

# **Report on Maternity**

1999

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# Contents

1	Introduction	1
1.1	Background	1
1.2	Structure of MNIS database	2
1.3	Data quality and limitations of the MNIS	3
1.4	Maternity report	5
2	Mother and Pregnancy	6
2.1	Demography	6
2.2	Deprivation scales	13
2.3	Miscarriages	16
2.4	Pregnancy complications	18
3	Labour and Birth	22
3.1	Type of birth	22
3.2	Procedures	34
4	Babies	38
4.1	Babies at birth	38
4.2	Birth outcomes	41
5	Postnatal Period	45
5.1	Postnatal hospital admissions	46
5.2	Breastfeeding	48
5.3	Postnatal care	50
6	Maternity Facility	53
7	Lead Maternity Carer	76
	Appendices	
	Appendix 1	82
	Appendix 2	83
	Glossary	84
	References	89

## List of Tables

Table 1.1:	Maternity hospital summary data, 1999	1
Table 1.2:	Total births, by source, 1999	3
Table 2.1:	Mother's age and ethnicity (hospital data), 1999	6
Table 2.2:	Percentage of women in each age bracket, by ethnicity (hospital data), 1999	7
Table 2.3:	Mother's place of residence, by DHB region and ethnicity (hospital data), 1999	9
Table 2.4:	Mother's place of residence, by DHB region (hospital data), 1999	10
Table 2.5:	Number of pregnancies (gravida), 1999	11
Table 2.6:	Number of previous births (parity) recorded at registration, 1999	12
Table 2.7:	Pregnancy rate (gravida), by ethnicity, 1999	13
Table 2.8:	Mothers, by rural/urban status and NZDep decile of woman's place of residence, 1999	13
Table 2.9:	Total hospital miscarriages, by mothers' age and ethnicity, 1999	16
Table 2.10:	Total antenatal hospital admissions and average length of stay (days) for mothers, by diagnosis related group (DRG) and ethnicity, 1999	18
Table 2.11:	Total antenatal hospital admissions and average length of stay (days) for mothers, by principal diagnosis, DRGs 685 and 686, 1999	19
Table 2.12:	Claims made for private specialist obstetrician consultations, by DHB region of woman's place of residence, 1999	20
Table 3.1:	Type of birth (numbers), by age, 1999	22
Table 3.2:	Type of birth (percent), by age, 1999	23
Table 3.3:	Type of birth (numbers), by ethnicity, 1999	23
Table 3.4:	Type of birth (percent), by ethnicity, 1999	24
Table 3.5:	Type of birth (numbers), by parity, 1999	24
Table 3.6:	Type of birth (percent), by parity, 1999	25
Table 3.7:	Type of birth (numbers), by DHB region of woman's place of residence, 1999	25
Table 3.8:	Type of birth (percent), by DHB region of woman's place of residence, 1999	26
Table 3.9:	Type of birth (numbers), by facility, 1999	28
Table 3.10:	Type of birth (percent), by facility, 1999	30
Table 3.11:	Birth procedure (numbers) for mothers during delivery, by DHB region of woman's place of residence, 1999	34
Table 3.12:	Birth procedure (rate per 100 deliveries) for mothers during delivery, by DHB region of woman's place of residence, 1999	35
Table 3.13:	Epidurals, by age and ethnicity, 1999	36
Table 3.14:	Inductions, by age and ethnicity, 1999	36
Table 4.1:	Babies, by mother's age and ethnicity (hospital data), 1999	38

Table 4.2:	Baby numbers and average birthweight for babies born in hospital, by gender and ethnicity, 1999	38
Table 4.3:	Gestational age at birth for babies born in hospital, by ethnicity, 1999	39
Table 4.4:	Number of babies born in hospital, by birthweight and DHB of woman's place of residence, 1999	39
Table 4.5:	Number of babies born in hospital (percent), by birthweight and DHB of woman's place of residence, 1999	40
Table 4.6:	Apgar score at five minutes, 1999	40
Table 4.7:	In-hospital perinatal outcomes, by DHB of mother's place of residence, 1999	41
Table 4.8:	In-hospital perinatal deaths, by ethnicity, 1999	42
Table 4.9:	Stillbirths (numbers), by mother's age and NZDep decile of woman's place of residence, 1999	42
Table 4.10:	Stillbirths (rates per 1000), by mother's age and NZDep decile of woman's place of residence, 1999	42
Table 4.11:	In-hospital neonatal deaths, by principal diagnosis, 1999	43
Table 4.12:	In-hospital neonatal deaths, by birthweight, 1999	44
Table 4.13:	In-hospital neonatal deaths, by gestational age, 1999	44
Table 5.1:	Postnatal readmissions for problems relating to pregnancy, average length of stay and significant operations, by principal diagnosis (DRGs 678 and 679 only), 1999	46
Table 5.2:	Readmissions to hospital for newborns born in hospital, by DHB region of woman's place of residence, 1999	47
Table 5.3:	Breastfeeding rates at time of transfer to well child provider, 1999	48
Table 5.4:	Breastfeeding rates, by age of mother, 1999	49
Table 5.5:	Breastfeeding rates, by ethnicity, 1999	49
Table 5.6:	Breastfeeding rates, by DHB region of woman's place of residence, 1999	50
Table 5.7:	Number of postnatal midwifery home visits, 1999	50
Table 5.8:	Transfer of maternity services to well child provider, 1999	51
Table 5.9:	Claims made for specialist paediatrician consultations, by DHB of woman's area of residence, 1999	51
Table 6.1:	Total live and stillbirths, by facility, 1999	53
Table 6.2:	Mothers, by ethnicity and facility, 1999	55
Table 6.3:	Mothers (percent), by rural/urban status, NZDep level (quintiles) and facility, 1999	57
Table 6.4:	Total antenatal hospital admissions and average length of stay (days), by facility, 1999	58
Table 6.5:	Type of hospital birth (numbers), by facility, 1999	60
Table 6.6:	Type of hospital delivery (percent), by facility, 1999	62
Table 6.7:	Inductions, epidurals and episiotomies, by facility, 1999	66
Table 6.8:	Mothers, by clinical complexity level (CCL) and facility, 1999	68

Table 6.9:	Average length of stay (days) for mothers, by clinical complexity level (CCL) and facility, 1999	70
Table 6.10:	Gestation age at birth (numbers), by facility, 1999	72
Table 6.11:	Gestational age at birth (percent), by facility, 1999	74
Table 7.1:	Number of LMC registrations per mother, 1999	76
Table 7.2:	Original LMC type, 1999	77
Table 7.3:	Original LMC by mother's age, 1999	77
Table 7.4:	Original LMC by ethnicity of mother, 1999	78
Table 7.5:	Original LMC at registration, by DHB of mother's place of residence, 1999	78
Table 7.6:	Original LMC, by mother's parity, 1999	79
Table 7.7:	First registration at time of delivery, 1999	79
Table 7.8:	Outcome of birth, by original LMC, 1999	80
Table 7.9:	Type of birth, by original LMC, 1999	80
Table 7.10:	Interventions by original LMC, 1999	81
Table 7.11:	Length of stay at delivery, by original LMC, 1999	81

## List of Figures

Figure 2.1:	Mother's age compared with ethnicity per 1000 women of reproductive age (hospital data), 1999	8
Figure 2.2:	Mother's ethnicity compared with age per 1000 women of reproductive age (hospital data), 1999	8
Figure 2.3:	Hospital birth rates (standardised by age and ethnicity) and 99% confidence limits per 1000 women of reproductive age, by DHB region of woman's place of residence, 1999	11
Figure 2.4:	Hospital birth rates per 1000 women of reproductive age, by rural/urban status and NZDep decile of woman's place of residence, 1999	14
Figure 2.5:	Standardised hospital birth rates (SBRs) per 1000 women of reproductive age, by ethnicity and NZDep decile, 1999	15
Figure 2.6:	Rate of hospital miscarriages per 100 mothers, by age and ethnicity, 1999	17
Figure 3.1:	Type of birth (standardised rates), by DHB region of woman's place of residence, 1999	27
Figure 3.2:	Standardised caesarean section rates, by facility, 1999	32
Figure 3.3:	Standardised operative vaginal birth rates, by facility, 1999	33
Figure 3.4:	Standardised normal vaginal birth rates, by facility, 1999	34
Figure 5.1:	Readmission rate to hospital and 99% confidence limits per 1000 births, by DHB of baby's place of residence, 1999	48
Figure 6.1:	Standardised caesarean section rates, by facility, 1999	64
Figure 6.2:	Standardised operative vaginal birth rates, by facility, 1999	65
Figure 6.3:	Standardised normal vaginal birth rates, by facility, 1999	66

# 1 Introduction

## 1.1 Background

This is the first of what is planned to be an annual *Report on Maternity* analysing New Zealand maternity services. It contains information on the outcomes, availability and utilisation of maternity services for women who delivered in New Zealand in 1999. This information will be useful for District Health Boards (DHBs) when they are considering maternity services and outcomes within their district, and it will assist them in preparing needs analysis. The report will also be of interest to lead maternity carers (LMCs), health professionals, policy makers, academics and consumers. The report will allow LMCs and institutions to benchmark their services, to compare their practice with that of their colleagues, and to make detailed international comparisons.

This report contains data from the newly established Maternal and Newborn Information System (MNIS), whose primary purpose is to improve the health of New Zealand children and mothers. It is essential that every country monitors its maternity service, for only by careful observation of the past can we develop methods to improve in the future.

National maternity data have been collected in New Zealand for some years, but reports have been limited and data incomplete.<sup>1</sup> To improve the information available, in July 1999 the Health Funding Authority initiated the establishment of the MNIS, which would be a collection of perinatal information, amalgamating data from two of the five current datasets;<sup>2</sup> LMC payments claims; and the data collected at hospital discharge through the National Minimum Dataset (NMDS).

It is hoped in the future to amalgamate all government collected data sets.

In New Zealand in 1999, 52,428 mothers gave birth, and 53,273 babies were born in hospital. The table below provides a summary of the maternity data used for this report.

**Table 1.1:** Maternity hospital summary data, 1999

Variables	Summary	
	Number	Percent
Mothers	52,428	
Babies	53,273	
<b>Perinatal deaths</b>		
• Stillbirths	440	0.8
• In-hospital neonatal deaths	145	1.1

<sup>1</sup> See NZHIS (2000); Health Funding Authority (1999); Ministry of Health (1999).

<sup>2</sup> Perinatal data sets include LMC payment claims from Health Benefits (HB); National Minimum Dataset (NMDS) collected at discharge from hospital; Perinatal Mortality Database; Birth and Death Registrations; Maternal Mortality Database.

Type of birth		
• Normal deliveries	36,582	68.7
• Caesarean section	10,842	20.4
• Operative deliveries	5849	11.0

Data source: NMDS

While the MNIS can answer a wide range of queries, data quality limitations affect the robustness of the analysis. Addressing the data quality issues will increase confidence in any analysis based on data held in the MNIS. The 1999 *Report on Maternity* should therefore be considered the first step in the production of reliable information for mothers, practitioners, providers, policy makers and funders of maternity services in New Zealand.

Under each table in this report that analyses data from MNIS there is a statement on how complete the field is. Note that data from the NMDS database is 95% accurate.

## 1.2 Structure of MNIS database

The MNIS currently contains extracts of data from the NMDS and data from payment claims submitted to Health Benefits (HB).

NMDS records are collected routinely from all patients discharged from a hospital in New Zealand. These records are forwarded in encoded form to the Ministry of Health's New Zealand Health Information Services (NZHIS), and checked and validated. These data include a substantial amount of clinical information. Diseases and operations are encoded using the international ICD-9-AM clinical codes.

HB manages payment claims from providers of maternity services, who are required, under their terms of payment, to submit certain information. Audits of data quality are random for HB data and only a small amount of clinical data are captured. This dataset does, however, collect community data, a unique feature of the New Zealand maternity service.

For a pregnancy to be identified in the MNIS database, the woman's encrypted unique national identifier (National Health Index – NHI) and the gravida number of this pregnancy are used. All valid encrypted NHI numbers from HB claims are mapped to the corresponding encrypted NHI numbers in the NMDS records, in order to obtain all hospital events from NMDS to supplement out-patient events recorded by HB. This should obtain all maternity-related events this mother has had from ten months before delivery to three months after delivery. These extracts of data are loaded monthly into the MNIS, and currently contain data from March 1998. These data are non-identifiable, and it is intended to make them available to a range of agencies and analysts, according to the NZHIS Information Release Policy.

The MNIS also contains information on the baby at birth and the immediate postnatal period. The baby is linked to the pregnancy by the mother's encrypted NHI and the gravida number for this pregnancy.

Currently HB data are collected from approximately 70% of births. These are births that are managed by LMCs who make claims for payment under the arrangements set down in 1998 in the Notice Issued Pursuant to Section 51 of the Health and Disability Services Act



1993 Concerning the Provision of Maternity Services (Health Funding Authority 1998) (now superseded by section 88 of the New Zealand Public Health and Disability Act 2000). Linking events therefore limits the data contained in the MNIS to approximately 70% of births. While in future we anticipate that all LMC data will be available on the MNIS, this limitation is in effect for this 1999 annual report.

For this first report, data are presented from either of two sources: NMDS or MNIS. The source is identified in the legend of each table.

**Table 1.2:** Total births, by source, 1999

Summary	
Births	Number
Total live babies <sup>3</sup>	57,421
Live babies recorded in NMDS (hospital births)	52,833
Live babies recorded in MNIS (hospital births and home birth claims less 30%)	39,078
Total mothers <sup>4</sup>	56,211
Mothers recorded in NMDS (discharged from hospital)	52,428
Mothers recorded in MNIS (hospital births and home birth claims less 30%)	39,406

Data source: NMDS, MNIS, and Births, Deaths and Marriages

In July 1999 a maternal and newborn advisory group was established to oversee the reporting and use of information in the MNIS. This group consists of a mix of consumers, health practitioners and technical experts (a full list of current members is in Appendix 2). The advisory group meets regularly to discuss issues surrounding the MNIS and the reports being produced.

## 1.3 Data quality and limitations of the MNIS

The accuracy of data within any information system is critical to the reliability of the system and its ability to provide meaningful and robust analyses. Since this is the first report from the MNIS, and it depends on data that have not previously been used for the purpose of compiling such a report, there are significant limitations on the quality of the data. These quality concerns are an important aspect of this first report.

A number of issues regarding MNIS have been identified, and solutions have been sought. These issues will be addressed before the next report is produced. There are three major areas where the quality of the data in the MNIS has a serious impact on analyses of maternity events and outcomes.

- **Incorrect and duplicate NHIs**  
Incorrect allocation and recording of NHI numbers have caused there to be many duplicate or incorrect NHI numbers. This means that data cannot be linked within

<sup>3</sup> Recorded in Births, Deaths and Marriages, 1999.

<sup>4</sup> Recorded in Births, Deaths and Marriages, 1999.

the MNIS to the appropriate woman and/or baby, which has a direct impact on the quantity and quality of data that can be analysed. As a separate project NZHIS is reviewing the NHI to improve the quality of and access to the existing NHI. One focus of the review will be on improving the search functionality to reduce the rate of duplication in the future; this will also improve the quality of the data within the MNIS.

- **Incorrect gravida numbers**

The gravida number is used to link the mother's records to the correct pregnancy so that all the events are correctly associated with each other. Incorrect recording of gravida numbers means that not all the events for a pregnancy can be linked, resulting in an incomplete picture of pregnancy and postnatal care. For example, the mother may be recorded at registration and delivery as a gravida 2, but when referred for an ultrasound may be recorded as a gravida 1. Hence this mother is not recorded as having had an ultrasound for this pregnancy, but is recorded as having the ultrasound in a previous pregnancy. This issue will be addressed in the future by introducing the estimated delivery date (EDD) as the unique pregnancy identifier rather than gravida number. This proposed change has recently been consulted on, and is likely to be introduced with the implementation of the revised Notice in 2002. As a temporary measure until this change can be made, the Ministry is also considering applying a data-cleansing process to identify as many records as possible associated with each pregnancy, even where there is variance in the recorded gravida number.

- **Non-section 88 LMC contract data**

Approximately 30% of women receive pregnancy care from a non-section 88 LMC provider. HB was unable to validate data from these groups. This means that data can be linked to only 70% of pregnancy, labour and birth, and postnatal events. Work is currently under way to ensure that data from all LMCs will be available to the MNIS in future. When this occurs, all analysis in future reports will be done from MNIS.

Further limitations of the MNIS include the following.

- **LMC claims**

LMC analysis needs to be interpreted with caution. There is some variation in the numbers obtained, which is likely to be due to duplicate gravida numbers and duplicate claim events.

- **Breastfeeding data**

Breastfeeding data are only collected at the time of transfer to the well child provider – and transfer takes place at variable times during the six weeks after the birth. This means that it is difficult to analyse breastfeeding rates at specific times following birth. There is also variable interpretation of the definition of breastfeeding status (exclusive breastfeeding, partial breastfeeding and not breastfeeding).

- **Difficulty in accurately identifying home births**

Home births can only be identified if a 'labour and birth information' claim form is submitted to HB. If this information is not supplied, the home birth is unable to be identified. Many home birth providers have non-section-88 contracts, so there is an underestimate of home births in the MNIS database.

- **Difficulty in accurately classifying cause of stillbirth or neonatal deaths**

While the MNIS can answer a wide range of queries, full analysis of perinatal deaths is unable to be achieved at present. However, NZHIS produce annual perinatal

mortality reports. It is hoped that the perinatal mortality database will be able to be included in the MNIS in the future.

## 1.4 Maternity report

This report provides information on pregnancy care, labour and birth events, postnatal care and outcomes for births occurring in the 1999 calendar year. Most of these services are provided by public facilities, but as publicly funded maternity care is also provided by private hospitals, this information is captured in this report.

A birth is defined as a live or stillborn baby (or babies, if it is a multiple birth) of at least 20 weeks' gestation and/or over 400 g. Antenatal events are defined as all women who were admitted to a hospital up to 44 weeks before the date of delivery,<sup>5</sup> irrespective of the diagnosis. Readmissions are defined as all women or babies admitted up to 12 weeks after the date of delivery,<sup>6</sup> irrespective of the diagnosis

Analysis of the type of birth includes normal deliveries, caesarean sections and operative deliveries. Caesarean sections are coded as acute or elective caesarean sections, and operative deliveries are coded as either vaginal breech delivery, forceps or vacuum extractions.

The total number of babies born includes both live and stillbirths, which are determined from the mother's records. Deaths occurring up to 27 days post-birth (neonatal deaths) are determined from the babies' records. Total perinatal deaths include all stillbirths and babies who died within seven days of birth. Babies are included only if the death occurred in hospital. Perinatal mortality definitions are included in the Glossary.<sup>7</sup>

While most of the information contained in this report is robust, some aspects of the report must be interpreted with caution. These areas are identified in the commentary below the relevant tables.

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<sup>5</sup> Only for women who delivered during the 1999 calendar year.

<sup>6</sup> *Ibid.*

<sup>7</sup> Data from the NMDS database has been filtered to exclude unwanted records. In particular, the following women have been excluded: women whose normal residence is outside New Zealand; duplicate records; events coded to an error Diagnosis Related Groups (DRG 951, 952, 955, 956). Records are also merged if a discharge record shows a woman transferred to the same or another hospital within the same DHB provider on the same or following day, with a discharge type (from the previous hospital event) indicating a transfer to another facility ('DT'), or an internal transfer between specialties ('DW'), except between medical and surgical and vice versa, or a statistical discharge for a change in funder ('DF').

## 2 Mother and Pregnancy

This section concentrates on the mother, especially her age, ethnicity, parity, gravidity and residence. Pregnancy complications including miscarriage and events leading to a hospital admission in the antenatal period are also discussed.

Home birth information is not included due to the difficulty of accurately identifying the number of home births in New Zealand. MNIS is only able to identify a home birth if the LMC submits a home birth and birthing unit claim form to HB. Not all home births are captured through this claim form. This exclusion means that home birth data are unable to be reported on.

There were 52,428 women who gave birth and 53,273 babies born in hospital in New Zealand in 1999. Ninety-nine percent of these babies were live births. European women make up the largest ethnic group, especially in the South Island, with a greater racial diversity in the North Island.

In recent years there has been a relative increase in births to Asian and Pacific women, and the age of mothers giving birth has increased slightly. Māori and Pacific women tend to have more children and begin child rearing at a younger age than European and Asian women (Health Funding Authority 1999).

The data in this section are predominant from the NMDS dataset, which represents the total hospital births.

### 2.1 Demography

The median age for New Zealand women to have a baby is 29 and 58% of New Zealand births were to women between the ages of 25 and 34 years. Seven percent of births were to teenagers, 19% (9968/52428) to Māori women, 10% to Pacific women (5287/52428), and 6% to Asian women (3119/52428) (Table 2.1).

**Table 2.1:** Mother's age and ethnicity (hospital data), 1999

Age group	Mothers						
	Māori	Pacific peoples	Asian	European	Other	Not stated	Total
Under 16	73	11	0	36	8	4	132
16–19	1569	410	51	1443	156	109	3738
20–24	3085	1238	333	4208	420	183	9467
25–29	2574	1565	882	8794	680	265	14,760
30–34	1691	1314	1122	10,441	731	250	15,549
35–39	827	622	634	4938	351	113	7485
40+	149	127	97	852	58	14	1297
Total	9968	5287	3119	30,712	2404	938	52,428

Total percent	19.0%	10.1%	5.9%	58.6%	4.6%	1.8%	100%
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Data source: NMDS

Māori women tend to have children at a younger age than women in other ethnic groups. The most common age for a Māori woman to give birth is 20–24 years and 42% (1642/3870) of teenage births (under 20 years of age) were to Māori women. Asian women, in contrast, most commonly give birth between 30 and 34 years of age and only account for 1% (51/3870) of the teenage (under 20) births, as shown in Figure 2.1. Pacific women have a higher birth rate than other ethnic groups. The birth rate for New Zealand women of reproductive age (age 15 to 44) is 57/1000 women. The birth rate for Pacific women is almost double that of Asian or European women (Figure 2.2).

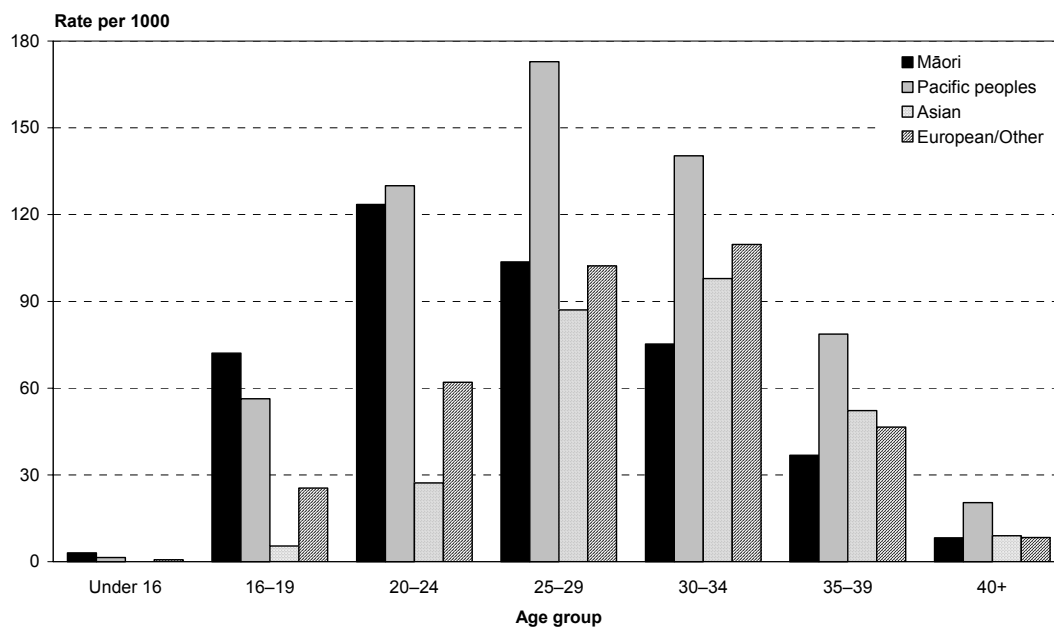
**Table 2.2:** Percentage of women in each age bracket, by ethnicity (hospital data), 1999

Age group	Mothers							Total number
	Māori (%)	Pacific peoples (%)	Asian (%)	European (%)	Other (%)	Not stated (%)	Total (%)	
Under 16	0.7	0.2	0.0	0.1	0.3	0.4	0.2	132
16–19	15.7	7.8	1.6	5.0	7.1	11.6	7.8	3738
20–24	30.9	23.4	10.7	14.1	18.1	19.5	23.4	9467
25–29	25.8	29.6	28.3	28.6	28.2	28.3	29.6	14,760
30–34	17.0	24.9	36.0	33.5	29.7	26.7	24.9	15,549
35–39	8.3	11.8	20.3	15.9	14.3	12.0	11.8	7485
40+	1.5	2.4	3.1	2.7	2.5	1.5	2.4	1297
Total	100	100	100	100	100	100	100	52,428

Data source: NMDS

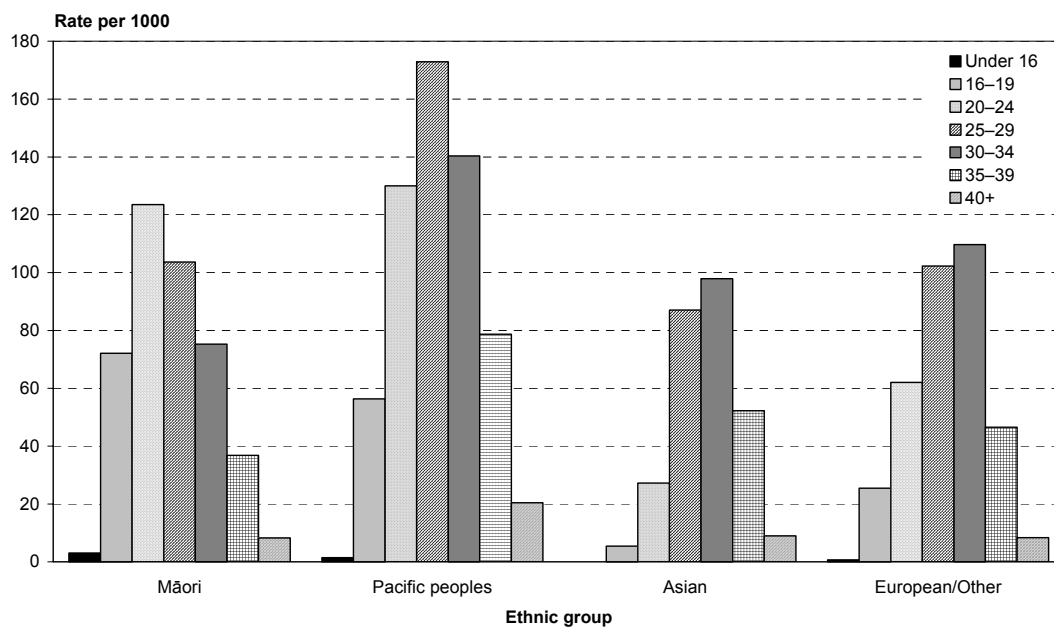
Numbers of deliveries include both live and still births, but exclude miscarriages (occurring prior to 20 weeks' gestation).

**Figure 2.1:** Mother's age compared with ethnicity per 1000 women of reproductive age (hospital data), 1999



Data source: NMDS

**Figure 2.2:** Mother's ethnicity compared with age per 1000 women of reproductive age (hospital data), 1999



Data source: NMDS

There is significant variation in collecting ethnicity data for health information across regions and hospitals. This is due to problems associated with administrative collection processes, inconsistent wording of questions on ethnicity, and a cultural/geographical factor related to the ethnic composition of the population. The latter effect means there is an undercount of Māori in hospitals in regions with a relatively low percentage of Māori, especially in the South Island.

938 women were recorded as 'Not stated' and 2404 mothers were classified as 'Other'. To group women from these two categories into the Other ethnic group would be erroneous, as this would not correspond in any way to the population of Other ethnic groups in New Zealand. A comparison of previous years' records of women who gave birth shows that these records were very probably from the European ethnic group, and include women who have objected to the ethnicity question, in particular the term 'New Zealand European/Pakeha'. For this reason, in the remainder of this report all women who were coded as either 'Not stated' or 'Other' have been included in the European/Other category.

Figure 2.1 shows that the majority of women who gave birth are 20–35 years of age. Figure 2.2 shows that Pacific peoples have the highest birth rate (92.9 per 1000 women of reproductive age), followed by Māori women (62.9 per 1000 women).

**Table 2.3:** Mother's place of residence, by DHB region and ethnicity (hospital data), 1999

DHB region	Mothers				
	Māori	Pacific peoples	Asian	European/Other	Total
Northland	927	31	22	996	1976
Waitemata	607	619	507	4219	5952
Auckland	581	1293	1031	2857	5762
Counties Manukau	1557	2082	594	2740	6973
Waikato	1121	128	123	2698	4070
Lakes	745	36	19	851	1651
Bay of Plenty	865	32	50	1523	2470
Tairāwhiti	394	17	5	292	708
Taranaki	229	8	12	1096	1345
Hawke's Bay	728	111	42	1220	2101
MidCentral	303	68	67	1535	1972
Whanganui	339	11	6	575	931
Capital and Coast	387	428	241	2460	3516
Hutt	373	175	105	1310	1963
Wairarapa	128	15	9	380	532
Nelson Marlborough	118	24	24	1265	1431
West Coast	34	2	1	318	355
Canterbury	296	141	207	4319	4963
South Canterbury	33	1	3	572	609
Otago	89	44	38	1703	1874
Southland	114	21	13	1127	1275
<b>Total</b>	<b>9968</b>	<b>5287</b>	<b>3119</b>	<b>34,054</b>	<b>52,428</b>

Data source: NMDS

DHBs are responsible for providing or buying government-funded health care services for the population of a specific geographical area. There are 21 DHBs in New Zealand and they have existed since 1 January 2001.

There is a skewed distribution of residence for the non-European women who gave birth in 1999: 39% (3866/9968) of Māori women, 78% (4122/5287) of Pacific women, and 72% (2255/3119) of Asian women who gave birth in 1999 lived in the Auckland/Waikato area.

