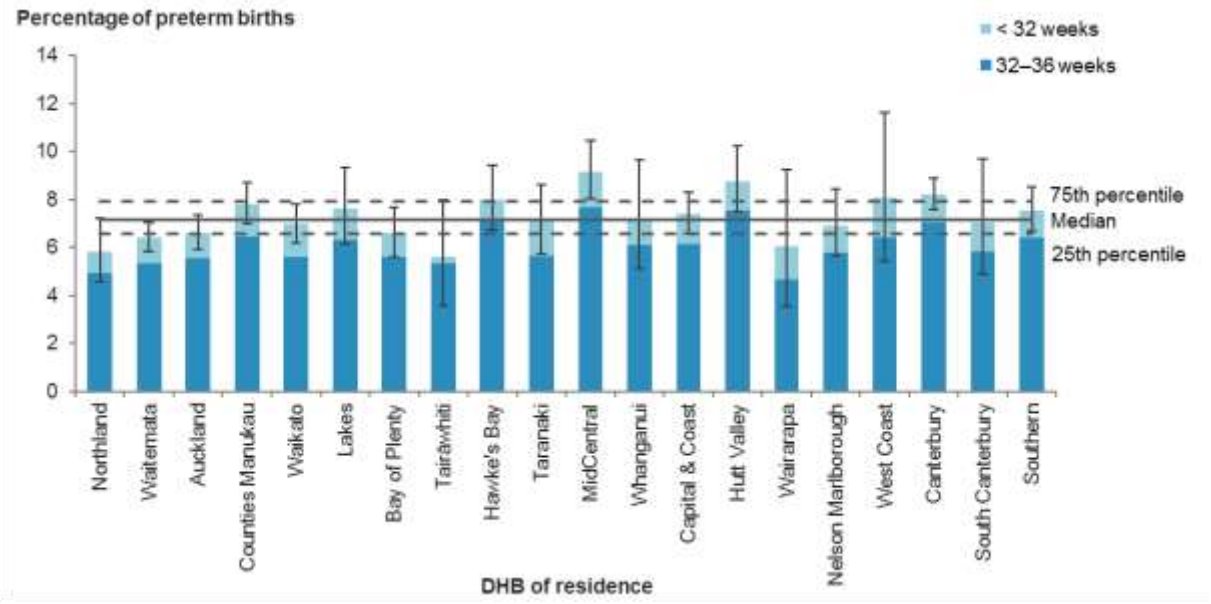
Recent investigation by the National Maternity Monitoring Group found that rates of preterm birth at 34 and 35 weeks' gestation remained fairly constant over the four years from 2008 to 2011. However, preterm births at 36 weeks' gestation have increased. This may represent changes in planned preterm 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.

Notes on 2015 data

Overall rates of preterm birth (< 37 weeks' gestation) varied between DHBs, ranging from 5.6% to 9.2%, and varied more widely between secondary and tertiary facilities, ranging from 1.3% to 11.4%. 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.

