

Hospital-based Maternity Events 2007

Copyright

The copyright owner of this publication is the Ministry of Health, which is part of the New Zealand Crown. The Ministry of Health permits the reproduction of material from this publication without prior notification, provided that all the following conditions are met:

- the content is not distorted or changed
- the information is not sold
- the material is not used to promote or endorse any product or service
- the material is not used in an inappropriate or misleading context, having regard to the nature of the material
- any relevant disclaimers, qualifications or caveats included in the publication are reproduced
- the Ministry of Health is acknowledged as the source.

Disclaimer

The purpose of this publication is to inform discussion and assist policy development. The opinions expressed in the publication do not necessarily reflect the official views of the Ministry of Health.

All care has been taken in the production of this publication; the data was deemed to be accurate at the time of release, but may be subject to slight changes over time as more information is received. It is advisable to check the current status of figures given here with the Ministry of Health before quoting or using them in further analysis.

The Ministry of Health makes no warranty, expressed or implied, nor assumes any legal liability or responsibility for the accuracy, correctness, completeness or use of the information or data in this publication. Further, the Ministry of Health shall not be liable for any loss or damage arising directly or indirectly from the information or data presented in this publication.

The Ministry of Health welcomes comments and suggestions about this publication.

Acknowledgements

Many people have assisted in the production of this publication. In particular, the Ministry of Health thanks the peer reviewers for their valuable contribution.

Citation: Ministry of Health. 2010. *Hospital-based Maternity Events 2007*.

Wellington: Ministry of Health.

Published in November 2010 by the

Ministry of Health

PO Box 5013, Wellington 6145, New Zealand

ISBN 978-0-478-37414-8 (online)
HP 5272

This document is available on the Ministry of Health's website:
<http://www.moh.govt.nz/moh.nsf/indexmh/dataandstatistics-subjects-maternity>



MANATŪ HAUORA

Contents

Executive Summary	vii
1 Introduction	1
1.1 Background	1
1.2 Purpose	1
1.3 Data sources and processing	1
1.4 Coverage	2
1.5 Explanatory notes	3
1.6 Data presentation	5
1.7 Additional information	5
2 Mother and Pregnancy	6
2.1 Demographic profile	6
2.2 Miscarriages	15
2.3 Pregnancy complications	16
3 Labour and Birth	19
3.1 Type of birth	19
3.2 Caesarean sections	23
3.3 Other birth procedures and events	27
3.4 Multiple births	31
4 Babies	32
4.1 Babies at birth	32
5 Length of Stay and Readmissions	39
5.1 Length of stay (birth event)	39
5.2 Discharge type from hospital	46
5.3 Postnatal hospital readmissions of the mother and baby	47
6 Maternal Deaths	56
7 Maternity Facilities	60
Appendices	
Appendix A: Diagnosis Related Group (DRG)	64
Appendix B: Ethnicity	67
Appendix C: District Health Board Regions	69
Appendix D: Catchment Areas	70
Appendix E: Standardisation	72
Appendix F: Population Data	74
Appendix G: Additional Tables and Figures	76

Glossary	86
References	92

List of Tables

Table 1.1:	Number of mothers and live babies in 2007, by data source	3
Table 2.1:	Age distribution of mothers, by ethnicity of mother, 2007	9
Table 2.2:	Number of mothers, by DHB region of mother's place of residence and ethnicity, 2007	12
Table 2.3:	Number of mothers, by DHB region of mother's place of residence and DHB of facility of birth, 2007	14
Table 2.4:	Antenatal hospital admissions (excluding transfers) and average length of stay for mothers, by selected DRGs ¹ and ethnicity, 2007	17
Table 2.5:	Antenatal and other obstetric admission (excluding transfers and same-day events) and average length of stay for mothers, by grouped principal diagnosis, 2007	18
Table 3.1:	Number of birth procedures, by type of birth, 2007	19
Table 3.2:	Number and percentage of birth procedures, by type of birth and DHB region of mother's place of residence, 2007	23
Table 3.3:	Number of hospital caesarean sections, by type of caesarean section, maternal ethnicity and age group of mother, 2007	26
Table 3.4:	Number of mothers, by birth-related procedures and events, and DHB region of mother's place of residence, 2007	28
Table 3.5:	Crude rate of birth-related procedures and events, by DHB region of mother's place of residence, 2007	29
Table 3.6:	Use of inductions, by age group and ethnicity of mother, 2007	30
Table 3.7:	Use of epidurals, by age group and ethnicity of mother, 2007	30
Table 3.8:	Number of mothers, by baby's birth status and plurality, 2007	31
Table 4.1:	Number of liveborn babies, by place of birth, sex and ethnicity, 2007	33
Table 4.2:	Average birthweight of liveborn babies, by sex and ethnicity, 2007	33
Table 4.3:	Percentage of liveborn babies, by birthweight and ethnicity, 2007	34
Table 4.4:	Percentage of liveborn babies, by gestational age and ethnicity, 2007	35
Table 4.5:	Numbers of liveborn babies, by gestational age and birthweight, 2007	36
Table 4.6:	Percentage of full-term liveborn babies (37 or more weeks' gestation) with a low birthweight (under 2500 g), by ethnicity and year, 2000–2007	37
Table 4.7:	Proportion of full-term liveborn babies (37 or more weeks' gestation) with a low birthweight (under 2500 g), by mother's age group and ethnicity, 2007	37
Table 4.8:	Number of liveborn babies, by birthweight, gestational age and DHB region of mother's place of residence, 2007	38
Table 5.1:	Number of mothers, by antenatal length of stay (days) and maternal ethnicity, 2007	40
Table 5.2:	Number of mothers, by postnatal length of stay (days), maternal ethnicity and age group, 2007	42
Table 5.3:	Number of birth procedures, by mode of birth and postnatal length of stay (days), 2007	42
Table 5.4:	Number of mothers, by DHB region of mother's place of residence and postnatal length of stay (days), 2007	43
Table 5.5:	Number of liveborn babies, by length of stay (days) and gestation, 2007	44
Table 5.6:	Number of liveborn babies, by length of stay (days) and ethnicity, 2007	45