**Table 2.4:** Mother's place of residence, by DHB region (hospital data), 1999

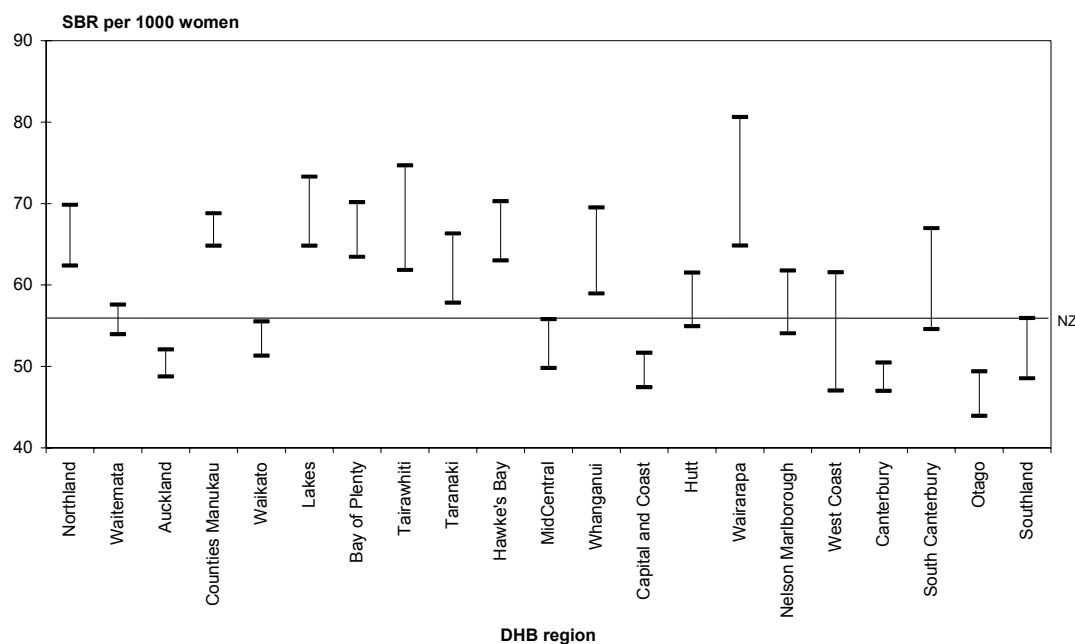
DHB	Deliveries		
	Number of mothers	Percent of mothers (%)	Mothers per 1000 women of reproductive age
Northland	1976	3.8	61.9
Waitemata	5952	11.4	55.9
Auckland	5762	11.0	56.0
Counties Manukau	6973	13.3	74.0
Waikato	4070	7.8	51.5
Lakes	1651	3.1	69.2
Bay of Plenty	2470	4.7	63.2
Tairāwhiti	708	1.4	65.1
Taranaki	1345	2.6	56.3
Hawke's Bay	2101	4.0	63.7
MidCentral	1972	3.8	50.3
Whanganui	931	1.8	60.5
Capital and Coast	3516	6.7	53.0
Hutt	1963	3.7	59.4
Wairarapa	532	1.0	64.3
Nelson Marlborough	1431	2.7	52.9
West Coast	355	0.7	49.1
Canterbury	4963	9.5	46.9
South Canterbury	609	1.2	53.5
Otago	1874	3.6	43.3
Southland	1275	2.4	49.0
Total	52,428	100	56.5

Data source: NMDS

The highest birth rate in New Zealand is for women living in the Counties Manukau DHB. This area has a large Pacific and Māori population. Women living in the Otago DHB have the lowest birth rate.



**Figure 2.3:** Hospital birth rates (standardised by age and ethnicity) and 99% confidence limits per 1000 women of reproductive age, by DHB region of woman's place of residence, 1999



Data source: NMDS

Standardised birth rates are the ratios of observed to expected in-hospital birth rates per 1000 women of childbearing age, multiplied by the overall national birth rate for all women. Expected rates are calculated on the age and ethnic population structure of each DHB region.

Figure 2.3 shows the rates in the centre of the upper and lower 99% confidence limits. If the lower confidence limit is completely above the national rate for all New Zealand, this indicates that the standardised DHB region birth rate is significantly greater than the overall national rate (99% confidence interval). If the upper confidence limit is completely below the national rate for all New Zealand, this indicates that the standardised DHB region birth rate is significantly less than the overall national rate (99% confidence interval). Otherwise the DHB region birth rate is no different from the overall national rate.

These data show that Northland, Counties Manukau, Lakes, Bay of Plenty, Tairāwhiti, Taranaki, Hawke's Bay, Whanganui and Wairarapa all have birth rates significantly higher than the national average. Conversely, birth rates in Auckland, Waikato, MidCentral, Capital and Coast, Canterbury, Otago and Southland are significantly below the national average.

**Table 2.5:** Number of pregnancies (gravida), 1999

Gravida	Labour and birth	
	Number	Percent
1	11,498	29.2
2	11,295	28.7

3	7477	19.0
4	4249	10.8
5	2284	5.8
6	1242	3.2
7	670	1.7
8	311	0.8
9	172	0.4
10	104	0.3
11	52	0.1
12	25	0.1
13	13	0.0
14	6	0.0
15	3	0.0
16	1	0.0
18	3	0.0
19	1	0.0
Total	39,406	100

Data source: MNIS

Gravida (number of pregnancies) is calculated at the time of registration with the LMC and at labour and birth. This information is obtained from MNIS, hence 30% of the data are missing.

Twenty-nine percent (11498/39406) births were to first-time mothers (gravida 1), a figure that has been relatively constant for some years (Health Funding Authority 1999). The median number of pregnancies to a New Zealand woman is three, with a range of 1 to 19 in 1999.

**Table 2.6:** Number of previous births (parity) recorded at registration, 1999

Parity	Number	Percent
0	12,846	37.0
1	11,281	32.5
2	5756	16.6
3	2662	7.7
4	1163	3.4
5	566	1.6
6	266	0.8
7	118	0.3
8	50	0.1
9	21	0.1
10	9	0.0
11	6	0.0
12	1	0.0
Total	34,745	100

Data source: MNIS

There are 4461 women (11.8%) for whom parity information is not recorded (39,406 women are recorded in MNIS as having delivered in 1999). As this information is obtained from MNIS, only 70% of women are included (MNIS excludes the 30% of deliveries that have non-section 88 contracts).

The average number of previous births per woman is one.

**Table 2.7:** Pregnancy rate (gravida), by ethnicity, 1999

Gravida	Ethnicity									
	Māori		Pacific peoples		Asian		European/Other		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
1	1247	18.8	652	21.4	544	28.9	9049	32.5	11,492	29.2
2	1465	22.1	689	22.6	652	34.6	8481	30.5	11,287	28.7
3	1283	19.3	578	18.9	396	21.0	5215	18.8	7472	19.0
4	1004	15.1	430	14.1	179	9.5	2635	9.5	4248	10.8
5–7	1332	20.1	600	19.7	110	5.8	2152	7.7	4194	10.6
8–10	260	3.9	90	3.0	3	0.2	234	0.8	587	1.5
>10	43	0.7	12	0.4	1	0.1	48	0.2	104	0.3
Total	6634	100	3051	100	1885	100	27,814	100	39,384	100

Data source: MNIS

As this information is obtained from MNIS, only 70% of women are included (MNIS excludes the 30% of deliveries that have non-section 88 contracts). 22 women could not be linked by gravida and ethnicity.

These data demonstrate interesting ethnic differences in the number of pregnancies. A greater proportion of Māori and Pacific women have a high pregnancy rate (20.1% of Māori women and 19.7% of Pacific women have a gravida between five and seven, in comparison with 5.8% and 7.7% of Asian and European/Other women respectively).

## 2.2 Deprivation scales

In this analysis, NZ deprivation (NZDep) scores have been grouped into 10 classes (deciles). These vary from 'Least deprived' (those domicile areas that are the least deprived), to 'Most deprived' (those domicile areas judged to be in the most deprived). (See Appendix 3 for further explanation on NZDep scores.)

**Table 2.8:** Mothers, by rural/urban status and NZDep decile of woman's place of residence, 1999

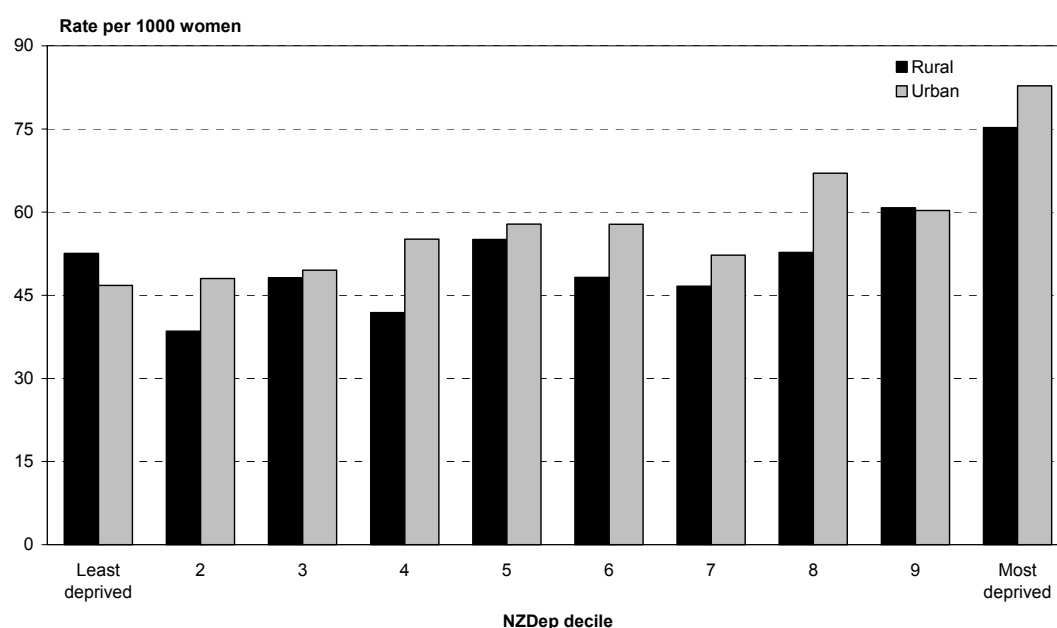
NZDep decile	Number	Percent
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	Rural	Urban	Rural	Urban
Least deprived	353	4020	8.1	91.9
2	731	3577	17.0	83.0
3	1162	3258	26.3	73.7
4	1097	3605	23.3	76.7
5	1234	3885	24.1	75.9
6	764	4317	15.0	85.0
7	839	3898	17.7	82.3
8	1057	4941	17.6	82.4
9	1104	4758	18.8	81.2
Most deprived	1659	6169	21.2	78.8
Total	10,000	42,428	19.1	80.9

Data source: NMDS

Mothers have been aggregated by the rural/urban status of the woman's place of residence, and 10 groups (deciles) of socioeconomic deprivation. Note that for women of childbearing age (15–44 years), 79% live in an urban area and 21% live in a rural area. The percentages provided are the proportions of mothers within each deprivation group who are living in either rural or urban areas.

**Figure 2.4:** Hospital birth rates per 1000 women of reproductive age, by rural/urban status and NZDep decile of woman's place of residence, 1999



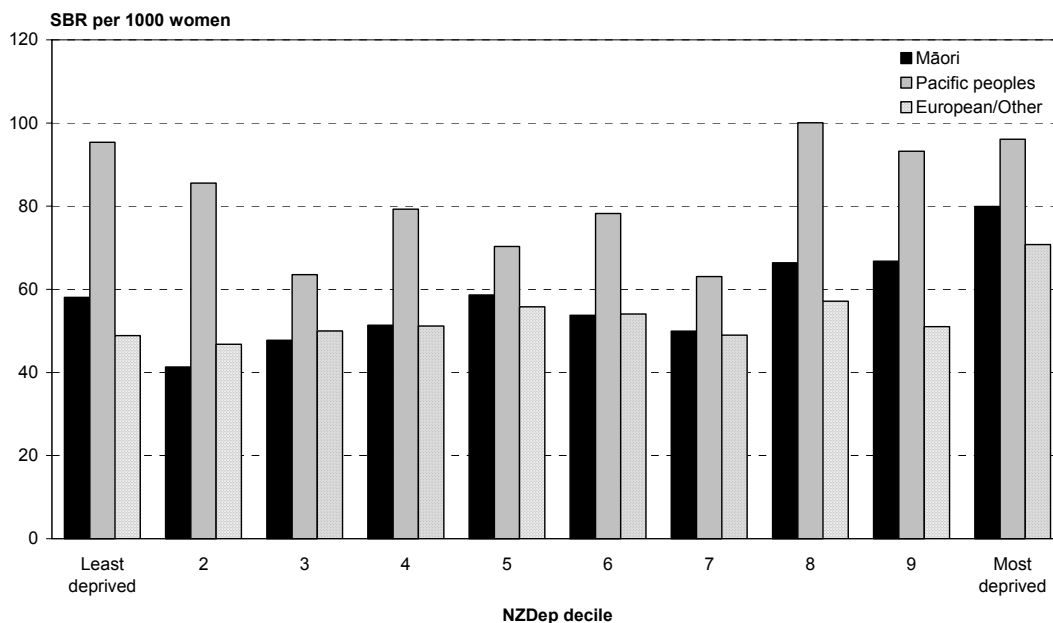
Data source: NMDS

Birth rates are not standardised, and are expressed as per 1000 women of childbearing age.

Women who are living in the most deprived areas (decile 10) have the highest birth rates. Across all deprivation levels, women living in rural areas have lower birth rates than

women from urban areas, with the exception of women living in the least deprived areas (decile 1), where women living in urban areas have the lower birth rate.

**Figure 2.5:** Standardised hospital birth rates (SBRs)<sup>8</sup> per 1000 women of reproductive age, by ethnicity and NZDep decile, 1999



Data source: NMDS

SBRs are age standardised, with expected rates calculated on the age structure of each ethnic and deprivation group.

Figure 2.5 shows evidence of higher birth rates for all three ethnic groups with increasing levels of deprivation. In fact, for all three ethnic groups women living in the three most deprived areas (deciles 8 to 10) had significantly higher<sup>9</sup> birth rates than women living in areas that were less deprived (deciles 1 to 7).

<sup>8</sup> Expected rates are calculated on the age population structure of each ethnic/NZDep group.

<sup>9</sup>  $p < 0.01$ .

## 2.3 Miscarriages

**Table 2.9:** Total hospital miscarriages, by mothers' age and ethnicity, 1999

Age group	Miscarriages in hospital									
	Number					Percent				
	Māori	Pacific peoples	Asian	European/ Other	Total	Māori	Pacific peoples	Asian	European/ Other	Total
Under 16	9	2	0	6	17	1.1	0.6	0.0	0.3	0.5
16–19	115	42	8	176	341	14.7	11.6	3.4	7.9	9.4
20–24	213	71	23	349	656	27.2	19.6	9.7	15.6	18.1
25–29	193	89	39	518	839	24.6	24.6	16.5	23.2	23.2
30–34	117	72	89	590	868	14.9	19.9	37.6	26.4	24.0
35–39	95	61	56	428	640	12.1	16.9	23.6	19.1	17.7
40+	41	25	22	170	258	5.2	6.9	9.3	7.6	7.1
Total	783	362	237	2237	3619	100	100	100	100	100

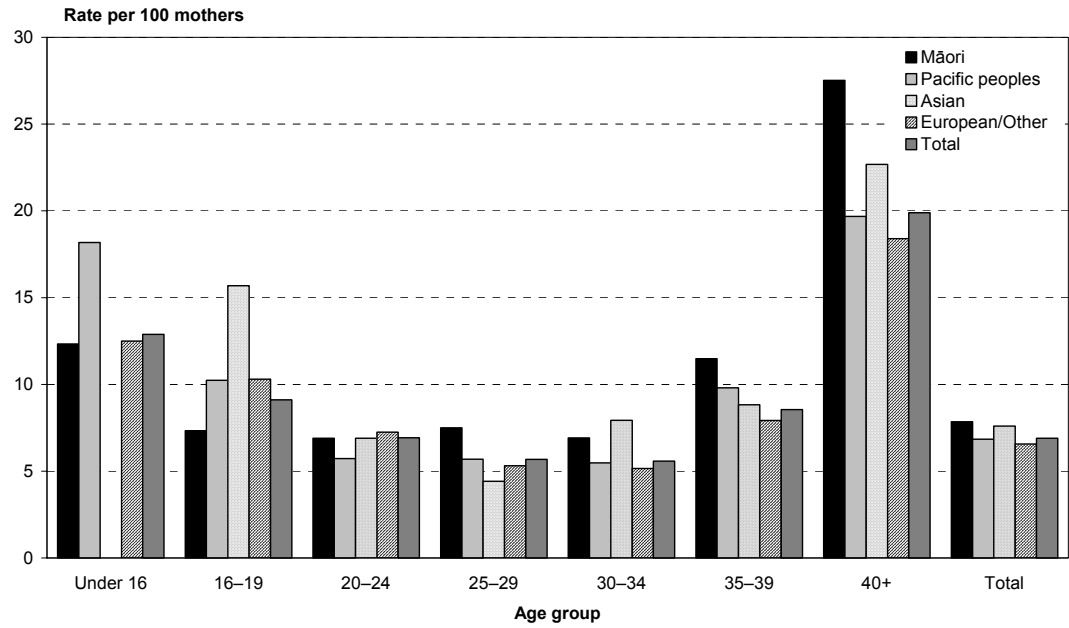
Data source: NMDS

Miscarriages are defined as all women whose pregnancies ended spontaneously prior to 20 weeks' gestation. These data do not include termination of pregnancy.

These data on women who suffer miscarriages should be interpreted with caution. It must be noted that hospital miscarriages includes all women who are referred to a hospital during a miscarriage. However, women also miscarry at home. If these women are not referred to a hospital, they are not included in these data. This is therefore only a subset of all miscarriages.

Spontaneous miscarriage is unfortunately a common complication of pregnancy. Women at both ends of the reproductive spectrum have the highest miscarriage rates, with those over 40 years of age having the highest rate. Pacific and Māori women tend to miscarry at an earlier age than Asian and European/Other women. Whether this represents a true ethnic difference or reflects an increased pregnancy number requires consideration.

**Figure 2.6:** Rate of hospital miscarriages per 100 mothers, by age and ethnicity, 1999



Data source: NMDS

## 2.4 Pregnancy complications

**Table 2.10:** Total antenatal hospital admissions and average length of stay (days) for mothers, by diagnosis related group (DRG) and ethnicity, 1999

DRG			Admissions		Average length of stay
Number	Name	Ethnic group	Number	Percent	
681	Threatened abortion	Māori	286	3.8	1.3
		Pacific peoples	74	1.0	1.0
		Asian	42	0.6	1.4
		European/Other	665	8.9	1.5
		Total	1067	14.4	1.4
684	Preterm labour	Māori	346	4.7	0.5
		Pacific peoples	215	2.9	0.3
		Asian	110	1.5	0.3
		European/Other	621	8.4	0.5
		Total	1292	17.4	0.4
685	Other antenatal admission with severe complicating diagnosis	Māori	412	5.5	2.6
		Pacific peoples	200	2.7	1.9
		Asian	78	1.0	2.3
		European/Other	1222	16.4	2.8
		Total	1912	25.7	2.6
686	Other antenatal admission with moderate or no complicating diagnosis	Māori	732	9.8	1.4
		Pacific peoples	360	4.8	1.8
		Asian	150	2.0	1.4
		European/Other	1920	25.8	1.5
		Total	3162	42.5	1.5
Total			7433	100	1.6

Data source: NMDS

Note that the difference between moderate and severe diagnosis is determined by differences in the cost and length of stay of the hospital admission (ie, admissions associated with higher costs and longer lengths of stay would be classified as DRG 685).



**Table 2.11:** Total antenatal hospital admissions and average length of stay (days) for mothers, by principal diagnosis, DRGs 685 and 686, 1999

Principal diagnosis Name	Admissions		Average length of stay
	Number	Percent	
Antepartum haemorrhage, abruptio placetae, and placenta previa	157	3.1	5.2
Hypertension complicating pregnancy, childbirth and the puerperium	944	18.6	2.3
Excessive vomiting in pregnancy	100	2.0	2.2
Early or threatened labour	4	0.1	1.5
Prolonged pregnancy	3	0.1	6.7
Other complications of pregnancy, not elsewhere classified	96	1.9	2.1
Infections and parasitic conditions in the mother classifiable elsewhere, but complicating pregnancy, childbirth, or the puerperium	4	0.1	1.5
Other current conditions in mother classifiable elsewhere, but complicating pregnancy, childbirth or the puerperium	196	3.9	2.6
Multiple gestation	38	0.7	3.1
Malposition and malpresentation of foetus	9	0.2	3.1
Abnormality of organs and soft tissues of pelvis	36	0.7	2.0
Known or suspected abnormality affecting management of mother	3	0.1	3.7
Other foetal and placental problems affecting management of mother	142	2.8	3.0
Polyhydramnios	26	0.5	2.5
Other problems associated with amniotic cavity and membranes	138	2.7	2.9
Other indications for care or intervention related to labour and delivery, not elsewhere classified	5	0.1	1.4
Other diagnosis	11	0.2	2.0
<b>Other antenatal admission with severe complicating diagnosis total</b>	<b>1912</b>	<b>37.7</b>	<b>2.6</b>
Antepartum haemorrhage, abruptio placetae, and placenta previa	501	9.9	1.5
Hypertension complicating pregnancy, childbirth and the puerperium	167	3.3	1.5
Excessive vomiting in pregnancy	294	5.8	2.8
Early or threatened labour	15	0.3	0.7
Prolonged pregnancy	67	1.3	0.8
Other complications of pregnancy, not elsewhere classified	862	17.0	1.3
Infections and parasitic conditions in the mother classifiable elsewhere, but complicating pregnancy, childbirth, or the puerperium	68	1.3	1.8
Other current conditions in mother classifiable elsewhere, but complicating pregnancy, childbirth or the puerperium	670	13.2	1.4
Malposition and malpresentation of foetus	66	1.3	1.9
Disproportion	2	0.0	1.0
Abnormality of organs and soft tissues of pelvis	39	0.8	2.2
Known or suspected abnormality affecting management of mother	7	0.1	2.0
Other foetal and placental problems affecting management of mother	107	2.1	1.0
Other problems associated with amniotic cavity and membranes	126	2.5	1.4
Other indications for care or intervention related to labour and delivery, not elsewhere classified	57	1.1	1.1
Other diagnosis	114	2.3	1.7
<b>Other antenatal admission with moderate or no complicating diagnosis total</b>	<b>3162</b>	<b>62.3</b>	<b>1.5</b>
<b>Total</b>	<b>5074</b>	<b>100</b>	<b>1.9</b>

Data source: NMDS

These are antenatal admissions only for DRGs 685 and 686. The figures for antenatal admissions may appear low, but it is only the principal diagnosis that is recorded for each admission. The *principal* diagnosis is the primary reason the woman is admitted to hospital.

**Table 2.12:** Claims made for private specialist obstetrician consultations, by DHB region of woman's place of residence, 1999

DHB region	Number of consultations					
	First		Subsequent		Total	
	Number	Rate per 100 deliveries in each DHB	Number	Rate per 100 deliveries in each DHB	Number	Rate per 100 deliveries in each DHB
Northland	20	1.2	12	0.7	32	2.0
Waitemata	407	8.1	565	11.3	972	19.4
Auckland	310	6.1	270	5.3	580	11.4
Counties Manukau	412	9.2	302	6.8	714	16.0
Waikato	96	2.9	152	4.6	248	7.6
Lakes	341	22.4	299	19.7	640	42.1
Bay of Plenty	343	16.3	274	13.0	617	29.4
Tairāwhiti	37	5.7	8	1.2	45	6.9
Taranaki	138	11.3	71	5.8	209	17.0
Hawke's Bay	13	0.7	9	0.5	22	1.2
MidCentral	95	5.8	33	2.0	128	7.9
Whanganui	84	11.9	107	15.2	191	27.2
Capital & Coast	12	2.1	7	1.2	19	3.3
Hutt	85	5.3	58	3.6	143	8.9
Wairarapa	3	0.6	2	0.4	5	1.1
Nelson Marlborough	4	0.3	10	0.8	14	1.2
West Coast	0	0.0	1	1.1	1	1.1
Canterbury	363	10.7	761	22.5	1124	33.2
South Canterbury	3	0.6	5	1.1	8	1.7
Otago	6	0.9	13	1.9	19	2.8
Southland	6	1.0	5	0.9	11	1.9
Total	2778	7.3	2964	7.8	5742	15.0

Data source: MNIS

As this information is obtained from MNIS, only 70% of women are included (MNIS excludes the 30% of deliveries that have non-Section 88 contracts). This data includes first and subsequent consultations during the labour and birth period.

Note that this only includes private specialist obstetrician consultations, so excludes specialist consultations provided within the hospital. These private consultations are provided at the request of the mother's LMC. These data tell us little about practice. Instead they tell us about private consultations, which is related to the availability of private obstetricians.

Some of these DHBs have special contracts with obstetricians, and therefore have higher obstetrician consultation rates. Lakes, Bay of Plenty, Whanganui and Canterbury referred more than 20% of women who delivered in 1999 to an obstetrician, with 42% of women living in Lakes DHB having been referred to an obstetrician. It may be that these differences reflect differences in data collection rather than differences in practice.

## 3 Labour and Birth

This section includes analysis of events relating to labour and birth. There is an emphasis on type of birth, including an analysis of delivery method and mothers' characteristics.

In 1999 there were 53,273 babies born in hospital to 52,428 mothers. Sixty-nine percent of babies had a normal vaginal birth. The number of babies born by caesarean section continues to rise. In 1999, 20% (10842/53273) of New Zealand babies were born by a caesarean section.

These data are primarily extracted from the NMDS dataset and the first four tables include only hospital births.

### 3.1 Type of birth

**Table 3.1:** Type of birth (numbers), by age, 1999

Age group	Hospital delivery type								
	Normal delivery	Total caesarean section	Acute caesarean section	Elective caesarean section	Total operative deliveries	Vaginal breech delivery	Forceps delivery	Vacuum extraction	Total
Under 16	102	15	14	1	16	0	7	9	133
16–19	2878	469	387	82	423	22	188	211	3770
20–24	7321	1347	1026	321	891	54	430	406	9559
25–29	10,401	2831	1907	924	1765	140	831	790	14,997
30–34	10,335	3656	2267	1389	1852	163	904	777	15,843
35–39	4783	2088	1223	865	779	77	379	318	7650
40+	762	436	240	196	123	12	62	48	1321
Total	36,582	10,842	7064	3778	5849	468	2801	2559	53,273

Data source: NMDS

Note that operative deliveries also include 21 women who are coded as 'other operative delivery'. These women are included in the total operative delivery numbers, and in the total number of deliveries.

**Table 3.2:** Type of birth (percent), by age, 1999

Age group	Hospital delivery type								
	Normal delivery (%)	Total caesarean section (%)	Acute caesarean section (%)	Elective caesarean section (%)	Total operative deliveries (%)	Vaginal breech delivery (%)	Forceps delivery (%)	Vacuum extraction (%)	Total (%)
Under 16	76.7	11.3	10.5	0.8	12.0	0.0	5.3	6.8	100
16–19	76.3	12.4	10.3	2.2	11.2	0.6	5.0	5.6	100
20–24	76.6	14.1	10.7	3.4	9.3	0.6	4.5	4.2	100
25–29	69.4	18.9	12.7	6.2	11.8	0.9	5.5	5.3	100
30–34	65.2	23.1	14.3	8.8	11.7	1.0	5.7	4.9	100
35–39	62.5	27.3	16.0	11.3	10.2	1.0	5.0	4.2	100
40+	57.7	33.0	18.2	14.8	9.3	0.9	4.7	3.6	100
Total	68.7	20.4	13.3	7.1	11.0	0.9	5.3	4.8	100

Data source: NMDS

These data include all births; ie, the total number of babies born (or total number of deliveries) as opposed to the number of mothers. Both live births and stillbirths are included. Note that operative deliveries also include 21 women who are coded as ‘other operative delivery’. These women are included in the total operative delivery numbers, and in the total number of deliveries.

The percentages provided are the proportions of babies within each age group from each delivery type.

The percentage of normal (non-operative) vaginal births continues to decline, and is now less than 70% for the first time in New Zealand. Operative vaginal births remain at a stable rate, although the percentage of vacuum extractions continues to rise, as these are thought to be less traumatic for the mother and baby. Vaginal breech births have declined in numbers. These data demonstrate a number of associations with the rate of caesarean sections, including an increasing maternal age and number of nulliparous women, a fall in gravidity and a changing ethnicity. However, this does not explain regional differences in rates, which raises the possibility of practice being implicated.

Age is one factor associated with the method of delivery, as shown in Tables 3.1 and 3.2. Thirty-three percent (436/1321) of women over 40 years had a caesarean section, whereas only 12.4% (469/3770) of women in the 16–19 age group had a caesarean section.

**Table 3.3:** Type of birth (numbers), by ethnicity, 1999

Ethnic group	Hospital delivery type								Total
	Normal delivery	Total caesarean section	Acute caesarean section	Elective caesarean section	Total operative delivery	Vaginal breech delivery	Forceps delivery	Vacuum extraction	
Māori	8053	1389	954	435	662	75	254	331	10,104
Pacific peoples	4165	887	641	246	307	50	102	155	5359
Asian	1937	755	516	239	455	26	214	215	3147
European /Other	22,427	7811	4953	2858	4425	317	2231	1858	34,663

Total	36,582	10,842	7064	3778	5849	468	2801	2559	53,273
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Data source: NMDS

**Table 3.4:** Type of birth (percent), by ethnicity, 1999

Ethnic group	Hospital delivery type								Total
	Normal delivery (%)	Total caesarean section (%)	Acute caesarean section (%)	Elective caesarean section (%)	Total operative delivery (%)	Vaginal breech delivery (%)	Forceps delivery (%)	Vacuum extraction (%)	
Māori	79.6	13.8	9.5	4.3	6.6	0.7	2.5	3.3	100
Pacific peoples	78.1	16.6	12.0	4.6	5.7	0.9	1.9	2.9	100
Asian	61.8	24.2	16.5	7.7	14.5	0.8	6.8	6.9	100
European /Other	64.6	22.5	14.3	8.2	12.8	0.9	6.4	5.4	100
Total	68.7	20.4	13.3	7.1	11.0	0.9	5.3	4.8	100

Data source: NMDS

The percentages provided are the proportions of women within each ethnic group from each delivery type. Percentages are age standardised, with expected rates calculated on the age structure of each ethnic group.