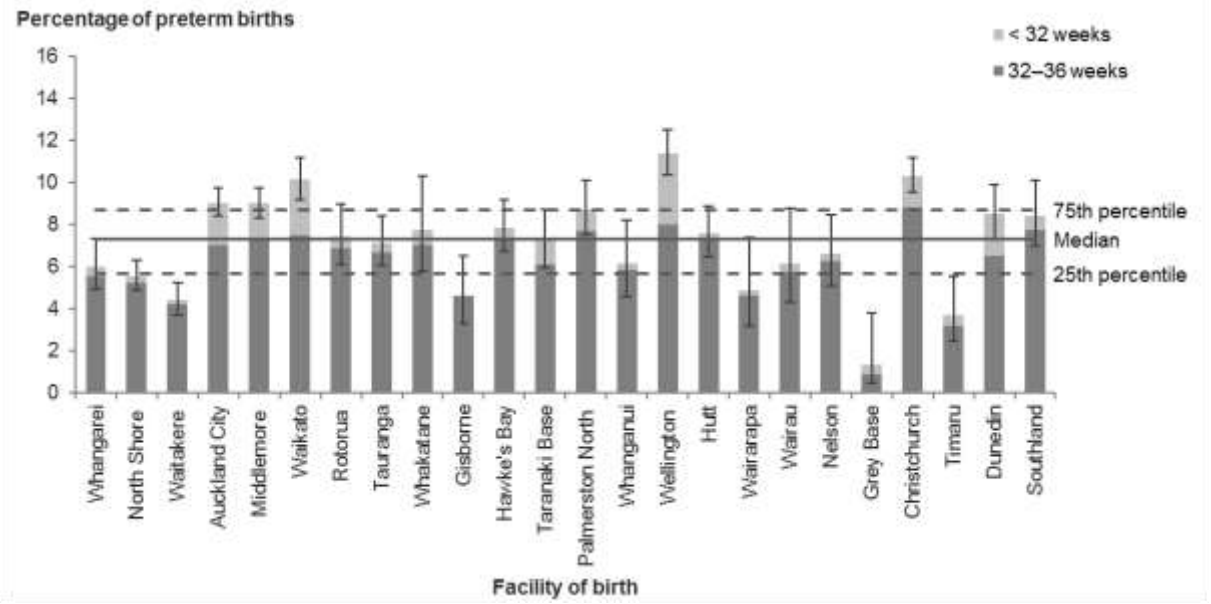
Indicator 18: Preterm births, 2015

Figure 31: Percentage of preterm births, by DHB of residence, 2015



Black 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 preterm births, by facility of birth (secondary and tertiary facilities), 2015



Black 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 preterm births, by DHB of residence, 2015

DHB of residence	Babies born under 37 weeks' gestation			All babies born (live births)	Rate (%)
	< 32 weeks	32–36 weeks	Total		
Northland	19	104	123	2,106	5.8
Waitemata	82	406	488	7,602	6.4
Auckland	62	332	394	5,959	6.6
Counties Manukau	112	533	645	8,250	7.8
Waikato	73	301	374	5,361	7.0
Lakes	20	96	116	1,519	7.6
Bay of Plenty	27	156	183	2,783	6.6
Tairāwhiti	2	41	43	769	5.6
Hawke's Bay	17	143	160	2,007	8.0
Taranaki	22	86	108	1,527	7.1
MidCentral	32	162	194	2,117	9.2
Whanganui	9	50	59	820	7.2
Capital & Coast	44	218	262	3,549	7.4
Hutt Valley	24	150	174	1,985	8.8
Wairarapa	6	20	26	428	6.1
Nelson Marlborough	16	83	99	1,434	6.9
West Coast	6	23	29	359	8.1
Canterbury	73	442	515	6,260	8.2
South Canterbury	8	39	47	667	7.0
Southern	40	220	260	3,441	7.6
Unknown	10	12	22	358	-
New Zealand	**704**	**3,617**	**4,321**	**59,301**	**7.3**

Table 38: Number and percentage of preterm births, by facility of birth (secondary and tertiary facilities), 2015

Place of birth	Babies born under 37 weeks' gestation			All babies born (live births)	Rate (%)
	< 32 weeks	32–36 weeks	Total		
Whangarei	7	82	89	1,480	6.0
North Shore	12	198	210	3,776	5.6
Waitakere	6	123	129	2,926	4.4
Auckland City	141	493	634	6,999	9.1
Middlemore	110	468	578	6,412	9.0
Waikato	95	267	362	3,565	10.2
Rotorua	7	88	95	1,277	7.4
Tauranga	8	120	128	1,791	7.1
Whakatane	4	38	42	542	7.7
Gisborne	0	31	31	668	4.6
Hawke's Bay	9	136	145	1,840	7.9
Taranaki Base	15	84	99	1,372	7.2
Palmerston North	19	145	164	1,878	8.7
Whanganui	2	40	42	683	6.1
Wellington	113	269	382	3,350	11.4
Hutt	7	135	142	1,868	7.6
Wairarapa	1	19	20	411	4.9
Wairau	2	26	28	454	6.2
Nelson	3	52	55	833	6.6
Grey Base	1	2	3	228	1.3
Christchurch	79	461	540	5,222	10.3
Timaru	3	19	22	595	3.7
Dunedin	34	112	146	1,715	8.5
Southland	8	93	101	1,199	8.4
All secondary and tertiary facilities	**686**	**3,501**	**4,187**	**51,084**	**8.2**
All primary facilities	**4**	**63**	**67**	**5,763**	**1.2**
All home births	**2**	**48**	**50**	**2,150**	**2.3**
New Zealand[1]	**704**	**3,617**	**4,321**	**59,301**	**7.3**

1 Includes babies without a birth location recorded.

Indicators 19 and 20: 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 19)

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 may be different from population charts.

There is extensive evidence for maternal factors leading to SGA, including smoking, hypertension, pre-eclampsia, poorly controlled diabetes, obesity and poor nutrition. This indicator is intended to drive multidisciplinary review of the prevention and management of poor fetal growth at a population level, with the potential for reducing risk of both SGA and stillbirth.