Table 5.7:	Number and percentage of mothers, by mode of separation and ethnicity, 2007	46
Table 5.8:	Number of babies, by mode of separation, 2007	47
Table 5.9:	Number and rate of hospital readmission ¹ for mothers and babies, by DHB region of mother's and baby's place of residence, 2007	48
Table 5.10:	Postnatal readmissions for mothers with problems relating to pregnancy, by principal diagnosis 2007	50
Table 5.11:	Length of time (in days) between mother's delivery and readmission for selected DRGs, by maternal ethnicity and age group, 2007	52
Table 5.12:	Postnatal readmission of babies (all), by top 10 principal diagnoses, 2007	53
Table 6.1:	Maternal deaths, 1996–2007	57
Table 6.2:	Number of maternal deaths, by underlying cause, 2003–2007	59
Table 7.1:	Total live and stillbirths delivered in hospital, by facility type, 2007	60
Table 7.2:	Antenatal hospital admissions and average length of stay, by facility type, 2007	61
Table 7.3:	Type of hospital birth (rate per 100 deliveries), by facility type, 2007	62
Table 7.4:	Number and rate of inductions, epidurals and episiotomies, by facility type, 2007	62
Table 7.5:	Number and percentage of mothers and average length of stay, by PCCL and facility type, 2007	63
Table 7.6:	Numbers of live babies born, by gestational age and facility type, 2007	63
Table A.1:	Obstetric DRGs	66
Table B.1:	Standard prioritisation of Level 2 ethnicity	68
Table F.1:	Prioritised female population projections, 2007, by ethnicity and age group for New Zealand	74
Table F.2:	WHO world population weight	75
Table G.1.1:	Number of women giving birth, by age and DHB region of mother's place of residence, 2007	76
Table G.2.1:	Antenatal hospital admissions (excluding transfers) and average length of stay for mothers, by principal diagnosis (DRGs O66A and O66B), 2007	77
Table G.3.1:	Number of birth procedures, by birth type and maternal age group, 2007	79
Table G.3.2:	Number of birth procedures, by birth type and maternal ethnicity, 2007	80
Table G.3.3:	Number of birth procedures, by birth type and DHB region of mother's place of residence, 2007	81
Table G.3.4:	Number of birth procedures, by plurality and birth type, 2007	82
Table G.4.1:	Percentage of liveborn babies, by gestational age and DHB region of mother's place of residence, 2007	83
Table G.4.2:	Percentage of liveborn babies, by birthweight and DHB region of mother's place of residence, 2007	84

List of Figures

Figure 1.1:	Perinatal periods	4
Figure 2.1:	Percentage of live birth registrations, by age of mother, 1978–2007	7
Figure 2.2:	Percentage of live birth registrations, by age of mother, 1999–2007	8
Figure 2.3:	Percentage of mothers, by ethnicity and year of delivery, 1999–2007	9
Figure 2.4:	Crude birth rate,* by ethnicity of mother, 2007	10
Figure 2.5:	Hospital delivery age-specific birth rate per 1000 women of reproductive age, by ethnicity and age group of mother, 2007	11
Figure 2.6:	Standardised hospital birth rates (standardised by age and ethnicity), with 99 percent confidence intervals, per 1000 women of reproductive age, by DHB of mother's place of residence, 2007	13
Figure 2.7:	Percentage of pregnancies ending in miscarriage, by ethnicity and age group of woman, 2007	16
Figure 3.1:	Percentage of birth procedures, by year and type of birth, 1999–2007	20
Figure 3.2:	Percentage of birth procedures, by type of birth and age group, 2007	21
Figure 3.3:	Percentage of birth procedures, by birth type and ethnicity, 2007	22
Figure 3.4:	Standardised hospital caesarean section rates (standardised by age and ethnicity) and 99 percent confidence intervals, by DHB region of mother's place of residence, 2007	24
Figure 3.5:	Percentage of hospital caesarean sections, by type of caesarean section and maternal age at delivery, 2007	25
Figure 3.6:	Percentage of mothers delivering by caesarean section, 1999–2007	27
Figure 3.7:	Percentage of birth procedures, by mode of birth and plurality, 2007	31
Figure 4.1:	Percentage of total live births, by ethnicity, 2000–2007	32
Figure 4.2:	Percentage of liveborn babies, by birthweight and sex, 2007	34
Figure 4.3:	Percentage of liveborn babies, by gestational age and sex, 2007	35
Figure 4.4:	Percentage of liveborn babies, by early and late gestational age (excluding babies born between 37 and 41 weeks' gestation), 1999–2007	36
Figure 5.1:	Percentage of mothers, by length of stay in hospital (days), 2007	40
Figure 5.2:	Percentage of mothers, by postnatal length of stay (days), 2007	41
Figure 5.3:	Percentage of babies, by ethnicity, gestational group and postnatal length of stay (days), 2007	45
Figure 5.4:	Rate of hospital readmission of mothers for postpartum and post-abortion diagnoses, with 99 percent confidence intervals, by DHB of mother's place of residence, 2007	49
Figure 5.5:	Percentage of mothers, by length of time between delivery and readmission (days) for selected DRGs,* 2007	51
Figure 5.6:	Rate of hospital readmission of babies discharged from hospital of birth (with 99 percent confidence intervals), by DHB of baby's place of residence, 2007	53
Figure 5.7:	Percentage of readmitted babies, by length of time between discharge from hospital of birth and readmission (days), 2007	54
Figure 5.8:	Percentage of readmitted babies, by ethnicity and length of time between discharge from hospital of birth and readmission (days), 2007	55
Figure 6.1:	Rates of maternal deaths, annual rate and three-year moving average, 1954–2007	58
Figure 7.1:	Percentage of mothers giving birth in primary, secondary and tertiary facilities, by ethnicity, 2007	61
Figure G.4.1:	Average birthweight of female babies, by ethnicity, 1999–2007	85
Figure G.4.2:	Average birthweight of male babies, by ethnicity, 1999–2007	85

Executive Summary

This publication summarises maternal and newborn data stored in the National Minimum Dataset (NMDs). Data from other sources has been included for comparative purposes. *Hospital-based Maternity Events 2007* is the third in a series of online publications and reports on publicly funded inpatient events only. Data from community and outpatient events is currently unavailable, but will be incorporated into the printed *Report on Maternity: Maternal and newborn information* series.

Introduction

- In 2007 the NMDs recorded that 60,961 women gave birth in a New Zealand hospital, and 62,045 babies were born in, or were subsequently admitted to, a New Zealand hospital.
- In the same period Statistics New Zealand reported 63,492 mothers on the birth registrations of 64,044 babies.
- Births outside hospital may account for the difference between the in-hospital birth numbers and the Statistics New Zealand numbers.

Mother and pregnancy

- The largest age group of mothers (28.4 percent) was the 30 to 34 years age group.
- The largest maternal ethnic group was European (56.4 percent), followed by Māori (20.5 percent).
- Of the ethnic groups, Pacific mothers had the highest crude birth rate at 117.2 births per 1000 women of reproductive age.

Labour and birth

- Nearly two-thirds (65.4 percent) of procedures were coded as normal vaginal birth, and 24.2 percent as caesarean section.
- The proportion of caesarean sections performed increased between 1999 and 2007 (from 19.4 percent to 24.2 percent of all procedures). This is in line with an international trend observed in many developed countries (Anderson 2004).
- The majority of total caesarean sections were performed as an emergency procedure (57.3 percent).
- Mothers over 35 years of age were the only group more likely to have an elective caesarean section (53.5 percent) than an emergency caesarean section.