There are major ethnic differences in the method of birthing. Māori women are the most likely to have a normal vaginal birth and Asian women the least. As the data illustrate, Asian women have the highest caesarean section rate (24.2%), compared to 22.5% of European/Other women, 16.6% of Pacific women, and 13.8% of Māori.

There are also differences in the incidence of elective (pre-labour) and acute (in labour) caesarean sections, although these are less significant than the overall ethnic differences. For women who have a caesarean, Pacific women are relatively less likely to have an elective procedure (28%) and European women most likely (37%).

The operative vaginal delivery rates are approximately double for European/Other and Asian women than for Māori and Pacific women.

**Table 3.5:** Type of birth (numbers), by parity, 1999

Parity	Type of birth								Total
	Normal delivery	Total caesarean section	Acute caesarean section	Elective caesarean section	Total operative deliveries	Vaginal breech delivery	Forceps delivery	Vacuum extraction	
0	6890	2851	2409	442	3022	126	1484	1412	12,763
1	7977	1741	1047	694	972	108	409	455	10,690
2	4359	692	343	349	260	65	93	102	5311
3	2012	364	180	184	87	39	17	31	2463
4	882	142	84	58	31	11	6	14	1055
5	415	70	47	23	18	6	1	11	503
6	199	31	22	9	10	5	2	3	240

7+	159	30	19	11	8	6	1	1	197
Total	22,893	5921	4151	1770	4408	366	2013	2029	33,222

Data source: MNIS

**Table 3.6:** Type of birth (percent), by parity, 1999

Parity	Type of birth								
	Normal delivery (%)	Total caesarean section (%)	Acute caesarean section (%)	Elective caesarean section (%)	Total operative deliveries (%)	Vaginal breech delivery (%)	Forceps delivery (%)	Vacuum extraction (%)	Total (%)
0	54.0	22.3	18.9	3.5	23.7	1.0	11.6	11.1	100
1	74.6	16.3	9.8	6.5	9.1	1.0	3.8	4.3	100
2	82.1	13.0	6.5	6.6	4.9	1.2	1.8	1.9	100
3	81.7	14.8	7.3	7.5	3.5	1.6	0.7	1.3	100
4	83.6	13.5	8.0	5.5	2.9	1.0	0.6	1.3	100
5	82.5	13.9	9.3	4.6	3.6	1.2	0.2	2.2	100
6	82.9	12.9	9.2	3.8	4.2	2.1	0.8	1.3	100
7+	80.7	15.2	9.6	5.6	4.1	3.1	0.5	0.5	100
Total	68.9	17.8	12.5	5.3	13.3	1.1	6.1	6.1	100

Data source: MNIS

Parity information is not provided for 4482 babies (11.9%). As this information is obtained from MNIS, only 70% of women are included (MNIS excludes the 30% of deliveries that have non-section 88 contracts).

There is also an association between parity and type of birth. Women in their first birth in New Zealand have only a 54.0% (6890/12763) incidence of a normal vaginal delivery. This is a decline from previous years (Health Funding Authority 1999). From these figures, approximately half of New Zealand women in their first birth have a normal vaginal birth, a quarter have an operative vaginal birth and a quarter have a caesarean section.

**Table 3.7:** Type of birth (numbers), by DHB region of woman's place of residence, 1999

DHB region	Hospital delivery type								
	Normal delivery	Total caesarean section	Acute caesarean section	Elective caesarean section	Total operative deliveries	Vaginal breech delivery	Forceps delivery	Vacuum extraction	Total
Northland	1535	334	209	125	141	18	37	85	2010
Waitemata	4046	1423	948	475	578	41	248	287	6047
Auckland	3807	1260	864	395	775	72	351	352	5842
Counties Manukau	5297	1134	788	345	641	57	202	381	7072
Waikato	2902	890	591	299	354	15	106	233	4146
Lakes	1244	271	176	95	160	15	123	22	1676
Bay of Plenty	1769	441	268	173	301	32	147	122	2510

Tairāwhiti	558	109	62	47	54	2	4	48	721
Taranaki	1025	244	180	64	94	9	31	41	1363
Hawke's Bay	1534	355	236	119	241	27	127	87	2130
MidCentral	1366	429	287	142	208	17	80	111	2002
Whanganui	662	193	127	65	93	6	54	33	948
Capital and Coast	2327	878	632	246	369	20	297	52	3574
Hutt	1324	410	276	134	255	11	178	63	1989
Wairarapa	339	86	48	38	114	9	78	25	539
Nelson Marlborough	1016	266	175	91	170	20	120	30	1452
West Coast	265	76	45	31	25	8	8	9	366
Canterbury	3012	1183	600	583	858	48	371	439	5053
South Canterbury	445	111	77	34	68	14	36	18	624
Otago	1215	432	275	157	260	19	126	115	1907
Southland	894	319	199	120	90	7	77	6	1303
<b>Total</b>	<b>36,582</b>	<b>10,842</b>	<b>7064</b>	<b>3778</b>	<b>5849</b>	<b>468</b>	<b>2801</b>	<b>2559</b>	<b>53,273</b>

Data source: NMDS

**Table 3.8:** Type of birth (percent), by DHB region of woman's place of residence, 1999

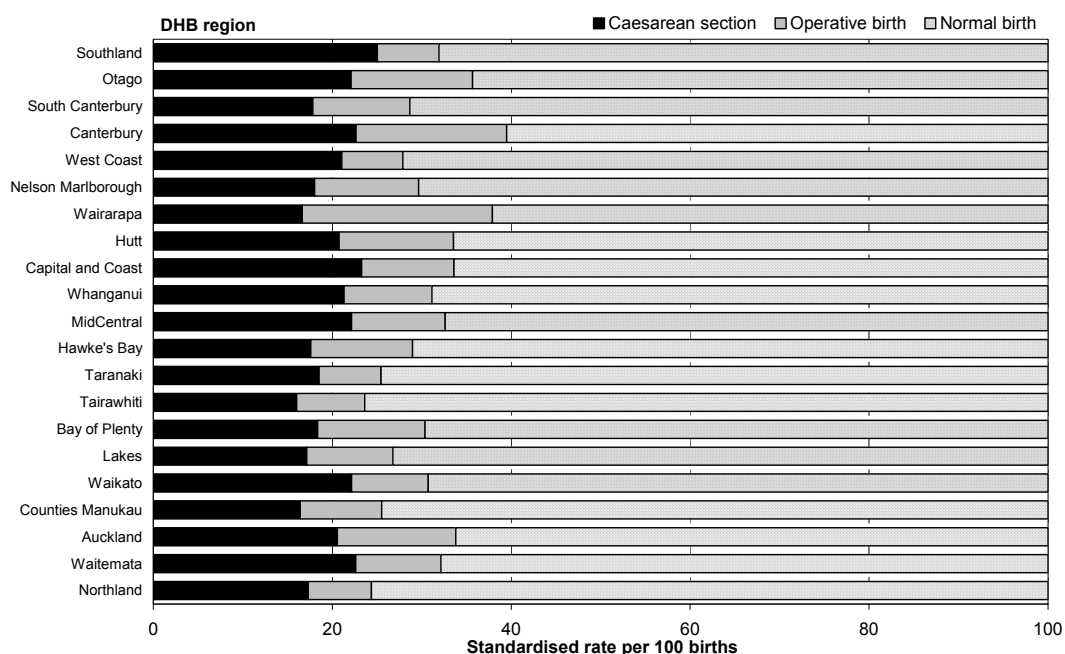
DHB region	Hospital delivery type								
	Normal delivery (%)	Total caesarean section (%)	Acute caesarean section (%)	Elective caesarean section (%)	Total operative deliveries (%)	Vaginal breech delivery (%)	Forceps delivery (%)	Vacuum extraction (%)	Total (%)
Northland	76.4	16.6	10.4	6.2	7.0	0.9	1.8	4.2	100
Waitemata	66.9	23.5	15.7	7.8	9.6	0.7	4.1	4.7	100
Auckland	65.2	21.6	14.8	6.8	13.3	1.2	6.0	6.0	100
Counties Manukau	74.9	16.0	11.1	4.9	9.1	0.8	2.9	5.4	100
Waikato	70.0	21.5	14.3	7.2	8.5	0.4	2.6	5.6	100
Lakes	74.2	16.2	10.5	5.7	9.6	0.9	7.3	1.3	100
Bay of Plenty	70.5	17.6	10.7	6.9	12.0	1.3	5.9	4.8	100
Tairāwhiti	77.4	15.1	8.6	6.5	7.5	0.3	0.6	6.7	100
Taranaki	75.2	17.9	13.2	4.7	6.9	0.7	2.3	3.0	100
Hawke's Bay	72.0	16.7	11.1	5.6	11.3	1.3	6.0	4.1	100
MidCentral	68.2	21.4	14.3	7.1	10.4	0.8	4.0	5.6	100
Whanganui	69.9	20.3	13.4	6.9	9.8	0.6	5.7	3.4	100
Capital and Coast	65.1	24.6	17.7	6.9	10.3	0.6	8.3	1.5	100



Hutt	66.6	20.6	13.9	6.7	12.8	0.6	8.9	3.2	100
Wairarapa	62.9	16.0	8.9	7.1	21.2	1.7	14.5	4.6	100
Nelson Marlborough	70.0	18.3	12.1	6.3	11.7	1.4	8.3	2.1	100
West Coast	72.4	20.8	12.3	8.5	6.8	2.2	2.2	2.5	100
Canterbury	59.6	23.4	11.9	11.5	17.0	0.9	7.3	8.7	100
South Canterbury	71.3	17.8	12.4	5.4	10.9	2.2	5.8	2.9	100
Otago	63.7	22.7	14.4	8.2	13.6	1.0	6.6	6.0	100
Southland	68.6	24.5	15.3	9.2	6.9	0.5	5.9	0.5	100
Total	68.7	20.4	13.3	7.1	11.0	0.9	5.3	4.8	100

Data source: NMDS

**Figure 3.1:** Type of birth (standardised rates), by DHB region of woman's place of residence, 1999



Data source: NMDS

Figure 3.1 shows age- and ethnic-standardised rates for each delivery type. Standardised rates are the ratios of observed to expected rates for each delivery type, multiplied by the overall national rate. Expected rates are calculated on the age and ethnic structure of each DHB region.

These data show high rates of both caesarean sections and operative births for women living in the Canterbury DHB region, where approximately only 60% of women achieve normal births. There is also a high operative birth rate for women living in the Wairarapa DHB region.

**Table 3.9:** Type of birth (numbers), by facility, 1999

Facility	Hospital delivery type								
	Normal vaginal birth	Total caesarean section	Acute caesarean section	Elective caesarean section	Total operative vaginal birth	Breech delivery	Forceps delivery	Vacuum extraction	Total
Greenlane/National Women's	4617	1888	1320	568	1059	98	520	440	7564
Middlemore	2978	618	446	172	272	43	48	180	3868
Waikato	1723	898	595	303	306	12	68	226	2927
Wellington	1935	957	701	256	380	27	304	49	3272
Christchurch Women's	2055	872	608	264	838	53	352	433	3765
Dunedin	1007	438	274	164	252	19	118	115	1697
<b>Tertiary total</b>	<b>14,315</b>	<b>5671</b>	<b>3944</b>	<b>1727</b>	<b>3107</b>	<b>252</b>	<b>1410</b>	<b>1443</b>	<b>23,093</b>
Whangarei	894	264	160	104	113	14	29	70	1271
North Shore	1733	698	422	276	272	14	127	131	2703
Waitakere	1797	418	283	135	183	4	55	124	2398
Rotorua	1059	265	174	91	176	15	137	24	1500
Whakatane (including Opotiki and Murupara)	621	106	67	39	47	5	5	37	774
Tauranga	1108	307	183	124	260	27	149	84	1675
Gisborne	518	107	59	48	55	2	4	49	680
Taranaki Base	878	230	173	57	85	6	28	38	1193
Hastings	1409	346	228	118	230	24	128	78	1985
Palmerston North	1082	446	294	152	219	19	76	124	1747
Wanganui	513	152	102	50	74	5	49	20	739
Hutt	1309	397	257	140	259	9	183	64	1965
Masterton	327	69	36	33	112	9	74	27	508
Wairau	326	87	66	21	48	2	28	18	461
Nelson	590	160	95	65	114	15	89	10	864
Grey	232	59	33	26	10	4	2	4	301
Timaru	442	120	83	37	65	13	36	16	627
Southland	743	294	190	104	71	6	63	2	1108
<b>Secondary total</b>	<b>15,581</b>	<b>4525</b>	<b>2905</b>	<b>1620</b>	<b>2393</b>	<b>193</b>	<b>1262</b>	<b>920</b>	<b>22,499</b>
Kaitiia	233	45	28	17	25	1	7	17	303
Ashburton	122	8	3	5	28	0	10	18	158
St George's	381	333	0	333	13	0	13	0	727
<b>Primary plus total</b>	<b>736</b>	<b>386</b>	<b>31</b>	<b>355</b>	<b>66</b>	<b>1</b>	<b>30</b>	<b>35</b>	<b>1188</b>
Dargaville	108	0	0	0	1	0	0	0	109
Bay of Islands	232	0	0	0	1	0	0	1	233
Warkworth	63	0	0	0	0	0	0	0	63
Pukekohe *	437	70	51	19	40	1	12	27	547
Papakura Obstetric *	729	88	60	28	76	6	17	53	893
Botany Downs Maternity *	785	96	67	29	103	8	24	71	984
Taumarunui	86	0	0	0	3	0	3	0	89
Thames	128	0	0	0	3	3	0	0	131
Te Kuiti	94	0	0	0	0	0	0	0	94
Tokoroa	136	0	0	0	0	0	0	0	136
Rhoda Read (Morrinsville)	153	0	0	0	0	0	0	0	153
Matariki (Te Awamutu)	177	0	0	0	0	0	0	0	177
Taupo General	237	0	0	0	1	0	1	0	238
Te Puia Springs	45	0	0	0	1	0	0	1	46
Hawera	86	0	0	0	1	0	1	0	87
Wairoa	91	0	0	0	3	0	0	3	94
Chatham Islands	5	0	0	0	0	0	0	0	5
Waipukurau	47	0	0	0	2	1	1	0	49
Horowhenua	178	0	0	0	1	0	1	0	179
Feilding Maternity	118	0	0	0	4	0	4	0	122

Facility	Hospital delivery type								
	Normal vaginal birth	Total caesarean section	Acute caesarean section	Elective caesarean section	Total operative vaginal birth	Breech delivery	Forceps delivery	Vacuum extraction	Total
Taihape	29	0	0	0	0	0	0	0	29
Waimarino Rural Health Centre	18	0	0	0	0	0	0	0	18
Marton	10	0	0	0	0	0	0	0	10
Kenepuru *	342	5	5	0	4	0	3	1	351
Paraparaumu *	101	1	1	0	2	0	2	0	104
Motueka Maternity	71	0	0	0	0	0	0	0	71
Golden Bay Community Hospital	26	0	0	0	1	1	0	0	27
Buller	15	0	0	0	1	0	0	1	16
Burwood	218	0	0	0	4	0	4	0	222
Kaikoura	13	0	0	0	0	0	0	0	13
Waikari	2	0	0	0	0	0	0	0	2
Darfield	4	0	0	0	0	0	0	0	4
Lincoln	102	0	0	0	0	0	0	0	102
Rangiora	84	0	0	0	0	0	0	0	84
Akaroa Community	7	0	0	0	0	0	0	0	7
Dunstan	30	0	0	0	3	2	1	0	33
Oamaru	91	0	0	0	1	0	0	1	92
Gore	21	0	0	0	3	0	3	0	24
Lakes District (Queenstown)	55	0	0	0	11	0	11	0	66
Maniototo Health Services Ltd	10	0	0	0	0	0	0	0	10
Hokianga	41	0	0	0	0	0	0	0	41
Birthcare Auckland	31	0	0	0	0	0	0	0	31
Pohlen Trust (Matamata)	132	0	0	0	7	0	7	0	139
Avonlea (Christchurch)	66	0	0	0	0	0	0	0	66
Wellsford Birthing Unit	41	0	0	0	0	0	0	0	41
Helensville Birthing Unit	10	0	0	0	0	0	0	0	10
Winton Birthing Centre	24	0	0	0	1	0	1	0	25
Tuatapere Maternity Hospital	14	0	0	0	0	0	0	0	14
Birthcare Huntly	163	0	0	0	0	0	0	0	163
Northern Southland Birthing Centre	13	0	0	0	0	0	0	0	13
Dannevirke Community Hospital	69	0	0	0	1	0	1	0	70
Charlotte Jean Maternity Unit (Alexandra)	15	0	0	0	1	0	0	1	16
Elizabeth R Hospital and Rest Home	39	0	0	0	0	0	0	0	39
Waihi Hospital	40	0	0	0	0	0	0	0	40
Primary total	5882	260	184	76	280	22	97	160	6422
Other facilities	68	0	0	0	3	0	2	1	71
Total	36,582	10,842	7064	3778	5849	468	2801	2559	53,273

Data source: NMDS

\* These facilities do not perform caesarean sections, but these data are collected from the hospitals where the woman was discharged from. Note that women discharged from Pukekohe, Papakura Obstetric and Botany Downs Maternity are likely to have had their caesarean section at Middlemore Hospital but resided in the postnatal period in the smaller units.

**Table 3.10:** Type of birth (percent), by facility, 1999

Facility	Hospital delivery type								
	Normal vaginal birth	Total caesarean section	Acute caesarean section	Elective caesarean section	Total operative vaginal birth	Breech delivery	Forceps delivery	Vacuum extraction	Total
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Greenlane/National Women's	61.0	25.0	17.5	7.5	14.0	1.3	6.9	5.8	100
Middlemore	77.0	16.0	11.5	4.4	7.0	1.1	1.2	4.7	100
Waikato	58.9	30.7	20.3	10.4	10.5	0.4	2.3	7.7	100
Wellington	59.1	29.2	21.4	7.8	11.6	0.8	9.3	1.5	100
Christchurch Women's	54.6	23.2	16.1	7.0	22.3	1.4	9.3	11.5	100
Dunedin	59.3	25.8	16.1	9.7	14.8	1.1	7.0	6.8	100
Tertiary total	62.0	24.6	17.1	7.5	13.5	1.1	6.1	6.2	100
Whangarei	70.3	20.8	12.6	8.2	8.9	1.1	2.3	5.5	100
North Shore	64.1	25.8	15.6	10.2	10.1	0.5	4.7	4.8	100
Waitakere	74.9	17.4	11.8	5.6	7.6	0.2	2.3	5.2	100
Rotorua	70.6	17.7	11.6	6.1	11.7	1.0	9.1	1.6	100
Whakatane (including Opotiki and Murupara)	80.2	13.7	8.7	5.0	6.1	0.6	0.6	4.8	100
Tauranga	66.1	18.3	10.9	7.4	15.5	1.6	8.9	5.0	100
Gisborne	76.2	15.7	8.7	7.1	8.1	0.3	0.6	7.2	100
Taranaki Base	73.6	19.3	14.5	4.8	7.1	0.5	2.3	3.2	100
Hastings	71.0	17.4	11.5	5.9	11.6	1.2	6.4	3.9	100
Palmerston North	61.9	25.5	16.8	8.7	12.5	1.1	4.4	7.1	100
Wanganui	69.4	20.6	13.8	6.8	10.0	0.7	6.6	2.7	100
Hutt	66.6	20.2	13.1	7.1	13.2	0.5	9.3	3.3	100
Masterton	64.4	13.6	7.1	6.5	22.0	1.8	14.6	5.3	100
Wairau	70.7	18.9	14.3	4.6	10.4	0.4	6.1	3.9	100
Nelson	68.3	18.5	11.0	7.5	13.2	1.7	10.3	1.2	100
Grey	77.1	19.6	11.0	8.6	3.3	1.3	0.7	1.3	100
Timaru	70.5	19.1	13.2	5.9	10.4	2.1	5.7	2.6	100
Southland	67.1	26.5	17.1	9.4	6.4	0.5	5.7	0.2	100
Secondary total	69.3	20.1	12.9	7.2	10.6	0.9	5.6	4.1	100
Kaitiia	76.9	14.9	9.2	5.6	8.3	0.3	2.3	5.6	100
Ashburton	77.2	5.1	1.9	3.2	17.7	0.0	6.3	11.4	100
St George's	52.4	45.8	0.0	45.8	1.8	0.0	1.8	0.0	100
Primary plus total	62.0	32.5	2.6	29.9	5.6	0.1	2.5	2.9	100
Dargaville	99.1	0.0	0.0	0.0	0.9	0.0	0.0	0.0	100
Bay of Islands	99.6	0.0	0.0	0.0	0.4	0.0	0.0	0.4	100
Warkworth	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Pukekohe *	79.9	12.8	9.3	3.5	7.3	0.2	2.2	4.9	100
Papakura Obstetric *	81.6	9.9	6.7	3.1	8.5	0.7	1.9	5.9	100
Botany Downs Maternity *	79.8	9.8	6.8	2.9	10.5	0.8	2.4	7.2	100
Taumarunui	96.6	0.0	0.0	0.0	3.4	0.0	3.4	0.0	100
Thames	97.7	0.0	0.0	0.0	2.3	2.3	0.0	0.0	100
Te Kuiti	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Tokoroa	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Rhoda Read (Morrinsville)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Matariki (Te Awamutu)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Taupo General	99.6	0.0	0.0	0.0	0.4	0.0	0.4	0.0	100
Te Puia Springs	97.8	0.0	0.0	0.0	2.2	0.0	0.0	2.2	100
Hawera	98.9	0.0	0.0	0.0	1.1	0.0	1.1	0.0	100
Wairoa	96.8	0.0	0.0	0.0	3.2	0.0	0.0	3.2	100
Chatham Islands	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Waipukurau	95.9	0.0	0.0	0.0	4.1	2.0	2.0	0.0	100
Horowhenua	99.4	0.0	0.0	0.0	0.6	0.0	0.6	0.0	100

Facility	Hospital delivery type								
	Normal vaginal birth	Total caesarean section	Acute caesarean section	Elective caesarean section	Total operative vaginal birth	Breech delivery	Forceps delivery	Vacuum extraction	Total
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Feilding Maternity	96.7	0.0	0.0	0.0	3.3	0.0	3.3	0.0	100
Taihape	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Waimarino Rural Health Centre	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Marion	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Kenepuru *	97.4	1.4	1.4	0.0	1.1	0.0	0.9	0.3	100
Paraparaumu *	97.1	1.0	1.0	0.0	1.9	0.0	1.9	0.0	100
Motueka Maternity	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Golden Bay Community Hospital	96.3	0.0	0.0	0.0	3.7	3.7	0.0	0.0	100
Buller	93.8	0.0	0.0	0.0	6.3	0.0	0.0	6.3	100
Burwood	98.2	0.0	0.0	0.0	1.8	0.0	1.8	0.0	100
Kaikoura	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Waikari	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Darfield	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Lincoln	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Rangiora	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Akaroa Community	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Dunstan	90.9	0.0	0.0	0.0	9.1	6.1	3.0	0.0	100
Oamaru	98.9	0.0	0.0	0.0	1.1	0.0	0.0	1.1	100
Gore	87.5	0.0	0.0	0.0	12.5	0.0	12.5	0.0	100
Lakes District (Queenstown)	83.3	0.0	0.0	0.0	16.7	0.0	16.7	0.0	100
Maniototo Health Services Ltd	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Hokianga	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Birthcare Auckland	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Pohlen Trust (Matamata)	95.0	0.0	0.0	0.0	5.0	0.0	5.0	0.0	100
Avonlea (Christchurch)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Wellsford Birthing Unit	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Helensville Birthing Unit	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Winton Birthing Centre	96.0	0.0	0.0	0.0	4.0	0.0	4.0	0.0	100
Tuatapere Maternity Hospital	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Birthcare Huntly	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Northern Southland Birthing Centre	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Dannevirke Community Hospital	98.6	0.0	0.0	0.0	1.4	0.0	1.4	0.0	100
Charlotte Jean Maternity Unit (Alexandra)	93.8	0.0	0.0	0.0	6.3	0.0	0.0	6.3	100
Elizabeth R Hospital and Rest Home	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Waihi Hospital	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Primary total	91.6	4.0	2.9	1.2	4.4	0.3	1.5	2.5	100
Other facilities	95.8	0.0	0.0	0.0	4.2	0.0	2.8	1.4	100
Total	68.7	20.4	13.3	7.1	11.0	0.9	5.3	4.8	100

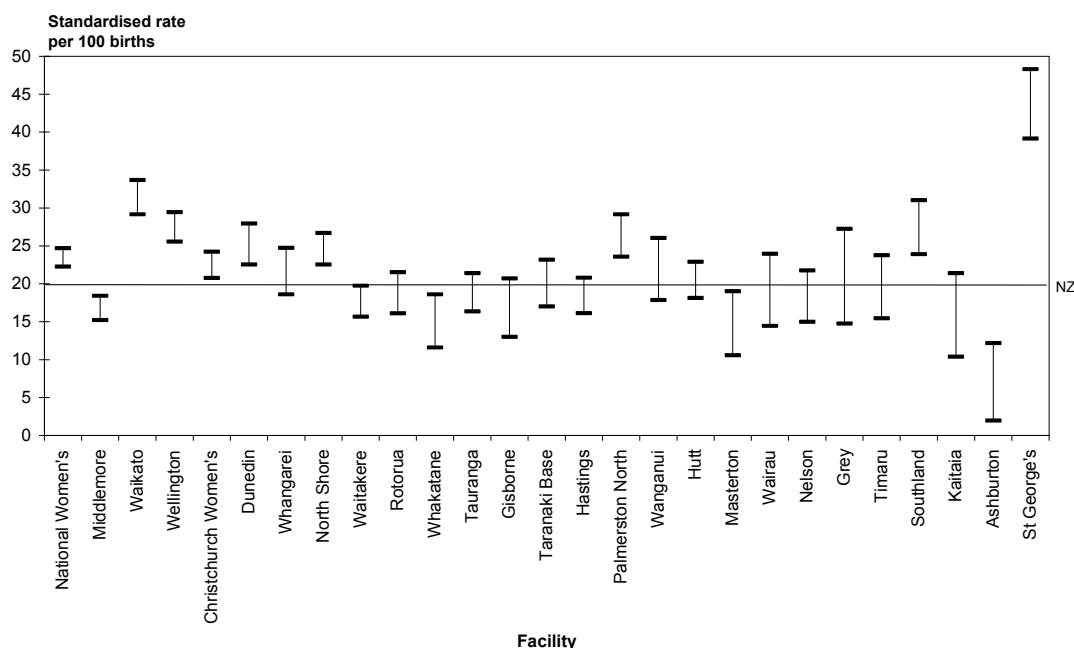
Data source: NMDS

\* These facilities do not perform caesarean sections, but these data are collected from the hospitals where the woman was discharged from. Note that women discharged from Pukekohe, Papakura Obstetric and Botany Downs Maternity are likely to have had their caesarean section at Middlemore hospital but resided in the postnatal period in the smaller units.

Facilities are first ordered by type of facility: tertiary, secondary, primary plus (primary facilities that do some caesareans), primary, and other. Within each type of facility, public facilities are ordered by the DHB in which the facility is situated, from north to south, with private facilities presented last.

Note that type of birth is recorded at discharge from the facility. This may not be the same facility as where the mother delivered (eg, women who had complications during delivery may have been transferred to a tertiary facility for the delivery, and then transferred back to the primary facility, from where they were discharged).

**Figure 3.2:** Standardised caesarean section rates, by facility, 1999



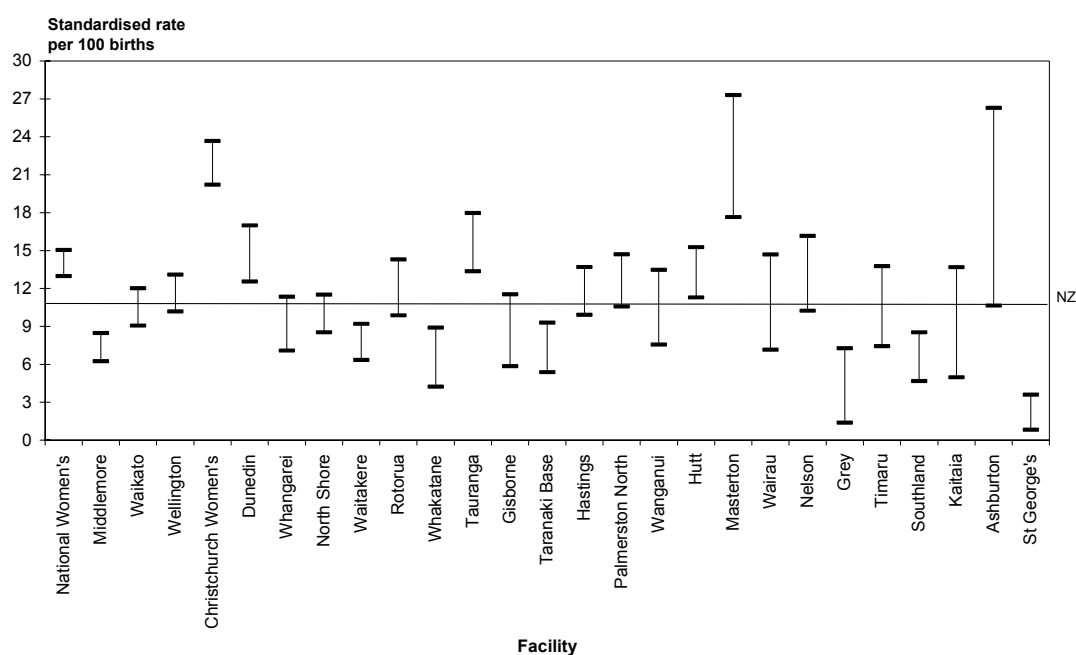
Data source: NMDS

Standardised caesarean section rate is the ratio of observed to expected caesarean section rates multiplied by the national caesarean section rate for all cases. Expected rates are calculated on the numbers of births by age from facility.