Small babies at term born at 40–42 weeks' gestation (indicator 20)

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 clinical practice management for 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 2015 data

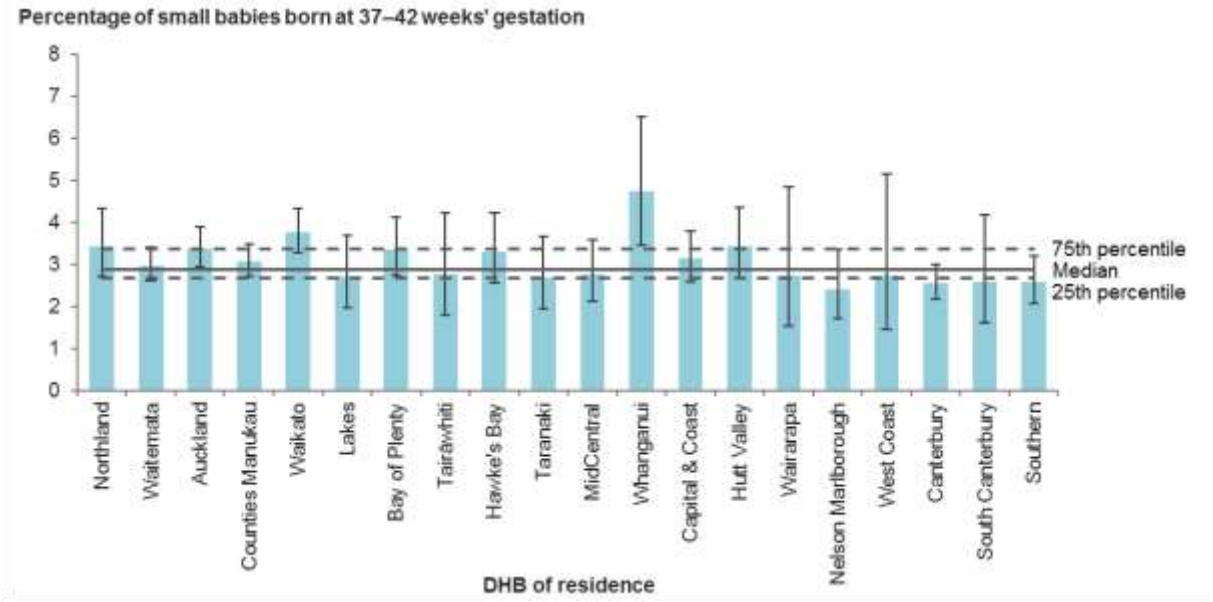
Of all babies born at 37–42 weeks' gestation, the proportion of SGA babies was generally low, but varied two-fold across the DHBs, ranging from 2.4% to 4.7%, and from 2.2% to 5.3% across secondary and tertiary facilities.

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 28.9% to 56.3% between DHBs, and from 26.7% to 56.3% across secondary and tertiary facilities. These rates were based on small numbers (in both numerator and denominator), so caution must be used 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 these babies that are at significantly increased risk of stillbirth and perinatal compromise.

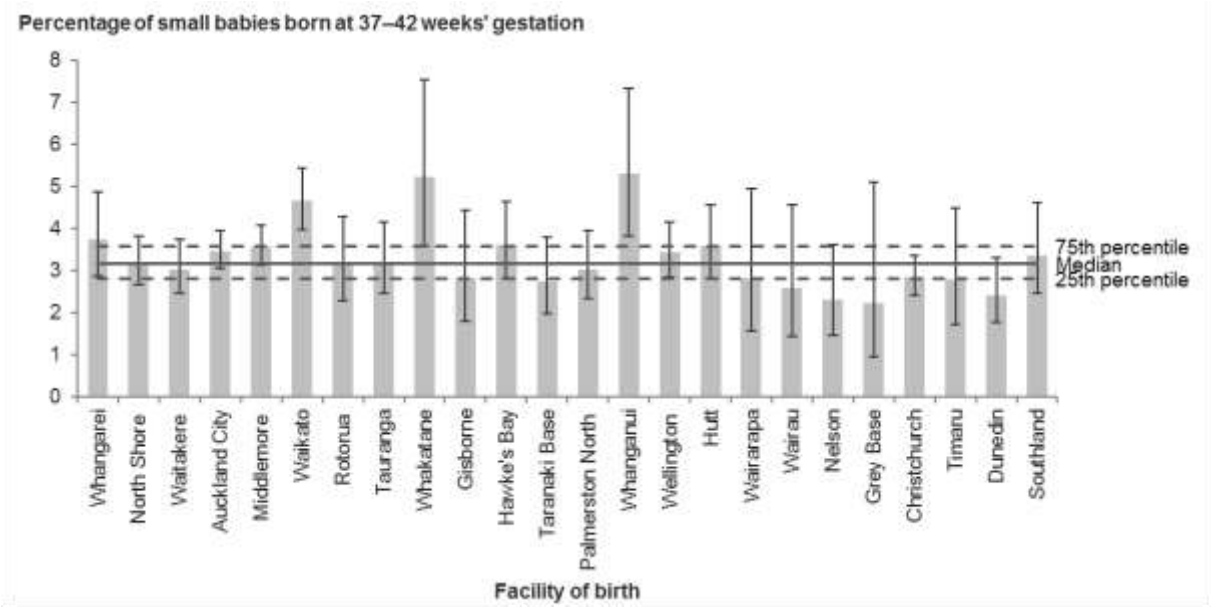
Indicator 19: Small babies at term (37–42 weeks' gestation), 2015