Babies

- Slightly more male babies were born than female babies (51.4 percent).
- As with mothers, the largest group of babies were identified as being of European ethnicity (54.7 percent). Twenty-two percent of babies were identified as Māori.
- The majority of liveborn babies were born at a gestational age of 37 or more weeks (88.0 percent), and the average birthweight was 3.43 kg.

Length of stay and readmissions

- The average maternal length of stay during the birth event was 2.5 days.
- The majority of mothers (60.5 percent) were discharged from the hospital of delivery within two days of admission.
- The majority of mothers (83.5 percent) were discharged home, and a further 16.3 percent were transferred, either to another facility or to another service within the same facility.
- The average length of stay for pre-term babies was 15.1 days.
- The average length of stay for term babies was 2.0 days.

Maternal deaths

- Thirteen maternal deaths were reported in 2007.
- Seven deaths were from direct causes and six were from indirect causes.

Maternity facilities

- The majority of women gave birth in either a tertiary (42.1 percent) or secondary (41.7 percent) facility.
- Most Pacific and Asian women gave birth in a tertiary facility (60.7 and 60.0 percent, respectively).
- Almost half of all Māori mothers (48.9 percent) gave birth in a secondary facility.
- Primary facilities had the lowest rates of induction, epidural and episiotomies.

1 Introduction

1.1 Background

Maternal and newborn health care services are a critical component of public health services. The World Health Organization (WHO) has stated that ‘care for pregnant women is often the entry point for health services for the family and community’ (WHO 2005). Monitoring maternal and newborn health constitutes an integral part of monitoring the health of the overall population.

This publication presents information on the use of maternity services and on the health outcomes for women and their babies who accessed hospital-based maternity services, in the 2007 calendar year. It will be of use to those who plan health services, as well as being of interest to health professionals, researchers and the community in general.

The robustness of any analysis is dependent on the quality of data submitted to the Ministry of Health. Potential issues affecting data integrity have been highlighted throughout this publication.

1.2 Purpose

This publication is the latest release in the *Hospital-based Maternity Events* series. It presents health statistics on the pregnancy and childbirth characteristics of mothers who gave birth in hospital (to babies liveborn or stillborn) and babies who were born in, or subsequently admitted to, hospital in the 2007 calendar year.

At the time of writing, data on community-based primary maternity services (provided by lead maternity carers) and outpatient events was not available. As a result, the information presented within this publication is not a complete picture of maternity services in New Zealand. When this data becomes available it will be incorporated into the *Report on Maternity Series*, which reports on both community- and hospital-based maternity services.

1.3 Data sources and processing

Unless otherwise stated, information presented in the tables and graphs of this publication:

- occurred during the 2007 calendar year
- has been sourced from the NMDS (National Minimum Dataset)
- refers to publicly funded inpatient events taking place in either a public or a private hospital or facility.

1.3.1 The National Minimum Dataset (NMDS)

Administrative information is routinely collected for all publicly funded inpatient events in which a patient is discharged from a facility in New Zealand. This information contains a substantial amount of demographic and clinical data, including diagnostic and procedural information. This information is assigned codes (generally by hospital coders) according to the classification system in use (see section 1.5.2). Newborn and maternal records are coded and extracted separately, and some details may differ. The event information is forwarded to the Ministry of Health, where it is checked, validated and loaded into the NMDS.

1.3.2 The Mortality Collection

The Ministry of Health's Mortality Collection stores information on the underlying cause of death for all deaths registered in New Zealand, including all registered fetal deaths (stillbirths). These deaths are coded by the year the registration of death was received and according to ICD-10-AM and the WHO Rules and Guidelines for Mortality Coding. Fetal and baby death data form a subset of the Mortality Collection, with data for extra fields collected (such as gestation and birthweight).

The Ministry of Health receives death and stillbirth information from a number of sources, including electronic records from Births, Deaths and Marriages (BDM), coroners' findings, and medical certificates of cause of death (from funeral directors or the person in charge of the disposal of the body). Additional information is sourced from a number of agencies such as the Cancer Registry, the New Zealand Transport Agency, Water Safety New Zealand, news media, certifying doctors and medical records officers.

1.3.3 Births, Deaths and Marriages (BDM)

BDM registers and maintains New Zealand's birth information and provides access to this data via Statistics New Zealand. BDM, unlike the NMDS, reports on births by the year of registration, not by the date of birth. Any undercount should therefore be balanced by late registrations from previous years.

1.3.4 Statistics New Zealand

Statistics New Zealand is responsible for conducting the New Zealand Census every five years. The Census is the official count of population and dwellings in New Zealand. Census data for reproductive-aged women is used as the denominator for many of the rates in this publication.

1.4 Coverage

Table 1.1 shows the number of women who gave birth and the number of live babies, as recorded in the NMDS in 2007, with corresponding numbers from BDM.

Table 1.1: Number of mothers and live babies in 2007, by data source

Source	Inclusion criteria	Number of:		
		Mothers	Liveborns	Stillborns
Births, Deaths and Marriages	Date of registration in the 2007 calendar year; includes late registrations (births from previous years)		65,121	
NMDS – Mother's record	Date of delivery in the 2007 calendar year	60,961	61,364	468
NMDS – Baby's record	Date of birth in the 2007 calendar year		62,045	

Data source: NMDS and Births, Deaths and Marriages New Zealand

Because the NMDS only receives data from publicly funded hospital births, it is likely that the differences between the NMDS and Statistics New Zealand numbers in Table 1.1 are due to births occurring outside a maternity facility setting.

It is important to note that due to data cleansing and subsequent updates of hospital records, the numbers in this publication may differ from reports published by District Health Boards (DHBs).