Figures 3.2, 3.3, and 3.4 all show the rates in the centre of the upper and lower 99% confidence limits. If the lower confidence limit is completely above the national rate for all New Zealand, this indicates the standardised rate is significantly greater than the overall national rate (99% confidence interval). If the upper confidence limit is completely below the national rate for all New Zealand, this indicates that the standardised rate is significantly less than the overall national rate (99% confidence interval). Otherwise the rate is not different from the overall national rate.

Five of the six tertiary facilities (National Women's, Waikato, Wellington, Christchurch Women's and Dunedin) had higher caesarean section rates than the national average, while Middlemore was below the national average. Three of the secondary facilities (North Shore, Palmerston North and Southland) had caesarean section rates well above the national average, while the caesarean section rate at St George's is the highest in the country.

**Figure 3.3:** Standardised operative vaginal birth rates, by facility, 1999

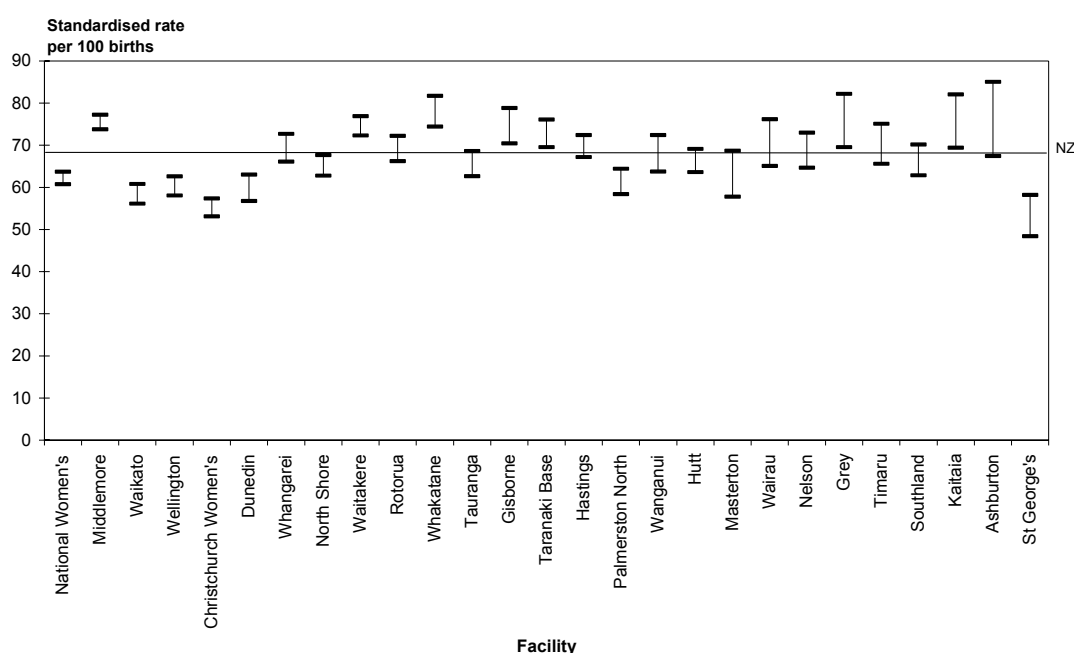


Data source: NMDS

Standardised operative vaginal birth rate is the ratio of observed to expected operative vaginal birth rates multiplied by the national operative vaginal birth rate for all cases. Expected rates are calculated on the numbers of births by age from facility.

The tertiary facilities (National Women's, Christchurch Women's and Dunedin) all had significantly higher operative vaginal birth rates than the national average, while the rate for Middlemore was significantly below the national average. The secondary facilities (Tauranga, Hutt and Masterton) all had operative vaginal birth rates higher than the national average.

**Figure 3.4:** Standardised normal vaginal birth rates, by facility, 1999



Data source: NMDS

Standardised normal vaginal birth rate is the ratio of observed to expected normal vaginal birth rates multiplied by the national normal vaginal birth rate for all cases. Expected rates are calculated on the numbers of births by age from facility.

All the above graphs show important differences in practice between institutions. A major benefit of these data is that they allow individual institutions to examine their own data and to compare them with similar institutions. In a situation of significant discrepancy, institutions should analyse reasons for the difference. Secondary units with a higher rate of caesarean sections such as North Shore, Palmerston North and Southland could investigate the reasons for these increases. Waikato is the only unit to have a caesarean section rate of greater than 30%, with Wellington also having a high caesarean section rate. The rate of operative vaginal births in Christchurch and Masterton of one in five births is double the country's average.

## 3.2 Procedures

**Table 3.11:** Birth procedure (numbers) for mothers during delivery, by DHB region of woman's place of residence, 1999

DHB region	Procedure					
	Inductions	Epidurals	Episiotomies	Manual removals of placenta	Hysterectomies	Post-partum haemorrhages
Northland	369	106	97	48	0	107
Waitemata	1685	1153	546	159	3	425
Auckland	1796	1250	772	102	1	448



Counties Manukau	1634	1236	620	110	3	483
Waikato	1032	781	277	75	1	476
Lakes	285	320	60	31	0	114
Bay of Plenty	572	213	268	46	0	179
Tairāwhiti	134	71	20	10	0	43
Taranaki	341	86	75	12	0	64
Hawkes Bay	466	580	191	36	1	107
MidCentral	346	379	183	23	0	142
Whanganui	222	123	65	7	0	58
Capital and Coast	910	1427	565	50	2	308
Hutt	514	642	211	45	0	128
Wairarapa	93	152	66	13	0	25
Nelson Marlborough	532	482	166	23	1	56
West Coast	78	18	27	4	0	26
Canterbury	1337	1445	653	98	1	292
South Canterbury	175	104	38	8	1	8
Otago	610	527	80	23	1	159
Southland	348	188	157	31	2	69
Total	13,480	11,283	5136	955	17	3717

Data source: NMDS

**Table 3.12:** Birth procedure (rate per 100 deliveries) for mothers during delivery, by DHB region of woman's place of residence, 1999

DHB region	Procedure					
	Inductions	Epidurals	Episiotomies	Manual removals of placenta	Hysterectomies	Post-partum haemorrhages
Northland	19.6	5.6	5.8	2.9	0.0	6.4
Waitemata	30.2	20.7	11.8	3.4	0.0	9.2
Auckland	33.0	23.0	16.8	2.2	0.0	9.8
Counties Manukau	24.3	18.4	10.4	1.9	0.0	8.1
Waikato	26.8	20.3	8.5	2.3	0.0	14.6
Lakes	18.0	20.2	4.3	2.2	0.0	8.1
Bay of Plenty	24.5	9.1	13.0	2.2	0.0	8.6
Tairāwhiti	19.9	10.5	3.3	1.6	0.0	7.0
Taranaki	26.3	6.6	6.7	1.1	0.0	5.7
Hawke's Bay	23.2	28.8	10.8	2.0	0.0	6.0
MidCentral	18.6	20.4	11.6	1.5	0.0	9.0
Whanganui	25.2	13.9	8.6	0.9	0.0	7.7
Capital and Coast	27.3	42.9	21.0	1.9	0.1	11.4
Hutt	27.7	34.6	13.4	2.8	0.0	8.1
Wairarapa	18.6	30.3	14.6	2.9	0.0	5.5
Nelson Marlborough	39.1	35.4	14.0	1.9	0.1	4.7
West Coast	23.3	5.4	9.3	1.4	0.0	9.0
Canterbury	29.9	32.3	16.9	2.5	0.0	7.5
South Canterbury	29.6	17.7	7.4	1.6	0.2	1.6
Otago	34.9	30.1	5.4	1.6	0.1	10.8
Southland	29.4	15.9	16.0	3.2	0.2	7.0

Total	27.2	22.8	12.1	2.3	0.0	8.8
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Data source: NMDS

The rates for inductions and epidurals are expressed per 100 babies, excluding elective caesarean sections. The rates for episiotomies, manual removals of placentas, and post-partum haemorrhages are expressed per 100 babies, excluding caesarean sections (ie, rate per vaginal delivery). The rates for hysterectomies are expressed per 100 babies.

This should be read in conjunction with Table 6.6.

**Table 3.13:** Epidurals, by age and ethnicity, 1999

Age group	Numbers of epidurals					Rate per 100 babies*				
	Māori	Pacific peoples	Asian	European/ Other	Total	Māori	Pacific peoples	Asian	European/ Other	Total
Under 16	26	4	0	20	50	35.6	36.4	–	41.7	37.9
16–19	327	85	16	485	913	21.1	20.9	30.8	28.9	24.8
20–24	459	219	88	1236	2002	15.2	18.0	26.5	26.5	21.7
25–29	260	234	242	2447	3183	10.5	15.4	28.7	26.5	22.6
30–34	160	145	255	2831	3391	9.9	11.5	24.7	26.9	23.5
35–39	64	60	133	1246	1503	8.2	10.2	23.4	25.7	22.2
40+	9	16	16	200	241	6.5	13.6	20.5	25.3	21.4
Total	1305	763	750	8465	11,283	13.5	14.9	25.8	26.6	22.8

Data source: NMDS

\* This rate excludes women who had an elective caesarean section.

Epidural rates are expressed per 100 babies, excluding elective caesarean sections.

There are ethnic differences in the usage of epidurals. European/Other and Asian women have almost double the usage of Māori and Pacific women. There is also an age-related difference, with epidurals offered to 38% of women under the age of 16. Thereafter the incidence is not age-related.

**Table 3.14:** Inductions, by age and ethnicity, 1999

Age group	Numbers of inductions					Rate per 100 babies*				
	Māori	Pacific peoples	Asian	European/ Other	Total	Māori	Pacific peoples	Asian	European/ Other	Total
Under 16	18	1	0	11	30	24.7	9.1	–	22.9	22.7
16–19	340	95	10	444	889	21.9	23.4	19.2	26.4	24.1
20–24	589	258	69	1255	2171	19.5	21.1	20.8	26.9	23.5
25–29	471	325	239	2757	3792	19.0	21.5	28.3	29.9	26.9
30–34	360	294	290	3233	4177	22.2	23.4	28.0	30.7	28.9
35–39	186	149	144	1549	2028	23.9	25.4	25.4	31.9	29.9
40+	40	43	19	291	393	28.8	36.4	24.4	36.8	34.9
Total	2004	1165	771	9540	13,480	20.7	22.8	26.5	30.0	27.2

Data source: NMDS

\* This rate excludes women who had an elective caesarean section.

Induction rates are expressed per 100 babies, excluding elective caesarean sections.

In New Zealand in 1999, 27% of births were induced. There are also ethnic differences apparent in the rate of induced births, though the ethnic disparities are not as great as those for epidurals. The rate of epidurals also increases with age for women over 24.

## 4 Babies

This chapter reviews newborn babies in New Zealand. In 1999 there were 53,273 babies born in hospital, of which 440 (0.8%) were stillbirths and 129 perinatal deaths.

### 4.1 Babies at birth

**Table 4.1:** Babies, by mother's age and ethnicity (hospital data), 1999

Age group	Total babies born				
	Māori	Pacific peoples	Asian	European/ Other	Total
Under 16	73	11	0	49	133
16–19	1583	414	53	1720	3770
20–24	3112	1250	335	4862	9559
24–29	2606	1582	891	9918	14,997
30–34	1740	1337	1130	11,636	15,843
35–39	839	635	639	5537	7650
40+	151	130	99	941	1321
Total	10,104	5359	3147	34,661	53,273

Data source: NMDS

The number of babies born includes both live and stillbirths.

**Table 4.2:** Baby numbers and average birthweight for babies born in hospital, by gender and ethnicity, 1999

Ethnic group	Babies born			Average birthweight (kg) (standard deviation – kg)		
	Female	Male	Total	Female	Male	Total
Māori	4876	5228	10,104	3.26 (0.59)	3.35 (0.60)	3.31 (0.60)
Pacific peoples	2698	2661	5359	3.51 (0.62)	3.57 (0.63)	3.54 (0.63)
Asian	1546	1601	3147	3.19 (0.52)	3.29 (0.56)	3.24 (0.54)
European/Other	16,945	17,714	34,663	3.36 (0.59)	3.49 (0.62)	3.42 (0.61)
Total	26,065	27,204	53,273	3.35 (0.59)	3.46 (0.62)	3.40 (0.61)

Data source: NMDS

There were four babies where gender was undefined.

Differences in birthweight for the different ethnic groups are identified here. Pacific babies are significantly larger and Asian babies significantly smaller than all other ethnic groups.<sup>10</sup>

**Table 4.3:** Gestational age at birth for babies born in hospital, by ethnicity, 1999

Ethnic group	Number by gestational age (weeks)						Percent by gestational age (weeks)					
	20–23	24–27	28–31	32–36	37–41	42+	20–23	24–27	28–31	32–36	37–41	42+
Māori	7	39	77	647	9008	326	0.1	0.4	0.8	6.4	89.2	3.2
Pacific peoples	6	20	34	262	4805	232	0.1	0.4	0.6	4.9	89.7	4.3
Asian	6	7	27	161	2885	62	0.2	0.2	0.9	5.1	91.7	2.0
European/Other	35	100	268	2150	31,022	1089	0.1	0.3	0.8	6.2	89.5	3.1
Total	54	165	405	3221	47,719	1709	0.1	0.3	0.8	6.0	89.6	3.2

Data source: NMDS

Seven percent of babies were born pre-term (< 37 weeks' gestation) in 1999. Māori had the same rate of pre-term births as other groups in 1999, whereas in the past their rate was higher (Health Funding Authority 1999). Pacific women have significantly fewer pre-term babies compared with all other ethnic groups.<sup>11</sup>

**Table 4.4:** Number of babies born in hospital, by birthweight and DHB of woman's place of residence, 1999

DHB region	Birthweight (g)						Total
	0–999	1000–1499	1500–1999	2000–2499	2500–4499	4500+	
Northland	7	10	26	103	1817	48	2010
Waitemata	18	31	74	260	5512	152	6047
Auckland	13	24	42	230	5385	148	5842
Counties Manukau	29	48	88	282	6451	173	7072
Waikato	19	37	62	192	3745	91	4146
Lakes	4	8	29	73	1539	23	1676
Bay of Plenty	10	18	39	100	2285	58	2510
Tairāwhiti	3	3	13	28	658	15	721
Taranaki	2	11	18	61	1236	35	1363
Hawke's Bay	10	12	47	87	1918	55	2130
MidCentral	11	16	25	69	1833	48	2002
Whanganui	4	5	9	37	874	19	948
Capital and Coast	25	19	49	143	3232	105	3574
Hutt	8	20	16	84	1806	55	1989
Wairarapa	2	2	5	16	502	12	539
Nelson Marlborough	1	2	21	56	1327	45	1452
West Coast	3	0	8	18	333	4	366
Canterbury	17	28	82	208	4588	131	5053
South Canterbury	2	4	11	25	564	17	624
Otago	17	14	20	72	1,746	38	1907
Southland	7	10	24	56	1,201	5	1303
Total	213	323	711	2199	48,552	1275	53,273

Data source: NMDS

<sup>10</sup> Both  $p < 0.01$ .

<sup>11</sup> Both  $p < 0.01$ .

**Table 4.5:** Number of babies born in hospital (percent), by birthweight and DHB of woman's place of residence, 1999

DHB region	Birthweight (g)						Total
	0-999	1000-1499	1500-1999	2000-2499	2500-4499	4500+	
Northland	0.3	0.5	1.3	5.1	90.4	2.4	100
Waitemata	0.3	0.5	1.2	4.3	91.2	2.5	100
Auckland	0.2	0.4	0.7	3.9	92.2	2.5	100
Counties Manukau	0.4	0.7	1.2	4.0	91.2	2.4	100
Waikato	0.5	0.9	1.5	4.6	90.3	2.2	100
Lakes	0.2	0.5	1.8	4.4	91.8	1.3	100
Bay of Plenty	0.4	0.7	1.5	4.0	91.1	2.3	100
Tairāwhiti	0.4	0.4	1.8	3.9	91.3	2.1	100
Taranaki	0.1	0.8	1.3	4.4	90.7	2.6	100
Hawke's Bay	0.5	0.6	2.2	4.1	90.1	2.6	100
MidCentral	0.5	0.8	1.3	3.5	91.6	2.4	100
Whanganui	0.4	0.5	1.0	3.9	92.2	2.0	100
Capital and Coast	0.7	0.5	1.4	4.0	90.4	2.9	100
Hutt	0.4	1.0	0.8	4.2	90.8	2.7	100
Wairarapa	0.4	0.4	0.9	2.9	93.2	2.2	100
Nelson Marlborough	0.1	0.1	1.5	3.9	91.4	3.1	100
West Coast	0.8	0.0	2.2	4.9	90.9	1.1	100
Canterbury	0.3	0.6	1.6	4.1	90.8	2.6	100
South Canterbury	0.3	0.7	1.8	4.1	90.4	2.8	100
Otago	0.9	0.7	1.0	3.8	91.6	2.0	100
Southland	0.5	0.8	1.9	4.3	92.1	0.4	100
Total	0.4	0.6	1.3	4.1	91.1	2.4	100

Data source: NMDS

One percent of New Zealand babies weighed less than 1500 g at birth. It is these babies who have the highest mortality and morbidity and contribute most to the workloads of our neonatal units. Women living in the Waikato, Hutt and Otago DHB regions had the highest rates of these small babies.

**Table 4.6:** Apgar score at five minutes, 1999

Apgar score	Number	Percent
0	2092	5.9
1-4	138	0.4
5-8	1653	4.7
9-10	31,630	89.1
Total	35,513	100

Data source: MNIS

Apgar score data are not available for 3671 babies in MNIS (9.4%). The 2092 babies with Apgar 0 are likely to be an error as this greatly exceeds the death rate. However, there is no method of checking this retrospectively. It may be that some records left blank were entered as 0, or that a score of 10 was mistaken for a score of 0.

## 4.2 Birth outcomes

This next section examines perinatal deaths in New Zealand in 1999. There were 585 babies who died between 20 weeks of pregnancy and one month of life, an incidence of just over 1% of all births in 1999. The perinatal mortality rate (which includes stillbirths and deaths less than seven days) is 10.7 per 1000 babies. Stillbirths are more likely to occur to women who are either very young or older, and/or deprived or Pacific women. The current data do not allow interpretation of cause of stillbirth by any internationally recognised classification. This information will be available in the perinatal mortality database; however, this database does not currently contain data for 1999.

**Table 4.7:** In-hospital perinatal outcomes, by DHB of mother's place of residence, 1999

DHB region	Number				Rate per 1000 babies			
	Live births	Stillbirths	Deaths < 7 days from birth	Deaths 7 to 27 days from birth	Stillbirths	Deaths < 7 days from birth	Total perinatal deaths	Deaths 7 to 27 days from birth
Northland	1986	24	4	0	11.9	2.0	13.9	0.0
Waitemata	6006	41	14	3	6.8	2.3	9.1	0.5
Auckland	5801	41	11	5	7.0	1.9	8.9	0.9
Counties Manukau	7013	59	20	1	8.3	2.8	11.2	0.1
Waikato	4114	33	12	2	7.8	2.9	10.7	0.5
Lakes	1662	14	4	1	8.4	2.4	10.7	0.6
Bay of Plenty	2491	19	7	1	7.6	2.8	10.4	0.4
Tairāwhiti	711	10	1	0	13.9	1.4	15.3	0.0
Taranaki	1351	12	1	0	8.8	0.7	9.5	0.0
Hawke's Bay	2099	31	3	0	14.6	1.4	16.0	0.0
MidCentral	1989	13	5	0	6.5	2.5	9.0	0.0
Whanganui	941	7	1	0	7.4	1.1	8.4	0.0
Capital and Coast	3536	38	10	0	10.6	2.8	13.4	0.0
Hutt	1971	18	6	0	9.0	3.0	12.1	0.0
Wairarapa	536	3	1	0	5.6	1.9	7.4	0.0
Nelson								
Marlborough	1438	14	1	0	9.6	0.7	10.3	0.0
West Coast	364	2	3	0	5.5	8.2	13.7	0.0
Canterbury	5017	36	12	1	7.1	2.4	9.5	0.2
South Canterbury	619	5	2	0	8.0	3.2	11.2	0.0
Otago	1889	18	7	2	9.4	3.7	13.1	1.0
Southland	1301	2	4	0	1.5	3.1	4.6	0.0
Total	52,834	440	129	16	8.2	2.4	10.7	0.3

Data source: NMDS

These data show important differences in outcomes between DHBs. It is hoped that individual DHBs will investigate these discrepancies. There were 585 babies who died before birth or shortly after, with a wide range of differences associated with locality. Some of the areas with high rates reflect deprived areas of New Zealand (Capital and Coast is an exception).

**Table 4.8:** In-hospital perinatal deaths, by ethnicity, 1999

Ethnic group	Number			Rate per 1000 babies			
	Stillbirths	Deaths < 7 days from birth	Deaths 7 to 27 days from birth	Stillbirths	Deaths < 7 days from birth	Total perinatal deaths	Deaths 7 to 27 days from birth
Māori	81	28	2	8.0	2.8	10.7	0.2
Pacific peoples	54	11	3	10.1	2.1	12.2	0.6
Asian	15	0	0	4.8	0.0	4.8	0.0
European/Other	290	90	11	8.4	2.6	11.0	0.3
Total	440	129	16	8.2	2.4	10.7	0.3

Data source: NMDS

The perinatal mortality rate of 10.7 per 1000 babies has continued to fall in recent years. It is a creditable rate by international standards. Pacific women have double the stillbirth rate of Asian women, and also have a slightly higher rate than Māori and European women. The very low perinatal mortality data for Asian women of 4.8 per 1000 and complete absence of neonatal deaths is surprising.

**Table 4.9:** Stillbirths (numbers), by mother's age and NZDep decile of woman's place of residence, 1999

NZDep level	Mother's age						Total
	< 20	20–24	25–29	30–34	35–39	40+	
Least deprived	1	5	7	10	12	2	37
2	3	2	11	11	5	0	32
3	1	1	7	7	3	0	19
4	2	4	9	8	2	2	27
5	3	9	7	14	5	2	40
6	1	9	12	14	9	2	47
7	3	5	14	12	4	2	40
8	5	12	10	16	13	2	58
9	6	11	27	10	9	1	64
Most deprived	11	22	20	13	6	4	76
Total	36	80	124	115	68	17	440

Data source: NMDS

**Table 4.10:** Stillbirths (rates per 1000), by mother's age and NZDep decile of woman's place of residence, 1999

NZDep level	Mother's age						Total
	< 20	20–24	25–29	30–34	35–39	40+	
Least deprived	9.1	11.3	6.8	5.7	12.2	11.2	8.2
2	21.4	4.4	9.7	6.7	5.7	0.0	7.3
3	5.1	1.7	5.7	4.5	3.8	0.0	4.2
4	8.4	5.8	6.5	4.9	2.8	14.9	5.6
5	9.6	10.5	4.8	8.4	6.4	15.7	7.7
6	2.6	9.5	7.7	9.4	13.5	18.5	9.1
7	8.3	5.5	9.5	8.9	6.7	17.1	8.3
8	9.1	9.0	5.8	9.8	18.0	16.5	9.5
9	9.7	8.3	15.3	7.0	13.0	8.2	10.7
Most deprived	11.4	10.7	8.9	7.7	7.5	24.1	9.6
Total	9.3	8.3	8.3	7.3	8.9	12.9	8.2

Data source: NMDS



There is an impression from these data that women from more deprived areas have a higher rate of stillbirths. Also, both extremes of the reproductive age group have a higher stillbirth rate.

**Table 4.11:** In-hospital neonatal deaths, by principal diagnosis, 1999

Principal diagnosis <sup>12</sup>		Number		Rate per 1000 babies	
Number	Name	Deaths < 7 days from birth	Deaths 7 to 27 days from birth	Deaths < 7 days from birth	Deaths 7 to 27 days from birth
320	Bacterial meningitis	1	0	0.02	0.00
742	Other congenital anomalies of nervous system	1	0	0.02	0.00
745	Bulbus cordis anomalies and anomalies of cardiac septal closure	1	0	0.02	0.00
746	Other congenital anomalies of heart	4	1	0.08	0.02
747	Other congenital anomalies of circulatory system	2	0	0.04	0.00
748	Congenital anomalies of respiratory system	1	1	0.02	0.02
751	Other congenital anomalies of digestive system	1	0	0.02	0.00
753	Congenital anomalies of urinary system	4	0	0.08	0.00
758	Chromosomal anomalies	4	0	0.08	0.00
759	Other and unspecified congenital anomalies	1	0	0.02	0.00
761	Foetus or newborn affected by maternal complications of pregnancy	1	0	0.02	0.00
764	Slow foetal growth and foetal malnutrition	1	0	0.02	0.00
765	Disorders relating to short gestation and unspecified low birthweight	88	10	1.65	0.19
768	Intrauterine hypoxia and birth asphyxia	7	1	0.13	0.02
769	Respiratory distress syndrome	0	1	0.00	0.02
770	Other respiratory conditions of foetus and newborn	2	1	0.04	0.02
776	Haematological disorders of foetus and newborn	1	0	0.02	0.00
778	Conditions involving the integument and temperature regulation of foetus and newborn	4	0	0.08	0.00
779	Other and ill-defined conditions originating in the perinatal period	4	0	0.08	0.00
798	Sudden death, cause unknown	0	1	0.00	0.02
	Other	1	0	0.02	0.00
Total		129	16	2.42	0.30

Data source: NMDS

These data are derived from ICD codes, making it difficult to assign a cause of death. Information on cause of death is available from the mortality database.

<sup>12</sup> Clinical code ICD9-9-CMA.

**Table 4.12:** In-hospital neonatal deaths, by birthweight, 1999

Birthweight (g)	Number		Rate per 1000 babies	
	Deaths < 7 days from birth	Deaths 7 to 27 days from birth	Deaths < 7 days from birth	Deaths 7 to 27 days from birth
0–999	78	4	366.0	18.8
1000–1499	12	4	37.2	12.4
1500–1999	4	1	5.6	1.4
2000–2499	12	2	5.5	0.9
2500–4499	19	5	0.4	0.1
4500+	4	0	3.1	0.0
Total	129	16	2.4	0.3

Data source: NMDS

Babies are included only if the death occurred in hospital.

**Table 4.13:** In-hospital neonatal deaths, by gestational age, 1999

Gestational age (weeks)	Number		Rate per 1000 babies	
	Deaths < 7 days from birth	Deaths 7 to 27 days from birth	Deaths < 7 days from birth	Deaths 7 to 27 days from birth
20–23	42	1	781.1	18.6
24–27	40	3	242.0	18.1
28–31	10	3	24.7	7.4
32–36	10	4	3.1	1.2
37–41	27	5	0.6	0.1
42+	0	0	0.0	0.0
Total	129	16	2.4	0.3

Data source: NMDS

Babies are included only if the death occurred in hospital.

## 5 Postnatal Period

This chapter describes the mother and baby in the first month after birth. These data include some information on community care for mothers and babies in the postnatal period. Readmission to hospital for either the mother or her newborn is often a sign of morbidity occurring in the postnatal period.

Ten percent (5130/52428) of mothers and 7% (3752/53273) of babies required a postnatal admission.

Hospital data are obtained from NMDS, and postnatal community aspects are obtained from HB in the MNIS. It is not always possible from these data to determine the reason for readmission.

## 5.1 Postnatal hospital admissions

**Table 5.1:** Postnatal readmissions for problems relating to pregnancy, average length of stay and significant operations, by principal diagnosis (DRGs 678 and 679 only), 1999

Principal diagnosis <sup>13</sup>	Readmissions		Number of significant operations		Average length of stay
	Number	Percent	Number	Percent	
Hypertension complicating pregnancy, childbirth, and the puerperium	151	2.9	0	0.0	3.3
Other complications of pregnancy, not elsewhere classified	108	2.1	3	0.6	2.3
Infections and parasitic conditions in the mother classified elsewhere, but complicating pregnancy, childbirth, or the puerperium	12	0.2	0	0.0	3.3
Other current conditions in mother classifiable elsewhere, but complicating pregnancy, childbirth or the puerperium	263	5.1	9	1.8	3.1
Abnormality of organs and soft tissues of pelvis	2	0.0	0	0.0	1.0
Trauma to perineum and vulva during delivery	20	0.4	11	2.2	2.4
Other obstetrical trauma	20	0.4	6	1.2	3.3
Postpartum haemorrhage	397	7.7	273	54.8	1.2
Retained placenta or membranes, without haemorrhage	63	1.2	49	9.8	1.8
Complications of the administration of anaesthetic or other sedation in labour and delivery	21	0.4	7	1.4	2.4
Other complications of labour and delivery, not elsewhere classified	5	0.1	1	0.2	2.2
Major puerperal infection	216	4.2	9	1.8	2.3
Venous complications in pregnancy and the puerperium	123	2.4	7	1.4	3.2
Pryrexia of unknown origin during the puerperium	42	0.8	3	0.6	2.9
Obstetrical pulmonary embolism	3	0.1	0	0.0	2.3
Other and unspecified complications of the puerperium, not elsewhere classified	201	3.9	34	6.8	3.2
Infections of the breast and nipple associated with childbirth	230	4.5	78	15.7	2.7
Other disorders of the breast associated with childbirth and disorders of lactate	363	7.1	0	0.0	3.5
Postpartum care and examination	2883	56.2	2	0.4	3.0
Other diagnosis	7	0.1	6	1.2	0.9
Postpartum and post-abortion diagnoses total	5130	100	498	100	2.8

Data source: NMDS

Note that all mental health events and transfers to another hospital are excluded. Only readmissions for postpartum and post-abortion diagnoses (DRGs 678 and 679) are included.

<sup>13</sup> Clinical code ICD9-9-CMA.

Of these postnatal readmissions for problems relating to pregnancy, there were 2883 women readmitted for postpartum care and examination. Many were admitted simply because their newborn baby required hospital admission.

There were five pulmonary embolisms in pregnancy in 1999, three once the mother had been discharged. Infection, postpartum haemorrhage and breast disorders account for the majority of maternal clinical reasons for readmissions. One mother was identified in NMDS as having died in hospital from maternal causes.