Figure 33: Percentage of small babies at term (37–42 weeks' gestation), by DHB of residence, 2015



Black 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 (37–42 weeks' gestation), by facility of birth (secondary and tertiary facilities), 2015



Black 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 (37–42 weeks' gestation), by DHB of residence, 2015

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	68	1,975	3.4
Waitemata	212	7,104	3.0
Auckland	188	5,556	3.4
Counties Manukau	233	7,587	3.1
Waikato	186	4,935	3.8
Lakes	38	1,401	2.7
Bay of Plenty	87	2,586	3.4
Tairāwhiti	20	722	2.8
Hawke's Bay	60	1,819	3.3
Taranaki	38	1,419	2.7
MidCentral	53	1,919	2.8
Whanganui	36	758	4.7
Capital & Coast	103	3,281	3.1
Hutt Valley	62	1,809	3.4
Wairarapa	11	402	2.7
Nelson Marlborough	32	1,333	2.4
West Coast	9	327	2.8
Canterbury	147	5,741	2.6
South Canterbury	16	617	2.6
Southern	82	3,177	2.6
Unknown	6	286	-
New Zealand	**1,687**	**54,754**	**3.1**

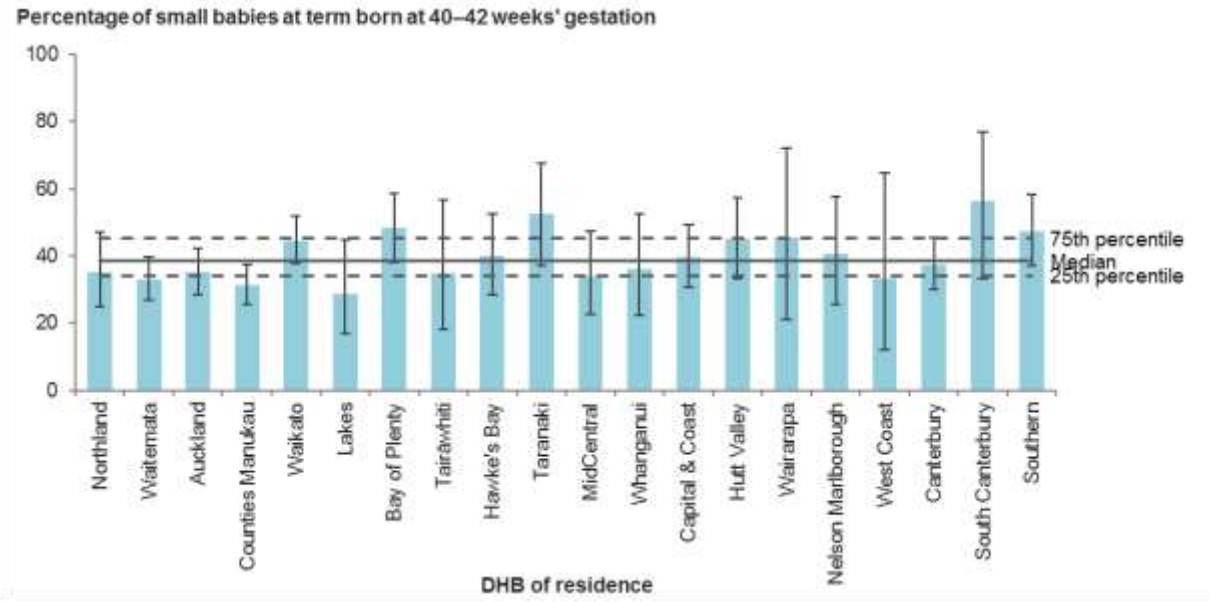
Table 40: Number and percentage of small babies at term (37–42 weeks' gestation), by facility of birth (secondary and tertiary facilities), 2015