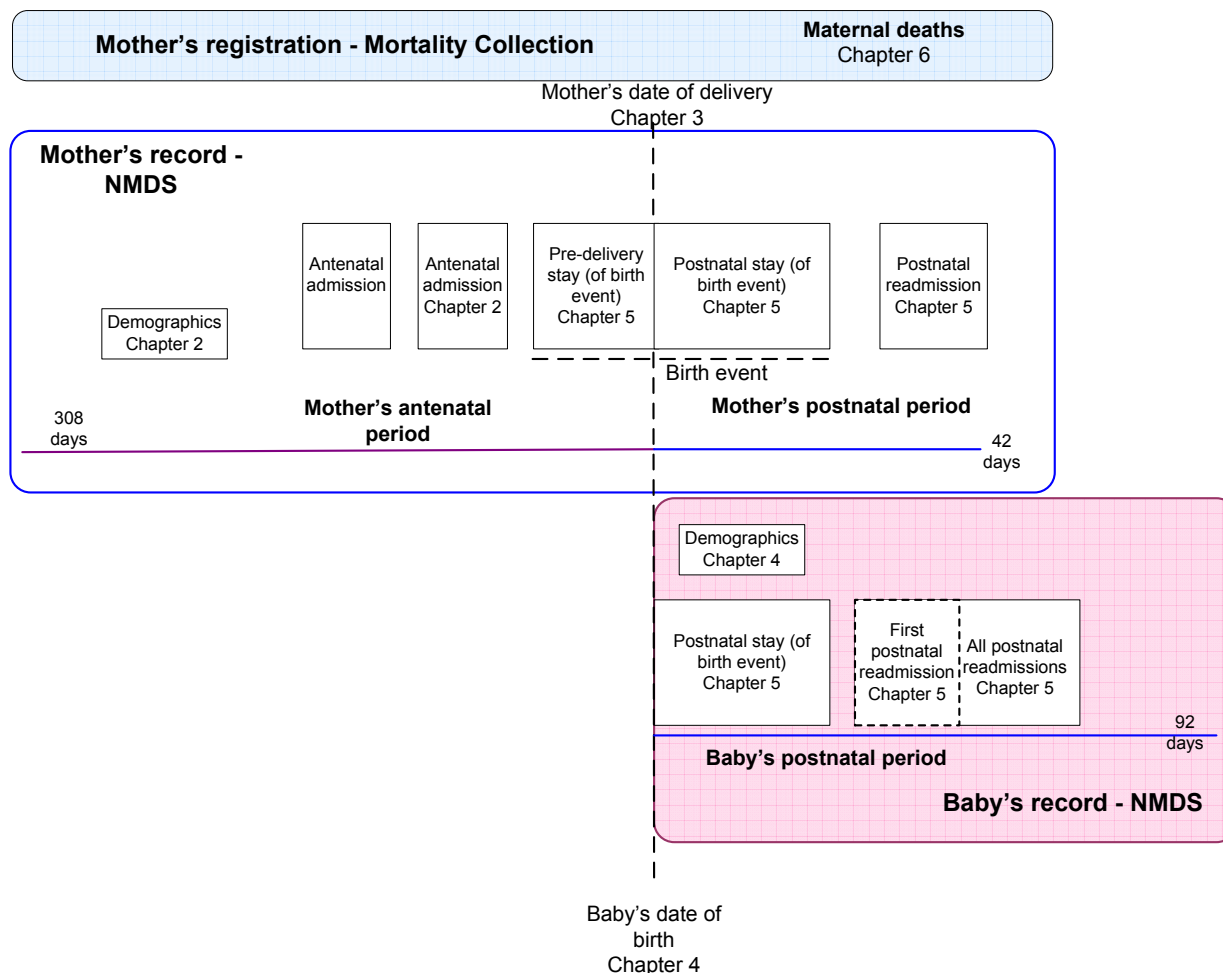
1.5 Explanatory notes

1.5.1 Definitions

Unless otherwise stated, 'mother' will be used to refer to a woman who had a publicly funded birth in a New Zealand hospital in the 2007 calendar year. 'Baby' will be used to refer to a newborn either born in, or subsequently admitted to, a New Zealand hospital in the 2007 calendar year. The maternal reproductive age group is defined as the 15 to 44 years age group. A maternity facility is defined as a hospital or birthing centre where mothers attend or are resident, for the primary purpose of receiving maternity care. See the Glossary for further definitions.

The following figure illustrates the data sources and time periods associated with the chapters in this publication.

Figure 1.1: Perinatal periods



1.5.2 Classification systems

This publication uses two classification systems: the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM), First Edition (NCCH 1998a); and the Australian Refined Diagnosis Related Groups (AR-DRG), Version 5.0.

ICD-10-AM is a system designed for classifying morbidity and mortality information for statistical, epidemiological and clinical purposes. Codes are used to classify demographic, clinical and resource information in a form that is internationally comparable.

The AR-DRG provides a clinically meaningful way of relating the types of conditions patients are treated for in a hospital to the resources required by the hospital. This classification scheme was developed in Australia for use in the monitoring and managing of health care services. For further information, see Appendix A.

1.6 Data presentation

Currently there is no robust system for matching maternal and newborn records. Even though there is some overlap in the data collected, this information is coded and extracted separately and details may differ slightly.

1.6.1 Numbers and rates

Some tables in this publication present information by multiple categories: for example low birthweight full-term babies by maternal age and ethnicity. For clarity, one total is shown in each table, and this applies to all categories within the table. Rounding may mean that some percentages do not add up to 100 percent.

Caution is advised when interpreting rates derived from small numbers (such as maternal mortality), because they may fluctuate markedly over time. To 'smooth out' random fluctuations, and better represent the underlying trend, three-year moving averages have been used for some graphs.

Some rates have been standardised by age and/or ethnicity to compensate for differences in population age and ethnicity structure (see the Glossary).

Confidence intervals have been calculated at the 99 percent level for rates standardised by age and ethnicity for all DHBs and for the rate of in-hospital stillbirths and neonatal deaths (see the Glossary).

1.7 Additional information

Should you require information not included in this report or in the online statistical tables, the Ministry of Health is capable of producing customised data extracts tailored to your needs. These may incur a charge (at Official Information Act rates).

Please contact:

Analytical Services
Ministry of Health
Phone (04) 496 2000
Fax (04) 816 2898

PO Box 5013
Wellington 6145
New Zealand

Email: data-enquiries@moh.govt.nz
or visit: <http://www.moh.govt.nz/dataandstatistics>

The Ministry of Health welcomes comments and suggestions about this publication.

2 Mother and Pregnancy

This section is a summary of the demographic and clinical profile of mothers who gave birth in a New Zealand hospital or who registered a birth in New Zealand. Pregnancy complications, including miscarriage and other antenatal hospitalisations, are also discussed.