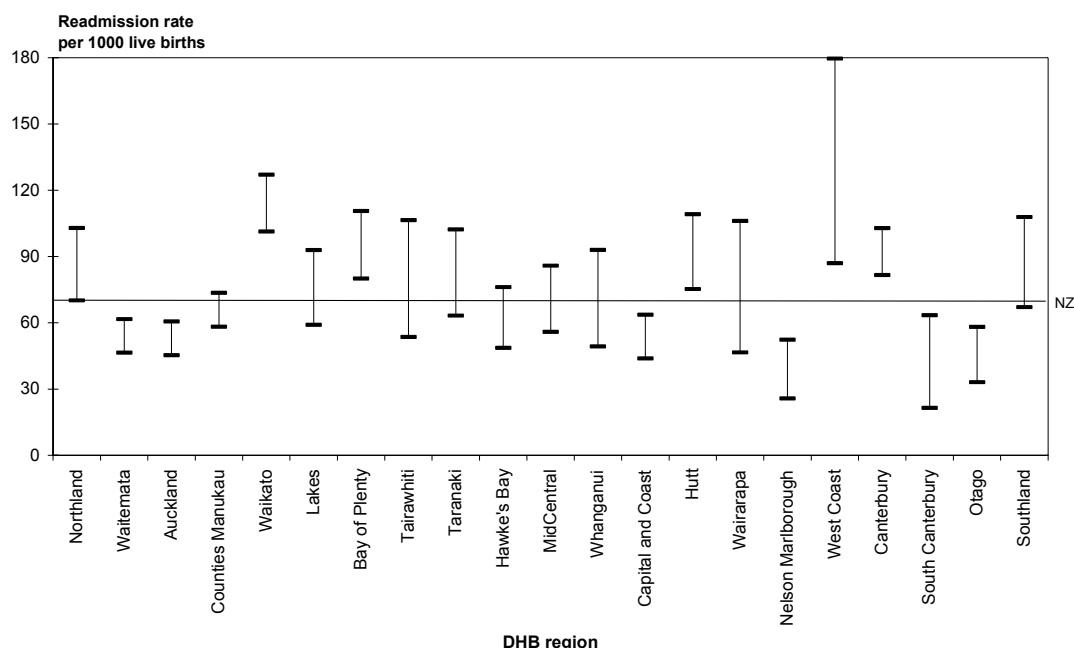
**Table 5.2:** Readmissions to hospital for newborns born in hospital, by DHB region of woman's place of residence, 1999

DHB region	Readmissions	
	Number	Rate per 1000 hospital live births
Northland	169	85.1
Waitemata	322	53.6
Auckland	304	52.4
Counties Manukau	459	65.5
Waikato	467	113.5
Lakes	123	74.2
Bay of Plenty	235	94.2
Tairāwhiti	54	75.9
Taranaki	109	80.7
Hawke's Bay	128	61.0
MidCentral	138	69.4
Whanganui	64	68.0
Capital and Coast	187	52.9
Hutt	179	90.8
Wairarapa	38	70.9
Nelson Marlborough	53	36.9
West Coast	46	126.4
Canterbury	460	91.7
South Canterbury	23	37.3
Otago	83	43.9
Southland	111	85.3
<b>Total</b>	<b>3752</b>	<b>71.0</b>

Data source: NMDS

Table 5.2 shows readmissions to hospital, within 12 weeks of birth, for babies born in hospital. Note that the filtering process excludes all mental health events, while transfers to another hospital are also excluded.

**Figure 5.1:** Readmission rate to hospital and 99% confidence limits per 1000 births, by DHB of baby's place of residence, 1999



Data source: NMDS

The graph shows the rates in the centre of the upper and lower 99% confidence limits. If the lower confidence limit is completely above the national rate for all New Zealand, this indicates the DHB region readmission rate is significantly greater than the overall national rate (99% confidence interval). If the upper confidence limit is completely below the national rate for all New Zealand, this indicates the DHB region readmission rate is significantly less than the overall national rate (99% confidence interval). Otherwise the DHB region readmission rate is no different from the overall national rate.

## 5.2 Breastfeeding

**Table 5.3:** Breastfeeding rates at time of transfer to well child provider, 1999

Breastfeeding status	Breastfeeding	
	Number	Percent
Exclusively	19,968	73.8
Partially	3081	11.4
Not at all	3993	14.8
Total	27,042	100

Data source: MNIS

For 12,142 babies (31.0%) breastfeeding status is unrecorded.

This is the first time New Zealand has been able to analyse LMC breastfeeding data nationally. From the data recorded, a rate of 74% breastfeeding at the time of transfer to the well child provider is an excellent achievement (if true). Unfortunately this is only reported in fewer than half the babies. There are also variations in the definitions of breastfeeding status, making it difficult to obtain an accurate picture. With the move towards baby-friendly initiatives it is hoped that the collection of breastfeeding data will be improved.

**Table 5.4:** Breastfeeding rates, by age of mother, 1999

Age of mother	Breastfeeding status							
	Exclusively		Partially		Not at all		Total	
	No.	%	No.	%	No.	%	No.	%
Under 16	11	52.4	4	19.1	6	28.6	21	100
16–19	917	60.5	208	13.7	390	25.7	1515	100
20–24	3004	69.0	538	12.4	810	18.6	4352	100
25–29	5200	73.7	778	11.0	1076	15.3	7054	100
30–34	6218	77.1	833	10.3	1010	12.5	8061	100
35–39	3144	76.5	496	12.1	468	11.4	4108	100
40+	596	75.1	106	13.4	92	11.6	794	100
Total	19,090	73.7	2963	11.4	3852	14.9	25,905	100

Data source: MNIS

For 12,142 babies (31.0%) breastfeeding status is unknown, and for 2233 babies (5.7%) the age of the mother is unknown.

Women who give birth at an older age are more likely to breastfeed than young mothers.

**Table 5.5:** Breastfeeding rates, by ethnicity, 1999

Ethnicity	Breastfeeding status							
	Exclusively		Partially		Not at all		Total	
	No.	%	No.	%	No.	%	No.	%
Māori	3135	68.3	648	14.1	810	17.6	4593	100
Pacific peoples	958	75.9	161	12.8	144	11.4	1263	100
Asian	656	68.1	190	19.7	118	12.2	964	100
European/Other	15,211	75.3	2081	10.3	2921	14.5	20,213	100
Total	19,960	73.8	3080	11.4	3993	14.8	27,033	100

Data source: MNIS

For 12,142 babies (31.0%) breastfeeding status is unknown.

European and Pacific women are more likely to breastfeed than Māori and Asian women.

**Table 5.6:** Breastfeeding rates, by DHB region of woman's place of residence, 1999

Facility	Breastfeeding status							
	Exclusively		Partially		Not at all		Total	
	No.	%	No.	%	No.	%	No.	%
Northland	1158	83.0	112	8.0	126	9.0	1396	100
Waitemata	2282	75.6	358	11.9	377	12.5	3017	100
Auckland	2304	82.5	285	10.2	204	7.3	2793	100
Counties Manukau	1181	74.6	176	11.1	226	14.3	1583	100
Waikato	1885	69.9	308	11.4	502	18.6	2695	100
Lakes	948	72.8	188	14.4	167	12.8	1303	100
Bay of Plenty	1360	73.2	209	11.2	289	15.6	1858	100
Tairāwhiti	391	72.4	57	10.6	92	17.0	540	100
Taranaki	721	71.5	133	13.2	155	15.4	1009	100
Hawke's Bay	1039	67.3	203	13.1	302	19.6	1544	100
MidCentral	946	71.2	142	10.7	240	18.1	1328	100
Whanganui	397	71.3	40	7.2	120	21.5	557	100
Capital & Coast	234	74.1	41	13.0	41	13.0	316	100
Hutt	870	66.9	218	16.8	213	16.4	1301	100
Wairarapa	127	72.6	15	8.6	33	18.9	175	100
Nelson Marlborough	802	77.7	95	9.2	135	13.1	1032	100
West Coast	23	71.9	4	12.5	5	15.6	32	100
Canterbury	1920	68.9	347	12.5	520	18.7	2787	100
South Canterbury	92	83.6	10	9.1	8	7.3	110	100
Otago	316	75.6	34	8.1	68	16.3	418	100
Southland	269	74.3	33	9.1	60	16.6	362	100
Total	19,265	73.7	3008	11.5	3883	14.9	26,156	100

Data source: MNIS

For 12,142 babies (31.0%) breastfeeding status is unknown.

## 5.3 Postnatal care

**Table 5.7:** Number of postnatal midwifery home visits, 1999

Number of home visits	Postnatal midwifery home visits	
	Number	Percent
1-4	1609	6.6
5-10	20,701	84.2
>10	2271	9.2
Total	24,581	100

Data source: MNIS

The number of home visits was not recorded for 14,825 women (37.6%).



LMCs are required to provide five to ten midwifery home visits under the Maternity Payment Schedule. The high number of unrecorded visits makes analysis impossible.

**Table 5.8:** Transfer of maternity services to well child provider, 1999

Baby age at transfer (weeks)	Transfer to well child provider	
	Number	Percent
0–2	2165	8.7
2–4	7683	30.8
4–6	11,858	47.5
6–8	2880	11.5
> 8	391	1.6
Total	24,977	100

Data source: MNIS

The date of transfer to the well child provider is not recorded, or is recorded incorrectly, for 14,429 babies (36.6%).

**Table 5.9:** Claims made for specialist paediatrician consultations, by DHB of woman's area of residence, 1999

DHB region	Number of consultations	
	Total	
	Number	Percent
Northland	8	0.3
Waitemata	158	6.0
Auckland	394	14.9
Counties Manukau	196	7.4
Waikato	126	4.8
Lakes	14	0.5
Bay of Plenty	349	13.2
Tairāwhiti	44	1.7
Taranaki	3	0.1
Hawke's Bay	8	0.3
MidCentral	4	0.2
Whanganui	13	0.5
Capital and Coast	19	0.7
Hutt	6	0.2
Wairarapa	1	0.0
Nelson Marlborough	105	4.0
West Coast	5	0.2
Canterbury	1035	39.2
South Canterbury	106	4.0
Otago	44	1.7
Southland	6	0.2
Total	2644	100

Data source: MNIS

These data demonstrate a wide range of availability and usage of private paediatricians. There are more private paediatrician visits in the urban areas. In many areas private paediatricians are not available, so the paediatric service is provided by the secondary/tertiary services.

## 6 Maternity Facility

All information on maternity in this section is analysed by individual hospital facility, with the exception of two graphs on type of birth which are analysed by DHB provider. These data allow individual facilities to compare their outcomes with similar facilities. This is the second step in audit of practice. This information enables facilities with outcomes divergent from similar facilities to explore the reasons for these differences.

Facilities are first ordered by type of facility: tertiary, secondary, primary plus (primary facilities which do some caesareans), primary and other. Within each type of facility, public facilities are ordered by the DHB in which the facility is situated, from north to south, with private facilities presented last.

Data are obtained from NMDS for these analyses. Information is presented by the facility of discharge and not the actual delivery.

**Table 6.1:** Total live and stillbirths, by facility, 1999

Facility	Live births		Still births		
	Number	Percent	Number	Percent	Rate per 1000
Greenlane/National Women's	7497	14.2	67	15.2	8.9
Middlemore	3815	7.2	53	12.1	13.7
Waikato	2892	5.5	36	8.1	12.1
Wellington	3218	6.1	54	12.3	16.5
Christchurch Women's	3728	7.1	37	8.4	9.8
Dunedin	1682	3.2	15	3.4	8.8
<b>Tertiary total</b>	<b>22,832</b>	<b>43.2</b>	<b>262</b>	<b>59.5</b>	<b>11.3</b>
Whangarei	1247	2.4	24	5.5	18.9
North Shore	2687	5.1	16	3.6	5.9
Waitakere	2394	4.5	4	0.9	1.7
Rotorua	1486	2.8	14	3.2	9.3
Whakatane (including Opotiki and Murupara)	763	1.4	11	2.5	14.2
Tauranga	1668	3.2	7	1.6	4.2
Gisborne	671	1.3	9	2.0	13.2
Taranaki Base	1181	2.2	12	2.7	10.1
Hastings	1955	3.7	30	6.8	15.1
Palmerston North	1737	3.3	10	2.3	5.7
Wanganui	736	1.4	3	0.7	4.1
Hutt	1954	3.7	11	2.5	5.6
Masterton	506	1.0	2	0.5	3.9
Wairau	458	0.9	3	0.7	6.5
Nelson	855	1.6	9	2.0	10.4
Grey	299	0.6	2	0.5	6.6
Timaru	623	1.2	4	0.9	6.4
Southland	1106	2.1	2	0.5	1.8
<b>Secondary total</b>	<b>22,326</b>	<b>42.3</b>	<b>173</b>	<b>39.4</b>	<b>7.7</b>
Kaitia	302	0.6	1	0.2	3.3
Ashburton	158	0.3	0	0.0	0.0
St George's	727	1.4	0	0.0	0.0
<b>Primary plus total</b>	<b>1187</b>	<b>2.2</b>	<b>1</b>	<b>0.2</b>	<b>0.8</b>
Dargaville	109	0.2	0	0.0	0.0
Bay of Islands	233	0.4	0	0.0	0.0
Warkworth	63	0.1	0	0.0	0.0

Facility	Live births		Still births		
	Number	Percent	Number	Percent	Rate per 1000
Pukekohe	547	1.0	0	0.0	0.0
Papakura Obstetric	892	1.7	1	0.2	1.1
Botany Downs Maternity	984	1.9	0	0.0	0.0
Taumarunui	89	0.2	0	0.0	0.0
Thames	131	0.2	0	0.0	0.0
Te Kuiti	94	0.2	0	0.0	0.0
Tokoroa	136	0.3	0	0.0	0.0
Rhoda Read (Morrinsville)	153	0.3	0	0.0	0.0
Matariki (Te Awamutu)	177	0.3	0	0.0	0.0
Taupo General	238	0.5	0	0.0	0.0
Te Puia Springs	46	0.1	0	0.0	0.0
Hawera	87	0.2	0	0.0	0.0
Wairoa	94	0.2	0	0.0	0.0
Chatham Islands	5	0.0	0	0.0	0.0
Waipukurau	49	0.1	0	0.0	0.0
Horowhenua	179	0.3	0	0.0	0.0
Feilding Maternity	122	0.2	0	0.0	0.0
Taihape	29	0.1	0	0.0	0.0
Waimarino Rural Health Centre	18	0.0	0	0.0	0.0
Marion	10	0.0	0	0.0	0.0
Kenepuru	351	0.7	0	0.0	0.0
Paraparaumu	104	0.2	0	0.0	0.0
Motueka Maternity	71	0.1	0	0.0	0.0
Golden Bay Community Hospital	27	0.1	0	0.0	0.0
Buller	16	0.0	0	0.0	0.0
Burwood	221	0.4	1	0.2	4.5
Kaikoura	13	0.0	0	0.0	0.0
Waikari	2	0.0	0	0.0	0.0
Darfield	4	0.0	0	0.0	0.0
Lincoln	102	0.2	0	0.0	0.0
Rangiora	84	0.2	0	0.0	0.0
Akaroa Community	7	0.0	0	0.0	0.0
Dunstan	33	0.1	0	0.0	0.0
Oamaru	92	0.2	0	0.0	0.0
Gore	24	0.0	0	0.0	0.0
Lakes District (Queenstown)	66	0.1	0	0.0	0.0
Maniototo Health Services Ltd	10	0.0	0	0.0	0.0
Hokianga	41	0.1	0	0.0	0.0
Birthcare Auckland	31	0.1	0	0.0	0.0
Pohlen Trust (Matamata)	139	0.3	0	0.0	0.0
Avonlea (Christchurch)	66	0.1	0	0.0	0.0
Wellsford Birthing Unit	41	0.1	0	0.0	0.0
Helensville Birthing Unit	10	0.0	0	0.0	0.0
Winton Birthing Centre	25	0.0	0	0.0	0.0
Tuatapere Maternity Hospital	14	0.0	0	0.0	0.0
Birthcare Huntly	163	0.3	0	0.0	0.0
Northern Southland Birthing Centre	13	0.0	0	0.0	0.0
Dannevirke Community Hospital	69	0.1	1	0.2	14.3
Charlotte Jean Maternity Unit (Alexandra)	16	0.0	0	0.0	0.0
Elizabeth R Hospital and Rest Home	39	0.1	0	0.0	0.0
Waihi Hospital	40	0.1	0	0.0	0.0
Primary total	6419	12	3	1	0.5
Other facilities	70	0	1	0	14.1
Total	52,834	100	440	100	8.2

Data source: NMDS

Forty-three percent (22832/52834) of live births in 1999 occurred in one of the six large tertiary units. The largest maternity unit is National Women's Hospital, where almost twice the number of women gave birth than in any other unit. Just over 40% of live births

occurred in the 18 secondary maternity units, with numbers ranging from 500 to 2700 mothers. Sixty percent (262/440) of stillbirths occurred in the larger tertiary units. Of the tertiary units, National Women's, Dunedin and Christchurch Women's had lower rates of stillbirths. Wellington, Whangarei and Hastings have the highest rate of stillbirths, which are above national average. These stillbirths data require further exploration. The rate of stillbirths in the secondary units may in part reflect their distance from a tertiary hospital.

**Table 6.2:** Mothers, by ethnicity and facility, 1999

Facility	Number					Percent				
	Māori	Pacific peoples	Asian	European/ Other	Total	Māori	Pacific peoples	Asian	European/ Other	Total
Greenlane/National Women's	603	1347	1315	4135	7400	8.1	18.2	17.8	55.9	100
Middlemore	976	1788	299	737	3800	25.7	47.1	7.9	19.4	100
Waikato	674	97	111	1962	2844	23.7	3.4	3.9	69.0	100
Wellington	300	314	231	2350	3195	9.4	9.8	7.2	73.6	100
Christchurch Women's	196	121	181	3172	3670	5.3	3.3	4.9	86.4	100
Dunedin	79	42	35	1504	1660	4.8	2.5	2.1	90.6	100
Tertiary total	2828	3709	2172	13,860	22,569	12.5	16.4	9.6	61.4	100
Whangarei	518	17	18	692	1245	41.6	1.4	1.4	55.6	100
North Shore	211	136	235	2088	2670	7.9	5.1	8.8	78.2	100
Waitakere	351	423	151	1462	2387	14.7	17.7	6.3	61.2	100
Rotorua	682	39	18	736	1475	46.2	2.6	1.2	49.9	100
Whakatane (including Opotiki and Murupara)	409	3	2	349	763	53.6	0.4	0.3	45.7	100
Tauranga	410	31	50	1167	1658	24.7	1.9	3.0	70.4	100
Gisborne	351	17	5	295	668	52.5	2.5	0.7	44.2	100
Taranaki Base	183	7	12	977	1179	15.5	0.6	1.0	82.9	100
Hastings	651	110	43	1155	1959	33.2	5.6	2.2	59.0	100
Palmerston North	238	44	60	1373	1715	13.9	2.6	3.5	80.1	100
Wanganui	286	10	5	430	731	39.1	1.4	0.7	58.8	100
Hutt	358	171	101	1314	1944	18.4	8.8	5.2	67.6	100
Masterton	128	15	9	351	503	25.4	3.0	1.8	69.8	100
Wairau	45	9	4	397	455	9.9	2.0	0.9	87.3	100
Nelson	59	14	17	764	854	6.9	1.6	2.0	89.5	100
Grey	25	1	1	270	297	8.4	0.3	0.3	90.9	100
Timaru	34	2	3	574	613	5.5	0.3	0.5	93.6	100
Southland	89	21	10	964	1084	8.2	1.9	0.9	88.9	100
Secondary total	5028	1070	744	15,358	22,200	22.6	4.8	3.4	69.2	100
Kaitiaia	177	7	0	116	300	59.0	2.3	0.0	38.7	100
Ashburton	9	0	3	146	158	5.7	0.0	1.9	92.4	100
St George's	33	13	21	656	723	4.6	1.8	2.9	90.7	100
Primary plus total	219	20	24	918	1181	18.5	1.7	2.0	77.7	100
Dargaville	33	1	1	74	109	30.3	0.9	0.9	67.9	100
Bay of Islands	151	7	1	74	233	64.8	3.0	0.4	31.8	100
Warkworth	8	2	2	51	63	12.7	3.2	3.2	81.0	100
Pukekohe	143	20	21	358	542	26.4	3.7	3.9	66.1	100
Papakura Obstetric	307	86	31	464	888	34.6	9.7	3.5	52.3	100
Botany Downs Maternity	165	192	78	545	980	16.8	19.6	8.0	55.6	100
Taumarunui	53	0	0	36	89	59.6	0.0	0.0	40.4	100
Thames	39	0	1	91	131	29.8	0.0	0.8	69.5	100
Te Kuiti	42	0	0	52	94	44.7	0.0	0.0	55.3	100
Tokoroa	71	15	2	48	136	52.2	11.0	1.5	35.3	100
Rhoda Read (Morrinsville)	18	0	4	131	153	11.8	0.0	2.6	85.6	100
Matariki (Te Awamutu)	48	0	0	129	177	27.1	0.0	0.0	72.9	100
Taupo General	102	5	1	130	238	42.9	2.1	0.4	54.6	100
Te Puia Springs	41	0	0	5	46	89.1	0.0	0.0	10.9	100

Facility	Number					Percent				
	Māori	Pacific peoples	Asian	European/ Other	Total	Māori	Pacific peoples	Asian	European/ Other	Total
Hawera	20	0	0	67	87	23.0	0.0	0.0	77.0	100
Wairoa	72	0	0	21	93	77.4	0.0	0.0	22.6	100
Chatham Islands	2	0	0	3	5	40.0	0.0	0.0	60.0	100
Waipukurau	12	2	0	35	49	24.5	4.1	0.0	71.4	100
Horowhenua	43	18	6	112	179	24.0	10.1	3.4	62.6	100
Feilding Maternity	20	2	0	100	122	16.4	1.6	0.0	82.0	100
Taihape	13	0	0	16	29	44.8	0.0	0.0	55.2	100
Waimarino Rural Health Centre	15	0	0	3	18	83.3	0.0	0.0	16.7	100
Marton	9	0	0	1	10	90.0	0.0	0.0	10.0	100
Kenepuru	93	119	11	128	351	26.5	33.9	3.1	36.5	100
Paraparaumu	13	3	4	84	104	12.5	2.9	3.8	80.8	100
Motueka Maternity	9	0	1	61	71	12.7	0.0	1.4	85.9	100
Golden Bay Community Hospital	1	0	0	26	27	3.7	0.0	0.0	96.3	100
Buller	0	1	0	15	16	0.0	6.3	0.0	93.8	100
Burwood	40	2	2	178	222	18.0	0.9	0.9	80.2	100
Kaikoura	1	0	0	12	13	7.7	0.0	0.0	92.3	100
Waikari	0	0	0	2	2	0.0	0.0	0.0	100.0	100
Darfield	0	0	0	4	4	0.0	0.0	0.0	100.0	100
Lincoln	19	3	2	78	102	18.6	2.9	2.0	76.5	100
Rangiora	4	1	0	79	84	4.8	1.2	0.0	94.0	100
Akaroa Community	0	0	0	7	7	0.0	0.0	0.0	100.0	100
Dunstan	2	0	0	31	33	6.1	0.0	0.0	93.9	100
Oamaru	3	0	1	88	92	3.3	0.0	1.1	95.7	100
Gore	3	0	0	21	24	12.5	0.0	0.0	87.5	100
Lakes District (Queenstown)	3	0	3	60	66	4.5	0.0	4.5	90.9	100
Maniototo Health Services Ltd	2	0	0	8	10	20.0	0.0	0.0	80.0	100
Hokianga	35	0	0	6	41	85.4	0.0	0.0	14.6	100
Birthcare Auckland	0	1	0	30	31	0.0	3.2	0.0	96.8	100
Pohlen Trust (Matamata)	43	1	1	94	139	30.9	0.7	0.7	67.6	100
Avonlea (Christchurch)	5	3	0	58	66	7.6	4.5	0.0	87.9	100
Wellsford Birthing Unit	14	0	0	27	41	34.1	0.0	0.0	65.9	100
Helensville Birthing Unit	5	0	0	5	10	50.0	0.0	0.0	50.0	100
Winton Birthing Centre	1	0	0	24	25	4.0	0.0	0.0	96.0	100
Tuatapere Maternity Hospital	2	0	0	12	14	14.3	0.0	0.0	85.7	100
Birthcare Huntly	107	1	3	52	163	65.6	0.6	1.8	31.9	100
Northern Southland Birthing Centre	1	1	0	11	13	7.7	7.7	0.0	84.6	100
Dannevirke Community Hospital	24	2	2	42	70	34.3	2.9	2.9	60.0	100
Charlotte Jean Maternity Unit (Alexandra)	0	0	0	16	16	0.0	0.0	0.0	100.0	100
Elizabeth R Hospital and Rest Home	11	0	0	28	39	28.2	0.0	0.0	71.8	100
Waihi Hospital	8	0	0	32	40	20.0	0.0	0.0	80.0	100
Primary total	1876	488	178	3865	6,407	29.3	7.6	2.8	60.3	100
Other facilities	17	0	1	53	71	23.9	0.0	1.4	74.6	100
Total	9968	5287	3119	34,054	52,428	19.0	10.1	5.9	65.0	100

Data source: NMDS

There are striking ethnic differences between hospitals. At Middlemore almost 50% of women are of Pacific origin while most South Island units have under 5% Pacific women. On the other hand, the ethnic distribution of women in Whakatane and Gisborne is predominantly Māori (greater than 50%).

**Table 6.3:** Mothers (percent), by rural/urban status, NZDep level (quintiles) and facility, 1999

Facility	NZ Deprivation level									
	Least deprived		Quintile 2		Quintile 3		Quintile 4		Most deprived	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Greenlane/National Women's	0.5	19.9	0.7	20.1	0.5	19.3	0.3	19.2	0.9	19
Middlemore	0.5	4.1	0.3	2.3	0.3	6.2	0.6	22.9	0.2	63
Waikato	1.7	14.8	5.6	6.7	7.2	18.1	4.3	10.1	8.2	23
Wellington	0.6	42.2	0.2	13.5	0.5	13.5	0.6	9.4	0.8	19
Christchurch Women's	4.3	15.6	5.0	20.1	3.9	14.6	0.8	20.8	0.0	15
Dunedin	3.2	14.8	9.7	8.9	6.6	22.1	3.5	25.4	0.6	5
Tertiary total	1.5	18.7	2.5	13.6	2.3	15.6	1.2	18.0	1.5	25
Whangarei	0.0	1.7	6.7	6.3	8.0	8.3	10.5	22.7	17.2	19
North Shore	1.0	40.1	2.3	35.0	1.6	14.3	1.1	3.8	0.1	1
Waitakere	1.2	16.9	2.7	9.7	0.6	34.2	1.1	26.7	0.1	7
Rotorua	2.4	8.2	3.3	7.1	1.6	7.6	2.2	9.2	8.1	50
Whakatane (including Opotiki and Murupara)	0.0	0.4	0.1	20.8	6.6	3.8	6.8	3.5	53.1	5
Tauranga	1.3	3.2	10.3	7.8	3.1	29.0	10.7	27.1	2.7	5
Gisborne	0.0	3.1	0.1	7.5	6.7	2.7	4.8	8.8	11.1	55
Taranaki Base	4.2	6.1	8.1	2.3	9.0	26.1	8.8	17.6	11.3	6
Hastings	0.0	5.9	1.5	8.7	2.7	17.2	3.1	15.9	3.6	41
Palmerston North	1.2	5.8	6.2	17.1	7.2	19.0	4.6	15.2	7.5	16
Wanganui	0.0	11.9	6.0	5.2	3.8	3.0	8.5	23.4	5.3	33
Hutt	6.1	19.7	0.4	14.4	0.1	15.9	0.2	21.5	0.3	21
Masterton	3.4	1.2	14.5	0.6	5.4	15.1	14.7	19.5	8.0	18
Wairau	0.0	5.5	6.8	20.9	8.1	30.8	6.6	12.7	0.0	9
Nelson	5.3	16.4	7.8	25.2	3.7	7.6	7.5	22.1	0.2	4
Grey	0.0	10.1	7.7	0.0	9.1	9.4	37.4	4.7	5.7	16
Timaru	6.4	3.8	14.4	9.8	15.2	15.3	7.3	27.7	0.0	0
Southland	10.6	9.0	9.9	14.9	5.8	14.2	1.5	22.4	3.5	8
Secondary total	2.3	12.5	5.0	13.7	4.1	17.1	5.1	17.3	6.0	17
Kaitiāia	0.0	0.3	0.3	0.7	0.0	0.7	5.0	0.7	91.3	1
Ashburton	15.8	12.0	5.1	30.4	0.0	29.7	0.0	7.0	0.0	0
St George's	5.1	19.1	4.6	24.3	3.6	14.2	0.7	18.7	0.1	10
Primary plus total	5.2	13.4	3.6	19.1	2.2	12.9	1.7	12.5	23.3	6
Dargaville	0.0	0.9	10.1	0.0	1.8	0.0	35.8	0.0	50.5	1
Bay of Islands	0.0	0.0	0.4	0.4	18.5	0.9	10.3	1.3	67.8	0
Warkworth	0.0	6.3	44.4	19.0	19.0	4.8	6.3	0.0	0.0	0
Pukekohe	7.7	1.5	11.8	11.1	4.2	26.9	12.0	0.7	0.7	23
Papakura Obstetric	3.2	7.5	1.1	3.3	0.2	12.3	0.3	18.1	0.1	54
Botany Downs Maternity	0.4	20.1	0.3	22.0	0.2	9.6	0.0	19.7	0.0	28
Taumarunui	3.4	0.0	0.0	0.0	9.0	0.0	3.4	1.1	82.0	1
Thames	0.8	0.0	2.3	1.5	20.6	0.8	44.3	0.0	28.2	2
Te Kuiti	0.0	0.0	1.1	0.0	24.5	0.0	14.9	0.0	58.5	1
Tokoroa	0.0	0.7	5.9	0.0	4.4	5.1	0.7	0.0	8.1	75
Rhoda Read (Morrisville)	0.7	1.3	41.8	0.0	39.9	1.3	5.9	0.7	5.9	3
Matariki (Te Awamutu)	2.3	9.0	6.8	0.6	13.6	45.8	1.1	10.2	7.3	3
Taupo General	0.0	10.5	4.6	8.4	7.6	13.4	5.0	35.3	11.8	3
Te Puia Springs	0.0	2.2	0.0	0.0	2.2	6.5	2.2	0.0	80.4	7
Hawera	0.0	0.0	11.5	2.3	19.5	4.6	5.7	43.7	11.5	1
Wairoa	0.0	0.0	0.0	1.1	0.0	0.0	3.2	0.0	95.7	0
Chatham Islands	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0
Waipukurau	0.0	0.0	8.2	2.0	20.4	0.0	61.2	2.0	2.0	4
Horowhenua	1.1	0.6	3.9	2.2	6.1	16.8	0.0	14.0	20.1	35
Feilding Maternity	0.0	4.9	13.1	12.3	8.2	25.4	4.9	30.3	0.0	1
Taihape	0.0	0.0	17.2	0.0	34.5	0.0	41.4	0.0	6.9	0
Waimarino Rural Health Centre	0.0	0.0	0.0	0.0	16.7	0.0	44.4	5.6	33.3	0
Marton	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0