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	52	1,389	3.7
North Shore	114	3,565	3.2
Waitakere	85	2,794	3.0
Auckland City	221	6,362	3.5
Middlemore	208	5,821	3.6
Waikato	149	3,194	4.7
Rotorua	37	1,182	3.1
Tauranga	53	1,657	3.2
Whakatane	26	497	5.2
Gisborne	18	636	2.8
Hawke's Bay	61	1,681	3.6
Taranaki Base	35	1,273	2.7
Palmerston North	52	1,711	3.0
Whanganui	34	639	5.3
Wellington	102	2,966	3.4
Hutt	62	1,726	3.6
Wairarapa	11	391	2.8
Wairau	11	425	2.6
Nelson	18	778	2.3
Grey Base	5	225	2.2
Christchurch	133	4,682	2.8
Timaru	16	572	2.8
Dunedin	38	1,568	2.4
Southland	37	1,098	3.4
All secondary and tertiary facilities	**1,578**	**46,832**	**3.4**
All primary facilities	**106**	**5,656**	**1.9**
All home births	**3**	**2,037**	**0.1**
New Zealand[1]	**1,687**	**54,754**	**3.1**

1 Includes babies where birth location was unspecified.

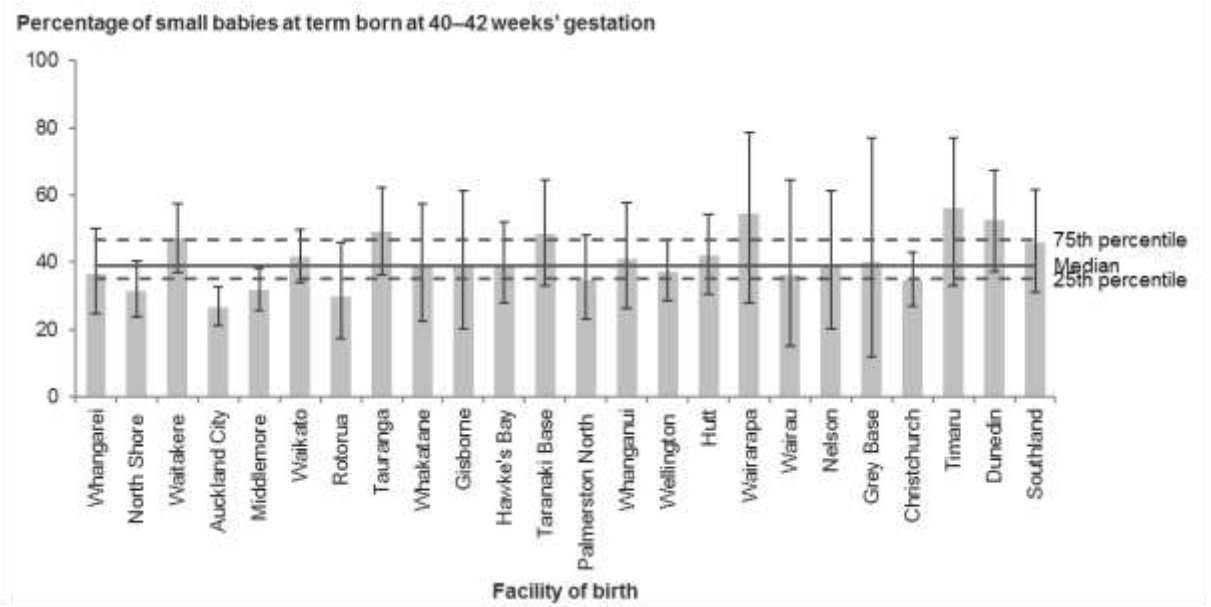
Indicator 20: Small babies at term born at 40–42 weeks' gestation, 2015

Figure 35: Percentage of small babies at term born at 40–42 weeks' gestation, by DHB of residence, 2015



Black 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 small babies at term born at 40–42 weeks' gestation, by facility of birth (secondary and tertiary facilities), 2015



Black 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 small babies at term born at 40–42 weeks' gestation, by DHB of residence, 2015