2.1 Demographic profile

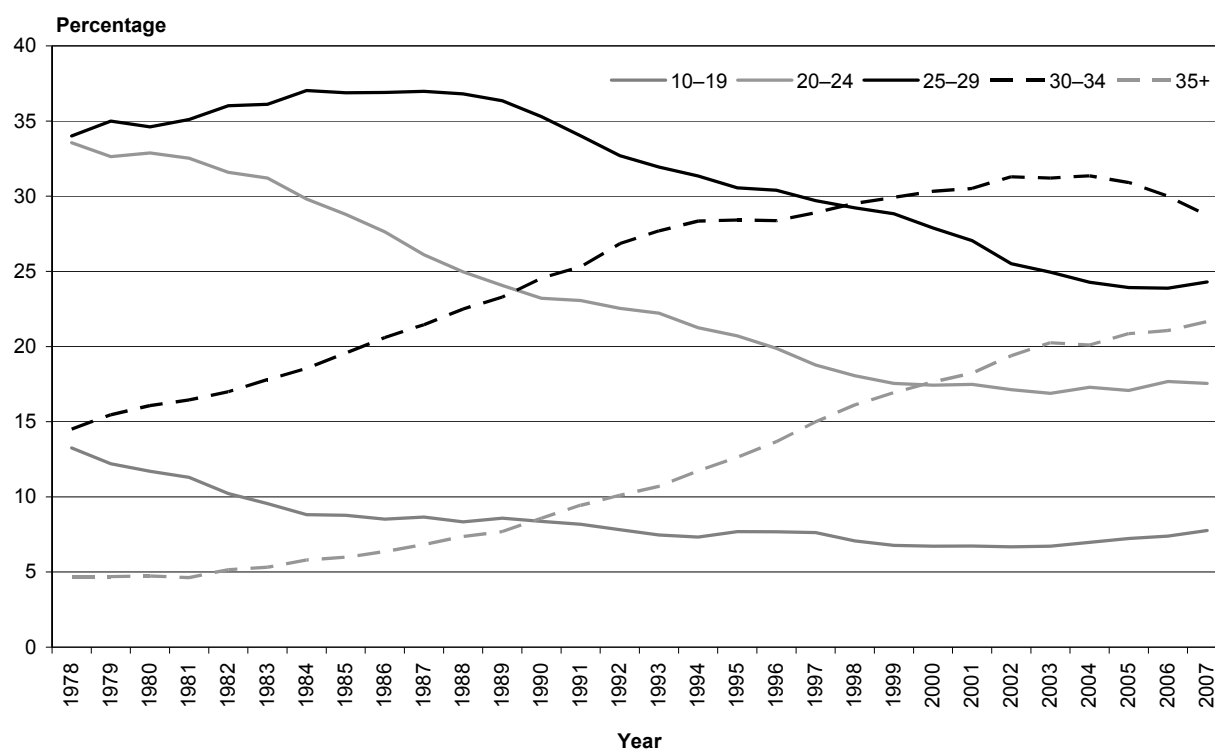
In 2007, 65,121 liveborn babies were registered by BDM. In the same year, New Zealand hospitals reported that 60,961 women gave birth in a maternity facility to 61,832 babies, of whom 61,364 were liveborn (sourced from the mother's record). The number of babies born in a maternity facility account for 95.7 percent of the liveborn babies registered with BDM. Births outside maternity facilities are likely to account for the difference between the number of hospital births and the number of babies registered by BDM.

Note on babies

Babies reported in this section are those whose information was collected on the mother's record. Some information may therefore differ from section 4, which is sourced directly from the baby's record.

Figure 2.1 was produced using birth registration data (as reported by BDM). It plots the proportion of live birth registrations by maternal age. The underlying trend seen between 1978 and 2007 is an increase in mothers in the 30 and over age groups and a decrease in mothers in the under 30 years age groups. These trends seem to have stabilised since 2003.

Figure 2.1: Percentage of live birth registrations, by age of mother, 1978–2007

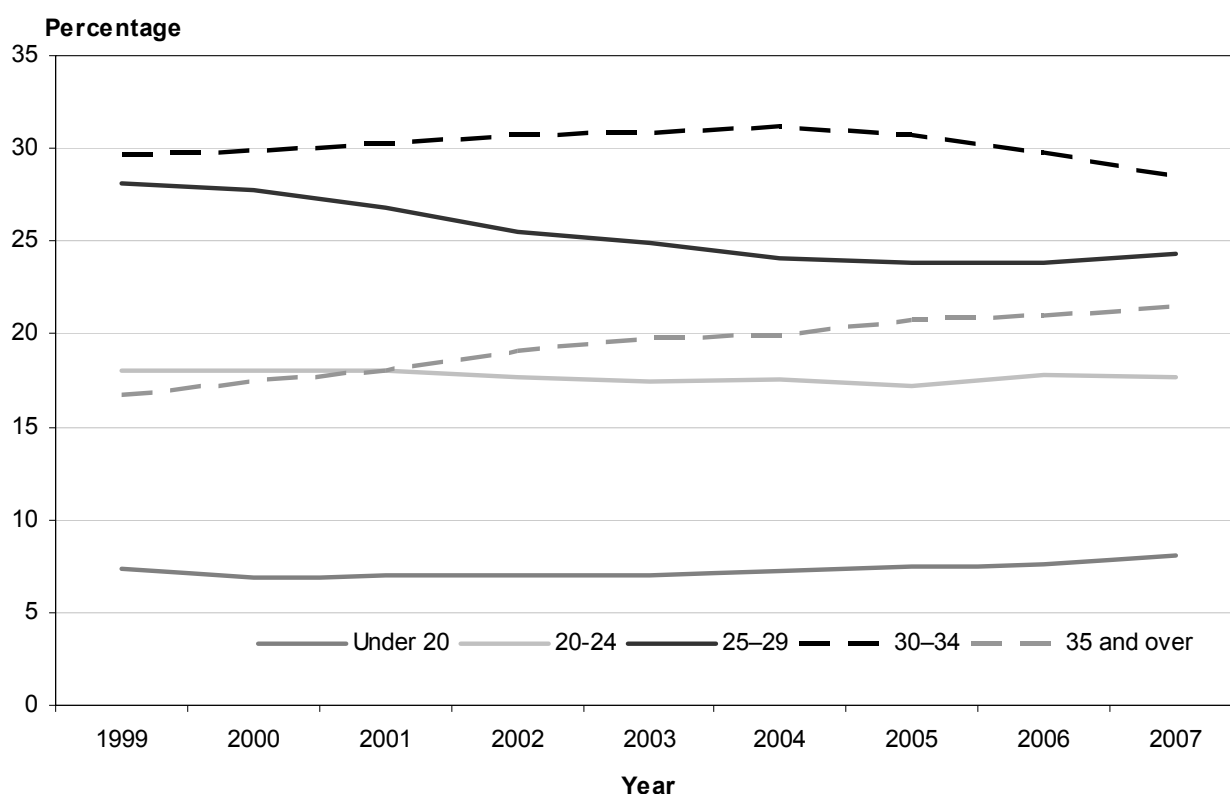


Data source: BDM

Statistics New Zealand reported that the median age of New Zealand mothers with a birth registered in 2007 was 30.0 years. The median ages of Māori and Pacific mothers were the lowest of the reported groups (26.0 years and 28.0 years, respectively).

Figure 2.2 graphs the percentage of mothers by age group as reported in the NMDS. This graph reflects the same trends seen in the BDM data (Figure 2.1).