Facility	NZ Deprivation level									
	Least deprived		Quintile 2		Quintile 3		Quintile 4		Most deprived	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Kenepuru	0.6	16.5	0.0	1.7	0.3	6.3	0.0	6.6	0.3	68
Paraparaumu	1.9	14.4	0.0	32.7	0.0	21.2	0.0	26.9	1.9	1
Motueka Maternity	1.4	1.4	5.6	2.8	19.7	2.8	63.4	1.4	0.0	1
Golden Bay Community Hospital	0.0	0.0	0.0	0.0	22.2	0.0	74.1	0.0	0.0	4
Buller	0.0	0.0	0.0	0.0	25.0	0.0	68.8	0.0	6.3	0
Burwood	0.0	7.7	0.0	23.4	0.9	14.4	0.9	29.3	0.0	23
Kaikoura	0.0	0.0	0.0	0.0	92.3	7.7	0.0	0.0	0.0	0
Waikari	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Darfield	0.0	25.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Lincoln	17.6	10.8	20.6	8.8	3.9	10.8	0.0	22.5	1.0	4
Rangiora	9.5	2.4	33.3	7.1	32.1	9.5	0.0	6.0	0.0	0
Akaroa Community	0.0	0.0	28.6	0.0	14.3	28.6	0.0	28.6	0.0	0
Dunstan	15.2	0.0	51.5	0.0	30.3	0.0	0.0	0.0	0.0	3
Oamaru	0.0	5.4	21.7	8.7	0.0	18.5	3.3	42.4	0.0	0
Gore	12.5	0.0	25.0	12.5	4.2	16.7	0.0	29.2	0.0	0
Lakes District (Queenstown)	19.7	0.0	72.7	0.0	6.1	1.5	0.0	0.0	0.0	0
Maniototo Health Services Ltd	20.0	0.0	20.0	0.0	10.0	0.0	50.0	0.0	0.0	0
Hokianga	0.0	0.0	0.0	4.9	2.4	0.0	0.0	0.0	90.2	2
Birthcare Auckland	0.0	3.2	0.0	19.4	0.0	58.1	0.0	9.7	3.2	6
Pohlen Trust (Matamata)	2.9	2.9	23.0	0.0	48.9	0.7	0.7	0.7	16.5	4
Avonlea (Christchurch)	1.5	6.1	4.5	15.2	1.5	16.7	1.5	25.8	0.0	27
Wellsford Birthing Unit	0.0	0.0	29.3	7.3	2.4	0.0	53.7	0.0	2.4	5
Helensville Birthing Unit	30.0	0.0	20.0	10.0	0.0	0.0	30.0	10.0	0.0	0
Winton Birthing Centre	40.0	0.0	8.0	4.0	48.0	0.0	0.0	0.0	0.0	0
Tuatapere Maternity Hospital	7.1	0.0	0.0	0.0	35.7	7.1	0.0	0.0	50.0	0
Birthcare Huntly	0.0	2.5	8.0	1.8	6.7	19.6	1.2	0.6	36.8	23
Northern Southland Birthing Centre	69.2	0.0	23.1	0.0	0.0	7.7	0.0	0.0	0.0	0
Dannevirke Community Hospital	0.0	0.0	28.6	0.0	4.3	1.4	17.1	1.4	47.1	0
Charlotte Jean Maternity Unit (Alexandra)	6.3	0.0	93.8	0.0	0.0	0.0	0.0	0.0	0.0	0
Elizabeth R Hospital and Rest Home	2.6	0.0	30.8	0.0	2.6	0.0	59.0	0.0	5.1	0
Waihi Hospital	0.0	0.0	2.5	0.0	22.5	2.5	27.5	2.5	42.5	0
<b>Primary total</b>	<b>2.6</b>	<b>7.1</b>	<b>8.2</b>	<b>8.0</b>	<b>8.1</b>	<b>11.4</b>	<b>7.3</b>	<b>12.3</b>	<b>12.7</b>	<b>22</b>
Other facilities	4.2	1.4	23.9	21.1	25.4	5.6	4.2	14.1	0.0	0
<b>Total</b>	<b>2.1</b>	<b>14.5</b>	<b>4.3</b>	<b>13.1</b>	<b>3.8</b>	<b>15.6</b>	<b>3.6</b>	<b>16.9</b>	<b>5.3</b>	<b>21</b>

Data source: NMDS

**Table 6.4:** Total antenatal hospital admissions and average length of stay (days), by facility, 1999

Facility	Number of admissions	Admission rate per 100 mothers	Average length of stay
Greenlane/National Women's	1534	20.7	1.2
Middlemore	862	22.7	1.5
Waikato	766	26.9	3.0
Wellington	447	14.0	2.5
Christchurch Women's	652	17.8	1.7
Dunedin	256	15.4	1.9
<b>Tertiary total</b>	<b>4517</b>	<b>20.0</b>	<b>1.8</b>
Whangarei	269	21.6	1.6
North Shore	334	12.5	1.1
Waitakere	268	11.2	1.3
Rotorua	220	14.9	1.8
Whakatane (including Opotiki and Murupara)	128	16.8	1.5
Tauranga	183	11.0	1.2



Facility	Number of admissions	Admission rate per 100 mothers	Average length of stay
Gisborne	135	20.2	1.3
Taranaki Base	233	19.8	1.4
Hastings	319	16.3	1.8
Palmerston North	278	16.2	1.4
Wanganui	142	19.4	1.9
Hutt	289	14.9	1.1
Masterton	100	19.9	1.5
Wairau	55	12.1	1.2
Nelson	59	6.9	1.0
Grey	72	24.2	1.6
Timaru	161	26.3	1.5
Southland	282	26.0	1.6
Secondary total	3527	15.9	1.4
Kaitiaia	54	18.0	1.3
Ashburton	23	14.6	0.6
St George's	59	8.2	1.1
Primary plus total	136	11.5	1.1
Dargaville	11	10.1	3.1
Bay of Islands	33	14.2	1.3
Warkworth	2	3.2	0.5
Pukekohe	39	7.2	1.1
Papakura Obstetric	151	17.0	1.1
Botany Downs Maternity	157	16.0	1.3
Taumarunui	7	7.9	0.3
Thames	17	13.0	1.1
Te Kuiti	8	8.5	1.9
Tokoroa	17	12.5	1.1
Rhoda Read (Morrinsville)	16	10.5	1.9
Matariki (Te Awamutu)	19	10.7	1.3
Taupo General	21	8.8	1.6
Te Puia Springs	10	21.7	1.0
Hawera	8	9.2	0.9
Wairoa	22	23.7	0.3
Chatham Islands	0	0.0	-
Waipukurau	4	8.2	0.8
Horowhenua	18	10.1	1.9
Feilding Maternity	9	7.4	0.7
Taihape	4	13.8	2.5
Waimarino Rural Health Centre	7	38.9	0.6
Marton	2	20.0	1.5
Kenepuru	22	6.3	1.3
Paraparaumu	3	2.9	0.7
Motueka Maternity	4	5.6	1.3
Golden Bay Community Hospital	1	3.7	1.0
Buller	1	6.3	1.0
Burwood	21	9.5	0.8
Kaikoura	0	0.0	-
Lincoln	13	12.7	0.6
Rangiora	8	9.5	1.1
Akaroa Community	1	14.3	0.0
Dunstan	1	3.0	3.0
Oamaru	10	10.9	0.5
Gore	5	20.8	0.4
Lakes District (Queenstown)	5	7.6	0.6
Maniototo Health Services Ltd	2	20.0	1.0
Hokianga	7	17.1	1.3
Birthcare Auckland	2	6.5	3.0
Pohlen Trust (Matamata)	12	8.6	1.2
Avonlea (Christchurch)	5	7.6	1.0

Facility	Number of admissions	Admission rate per 100 mothers	Average length of stay
Wellsford Birthing Unit	2	4.9	0.0
Helensville Birthing Unit	2	20.0	1.0
Winton Birthing Centre	3	12.0	1.3
Tuatapere Maternity Hospital	1	7.1	1.0
Birthcare Huntly	6	3.7	0.7
Dannevirke Community Hospital	9	12.9	0.2
Charlotte Jean Maternity Unit (Alexandra)	1	6.3	2.0
Elizabeth R Hospital and Rest Home	4	10.3	1.5
Waihi Hospital	3	7.5	2.0
Primary total	736	11.5	1.2
Other facilities	10	14.1	0.8
Total	8926	17.0	1.6

Data source: NMDS

The average length of stay is so low because these admissions include day visits.

Seventeen percent of New Zealand women can expect to have an antenatal admission in their pregnancy. This high number is surprising, and may reflect the inclusion of short day-stay admissions. The number of admissions for each hospital varies widely, with a range for the tertiary units from 14% in Wellington to 27% in Waikato. Small rural units such as Helensville, Waimarino, Wairoa and Marton have high rates.

**Table 6.5:** Type of hospital birth (numbers), by facility, 1999

Facility	Hospital delivery type								
	Normal vaginal birth	Total caesarean section	Acute caesarean section	Elective caesarean section	Total operative vaginal birth	Breech delivery	Forceps delivery	Vacuum extraction	Total
Greenlane/National Women's	4617	1888	1320	568	1059	98	520	440	7564
Middlemore	2978	618	446	172	272	43	48	180	3868
Waikato	1723	898	595	303	306	12	68	226	2927
Wellington	1935	957	701	256	380	27	304	49	3272
Christchurch Women's	2055	872	608	264	838	53	352	433	3765
Dunedin	1007	438	274	164	252	19	118	115	1697
Tertiary total	14,315	5671	3944	1727	3107	252	1410	1443	23,093
Whangarei	894	264	160	104	113	14	29	70	1271
North Shore	1733	698	422	276	272	14	127	131	2703
Waitakere	1797	418	283	135	183	4	55	124	2398
Rotorua	1059	265	174	91	176	15	137	24	1500
Whakatane (including Opotiki and Murupara)	621	106	67	39	47	5	5	37	774
Tauranga	1108	307	183	124	260	27	149	84	1675
Gisborne	518	107	59	48	55	2	4	49	680
Taranaki Base	878	230	173	57	85	6	28	38	1193
Hastings	1409	346	228	118	230	24	128	78	1985
Palmerston North	1082	446	294	152	219	19	76	124	1747
Wanganui	513	152	102	50	74	5	49	20	739
Hutt	1309	397	257	140	259	9	183	64	1965
Masterton	327	69	36	33	112	9	74	27	508
Wairau	326	87	66	21	48	2	28	18	461
Nelson	590	160	95	65	114	15	89	10	864
Grey	232	59	33	26	10	4	2	4	301
Timaru	442	120	83	37	65	13	36	16	627
Southland	743	294	190	104	71	6	63	2	1108
Secondary total	15,581	4525	2905	1620	2393	193	1262	920	22,499

Facility	Hospital delivery type								
	Normal vaginal birth	Total caesarean section	Acute caesarean section	Elective caesarean section	Total operative vaginal birth	Breech delivery	Forceps delivery	Vacuum extraction	Total
Kaitaia	233	45	28	17	25	1	7	17	303
Ashburton	122	8	3	5	28	0	10	18	158
St George's	381	333	0	333	13	0	13	0	727
Primary plus total	736	386	31	355	66	1	30	35	1188
Dargaville	108	0	0	0	1	0	0	0	109
Bay of Islands	232	0	0	0	1	0	0	1	233
Warkworth	63	0	0	0	0	0	0	0	63
Pukekohe *	437	70	51	19	40	1	12	27	547
Papakura Obstetric *	729	88	60	28	76	6	17	53	893
Botany Downs Maternity *	785	96	67	29	103	8	24	71	984
Taumarunui	86	0	0	0	3	0	3	0	89
Thames	128	0	0	0	3	3	0	0	131
Te Kuiti	94	0	0	0	0	0	0	0	94
Tokoroa	136	0	0	0	0	0	0	0	136
Rhoda Read (Morrinsville)	153	0	0	0	0	0	0	0	153
Matariki (Te Awamutu)	177	0	0	0	0	0	0	0	177
Taupo General	237	0	0	0	1	0	1	0	238
Te Puia Springs	45	0	0	0	1	0	0	1	46
Hawera	86	0	0	0	1	0	1	0	87
Wairoa	91	0	0	0	3	0	0	3	94
Chatham Islands	5	0	0	0	0	0	0	0	5
Waipukurau	47	0	0	0	2	1	1	0	49
Horowhenua	178	0	0	0	1	0	1	0	179
Feilding Maternity	118	0	0	0	4	0	4	0	122
Taihape	29	0	0	0	0	0	0	0	29
Waimarino Rural Health Centre	18	0	0	0	0	0	0	0	18
Marion	10	0	0	0	0	0	0	0	10
Kenepuru *	342	5	5	0	4	0	3	1	351
Paraparaumu *	101	1	1	0	2	0	2	0	104
Motueka Maternity	71	0	0	0	0	0	0	0	71
Golden Bay Community Hospital	26	0	0	0	1	1	0	0	27
Buller	15	0	0	0	1	0	0	1	16
Burwood	218	0	0	0	4	0	4	0	222
Kaikoura	13	0	0	0	0	0	0	0	13
Waikari	2	0	0	0	0	0	0	0	2
Darfield	4	0	0	0	0	0	0	0	4
Lincoln	102	0	0	0	0	0	0	0	102
Rangiora	84	0	0	0	0	0	0	0	84
Akaroa Community	7	0	0	0	0	0	0	0	7
Dunstan	30	0	0	0	3	2	1	0	33
Oamaru	91	0	0	0	1	0	0	1	92
Gore	21	0	0	0	3	0	3	0	24
Lakes District (Queenstown)	55	0	0	0	11	0	11	0	66
Maniototo Health Services Ltd	10	0	0	0	0	0	0	0	10
Hokianga	41	0	0	0	0	0	0	0	41
Birthcare Auckland	31	0	0	0	0	0	0	0	31
Pohlen Trust (Matamata)	132	0	0	0	7	0	7	0	139
Avonlea (Christchurch)	66	0	0	0	0	0	0	0	66
Wellsford Birthing Unit	41	0	0	0	0	0	0	0	41
Helensville Birthing Unit	10	0	0	0	0	0	0	0	10
Winton Birthing Centre	24	0	0	0	1	0	1	0	25
Tuatapere Maternity Hospital	14	0	0	0	0	0	0	0	14
Birthcare Huntly	163	0	0	0	0	0	0	0	163

Facility	Hospital delivery type								
	Normal vaginal birth	Total caesarean section	Acute caesarean section	Elective caesarean section	Total operative vaginal birth	Breech delivery	Forceps delivery	Vacuum extraction	Total
Northern Southland Birthing Centre	13	0	0	0	0	0	0	0	13
Dannevirke Community Hospital	69	0	0	0	1	0	1	0	70
Charlotte Jean Maternity Unit (Alexandra)	15	0	0	0	1	0	0	1	16
Elizabeth R Hospital and Rest Home	39	0	0	0	0	0	0	0	39
Waihi Hospital	40	0	0	0	0	0	0	0	40
Primary total	5882	260	184	76	280	22	97	160	6422
Other facilities	68	0	0	0	3	0	2	1	71
Total	36,582	10,842	7064	3778	5849	468	2801	2559	53,273

Data source: NMDS

\* These facilities do not perform caesarean sections, but this is where the woman was discharged from. Note that women discharged from Pukekohe, Papakura Obstetric and Botany Downs Maternity are likely to have had their caesarean section at Middlemore Hospital.

**Table 6.6:** Type of hospital delivery (percent), by facility, 1999

Facility	Hospital delivery type								
	Normal vaginal birth	Total caesarean section	Acute caesarean section	Elective caesarean section	Total operative vaginal birth	Breech delivery	Forceps delivery	Vacuum extraction	Total
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Greenlane/National Women's	61.0	25.0	17.5	7.5	14.0	1.3	6.9	5.8	100
Middlemore	77.0	16.0	11.5	4.4	7.0	1.1	1.2	4.7	100
Waikato	58.9	30.7	20.3	10.4	10.5	0.4	2.3	7.7	100
Wellington	59.1	29.2	21.4	7.8	11.6	0.8	9.3	1.5	100
Christchurch Women's	54.6	23.2	16.1	7.0	22.3	1.4	9.3	11.5	100
Dunedin	59.3	25.8	16.1	9.7	14.8	1.1	7.0	6.8	100
Tertiary total	62.0	24.6	17.1	7.5	13.5	1.1	6.1	6.2	100
Whangarei	70.3	20.8	12.6	8.2	8.9	1.1	2.3	5.5	100
North Shore	64.1	25.8	15.6	10.2	10.1	0.5	4.7	4.8	100
Waitakere	74.9	17.4	11.8	5.6	7.6	0.2	2.3	5.2	100
Rotorua	70.6	17.7	11.6	6.1	11.7	1.0	9.1	1.6	100
Whakatane (including Opotiki and Murupara)	80.2	13.7	8.7	5.0	6.1	0.6	0.6	4.8	100
Tauranga	66.1	18.3	10.9	7.4	15.5	1.6	8.9	5.0	100
Gisborne	76.2	15.7	8.7	7.1	8.1	0.3	0.6	7.2	100
Taranaki Base	73.6	19.3	14.5	4.8	7.1	0.5	2.3	3.2	100
Hastings	71.0	17.4	11.5	5.9	11.6	1.2	6.4	3.9	100
Palmerston North	61.9	25.5	16.8	8.7	12.5	1.1	4.4	7.1	100
Wanganui	69.4	20.6	13.8	6.8	10.0	0.7	6.6	2.7	100
Hutt	66.6	20.2	13.1	7.1	13.2	0.5	9.3	3.3	100
Masterton	64.4	13.6	7.1	6.5	22.0	1.8	14.6	5.3	100
Wairau	70.7	18.9	14.3	4.6	10.4	0.4	6.1	3.9	100
Nelson	68.3	18.5	11.0	7.5	13.2	1.7	10.3	1.2	100
Grey	77.1	19.6	11.0	8.6	3.3	1.3	0.7	1.3	100
Timaru	70.5	19.1	13.2	5.9	10.4	2.1	5.7	2.6	100
Southland	67.1	26.5	17.1	9.4	6.4	0.5	5.7	0.2	100
Secondary total	69.3	20.1	12.9	7.2	10.6	0.9	5.6	4.1	100
Kaitiaki	76.9	14.9	9.2	5.6	8.3	0.3	2.3	5.6	100
Ashburton	77.2	5.1	1.9	3.2	17.7	0.0	6.3	11.4	100
St George's	52.4	45.8	0.0	45.8	1.8	0.0	1.8	0.0	100

Facility	Hospital delivery type								
	Normal vaginal birth	Total caesarean section	Acute caesarean section	Elective caesarean section	Total operative vaginal birth	Breech delivery	Forceps delivery	Vacuum extraction	Total
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Primary plus total	62.0	32.5	2.6	29.9	5.6	0.1	2.5	2.9	100
Dargaville	99.1	0.0	0.0	0.0	0.9	0.0	0.0	0.0	100
Bay of Islands	99.6	0.0	0.0	0.0	0.4	0.0	0.0	0.4	100
Warkworth	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Pukekohe *	79.9	12.8	9.3	3.5	7.3	0.2	2.2	4.9	100
Papakura Obstetric *	81.6	9.9	6.7	3.1	8.5	0.7	1.9	5.9	100
Botany Downs Maternity *	79.8	9.8	6.8	2.9	10.5	0.8	2.4	7.2	100
Taumarunui	96.6	0.0	0.0	0.0	3.4	0.0	3.4	0.0	100
Thames	97.7	0.0	0.0	0.0	2.3	2.3	0.0	0.0	100
Te Kuiti	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Tokoroa	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Rhoda Read (Morrinsville)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Matariki (Te Awamutu)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Taupo General	99.6	0.0	0.0	0.0	0.4	0.0	0.4	0.0	100
Te Puia Springs	97.8	0.0	0.0	0.0	2.2	0.0	0.0	2.2	100
Hawera	98.9	0.0	0.0	0.0	1.1	0.0	1.1	0.0	100
Wairoa	96.8	0.0	0.0	0.0	3.2	0.0	0.0	3.2	100
Chatham Islands	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Waipukurau	95.9	0.0	0.0	0.0	4.1	2.0	2.0	0.0	100
Horowhenua	99.4	0.0	0.0	0.0	0.6	0.0	0.6	0.0	100
Feilding Maternity	96.7	0.0	0.0	0.0	3.3	0.0	3.3	0.0	100
Taihape	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Waimarino Rural Health Centre	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Marton	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Kenepuru *	97.4	1.4	1.4	0.0	1.1	0.0	0.9	0.3	100
Paraparaumu *	97.1	1.0	1.0	0.0	1.9	0.0	1.9	0.0	100
Motueka Maternity	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Golden Bay Community Hospital	96.3	0.0	0.0	0.0	3.7	3.7	0.0	0.0	100
Buller	93.8	0.0	0.0	0.0	6.3	0.0	0.0	6.3	100
Burwood	98.2	0.0	0.0	0.0	1.8	0.0	1.8	0.0	100
Kaikoura	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Waikari	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Darfield	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Lincoln	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Rangiora	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Akaroa Community	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Dunstan	90.9	0.0	0.0	0.0	9.1	6.1	3.0	0.0	100
Oamaru	98.9	0.0	0.0	0.0	1.1	0.0	0.0	1.1	100
Gore	87.5	0.0	0.0	0.0	12.5	0.0	12.5	0.0	100
Lakes District (Queenstown)	83.3	0.0	0.0	0.0	16.7	0.0	16.7	0.0	100
Maniototo Health Services Ltd	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Hokianga	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Birthcare Auckland	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Pohlen Trust (Matamata)	95.0	0.0	0.0	0.0	5.0	0.0	5.0	0.0	100
Avonlea (Christchurch)	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Wellsford Birthing Unit	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Helensville Birthing Unit	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Winton Birthing Centre	96.0	0.0	0.0	0.0	4.0	0.0	4.0	0.0	100
Tuatapere Maternity Hospital	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Birthcare Huntly	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Northern Southland Birthing Centre	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Dannevirke Community Hospital	98.6	0.0	0.0	0.0	1.4	0.0	1.4	0.0	100

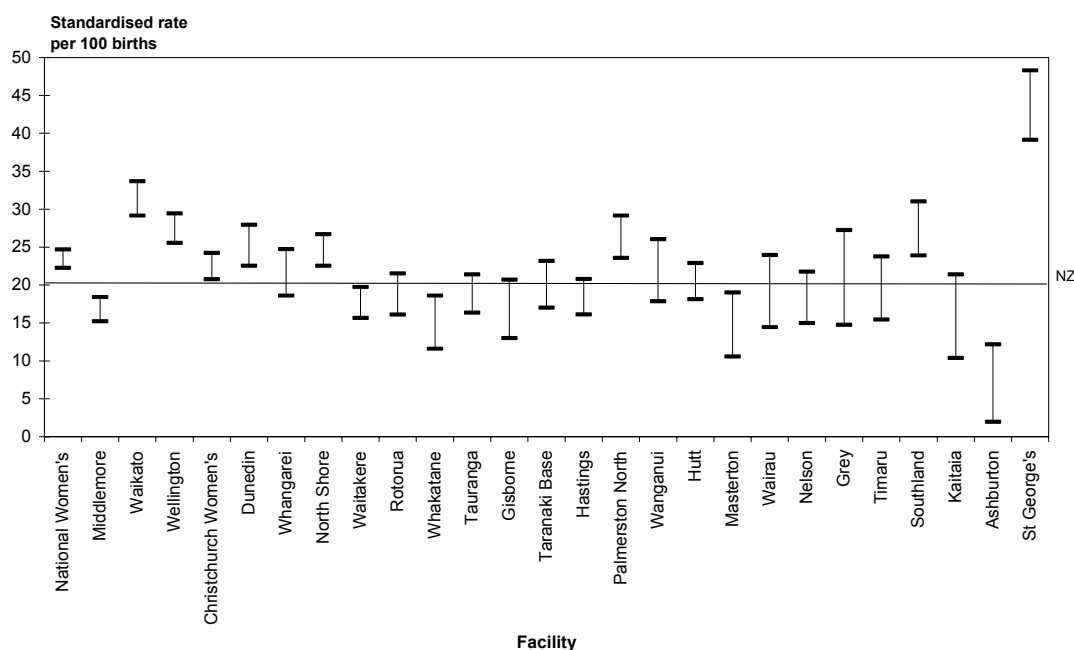
Facility	Hospital delivery type								
	Normal vaginal birth	Total caesarean section	Acute caesarean section	Elective caesarean section	Total operative vaginal birth	Breech delivery	Forceps delivery	Vacuum extraction	Total
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Charlotte Jean Maternity Unit (Alexandra)	93.8	0.0	0.0	0.0	6.3	0.0	0.0	6.3	100
Elizabeth R Hospital and Rest Home	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Waihi Hospital	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
Primary total	91.6	4.0	2.9	1.2	4.4	0.3	1.5	2.5	100
Other facilities	95.8	0.0	0.0	0.0	4.2	0.0	2.8	1.4	100
Total	68.7	20.4	13.3	7.1	11.0	0.9	5.3	4.8	100

Data source: NMDS

\* These facilities do not perform caesarean sections, but this is where the woman was discharged from. Note that women discharged from Pukekohe, Papakura Obstetric and Botany Downs Maternity are likely to have had their caesarean section at Middlemore Hospital.

The mean rate of normal vaginal births is 62% in tertiary units and 69% in secondary units. This is due to both an increase in the rate of caesarean sections and operative vaginal births. Middlemore has for many years had a higher normal vaginal birth rate than other tertiary units and most secondary and primary units.

**Figure 6.1:** Standardised caesarean section rates, by facility, 1999



Data source: NMDS

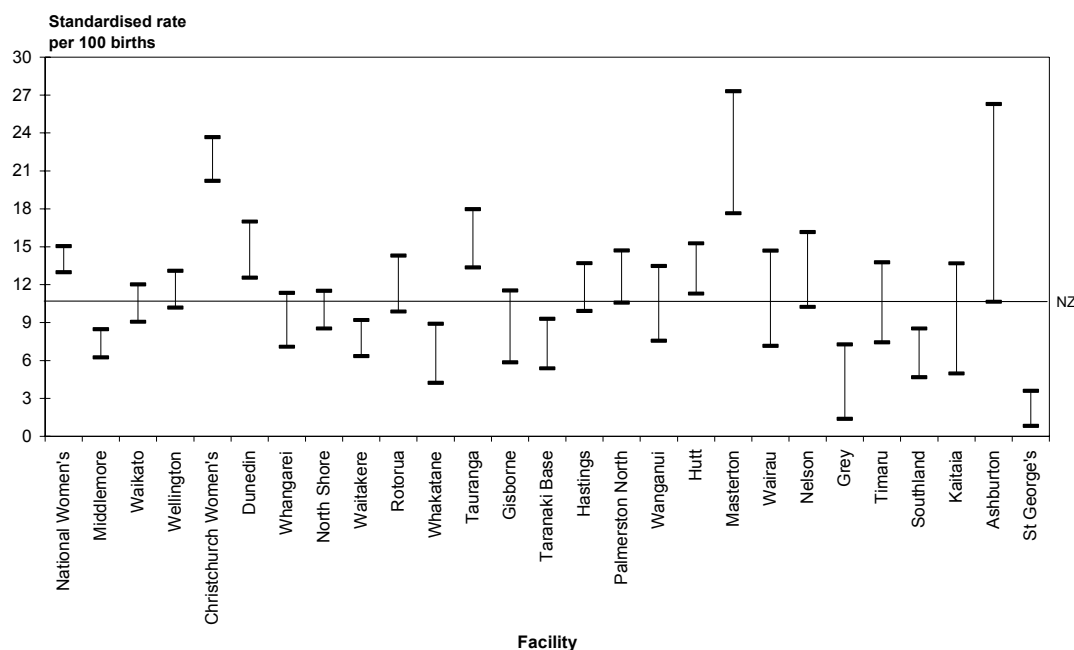
Standardised caesarean section rate is the ratio of observed to expected caesarean section rates multiplied by the national caesarean section rate for all cases. Expected rates are calculated on the numbers of births by age from facility.

Figures 6.1, 6.2 and 6.3 all show the rates in the centre of the upper and lower 99% confidence limits. If the lower confidence limit is completely above the national rate for all New Zealand, this indicates that the standardised rate is significantly greater than the

overall national rate (99% confidence interval). If the upper confidence limit is completely below the national rate for all New Zealand, this indicates that the standardised rate is significantly less than the overall national rate (99% confidence interval). Otherwise the rate is no different from the overall national rate.

Of the six tertiary facilities, National Women's, Waikato, Wellington, Christchurch Women's and Dunedin all had significantly higher caesarean section rates than the national average, while Middlemore was significantly below the national average. Of the secondary facilities, North Shore, Palmerston North, and Southland all had caesarean section rates significantly above the national average, while the caesarean section rate at St George's is the highest in the country.