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	24	68	35.3
Waitemata	70	212	33.0
Auckland	66	188	35.1
Counties Manukau	73	233	31.3
Waikato	83	186	44.6
Lakes	11	38	28.9
Bay of Plenty	42	87	48.3
Tairāwhiti	7	20	35.0
Hawke's Bay	24	60	40.0
Taranaki	20	38	52.6
MidCentral	18	53	34.0
Whanganui	13	36	36.1
Capital & Coast	41	103	39.8
Hutt Valley	28	62	45.2
Wairarapa	5	11	45.5
Nelson Marlborough	13	32	40.6
West Coast	3	9	33.3
Canterbury	55	147	37.4
South Canterbury	9	16	56.3
Southern	39	82	47.6
Unknown	3	6	-
New Zealand	**647**	**1,687**	**38.4**

Table 42: Number and percentage of small babies at term born at 40–42 weeks' gestation, by facility of birth (secondary and tertiary facilities), 2015

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	19	52	36.5
North Shore	36	114	31.6
Waitakere	40	85	47.1
Auckland City	59	221	26.7
Middlemore	66	208	31.7
Waikato	62	149	41.6
Rotorua	11	37	29.7
Tauranga	26	53	49.1
Whakatane	10	26	38.5
Gisborne	7	18	38.9
Hawke's Bay	24	61	39.3
Taranaki Base	17	35	48.6
Palmerston North	18	52	34.6
Whanganui	14	34	41.2
Wellington	38	102	37.3
Hutt	26	62	41.9
Wairarapa	6	11	54.5
Wairau	4	11	36.4
Nelson	7	18	38.9
Grey Base	2	5	40.0
Christchurch	46	133	34.6
Timaru	9	16	56.3
Dunedin	20	38	52.6
Southland	17	37	45.9
All secondary and tertiary facilities	**584**	**1,578**	**37.0**
All primary facilities	**62**	**106**	**58.5**
All home births	**1**	**3**	**33.3**
New Zealand[1]	**647**	**1,687**	**38.4**

1 Includes babies where birth location was unspecified.

Indicator 21: 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.

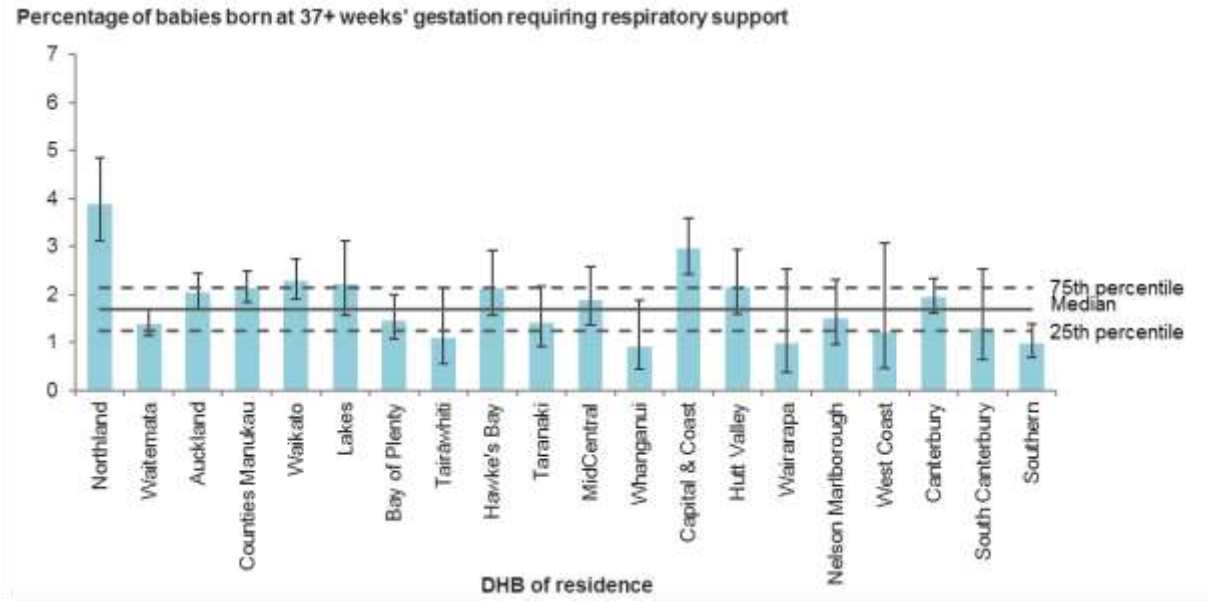
Data presented for this indicator may reflect variation in reporting practices regarding respiratory support for babies. This should be addressed locally; all DHBs should ensure data they report to the national collections is accurate and complete.

Notes on 2015 data

There was considerable variation in the rate of babies born at term (37+ weeks' gestation) requiring respiratory support, ranging from 0.9% to 3.9% across the DHBs, and from 0% to 4.9% across secondary and tertiary facilities. This warrants further investigation at the local level.