Figure 2.2: Percentage of live birth registrations, by age of mother, 1999–2007



Data source: NMDS (mother's record)

Table 2.1 shows that the majority of mothers were of European ethnicity (56.4 percent). Māori and Pacific mothers accounted for 20.5 percent and 10.5 percent, respectively, while Asian mothers were the smallest of the reported ethnicities (9.3 percent). As Figure 2.3 shows, there were no major shifts in mothers' ethnicity from 1999 to 2007, although the proportion of European mothers decreased from 58.6 percent of all mothers to 56.4 percent and the percentage of Asian mothers increased from 5.9 percent of all mothers to 6.3 percent.

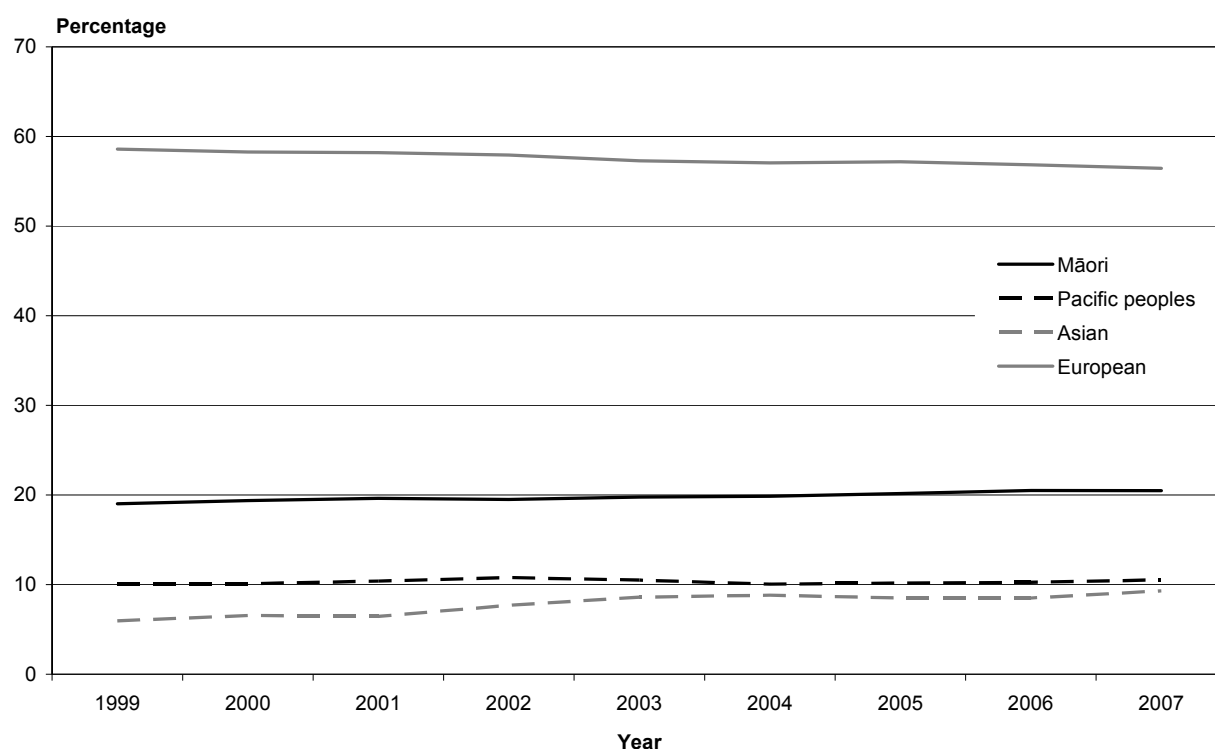
Note on ethnic groups

In this publication, the 'Not stated' ethnic group refers to those who did not provide details of their ethnicity, while the 'Other' ethnic group refers to those who indicated an ethnic group other than the groups specified. For further information on ethnicity, see Appendix B.

Table 2.1: Age distribution of mothers, by ethnicity of mother, 2007

Age group	Ethnicity						Total	
	Māori	Pacific	Asian	European	Other	Not stated	No	%
Under 16	108	18	1	58	3	1	189	0.3
16–19	2274	538	92	1735	60	38	4737	7.8
20–24	3688	1604	724	4486	241	68	10,811	17.7
25–29	2910	1773	1782	7806	402	129	14,802	24.3
30–34	2056	1376	1821	11,455	486	132	17,326	28.4
35–39	1184	860	1041	7430	276	62	10,853	17.8
40 and over	267	251	206	1435	71	13	2243	3.7
Not stated	0	0	0	0	0	0	0	0.0
Total number	12,487	6420	5667	34,405	1539	443	60,961	
Total percentage	20.5	10.5	9.3	56.4	2.5	0.7		100.0

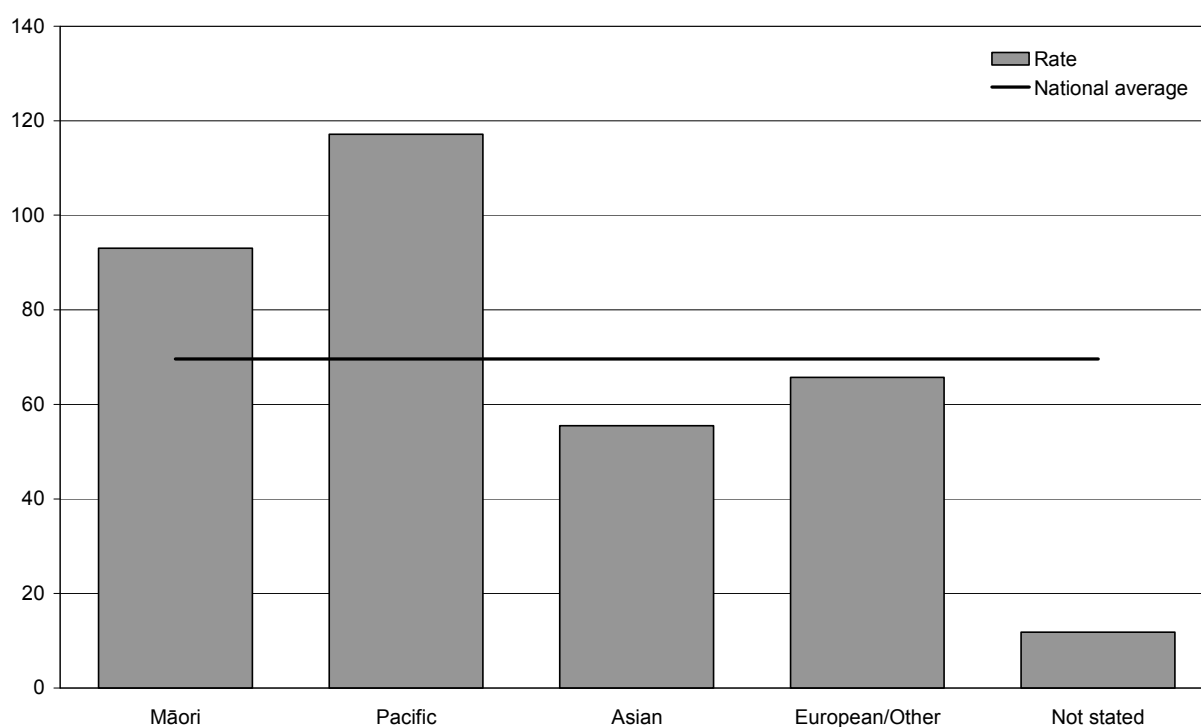
Data source: NMDS (mother's record)

Figure 2.3: Percentage of mothers, by ethnicity and year of delivery, 1999–2007

Data source: NMDS (mother's record)

In 2007 the national crude birth rate was 69.6 births per 1000 women of reproductive age. Pacific and Māori women had the highest crude birth rates at 117.2 and 93.0 births per 1000 reproductive-aged women, respectively. European/Other and Asian mothers had crude birth rates below the national rate (65.7 and 55.5 births per 1000 women of reproductive age, respectively; see Figure 2.4).