**Figure 6.2:** Standardised operative vaginal birth rates, by facility, 1999

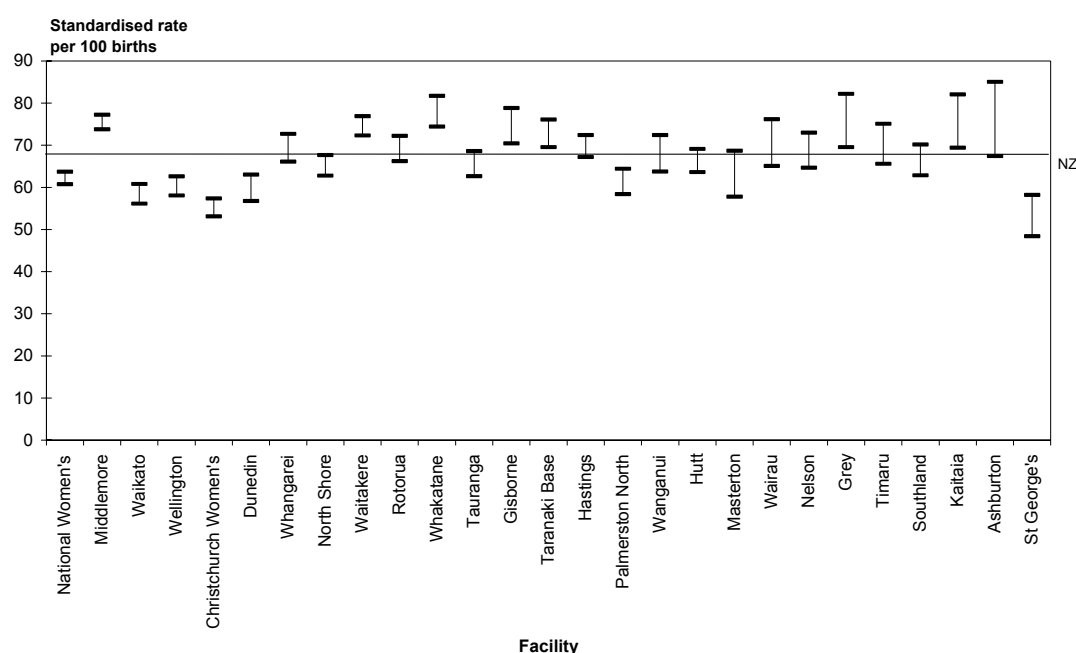


Data source: NMDS

Standardised operative vaginal birth rate is the ratio of observed to expected operative vaginal birth rates multiplied by the national operative vaginal birth rate for all cases. Expected rates are calculated on the numbers of births by age from facility.

Of the tertiary facilities, National Women's, Christchurch Women's and Dunedin all had significantly higher operative vaginal birth rates than the national average, while the rate for Middlemore was significantly below the national average. Of the secondary facilities, Tauranga, Hutt, and Masterton all had operative vaginal birth rates which were significantly higher than the national average.

**Figure 6.3:** Standardised normal vaginal birth rates, by facility, 1999



Data source: NMDS

Standardised normal vaginal birth rate is the ratio of observed to expected normal vaginal birth rates multiplied by the national normal vaginal birth rate for all cases. Expected rates are calculated on the numbers of births by age from facility.

As expected, facilities with low rates for normal vaginal births generally have higher rates of caesarean sections, and (to a lesser extent) operative vaginal births. Given that both Christchurch Women's and St George's have very low rates for normal vaginal births, it is not surprising that only about 60% of total births for women in the Canterbury DHB region are a normal vaginal type of birth, as evidenced in Figure 3.1.

All the above graphs show significant differences in practice between institutions. A major benefit of these data is that they allow individual institutions to examine their own data and to compare these with similar institutions. In a situation of significant discrepancy, institutions should analyse reasons for the difference. Secondary units with a higher rate of caesarean sections (such as North Shore, Palmerston North and Southland) should investigate the reasons for these increases. Waikato is the only unit to have a caesarean section rate of greater than 30%, but Wellington also has a high caesarean section rate. The rates of operative vaginal births in Christchurch and Masterton of one in five births, or double the country's average, also need investigating. The differences in the type of operative vaginal birth between units may reflect the training and experiences of the obstetricians rather than patient differences.

**Table 6.7:** Inductions, epidurals and episiotomies, by facility, 1999

Facility	Number			Rate per 100 babies		
	Inductions	Epidurals	Episiotomies	Inductions	Epidurals	Episiotomies
Greenlane/National Women's	2536	1673	1085	37.1	24.5	19.7
Middlemore	866	572	256	23.9	15.8	8.0
Waikato	934	762	243	36.8	30.0	12.5



Facility	Number			Rate per 100 babies		
	Inductions	Epidurals	Episiotomies	Inductions	Epidurals	Episiotomies
Wellington	934	1476	569	31.8	50.2	25.4
Christchurch Women's	1188	1443	603	34.9	42.4	21.6
Dunedin	588	531	63	39.3	35.5	5.2
Tertiary total	7046	6457	2819	33.8	31.0	16.7
Whangarei	324	90	76	28.4	7.9	7.7
North Shore	787	593	278	32.9	24.8	14.1
Waitakere	523	357	144	23.2	15.9	7.3
Rotorua	284	332	58	20.5	24.0	4.8
Whakatane (including Opotiki and Murupara)	150	42	47	20.7	5.8	7.2
Tauranga	425	165	227	27.7	10.8	16.8
Gisborne	135	72	18	21.8	11.6	3.2
Taranaki Base	330	78	69	29.4	7.0	7.3
Hastings	465	582	185	25.3	31.6	11.5
Palmerston North	357	393	175	22.8	25.1	13.8
Wanganui	194	97	42	28.5	14.2	7.3
Hutt	518	635	201	28.7	35.2	13.0
Masterton	79	134	67	16.8	28.5	15.4
Wairau	171	258	43	39.4	59.4	11.7
Nelson	356	221	121	45.1	28.0	17.4
Grey	67	0	19	24.7	0.0	8.0
Timaru	175	102	34	30.4	17.7	6.9
Southland	327	175	130	33.4	17.9	16.5
Secondary total	5667	4326	1934	27.5	21.0	10.9
Kaitia	37	11	11	13.1	3.9	4.3
Ashburton	42	27	23	27.5	17.6	15.3
St George's	87	0	28	22.3	0.0	7.2
Primary plus total	166	38	62	20.1	4.6	7.8
Dargaville *	1	0	2	0.9	0.0	1.8
Bay of Islands	0	0	7	0.0	0.0	3.0
Warkworth	0	0	5	0.0	0.0	7.9
Pukekohe *	82	76	27	15.7	14.5	5.7
Papakura Obstetric *	169	150	59	19.7	17.4	7.4
Botany Downs Maternity *	200	226	84	21.0	23.8	9.5
Taumarunui *	9	0	4	10.1	0.0	4.5
Thames *	5	0	2	3.8	0.0	1.5
Te Kuiti *	4	0	3	4.3	0.0	3.2
Tokoroa *	3	0	7	2.2	0.0	5.1
Rhoda Read (Morrinsville) *	1	0	0	0.7	0.0	0.0
Matariki (Te Awamutu) *	8	0	0	4.5	0.0	0.0
Taupo General *	12	0	5	5.0	0.0	2.1
Te Puia Springs	0	0	1	0.0	0.0	2.2
Hawera *	3	0	4	3.4	0.0	4.6
Wairoa	0	0	1	0.0	0.0	1.1
Chatham Islands	0	0	0	0.0	0.0	0.0
Waipukurau *	1	1	6	2.0	2.0	12.2
Horowhenua	0	0	3	0.0	0.0	1.7
Feilding Maternity	0	0	9	0.0	0.0	7.4
Taihape	0	0	1	0.0	0.0	3.4
Waimarino Rural Health Centre	0	0	1	0.0	0.0	5.6
Marton	0	0	0	0.0	0.0	0.0
Kenepuru *	15	8	18	4.3	2.3	5.2
Paraparaumu *	3	1	1	2.9	1.0	1.0
Motueka Maternity	0	0	1	0.0	0.0	1.4
Golden Bay Community Hospital	0	0	0	0.0	0.0	0.0
Buller	0	0	0	0.0	0.0	0.0
Burwood *	24	0	12	10.8	0.0	5.4
Kaikoura *	1	0	0	7.7	0.0	0.0
Waikari	0	0	0	0.0	0.0	0.0

Facility	Number			Rate per 100 babies		
	Inductions	Epidurals	Episiotomies	Inductions	Epidurals	Episiotomies
Darfield	0	0	0	0.0	0.0	0.0
Lincoln *	5	0	2	4.9	0.0	2.0
Rangiora	0	0	4	0.0	0.0	4.8
Akaroa Community	0	0	0	0.0	0.0	0.0
Dunstan	0	0	2	0.0	0.0	6.1
Oamaru *	5	0	3	5.4	0.0	3.3
Gore	1	0	6	4.2	0.0	25.0
Lakes District (Queenstown) *	11	0	13	16.7	0.0	19.7
Maniototo Health Services Ltd	0	0	0	0.0	0.0	0.0
Hokianga	0	0	0	0.0	0.0	0.0
Birthcare Auckland	0	0	2	0.0	0.0	6.5
Pohlen Trust (Matamata) *	11	0	6	7.9	0.0	4.3
Avonlea (Christchurch) *	8	0	0	12.1	0.0	0.0
Wellsford Birthing Unit	0	0	0	0.0	0.0	0.0
Helensville Birthing Unit	0	0	0	0.0	0.0	0.0
Winton Birthing Centre *	1	0	8	4.0	0.0	32.0
Tuatapere Maternity Hospital	0	0	0	0.0	0.0	0.0
Birthcare Huntly *	9	0	1	5.5	0.0	0.6
Northern Southland Birthing Centre	0	0	0	0.0	0.0	0.0
Dannevirke Community Hospital	0	0	6	0.0	0.0	8.6
Charlotte Jean Maternity Unit (Alexandra)	0	0	0	0.0	0.0	0.0
Elizabeth R Hospital and Rest Home	0	0	0	0.0	0.0	0.0
Waihi Hospital	0	0	0	0.0	0.0	0.0
Primary total	592	462	316	9.4	7.3	5.1
Other facilities	9	0	5	12.7	0.0	7.0
Total	13,480	11,283	5136	27.7	23.2	12.4

Data source: NMDS

\* These facilities are not likely to have performed the induction or epidural, but this is where the woman was discharged from.

Approximately one-third of New Zealand women who gave birth in a tertiary unit during 1999 had an epidural and/or induction of labour. Induction of labour rates vary in secondary and tertiary facilities, from 16% to 45% of mothers. It is most commonly employed at Nelson, Wairau, Waikato, Dunedin and National Women's hospitals. Epidural usage varies more widely, with rates greater than 50% in Wellington and Wairau compared with units such as Whangarei, Whakatane, Taranaki and Grey with less than 10%. DHBs may wish to investigate these differences, which are more likely to be due to availability issues rather than choice.

**Table 6.8:** Mothers, by clinical complexity level (CCL) and facility, 1999

Facility	Number of deliveries					Percent				
	Other	CCL 1	CCL 2	CCL 3	Most severe	Other	CCL 1	CCL 2	CCL 3	Most complex
Greenlane/National Women's	3	6124	1176	73	24	0.0	82.8	16	1.0	0.3
Middlemore	1	3445	327	18	9	0.0	90.7	9	0.5	0.2
Waikato	0	2345	454	36	9	0.0	82.5	16	1.3	0.3
Wellington	3	2814	348	14	16	0.1	88.1	11	0.4	0.5
Christchurch Women's	0	3252	387	20	11	0.0	88.6	11	0.5	0.3
Dunedin	1	1542	109	8	0	0.1	92.9	7	0.5	0.0
Tertiary total	8	19,522	2801	169	69	0.0	86.5	12	0.7	0.3
Whangarei	1	1112	115	8	9	0.1	89.3	9	0.6	0.7
North Shore	0	2470	178	18	4	0.0	92.5	7	0.7	0.1
Waitakere	0	2268	109	6	4	0.0	95.0	5	0.3	0.2

Facility	Number of deliveries					Percent				
	Other	CCL 1	CCL 2	CCL 3	Most severe	Other	CCL 1	CCL 2	CCL 3	Most complex
Rotorua	0	1292	176	5	2	0.0	87.6	12	0.3	0.1
Whakatane (including Opotiki and Murupara)	0	674	87	2	0	0.0	88.3	11	0.3	0.0
Tauranga	0	1555	99	3	1	0.0	93.8	6	0.2	0.1
Gisborne	0	595	70	3	0	0.0	89.1	10	0.4	0.0
Taranaki Base	1	1114	59	5	0	0.1	94.5	5	0.4	0.0
Hastings	1	1851	104	3	0	0.1	94.5	5	0.2	0.0
Palmerston North	1	1658	50	4	2	0.1	96.7	3	0.2	0.1
Wanganui	0	627	95	9	0	0.0	85.8	13	1.2	0.0
Hutt	2	1815	118	9	0	0.1	93.4	6	0.5	0.0
Masterton	0	464	37	0	2	0.0	92.2	7	0.0	0.4
Wairau	0	418	36	0	1	0.0	91.9	8	0.0	0.2
Nelson	0	840	12	1	1	0.0	98.4	1	0.1	0.1
Grey	0	276	19	2	0	0.0	92.9	6	0.7	0.0
Timaru	1	580	32	0	0	0.2	94.6	5	0.0	0.0
Southland	0	959	119	6	0	0.0	88.5	11	0.6	0.0
Secondary total	7	20,568	1515	84	26	0.0	92.6	7	0.4	0.1
Kaitiāia	0	289	10	1	0	0.0	96.3	3	0.3	0.0
Ashburton	0	150	8	0	0	0.0	94.9	5	0.0	0.0
St George's	0	639	78	4	2	0.0	88.4	11	0.6	0.3
Primary plus total	0	1078	96	5	2	0.0	91.3	8	0.4	0.2
Dargaville	0	109	0	0	0	0.0	100.0	0	0.0	0.0
Bay of Islands	0	229	3	1	0	0.0	98.3	1	0.4	0.0
Warkworth	0	63	0	0	0	0.0	100.0	0	0.0	0.0
Pukekohe	0	497	41	3	1	0.0	91.7	8	0.6	0.2
Papakura Obstetric	0	851	37	0	0	0.0	95.8	4	0.0	0.0
Botany Downs Maternity	0	934	44	2	0	0.0	95.3	4	0.2	0.0
Taumarunui	0	87	2	0	0	0.0	97.8	2	0.0	0.0
Thames	0	130	1	0	0	0.0	99.2	1	0.0	0.0
Te Kuiti	0	93	1	0	0	0.0	98.9	1	0.0	0.0
Tokoroa	0	136	0	0	0	0.0	100.0	0	0.0	0.0
Rhoda Read (Morrinsville)	0	152	1	0	0	0.0	99.3	1	0.0	0.0
Matariki (Te Awamutu)	0	176	1	0	0	0.0	99.4	1	0.0	0.0
Taupo General	0	238	0	0	0	0.0	100.0	0	0.0	0.0
Te Puia Springs	0	45	1	0	0	0.0	97.8	2	0.0	0.0
Hawera	0	86	1	0	0	0.0	98.9	1	0.0	0.0
Wairoa	0	93	0	0	0	0.0	100.0	0	0.0	0.0
Chatham Islands	0	5	0	0	0	0.0	100.0	0	0.0	0.0
Waipukurau	0	47	2	0	0	0.0	95.9	4	0.0	0.0
Horowhenua	0	177	2	0	0	0.0	98.9	1	0.0	0.0
Feilding Maternity	0	121	1	0	0	0.0	99.2	1	0.0	0.0
Taihape	0	29	0	0	0	0.0	100.0	0	0.0	0.0
Waimarino Rural Health Centre	0	17	1	0	0	0.0	94.4	6	0.0	0.0
Marton	0	10	0	0	0	0.0	100.0	0	0.0	0.0
Kenepuru	1	348	2	0	0	0.3	99.1	1	0.0	0.0
Paraparaumu	0	101	3	0	0	0.0	97.1	3	0.0	0.0
Motueka Maternity	0	71	0	0	0	0.0	100.0	0	0.0	0.0
Golden Bay Community Hospital	0	27	0	0	0	0.0	100.0	0	0.0	0.0
Buller	0	16	0	0	0	0.0	100.0	0	0.0	0.0
Burwood	1	216	5	0	0	0.5	97.3	2	0.0	0.0
Kaikoura	0	13	0	0	0	0.0	100.0	0	0.0	0.0
Waikari	0	2	0	0	0	0.0	100.0	0	0.0	0.0
Darfield	0	4	0	0	0	0.0	100.0	0	0.0	0.0
Lincoln	0	102	0	0	0	0.0	100.0	0	0.0	0.0
Rangiora	0	82	2	0	0	0.0	97.6	2	0.0	0.0
Akaroa Community	0	6	1	0	0	0.0	85.7	14	0.0	0.0
Dunstan	0	33	0	0	0	0.0	100.0	0	0.0	0.0
Oamaru	0	91	1	0	0	0.0	98.9	1	0.0	0.0

Facility	Number of deliveries					Percent				
	Other	CCL 1	CCL 2	CCL 3	Most severe	Other	CCL 1	CCL 2	CCL 3	Most complex
Gore	0	24	0	0	0	0.0	100.0	0	0.0	0.0
Lakes District (Queenstown)	0	63	3	0	0	0.0	95.5	5	0.0	0.0
Maniototo Health Services Ltd	0	10	0	0	0	0.0	100.0	0	0.0	0.0
Hokianga	0	41	0	0	0	0.0	100.0	0	0.0	0.0
Birthcare Auckland	0	31	0	0	0	0.0	100.0	0	0.0	0.0
Pohlen Trust (Matamata)	0	139	0	0	0	0.0	100.0	0	0.0	0.0
Avonlea (Christchurch)	0	66	0	0	0	0.0	100.0	0	0.0	0.0
Wellsford Birthing Unit	0	41	0	0	0	0.0	100.0	0	0.0	0.0
Helensville Birthing Unit	0	10	0	0	0	0.0	100.0	0	0.0	0.0
Winton Birthing Centre	0	25	0	0	0	0.0	100.0	0	0.0	0.0
Tuatapere Maternity Hospital	0	14	0	0	0	0.0	100.0	0	0.0	0.0
Birthcare Huntly	0	159	4	0	0	0.0	97.5	2	0.0	0.0
Northern Southland Birthing Centre	0	13	0	0	0	0.0	100.0	0	0.0	0.0
Dannevirke Community Hospital	0	69	1	0	0	0.0	98.6	1	0.0	0.0
Charlotte Jean Maternity Unit (Alexandra)	0	16	0	0	0	0.0	100.0	0	0.0	0.0
Elizabeth R Hospital and Rest Home	0	39	0	0	0	0.0	100.0	0	0.0	0.0
Waihi Hospital	0	40	0	0	0	0.0	100.0	0	0.0	0.0
Primary total	2	6237	161	6	1	0.0	97.3	3	0.1	0.0
Other facilities	0	69	2	0	0	0.0	97.2	3	0.0	0.0
Total	17	47,474	4575	264	98	0.0	0.0	0.0	0.0	0.0

Data source: NMDS

CCL measures the complexity of the co-morbid and complicating conditions for each woman relative to all other women of the same condition. Women classified as 'Other' are primarily in hospital for reasons other than giving birth.

The majority of women have little or no co-morbid or complicating conditions at the time of birth. The majority of women with complex conditions are in tertiary hospitals.

**Table 6.9:** Average length of stay (days) for mothers, by clinical complexity level (CCL) and facility, 1999

Facility	Complexity level					
	Other	CCL 1	CCL 2	CCL 3	Most complex	Total
Greenlane/National Women's	62.3	2.9	5.6	8.2	7.8	3.4
Middlemore	1.0	2.3	4.1	6.0	10.4	2.5
Waikato	–	2.5	4.4	5.9	7.4	2.9
Wellington	3.0	2.7	5.2	16.3	7.3	3.1
Christchurch Women's	–	2.7	5.9	10.4	5.7	3.1
Dunedin	9.0	4.1	8.4	16.1	–	4.5
Tertiary total	25.8	2.8	5.4	8.8	7.7	3.2
Whangarei	3.0	3.5	5.0	11.1	5.9	3.7
North Shore	–	2.6	3.7	5.4	4.3	2.7
Waitakere	–	2.6	3.9	4.3	4.8	2.7
Rotorua	–	2.8	4.6	5.2	3.0	3.0
Whakatane (including Opotiki and Murupara)	–	2.1	4.6	3.0	–	2.4
Tauranga	–	2.9	4.4	5.7	5.0	3.0
Gisborne	–	2.5	4.4	2.3	–	2.7
Taranaki Base	0.0	3.3	4.9	6.4	–	3.4
Hastings	31.0	2.8	6.9	5.3	–	3.0
Palmerston North	22.0	2.6	4.4	3.8	4.5	2.7
Wanganui	–	3.0	4.9	7.0	–	3.3

Facility	Complexity level					
	Other	CCL 1	CCL 2	CCL 3	Most complex	Total
Hutt	2.5	2.2	4.2	6.4	–	2.4
Masterton	–	2.4	5.1	–	5.0	2.6
Wairau	–	3.1	4.1	–	4.0	3.2
Nelson	–	3.2	7.8	7.0	3.0	3.3
Grey	–	3.7	8.6	12.0	–	4.0
Timaru	7.0	4.0	6.1	–	–	4.1
Southland	–	2.5	3.8	3.0	–	2.6
Secondary total	9.7	2.8	4.6	6.0	4.8	2.9
Kaitia	–	3.2	6.5	9.0	–	3.3
Ashburton	–	3.5	4.0	–	–	3.6
St George's	–	3.6	9.1	4.5	5.0	4.2
Primary plus total	–	3.5	8.4	5.4	5.0	3.9
Dargaville	–	3.0	–	–	–	3.0
Bay of Islands	–	2.0	4.3	5.0	–	2.0
Warkworth	–	0.8	–	–	–	0.8
Pukekohe	–	3.8	4.5	7.0	21.0	3.9
Papakura Obstetric	–	3.1	4.1	–	–	3.2
Botany Downs Maternity	–	3.0	4.2	5.0	–	3.0
Taumarunui	–	1.8	2.0	–	–	1.8
Thames	–	2.0	3.0	–	–	2.0
Te Kuiti	–	1.2	12.0	–	–	1.3
Tokoroa	–	1.5	–	–	–	1.5
Rhoda Read (Morrinsville)	–	3.5	4.0	–	–	3.5
Matariki (Te Awamutu)	–	2.8	8.0	–	–	2.8
Taupo General	–	2.4	–	–	–	2.4
Te Puia Springs	–	3.0	2.0	–	–	3.0
Hawera	–	2.9	2.0	–	–	2.9
Wairoa	–	1.5	–	–	–	1.5
Chatham Islands	–	9.0	–	–	–	9.0
Waipukurau	–	2.1	4.0	–	–	2.2
Horowhenua	–	1.7	2.5	–	–	1.7
Feilding Maternity	–	2.9	4.0	–	–	2.9
Taihape	–	1.8	–	–	–	1.8
Waimarino Rural Health Centre	–	1.2	0.0	–	–	1.2
Marton	–	0.3	–	–	–	0.3
Kenepuru	1.0	1.4	2.5	–	–	1.4
Paraparaumu	–	1.4	1.3	–	–	1.4
Motueka Maternity	–	2.4	–	–	–	2.4
Golden Bay Community Hospital	–	1.6	–	–	–	1.6
Buller	–	2.9	–	–	–	2.9
Burwood	4.0	3.0	4.0	–	–	3.0
Kaikoura	–	3.2	–	–	–	3.2
Waikari	–	2.0	–	–	–	2.0
Darfield	–	4.5	–	–	–	4.5
Lincoln	–	2.8	–	–	–	2.8
Rangiora	–	4.1	6.0	–	–	4.1
Akaroa Community	–	4.5	10.0	–	–	5.3
Dunstan	–	2.6	–	–	–	2.6
Oamaru	–	3.1	3.0	–	–	3.1
Gore	–	2.3	–	–	–	2.3
Lakes District (Queenstown)	–	1.5	2.3	–	–	1.5
Maniototo Health Services Ltd	–	2.2	–	–	–	2.2
Hokianga	–	2.5	–	–	–	2.5
Birthcare Auckland	–	2.7	–	–	–	2.7
Pohlen Trust (Matamata)	–	3.6	–	–	–	3.6
Avonlea (Christchurch)	–	2.4	–	–	–	2.4
Wellsford Birthing Unit	–	0.9	–	–	–	0.9
Helensville Birthing Unit	–	0.6	–	–	–	0.6

Facility	Complexity level					
	Other	CCL 1	CCL 2	CCL 3	Most complex	Total
Winton Birthing Centre	–	5.0	–	–	–	5.0
Tuatapere Maternity Hospital	–	3.0	–	–	–	3.0
Birthcare Huntly	–	2.6	3.3	–	–	2.6
Northern Southland Birthing Centre	–	2.8	–	–	–	2.8
Dannevirke Community Hospital	–	3.8	3.0	–	–	3.8
Charlotte Jean Maternity Unit (Alexandra)	–	2.2	–	–	–	2.2
Elizabeth R Hospital and Rest Home	–	2.4	–	–	–	2.4
Waihi Hospital	–	3.1	–	–	–	3.1
Primary total	2.5	2.7	4.1	6.0	21.0	2.7
Other facilities	–	2.3	1.5	–	–	2.3
Total	16.4	2.8	5.1	7.8	7.0	3.0

Data source: NMDS

The average length of stay increases with the level of complexity.

**Table 6.10:** Gestation age at birth (numbers), by facility, 1999

Facility	Gestational age						Total
	20–23	24–27	28–31	32–36	37–41	42+	
Greenlane/National Women's	16	36	116	700	6517	179	7564
Middlemore	4	15	30	233	3419	166	3868
Waikato	3	25	55	264	2382	198	2927
Wellington	5	42	64	262	2788	112	3272
Christchurch Women's	8	9	51	328	3331	37	3765
Dunedin	8	13	23	115	1519	18	1697
Tertiary total	44	141	339	1905	19,956	707	23,093
Whangarei	1	0	2	102	1109	58	1271
North Shore	2	0	5	111	2524	61	2703
Waitakere	0	0	3	67	2262	67	2398
Rotorua	0	2	2	93	1345	57	1500
Whakatane (including Opotiki and Murupara)	0	1	0	30	715	28	774
Tauranga	1	1	0	76	1513	85	1675
Gisborne	0	2	4	48	610	16	680
Taranaki Base	0	5	4	99	1057	28	1193
Hastings	0	3	8	122	1759	92	1985
Palmerston North	1	2	13	106	1552	73	1747
Wanganui	0	1	0	33	679	26	739
Hutt	1	0	2	102	1805	55	1965
Masterton	0	1	1	17	481	8	508
Wairau	0	0	0	29	418	14	461
Nelson	0	1	1	50	777	36	864
Grey	0	0	0	12	286	3	301
Timaru	1	0	1	35	573	17	627
Southland	0	0	0	23	1085	0	1108
Secondary total	7	19	46	1,151	20,556	720	22,499
Kaitia	2	1	0	7	279	14	303
Ashburton	0	0	1	2	146	9	158
St George's	0	0	0	5	717	5	727
Primary plus total	2	1	1	14	1143	28	1188
Dargaville	0	1	0	7	99	3	109
Bay of Islands	0	0	0	5	223	6	233
Warkworth	0	0	0	1	61	1	63
Pukekohe	0	1	2	19	497	28	547
Papakura Obstetric	0	0	3	46	799	46	893
Botany Downs Maternity	0	1	3	28	907	45	984

Facility	Gestational age						Total
	20-23	24-27	28-31	32-36	37-41	42+	
Taumarunui	0	0	1	4	81	4	89
Thames	0	0	0	3	125	4	131
Te Kuiti	0	0	2	1	89	2	94
Tokoroa	0	0	1	6	126	4	136
Rhoda Read (Morrinsville)	0	0	1	1	146	5	153
Matariki (Te Awamutu)	0	0	0	0	171	6	177
Taupo General	0	0	0	5	220	13	238
Te Puia Springs	0	0	0	2	44	0	46
Hawera	0	0	1	2	84	0	87
Wairoa	0	0	0	3	91	0	94
Chatham Islands	0	0	0	0	5	0	5
Waipukurau	0	0	0	0	47	2	49
Horowhenua	0	0	0	1	176	2	179
Feilding Maternity	0	0	0	1	118	3	122
Taihape	0	0	0	0	28	1	29
Waimarino Rural Health Centre	0	0	0	0	18	0	18
Marton	0	0	0	0	10	0	10
Kenepuru	0	0	0	1	338	12	351
Paraparaumu	0	0	0	1	103	0	104
Motueka Maternity	0	0	0	1	69	1	71
Golden Bay Community Hospital	0	0	0	0	26	1	27
Buller	0	0	0	0	16	0	16
Burwood	0	0	0	3	217	2	222
Kaikoura	0	0	0	0	13	0	13
Waikari	0	0	0	0	2	0	2
Darfield	0	0	0	0	4	0	4
Lincoln	0	0	0	0	99	3	102
Rangiora	0	0	1	0	78	5	84
Akaroa Community	0	0	0	0	7	0	7
Dunstan	0	0	0	1	32	0	33
Oamaru	0	0	0	1	86	5	92
Gore	0	0	0	0	24	0	24
Lakes District (Queenstown)	0	0	0	0	66	0	66
Maniototo Health Services Ltd	0	0	0	0	7	3	10
Hokianga	0	0	1	2	37	2	41
Birthcare Auckland	0	0	0	0	31	0	31
Pohlen Trust (Matamata)	0	0	0	3	124	12	139
Avonlea (Christchurch)	0	0	0	1	61	4	66
Wellsford Birthing Unit	0	0	1	0	36	4	41
Helensville Birthing Unit	0	0	0	0	10	0	10
Winton Birthing Centre	0	0	0	1	23	1	25
Tuatapere Maternity Hospital	0	0	0	0	14	0	14
Birthcare Huntly	0	0	0	0	148	15	163
Northern Southland Birthing Centre	0	0	0	0	12	1	13
Dannevirke Community Hospital	0	0	0	1	63	6	70
Charlotte Jean Maternity Unit (Alexandra)	0	0	0	0	15	1	16
Elizabeth R Hospital and Rest Home	0	0	0	0	38	1	39
Waihi Hospital	0	0	0	0	40	0	40
Primary total	0	3	17	149	6002	251	6422
Other facilities	0	0	0	1	68	2	71
Total	54	165	405	3223	47,717	1709	53,273