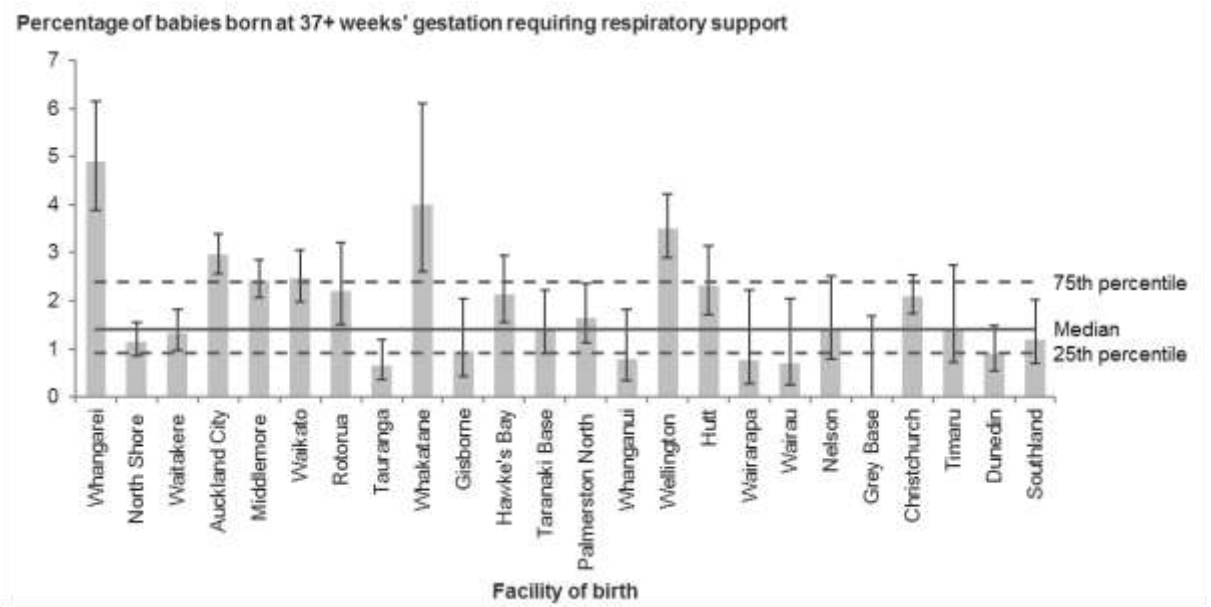
Indicator 21: Babies born at 37+ weeks' gestation requiring respiratory support, 2015

Figure 37: Percentage of babies born at 37+ weeks' gestation requiring respiratory support, by DHB of residence, 2015



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

Figure 38: Percentage of babies born at 37+ weeks' gestation requiring respiratory support, by facility of birth (secondary and tertiary facilities), 2015



Black 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 43: Number and percentage of babies born at 37+ weeks' gestation requiring respiratory support, by DHB of residence, 2015

DHB of residence	Babies born at 37+ weeks' gestation requiring over 4 hours of respiratory support	Babies born at 37+ weeks' gestation	Rate (%)
Northland	77	1,979	3.9
Waitemata	98	7,110	1.4
Auckland	113	5,561	2.0
Counties Manukau	162	7,593	2.1
Waikato	114	4,980	2.3
Lakes	31	1,403	2.2
Bay of Plenty	38	2,598	1.5
Tairāwhiti	8	725	1.1
Hawke's Bay	39	1,827	2.1
Taranaki	20	1,419	1.4
MidCentral	36	1,923	1.9
Whanganui	7	760	0.9
Capital & Coast	97	3,284	3.0
Hutt Valley	39	1,810	2.2
Wairarapa	4	402	1.0
Nelson Marlborough	20	1,334	1.5
West Coast	4	330	1.2
Canterbury	112	5,744	1.9
South Canterbury	8	620	1.3
Southern	31	3,180	1.0
Unknown	8	290	-
New Zealand	**1,066**	**54,872**	**1.9**

Table 39: Number and percentage of babies born at 37+ weeks' gestation requiring respiratory support, by facility of birth (secondary and tertiary facilities), 2015