Figure 2.4: Crude birth rate,* by ethnicity of mother, 2007

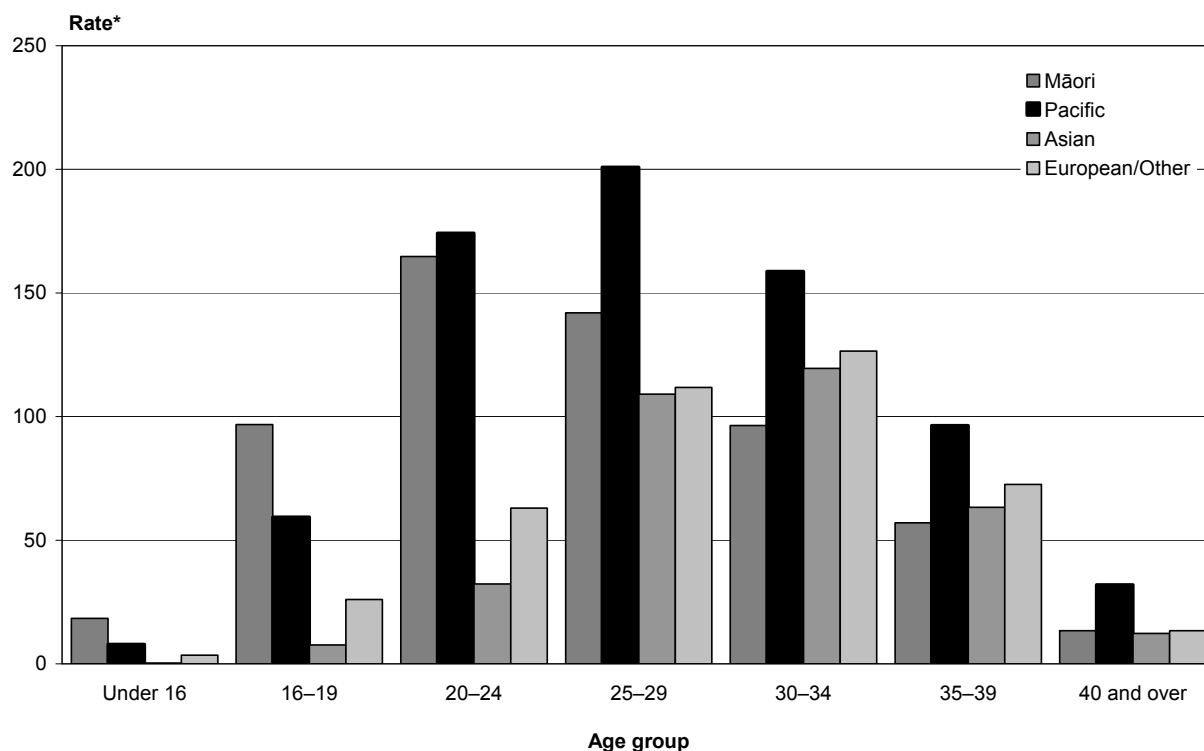


* Crude birth rate per 1000 women of reproductive age.

Data source: NMDS (mother's record)

As Figure 2.5 shows Māori women tend to have children at a younger age than women in other ethnic groups. In 2007 the Māori birth rate peaked in the 20 to 24 years age group. In comparison, the birth rate for Pacific women peaked in the 25 to 29 years age group. Mothers in the 30 to 34 years age group had the highest crude birth rate within the Asian and European groups.

Figure 2.5: Hospital delivery age-specific birth rate per 1000 women of reproductive age, by ethnicity and age group of mother, 2007



Data source: NMDS (mother's record)

* Crude birth rate per 1000 women of reproductive age.

A regional breakdown of maternal data by DHB region (of residence) is shown in Table 2.2 and Figure 2.6. Mothers residing in DHB regions in the greater Auckland region (Waitemata, Auckland and Counties Manukau) accounted for over one-third of all mothers (37.3 percent). This is consistent with the distribution of the general population. In 2007 the Counties Manukau DHB region had the highest number of mothers (8691 births; 14.3 percent of mothers), while West Coast DHB region had the lowest (373 births; 0.6 percent of mothers).

The population of individual DHB regions varies in its ethnic composition. Tairāwhiti DHB region had the largest percentage of Māori mothers (59.8 percent), the Auckland DHB region had the largest percentage of Asian mothers (21.3 percent), and Counties Manukau DHB region had the largest percentage of Pacific mothers (32.0 percent).

Table 2.2: Number of mothers, by DHB region of mother's place of residence and ethnicity, 2007

DHB region	Māori	Pacific peoples	Asian	European	Other	Not stated	Total	%	Crude birth rate*
Northland	1036	38	38	972	6	48	2138	3.5	76.7
Waitemata	924	880	1133	4307	218	24	7486	12.3	65.5
Auckland	645	1275	1401	2969	242	33	6565	10.8	58.6
Counties Manukau	2008	2781	1268	2301	281	52	8691	14.3	82.7
Waikato	1558	159	284	3110	116	25	5252	8.6	71.5
Lakes	738	40	43	706	33	7	1567	2.6	76.0
Bay of Plenty	988	64	128	1619	13	28	2840	4.7	74.3
Tairāwhiti	446	18	15	259	5	3	746	1.2	82.5
Hawke's Bay	825	130	55	1217	43	10	2280	3.7	77.0
Taranaki	325	24	35	1073	44	7	1508	2.5	73.0
MidCentral	451	63	89	1504	32	15	2154	3.5	62.8
Whanganui	301	18	16	500	3	1	839	1.4	71.5
Capital & Coast	536	387	383	2340	130	31	3807	6.2	54.4
Hutt Valley	431	211	162	1204	49	22	2079	3.4	68.8
Wairarapa	107	11	7	362	7	2	496	0.8	72.9
Nelson Marlborough	169	32	59	1290	27	30	1607	2.6	64.2
West Coast	35	4	2	323	6	3	373	0.6	62.2
Canterbury	549	193	420	4969	164	73	6368	10.4	61.0
South Canterbury	58	8	21	551	4	3	645	1.1	67.1
Otago	163	43	59	1649	46	17	1977	3.2	48.7
Southland	189	37	48	1163	68	8	1513	2.5	66.0
Not stated	5	4	1	17	2	1	30	0.0	...
Total	12,487	6420	5667	34,405	1539	443	60,961	100.0	66.8