Data source: NMDS

**Table 6.11: Gestational age at birth (percent), by facility, 1999**

Facility	Gestational age						Total
	20-23	24-27	28-31	32-36	37-41	42+	
Greenlane/National Women's	29.9	21.9	28.5	21.7	13.7	10.5	14.2
Middlemore	7.5	9.2	7.5	7.2	7.2	9.7	7.3
Waikato	5.4	15.4	13.5	8.2	5.0	11.6	5.5
Wellington	9.1	25.4	15.7	8.1	5.8	6.5	6.1
Christchurch Women's	15.6	5.6	12.6	10.2	7.0	2.2	7.1
Dunedin	15.0	7.9	5.7	3.6	3.2	1.1	3.2
Tertiary total	82.5	85.3	83.7	59.1	41.8	41.4	43.3
Whangarei	1.9	0.0	0.5	3.2	2.3	3.4	2.4
North Shore	3.7	0.0	1.2	3.4	5.3	3.6	5.1
Waitakere	0.0	0.0	0.7	2.1	4.7	3.9	4.5
Rotorua	0.0	1.2	0.5	2.9	2.8	3.4	2.8
Whakatane (including Opotiki and Murupara)	0.0	0.7	0.0	0.9	1.5	1.7	1.5
Tauranga	1.9	0.6	0.0	2.3	3.2	5.0	3.1
Gisborne	0.0	1.2	1.0	1.5	1.3	0.9	1.3
Taranaki Base	0.0	3.0	1.0	3.1	2.2	1.6	2.2
Hastings	0.0	2.1	2.0	3.8	3.7	5.4	3.7
Palmerston North	1.8	1.2	3.2	3.3	3.3	4.3	3.3
Wanganui	0.0	0.6	0.0	1.0	1.4	1.5	1.4
Hutt	1.9	0.0	0.5	3.2	3.8	3.2	3.7
Masterton	0.0	0.6	0.2	0.5	1.0	0.5	1.0
Wairau	0.0	0.0	0.0	0.9	0.9	0.8	0.9
Nelson	0.0	0.6	0.2	1.5	1.6	2.1	1.6
Grey	0.0	0.0	0.0	0.4	0.6	0.2	0.6
Timaru	1.9	0.0	0.2	1.1	1.2	1.0	1.2
Southland	0.0	0.0	0.0	0.7	2.3	0.0	2.1
Secondary total	13.2	11.6	11.2	35.7	43.1	42.2	42.2
Kaitiāia	3.6	0.6	0.0	0.2	0.6	0.8	0.6
Ashburton	0.0	0.0	0.2	0.1	0.3	0.5	0.3
St George's	0.0	0.0	0.0	0.2	1.5	0.3	1.4
Primary plus total	3.7	0.6	0.2	0.4	2.4	1.6	2.2
Dargaville	0.0	0.6	0.0	0.2	0.2	0.2	0.2
Bay of Islands	0.0	0.0	0.0	0.1	0.5	0.3	0.4
Warkworth	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Pukekohe	0.0	0.6	0.5	0.6	1.0	1.7	1.0
Papakura Obstetric	0.0	0.0	0.7	1.4	1.7	2.7	1.7
Botany Downs Maternity	0.0	0.6	0.7	0.9	1.9	2.6	1.8
Taumarunui	0.0	0.0	0.2	0.1	0.2	0.2	0.2
Thames	0.0	0.0	0.0	0.1	0.3	0.2	0.2
Te Kuiti	0.0	0.0	0.5	0.0	0.2	0.1	0.2
Tokoroa	0.0	0.0	0.2	0.2	0.3	0.2	0.3
Rhoda Read (Morrinsville)	0.0	0.0	0.2	0.0	0.3	0.3	0.3
Matariki (Te Awamutu)	0.0	0.0	0.0	0.0	0.4	0.3	0.3
Taupo General	0.0	0.0	0.0	0.1	0.5	0.8	0.4
Te Puia Springs	0.0	0.0	0.0	0.1	0.1	0.0	0.1
Hawera	0.0	0.0	0.2	0.1	0.2	0.0	0.2
Wairoa	0.0	0.0	0.0	0.1	0.2	0.0	0.2
Chatham Islands	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Waipukurau	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Horowhenua	0.0	0.0	0.0	0.0	0.4	0.1	0.3
Feilding Maternity	0.0	0.0	0.0	0.0	0.2	0.2	0.2
Taihape	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Waimarino Rural Health centre	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Marton	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kenepuru	0.0	0.0	0.0	0.0	0.7	0.7	0.7
Paraparaumu	0.0	0.0	0.0	0.0	0.2	0.0	0.2
Motueka Maternity	0.0	0.0	0.0	0.0	0.1	0.1	0.1



Facility	Gestational age						Total
	20–23	24–27	28–31	32–36	37–41	42+	
Golden Bay Community Hospital	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Buller	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Burwood	0.0	0.0	0.0	0.1	0.5	0.1	0.4
Kaikoura	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Waikari	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Darfield	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lincoln	0.0	0.0	0.0	0.0	0.2	0.2	0.2
Rangiora	0.0	0.0	0.2	0.0	0.2	0.3	0.2
Akaroa Community	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dunstan	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Oamaru	0.0	0.0	0.0	0.0	0.2	0.3	0.2
Gore	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Lakes District (Queenstown)	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Maniototo Health Services Ltd	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Hokianga	0.0	0.0	0.2	0.0	0.1	0.1	0.1
Birthcare Auckland	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Pohlen Trust (Matamata)	0.0	0.0	0.0	0.1	0.3	0.7	0.3
Avonlea (Christchurch)	0.0	0.0	0.0	0.0	0.1	0.2	0.1
Wellsford Birthing Unit	0.0	0.0	0.3	0.0	0.1	0.2	0.1
Helensville Birthing Unit	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Winton Birthing Centre	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Tuatapere Maternity Hospital	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Birthcare Huntly	0.0	0.0	0.0	0.0	0.3	0.9	0.3
Northern Southland Birthing Centre	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Dannevirke Community Hospital	0.0	0.0	0.0	0.0	0.1	0.3	0.1
Charlotte Jean Maternity Unit (Alexandra)	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Elizabeth R Hospital and Rest Home	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Waihi Hospital	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Primary total	0.0	1.8	4.1	4.6	12.6	14.7	12.1
Other facilities	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Total	100	100	100	100	100	100	100

Data source: NMDS

These data show that the policy of *in utero* transfer rate for infants born at early gestation is working. In 1999 83% of infants born at 20–23 weeks' gestation were born in a unit with tertiary-level neonatal services. Of infants born from 24–27 weeks gestation, 85% were born in a tertiary level unit and 97% in either a tertiary or a secondary unit. Rates are similar for infants born at 28–31 weeks' gestation. For infants born < 32 weeks' gestation an *in utero* transferral rate of > 90% is desirable, as this is associated with improved neonatal outcomes. Some secondary units (for example, Palmerston North and Hastings) have neonatal services with the capability for ventilation of pre-term infants, and this is reflected in the data.

## 7 Lead Maternity Carer

This section looks at lead maternity carers (LMCs). All women are expected to choose a practitioner as their LMC during their pregnancy: a midwife, general practitioner or a specialist obstetrician. The LMC takes “responsibility for the care provided to the woman throughout her pregnancy and postpartum period, including the management of labour and birth’ (Health Funding Authority 1998).

Working arrangements of LMCs vary somewhat around the country according to differences in contracts and local practices. In particular, practitioners have various arrangements about teamwork which may mean that, although there is a named LMC, care is shared between several practitioners. This is frequently the case where women choose to receive care from a hospital provider. Also, obstetricians and midwives may either work privately or in a hospital. Private obstetricians are more likely to deal with medium-risk women, where hospital obstetricians usually deal with higher risk women. This analysis groups all obstetricians together and all midwives together, posing a problem due to differences in work practices. These practice variations mean that at present caution must be used when comparing outcomes by LMC type.

The data show that midwives make up 66% of the LMCs with whom women first register. Midwife LMCs tend to care for more younger women and Māori women.

Data on the LMC is obtained from claims submitted to HB under the Section 88 maternity notice and therefore excludes births under other arrangements. This analysis from MNIS needs to be interpreted with caution due to uncertainty around the quality of these data. A problem has been identified in that in some cases there is a slight variation in the total number of women obtained. Some of the difference can be explained by the fact that when LMC data are linked to NMDS events (for example, delivery type), home births are excluded. However, the differences in numbers are likely to be mainly caused by duplicate gravida numbers and duplicate claim events. Also, a proportion of the data is missing (for example, the LMC occupation is not stated for all claims). Note also that all LMC analysis excludes practitioners coded as an HHS as only a small proportion of HHS practitioners can be identified.

**Table 7.1:** Number of LMC registrations per mother, 1999

Number of registrations per mother	Rate	
	Number	Percent
0	1709	4.3
1	31,161	79.1
2	5189	13.2
3	1120	2.8
> 3	227	0.6
<b>Total</b>	<b>39,406</b>	<b>100</b>

Data source: MNIS

This information is available for all mothers who delivered in 1999 recorded in MNIS (39,406). Note: MNIS has 30% of the data missing.

From these data it would appear that women usually select one LMC with whom they continue.

**Table 7.2:** Original LMC type, 1999

LMC type	Registration	
	Number	Percent
Midwife	23,200	65.9
General practitioner	6902	19.6
Obstetrician	5087	14.5
Total	35,189	100

Data source: MNIS

Information on LMC type is not provided for 2508 (6.7%) of women who register with an LMC. This information is obtained from MNIS, hence 30% of the data are missing. The above table records the LMC type the mother registers with for her first registration. The LMC type each mother registers with is recorded in the registration claim form.

**Table 7.3:** Original LMC by mother's age, 1999

Age of mother	LMC							
	Midwife		GP		Obstetrician		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Under 16	22	66.7	4	12.1	7	21.2	33	100
16-19	1570	73.6	369	17.3	193	9.1	2132	100
20-24	4281	72.5	1082	18.3	538	9.1	5901	100
25-29	6232	68.4	1846	20.3	1033	11.3	9111	100
30-34	6451	63.3	2085	20.5	1658	16.3	10,194	100
35-39	3020	58.9	1028	20.1	1077	21.0	5125	100
40+	520	52.5	210	21.2	260	26.3	990	100
Total	22,096	66.0	6624	19.8	4766	14.2	33,486	100

Data source: MNIS

Information on LMC type is not provided for 2508 (6.7%) of women who register with an LMC and information on the age of mother is not provided for 1703 women (4.5%). This information is obtained from MNIS, hence 30% of the data are missing.

Younger women are more likely to have a midwife LMC.

**Table 7.4:** Original LMC by ethnicity of mother, 1999

Ethnicity of mother	LMC							
	Midwife		GP		Obstetrician		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
European/Other	16,723	65.5	5049	19.8	3776	14.8	25,548	100
Māori	4590	73.2	1076	17.2	607	9.7	6273	100
Pacific peoples	1199	57.2	471	22.5	426	20.3	2096	100
Asian	676	53.7	305	24.2	277	22.0	1258	100
Total	23,188	65.9	6901	19.6	5086	14.5	35,175	100

Data source: MNIS

Information on LMC type is not provided for 2508 (6.7%) of women who register with an LMC, and information on ethnicity is not provided for 14 women. If ethnicity information is not given by HB, it is obtained from NMDS. This information is obtained from MNIS, hence 30% of the data are missing.

Māori women are more likely to have a midwife LMC, while Pacific and Asian women have a disproportionately higher representation of an obstetrician LMC. European mothers mirror the overall distribution of LMC type.

**Table 7.5:** Original LMC at registration, by DHB of mother's place of residence, 1999

DHB	LMC							
	Midwife		GP		Obstetrician		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Northland	1308	81.9	162	10.1	128	8.0	1598	100
Waitemata	2331	61.4	1048	27.6	420	11.1	3799	100
Auckland	1592	49.1	720	22.2	928	28.6	3240	100
Counties Manukau	2036	53.1	686	17.9	1114	29.0	3836	100
Waikato	2699	85.4	434	13.7	26	0.8	3159	100
Lakes	1274	81.7	268	17.2	18	1.2	1560	100
Bay of Plenty	1963	95.1	71	3.4	30	1.5	2064	100
Tairāwhiti	463	73.5	152	24.1	15	2.4	630	100
Taranaki	716	58.4	134	10.9	375	30.6	1225	100
Hawke's Bay	984	52.2	716	38.0	184	9.8	1884	100
MidCentral	694	44.8	503	32.5	351	22.7	1548	100
Whanganui	541	75.9	112	15.7	60	8.4	713	100
Capital and Coast	270	54.5	79	16.0	146	29.5	495	100
Hutt	647	41.5	525	33.7	388	24.9	1560	100
Wairarapa	452	92.8	26	5.3	9	1.8	487	100
Nelson Marlborough	801	68.9	233	20.1	128	11.0	1162	100
West Coast	47	61.0	23	29.9	7	9.1	77	100
Canterbury	3001	88.3	234	6.9	163	4.8	3398	100
South Canterbury	89	19.8	31	6.9	329	73.3	449	100
Otago	308	49.2	274	43.8	44	7.0	626	100
Southland	237	39.7	269	45.1	91	15.2	597	100
Total	22,453	65.8	6700	19.6	4954	14.5	34,107	100

Data source: MNIS

Information on LMC type is not provided for 2508 (6.7%) of women who register with an LMC, and information on DHB is not provided for 1082 women (2.7%). This information is obtained from MNIS, hence 30% of the data are missing.

Wide variation in availability of LMC type across regions may reflect availability of some practitioner types, and is also likely to reflect different contract arrangements.

**Table 7.6:** Original LMC, by mother's parity, 1999

Parity	LMC							
	Midwife		GP		Obstetrician		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
0	8341	63.8	2763	21.1	1980	15.1	13,084	100
1	7570	66.2	2196	19.2	1665	14.6	11,431	100
2	3983	68.8	1023	17.7	785	13.6	5791	100
3	1861	69.2	514	19.1	315	11.7	2690	100
4	764	65.9	224	19.3	172	14.8	1160	100
5	389	68.1	103	18.0	79	13.8	571	100
6	163	64.4	40	15.8	50	19.8	253	100
7	78	65.6	21	17.7	20	16.8	119	100
8	29	58.0	13	26.0	8	16.0	50	100
9	11	55.0	1	5.0	8	40.0	20	100
10	4	50.0	2	25.0	2	25.0	8	100
11	3	50.0	2	33.3	1	16.7	6	100
12	1	100.0	0	0	0	0	1	100
Total	23,197	65.9	6902	19.6	5085	14.5	35,184	100

Data source: MNIS

Information on LMC type is not provided for 2508 (6.7%) of women who register with an LMC and five women do not have parity stated. This information is obtained from MNIS, hence 30% of the data are missing.

**Table 7.7:** First registration at time of delivery, 1999

LMC	First registration at birth	
	Number	Percent
Midwife	474	56.0
General practitioner	56	6.6
Obstetrician	316	37.4
Total	846	100

Data source: MNIS

There were a further 138 women (14.0%) with LMC type not stated. These women had their first registration with a LMC at the time they gave birth. This information is obtained from MNIS, hence 30% of the data are missing.

Obstetricians tend to have a high rate of first registrations at time of delivery.

**Table 7.8:** Outcome of birth, by original LMC, 1999

Outcome of birth	Original LMC							
	Midwife		GP		Obstetrician		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Single live birth	22,341	98.0	6590	97.9	4537	96.0	33,468	97.7
Single stillbirth	136	0.6	38	0.6	44	0.9	218	0.6
Twin live birth	317	1.4	101	1.5	140	3.0	558	1.6
Twin stillbirth	6	0.0	0	0	3	0.1	9	0.0
Twin live and stillbirth	8	0.0	2	0.0	4	0.1	14	0.0
Total	22,808	100	6731	100	4728	100	34,267	100

Data source: MNIS

This information is obtained from the maternity section 88 claim forms. Information on LMC type is not provided for 2508 (6.7%) of women who register with an LMC, and 992 women (2.4%) do not have information on the outcome of birth. This information is obtained from MNIS, hence 30% of the data are missing.

Midwives and general practitioners share similar outcomes during the labour and birth phase of maternity services.

It cannot be assumed that the 'risk status' of women with midwife LMCs is low, as current practice is for some midwife LMCs to provide continuity of care in consultation with a private obstetrician or HHS obstetrician. A change in risk status still requires ongoing midwifery care. Many HHSs are reliant on the midwife LMC continuing to provide midwifery care even when the woman is receiving secondary care.

**Table 7.9:** Type of birth, by original LMC, 1999

Type of birth	Original LMC							
	Midwife		GP		Obstetrician		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Acute caesarean section	2400	11.1	902	13.4	811	16.0	4113	12.3
Elective caesarean section	850	4.0	289	4.3	561	11.1	1700	5.1
Vaginal breech delivery	193	0.9	47	0.7	62	1.2	302	0.9
Forceps delivery	1134	5.3	456	6.8	399	7.9	1989	6.0
Vacuum extraction	1270	5.9	345	5.1	299	5.9	1914	5.7
Normal delivery	15,688	72.9	4711	69.8	2931	57.9	23,330	70.0
Total	21,535	100	6750	100	5063	100	33,348	100

Data source: MNIS

Information on LMC type is not provided for 2508 (6.7%) of women who register with an LMC and 1841 (4.9%) do not have their delivery type stated (these are likely to be home births where delivery-type information is not provided, as this is obtained from NMDS clinical codes obtained at discharge from hospital). This information is obtained from MNIS, hence 30% of the data are missing.

**Table 7.10:** Interventions by original LMC, 1999

Type of birth	Original LMC							
	Midwife		GP		Obstetrician		Total	
	Number	Rate per 100 hospital deliveries	Number	Rate per 100 hospital deliveries	Number	Rate per 100 hospital deliveries	Number	Rate per 100 hospital deliveries
Acute caesarean section	2400	10.3	902	13.1	811	15.9	4113	11.7
Elective caesarean section	850	3.7	289	4.2	561	11.0	1700	4.8
Forceps delivery	1134	4.9	456	6.6	399	7.8	1989	5.7
Vacuum extraction	1270	5.5	345	5.0	299	5.9	1914	5.4
Induction of labour	4353	18.8	1423	20.6	1462	28.7	7238	20.6
Epidural	3103	13.4	1187	17.2	1124	22.1	5414	15.4
Episiotomy	1942	8.4	795	11.5	554	10.9	3291	9.4

Data source: MNIS

Information on LMC type is not provided for 2508 (6.7%) of women who register with an LMC. Intervention data are obtained from NMDS clinical codes. Note that some women will have more than one type of intervention. This information is obtained from the MNIS database, hence 30% of the data are missing.

**Table 7.11:** Length of stay at delivery, by original LMC, 1999

Length of Stay	LMC							
	Midwife		GP		Obstetrician		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
0	3083	14.3	578	8.6	452	8.9	4113	12.3
1	4902	22.8	1455	21.6	1059	20.9	7416	22.2
2	4278	19.9	1477	21.9	847	16.7	6602	19.8
3	3508	16.3	1130	16.8	772	15.3	5410	16.2
4	2360	11.0	877	13.0	729	14.4	3966	11.9
5	1579	7.3	631	9.4	518	10.2	2728	8.2
6	767	3.6	300	4.4	284	5.6	1351	4.1
7-8	576	2.7	176	2.6	210	4.1	962	2.9
> 8	472	2.2	122	1.8	190	3.8	784	2.4
Total	21,525	100	6746	100	5061	100	33,332	100

Data source: MNIS

Information on LMC type is not provided for 2508 (6.7%) of women who register with an LMC, and information on length of stay at delivery is not provided for 1857 (4.9%) women (these are women who do not give birth in hospital and therefore are not captured in the NMDS hospital database). This information is obtained from MNIS, hence 30% of the data are missing.

The reduced length of stay for women with a midwife LMC may reflect the continuity of midwifery care throughout the pregnancy episode that is available from midwife LMCs.

# Appendix 1

## New Zealand deprivation scores

New Zealand deprivation (NZDep) scores have been generated from the 1996 Census data as an attempt to measure special health needs, calculated as a function of nine socioeconomic variables (Salmond et al 1998a; 1998b). Each class is of equal size in terms of New Zealand's population. The general theory is that an area with a high NZDep score is, on the whole, more likely to need health services than one with a low NZDep score. These variables have been shown through the literature to be associated with mortality or morbidity or some type of disadvantage. The variables are calculated by mesh block and then aggregated up to domicile area (using population weights), where a domicile is a geographical area defined by Statistics New Zealand for census and related purposes. The list of variables used is given below:

Name of variable	Description of variable
• Communication	People with no access to a telephone
• Income	People aged 18–59 receiving a means-tested benefit
• Income	Equivalised <sup>14</sup> household income below an income threshold
• Transport	People with no access to a car
• Living space	Equivalised household below a bedroom occupancy threshold
• Owned home	People not living in own home
• Employment	Unemployed people aged 18–59
• Qualifications	People aged 18–59 without any qualifications
• Support	People aged < 60 living in a single-parent family

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<sup>14</sup> Equivalisation: methods used to control for family composition.



## Appendix 2

Below is a list of current MNIS advisory group members and the organisations they represent.

Name	Organisation
A. Dharmalingam	Population Studies Centre, University of Waikato
Alec Ekeroma	Pacifika Medical Association
Dawn Elder	Department of Paediatrics, Wellington School of Medicine
William Ferguson	New Zealand College of General Practitioners
Karen Guilliland	New Zealand College of Midwives
Penny Guy	Parent's Centres New Zealand
Teenah Handiside	Federation of Women's Health Councils
Miriama Kupe	Nga Maia
Neil Pattison	Royal Australian and New Zealand College of Gynaecologists and Obstetricians
Joanne Rama-Mansa	Nga Maia
Judi Strid	Homebirth Association
Barry Twyde	Maternity Manager, Waitemata Health

The following employees of the Ministry of Health and New Zealand Health Information Service (NZHIS) also contributed to this report:

Karin Bowen (Project Manager)  
Barbara Browne  
Rachel Gilchrist  
Jane Little  
Robert Lynn  
John Marwick  
Amanda Newton

# Glossary

<b>Abortion, induced</b>	an abortion brought about intentionally. Also called an artificial or therapeutic abortion, as opposed to a spontaneous abortion (a miscarriage).
<b>Abortion, spontaneous</b>	the spontaneous expulsion of a foetus of less than 20 weeks' gestation and less than 400 grams' birthweight.
<b>Antenatal hospital events</b>	all women who were admitted to a hospital up to 44 weeks before the date of delivery, irrespective of the diagnosis.
<b>Apgar score</b>	numerical score used to evaluate the infant's condition at one and five minutes after birth. Five variables are scored: colour, breathing, heart rate, reactivity to stimulation, and muscle tone. A baby may be able to be resuscitated after an initial one-minute apgar score of 0 but a five-minute score of 0 usually means that the infant cannot be resuscitated. If no heart rate had been heard before or during resuscitation then this would be documented as a stillbirth. If a heart rate had been heard but the baby could not be fully resuscitated, this would be called a live birth and neonatal death.
<b>Asphyxia</b>	cessation of blood flow and/or oxygen delivery to vital body organs. This may occur before, during or after birth. The long-term effect on the foetus or infant depends on the length of the period of asphyxia and whether blood flow and/or oxygen supply can be restored.
<b>Bacterial meningitis</b>	inflammation of the meninges due to a bacterial infection, often with the streptococcus B bacteria.
<b>Birth</b>	a delivery of a baby (or babies for a multiple birth) over 400 grams or after a minimum of 20 weeks gestation.
<b>Birthing unit</b>	a hospital that provides services for labour and birth but does not provide inpatient postnatal care and is designated by the Ministry of Health as a birthing unit. As at 1 March 2002, the designated birthing units are situated in Wellsford, Murupara, Raetihi, Marton and Otaki.
<b>Birthweight</b>	the first weight of the baby obtained after birth (usually measured to the nearest 5 grams and obtained within one hour of birth).
<b>Caesarean section</b>	operative birth through an abdominal incision.
<b>Caesarean section, acute</b>	caesarean section performed urgently for maternal or foetal health once labour has started.
<b>Caesarean section, elective</b>	caesarean section performed before the onset of labour.

<b>Clinical complexity level (CCL)</b>	a measure of the complexity/severity of each woman's co-morbidities and complications, in comparison to other women within the same DRG.
<b>Diagnosis related group (DRG) code</b>	a DRG is produced by invoking a DRG programme that compares all diagnostic codes in a health event and assigns a DRG code based on a complex series of decision trees. This provides another way of analysing event information based on classifying episodes of inpatient care into clinically meaningful groups with similar resource consumption.
<b>District Health Board (DHB)</b>	District Health Boards are responsible for providing or buying government-funded health care services for the population of a specific geographical area. There are 21 DHBs in New Zealand and they have existed since 1 January 2001.
<b>Domicile</b>	the mother's usual residential address.
<b>Ectopic pregnancy</b>	a fertilised egg settles and grows in any location other than the inner lining of the uterus. The large majority (95%) of ectopic pregnancies occur in the Fallopian tube. However, they can occur in other locations, such as the ovary, cervix and abdominal cavity.
<b>Epidural</b>	injection of analgesic agent outside the duramater that covers the spinal canal; includes lumbar, spinal and epidural anaesthetics.
<b>Episiotomy</b>	an incision of the perineal tissue surrounding the vagina at the time of birth.
<b>Estimated delivery date (EDD)</b>	the estimated date on which the baby is due, either calculated from the last menstrual period, an ultrasound scan or the best estimate.
<b>Ethnic code</b>	the code that defines the mother's ethnic group.
<b>Facility</b>	place that mothers attend or are resident in for the primary purpose of receiving maternity care.
<b>Forceps</b>	operative vaginal delivery using a metallic obstetric instrument.
<b>Gestational age</b>	the duration of pregnancy in completed weeks, calculated from the date of the first day of a woman's last menstrual period and her infant's date of birth, or derived from clinical assessment during pregnancy, or from examination of the infant after birth.
<b>Gravida number</b>	the total number of pregnancies, including previous pregnancies, irrespective of the pregnancy outcome (miscarriages, etc.) and including the current pregnancy. This is calculated at the time of registration with the LMC and at labour and birth.
<b>Health Benefits (HB)</b>	the organisation that operates as part of the Ministry of Health to manage payment claims.
<b>Home birth</b>	a birth that takes place in a person's home and not in a maternity facility or birthing unit.

<b>Hypertension</b>	(also called high blood pressure) a repeatedly elevated blood pressure exceeding 140 over 90 mmHg – a systolic pressure above 140 with a diastolic pressure above 90.
<b>Hysterectomy</b>	a surgical operation to remove the uterus and, sometimes, the cervix. Removal of the body of the uterus without removing the cervix is referred to as a subtotal hysterectomy; removal of the entire uterus and the cervix is referred to as a total hysterectomy.
<b>ICD-9-AM (International Classification of Diseases, 9<sup>th</sup> Revision) clinical codes</b>	based on the official version of the World Health Organization's International Classification of Diseases. This is designed for classification of morbidity and mortality information for statistical purposes, and for indexing hospital records by disease and operations, for data storage and retrieval. The clinical codes are used to classify the clinical description of a condition, cause of intentional and unintentional injury, underlying cause of death, operation or procedure performed, or pathological nature of a tumour.
<b>Induction of labour</b>	an intervention undertaken to stimulate the onset of labour by pharmacological or other means.
<b>Lead maternity carer (LMC)</b>	the general practitioner, midwife or obstetric specialist who has been selected by the woman to co-ordinate and provide comprehensive maternity care including the management of labour and birth.
<b>Length of stay</b>	defined by the number of nights a woman spends in a facility.
<b>Live birth</b>	the complete expulsion or extraction from its mother of a product of conception, irrespective of duration of pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached. Each product of such a birth is considered liveborn (WHO definition).
<b>Major diagnostic category (MDC)</b>	a group of DRGs.
<b>Major surgery</b>	any surgery that requires opening of a body cavity.
<b>Maternal and Newborn Information System (MNIS)</b>	a collection of perinatal information amalgamating data from LMC payments claims to HB with data collected at hospital discharge and recorded in NMDS.
<b>Maternity facility</b>	a hospital that provides labour and birth services and inpatient postnatal care.
<b>Median</b>	the middle data point if the data were ranked from the lowest to the highest number. It is used instead of the mean when the data is not normally distributed.

<b>Ministry of Health</b>	the Government's principal advisor on health and disability in New Zealand.
<b>Miscarriage</b>	all women whose pregnancies ended spontaneously prior to 20 weeks' gestation. 'Hospital miscarriages' includes all women who are referred to a hospital during a miscarriage.
<b>National Health Index (NHI)</b>	the unique identifier number assigned to the health care user.
<b>National Minimum Data Set (NMDS)</b>	an integrated collection of health data that are collected routinely from all people who are discharged from a hospital in New Zealand.
<b>Neonatal deaths</b>	deaths occurring up to 27 days post-birth.
<b>New Zealand Deprivation Scores (NZDep scores)</b>	generated from the 1996 Census data as an attempt to measure special health needs. An area with a high NZDep score is, on the whole, more likely to need health services than one with a low NZDep score.
<b>New Zealand Health Information Services (NZHIS)</b>	a group within the Ministry of Health responsible for the collection and dissemination of health-related information. The NZHIS has as its foundation the goal of making accurate information readily available and accessible in a timely manner throughout the health sector.
<b>Normal birth</b>	the birth of a baby without obstetric operative intervention (vaginal delivery).
<b>Operative birth</b>	a vaginal birth that includes operative procedures (eg, vaginal breech delivery, forceps delivery, vacuum extraction).
<b>Parity</b>	the number of times a woman has borne children that are either dead or alive after 20 weeks' gestation.
<b>Perinatal deaths</b>	all stillbirths and babies from 20 weeks' gestation and/or over 400 grams who died within seven days of birth.
<b>Postnatal</b>	all pregnancy events following birth.
<b>Post-partum haemorrhages</b>	abnormal bleeding that occurs soon after labour or childbirth.
<b>Pre-term labour</b>	labour before 37 completed weeks of gestation.
<b>Readmissions</b>	all women admitted up to 12 weeks after the date of birth, irrespective of the diagnosis.
<b>Registration</b>	the documentation showing that a woman has selected a lead maternity carer; includes the forwarding of this information to Health Benefits.
<b>Reproductive age</b>	women aged 15–44 years

<b>Rural area</b>	an area is defined as rural if the census area unit (domicile) is located in an area of less than 10,000 people.
<b>Stillbirth</b>	birth that takes place after 20 weeks' gestation, and/or over 400 grams, where the baby shows no signs of life.
<b>Urban area</b>	an area is defined as urban if the census area unit (domicile) is located in an area of more than 10,000 people.
<b>Vacuum extraction</b>	assisted birth using a suction cap applied to the baby's head.
<b>Vaginal breech birth</b>	birth of the baby by the buttocks first, rather than the head.
<b>Well child provider</b>	organisation or individual to whom the care of a baby is transferred to at the end of the LMC postnatal care (eg, Plunket).

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