Place of birth	Babies born at 37+ weeks' gestation requiring over 4 hours of respiratory support	Babies born at 37+ weeks' gestation	Rate (%)
Whangarei	68	1,389	4.9
North Shore	41	3,565	1.2
Waitakere	37	2,796	1.3
Auckland City	188	6,363	3.0
Middlemore	141	5,825	2.4
Waikato	79	3,200	2.5
Rotorua	26	1,182	2.2
Tauranga	11	1,661	0.7
Whakatane	20	499	4.0
Gisborne	6	636	0.9
Hawke's Bay	36	1,684	2.1
Taranaki Base	18	1,273	1.4
Palmerston North	28	1,714	1.6
Whanganui	5	641	0.8
Wellington	104	2,967	3.5
Hutt	40	1,726	2.3
Wairarapa	3	391	0.8
Wairau	3	425	0.7
Nelson	11	778	1.4
Grey Base	0	225	0.0
Christchurch	98	4,682	2.1
Timaru	8	573	1.4
Dunedin	14	1,568	0.9
Southland	13	1,098	1.2
All secondary and tertiary facilities	**998**	**46,861**	**2.1**
All primary facilities	**50**	**5,683**	**0.9**
All home births	**15**	**2,089**	**0.7**
New Zealand[1]	**1,066**	**54,872**	**1.9**

1 Includes babies where birth location was unspecified.

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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
- 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]

These sources are collected for administrative purposes (including the funding of maternity services). The collection does not contain details of stillborn babies. Information about stillbirths is included in the Mortality Collection. 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 National Minimum Dataset 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 information is assigned 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 National Minimum Dataset.

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 information is received through the LMC claim forms, and includes all women registered with an LMC. This represented 91% of all women giving birth in 2014. Data sourced from LMC claim forms includes details on registration with an LMC, as well as other antenatal and postnatal factors (eg, parity, BMI, smoking status, breastfeeding status).

4 Collection of this data set (from 2014 onwards) is under way but is incomplete at this time. Data currently available in the National Maternity Collection has been included 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 being provided by DHBs 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 2014, approximately 87% of women giving birth registered to receive primary maternity care with an LMC and 5% registered to receive care from a DHB primary maternity service. Provision of care was unknown for 8% 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

Getting the data

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

Parity, smoking status and BMI data in the National Maternity Collection is primarily sourced 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 (95% of women giving birth in 2014).

Indicators 2–12 and 21 require additional information that is not available in the National Maternity Collection. Therefore, hospital events occurring during the pregnancy and postnatal period for these women and their babies were identified and extracted from the National Minimum Dataset.

Hospital events in the National Minimum Dataset are coded using the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM). The 6th edition was used for hospital discharges up to 30 June 2014 and the 8th edition was used for hospital discharges from 1 July 2014 onwards. The clinical codes used are provided in the next section.

Clinical codes and definitions

Standard primiparae: a group of mothers considered to be clinically comparable and expected to require low levels of obstetric intervention. Standard primiparae are defined in this report 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 birth[6]
- 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. Women giving birth at home are counted 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). Women giving birth at home are counted as having had a spontaneous vaginal birth without an episiotomy.

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

Table A8: Episiotomy and/or perineal tear codes

Clinical code (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. Data for individual primary facilities is provided in the accompanying online tables. Care should be taken 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. All relevant data is reported in this report under 'Southern DHB'.

Christchurch and Christchurch Women's data: from 1 July 2009 maternity events that had previously been reported as occurring in Christchurch Women's Hospital were reported as occurring in Christchurch Hospital. This change represents a change in the way the data is reported, rather than a change in patient care. For the purposes of this report, Christchurch Women's Hospital and Christchurch Hospital events have been summed.

Appendix 3: Catchment areas

The primary, secondary and tertiary maternity facilities that reported births between 2009 and 2015 are listed by DHB region (of location) in the table below. Their geographical locations are presented in Figure A1.

DHB	Tertiary facility[1]	Secondary facility[2]	Primary facility[3]
Northland	Auckland City	Whangarei	Bay of Islands Dargaville 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 Pohlen Trust Rhoda Read River Ridge Taumaranui 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* Hawera
Hawke's Bay	Wellington	Hawke's Bay Regional	Wairoa
MidCentral		Palmerston North	Dannevirke Horowhenua
Whanganui		Whanganui	Otaihape Waimarino
Capital & Coast			Kapiti 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
Canterbury			Akaroa* Ashburton Burwood Darfield Kaikoura Lincoln Rangiora St George's Waikari*
South Canterbury		Timaru	
Southern		Dunedin Southland	Charlotte Jean Clutha Dunstan* Gore Lakes District Lumsden Maniototo 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 intensive care units.

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.

* These facilities did not provide birth care in 2015.

Figure A1: Maternity facilities in New Zealand by DHB and facility type (2009–2015)