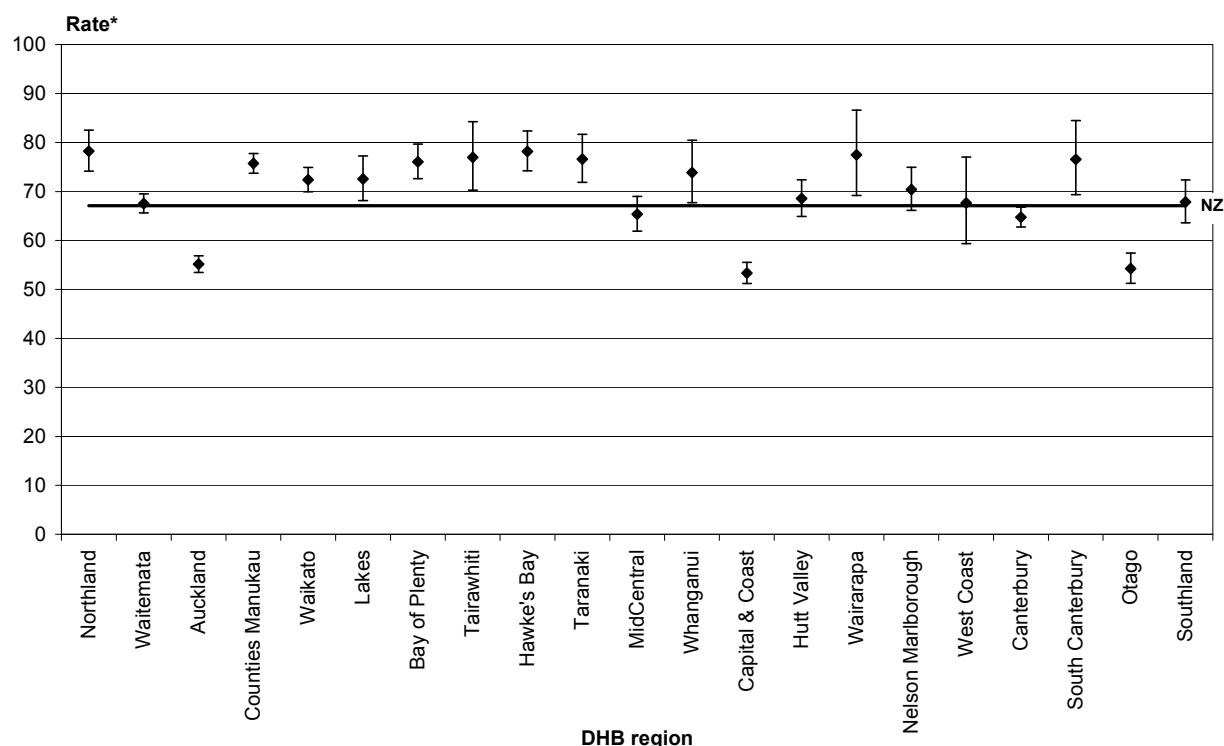
Data source: NMDS (mother's record)

... Calculation of rates not applicable.

* Crude birth rate per 1000 women of reproductive age.

Figure 2.6 presents hospital birth rates for each DHB region of mother's place of residence, standardised by age and ethnic group, along with 99 percent confidence intervals (see Appendix E).

Figure 2.6: Standardised hospital birth rates (standardised by age and ethnicity), with 99 percent confidence intervals, per 1000 women of reproductive age, by DHB of mother's place of residence, 2007



Data source: NMDS (mother's record)

* Standardised hospital birth rate per 1000 women of reproductive age.

Northland and Hawke's Bay DHBs shared the highest standardised birth rates in the North Island (78.2 per 1000 women of reproductive age). In the South Island the highest birth rates were found in the South Canterbury and Nelson Marlborough DHBs (76.6 and 70.4 per 1000 women of reproductive age, respectively). Capital & Coast, Otago and Auckland DHBs had the lowest standardised birth rates (53.3, 54.3 and 55.1 per 1000 women of reproductive age, respectively).

As Table 2.3 shows, in 2007 the majority of women used the maternity services in their DHB region of residence. Women residing in DHB regions without major tertiary (see Glossary) maternity facilities accessed these services in neighbouring DHB regions, which is in line with Ministry of Health and governmental expectations and policy. Appendix D lists the maternity services available by DHB catchment area.

Table 2.3: Number of mothers, by DHB region of mother's place of residence and DHB of facility of birth, 2007

DHB region of residence	DHB of facility																					Total
	Northland	Waitemata	Auckland	Counties Manukau	Waikato	Lakes	Bay of Plenty	Tairawhiti	Hawke's Bay	Taranaki	MidCentral	Wanganui	Capital & Coast	Hutt	Wairarapa	Nelson Marlborough	West Coast	Canterbury	South Canterbury	Otago	Southland	
Northland	2032	44	40	9			3	2			1										2138	
Waitemata	10	6364	1068	21	4		2		1	1	2		3			2		6		2	7486	
Auckland	3	372	5591	584	3 ⁴	1	4	1	2				4				1	2			6565	
Counties Manukau	12	56	1170	7423	13	2	5	1	1				1					2		1	8691	
Waikato	4	4	34	32	5050	20	85	3	3	4	7	1	3								5252	
Lakes	1	6	5	2	41	1485	15		3	1 ²	2	1	2	1 ¹							1567	
Bay of Plenty			15		66	69	2676	3	2		2		4			1	2	2			2840	
Tairawhiti			1		8		1	694	40		1		1		1						746	
Hawke's Bay	1	3	3		4	3	1	9	2216		10	1	19	1							2280	
Taranaki	1		4	1	2	1				1474		20	4		1						1508	
MidCentral			2	1	1				5	2	2051	3	60	3	21		9				2154	
Whanganui					4	1	2				146	667	14		1	1					839	
Capital & Coast	2 ¹		3	2	3	1	3		2	3	15		3635	137	1	1	1				3807	
Hutt Valley			2 ¹	1		1			1 ¹		5		151	1915			1	1		1	2079	
Wairarapa		2			1						1		17	11	462		2	1		1	496	
Nelson Marlborough	1		2		2		1						16			1573		9		2	1607	
West Coast					2								3			5	336	25		1	373	
Canterbury		4	5	1	6		2				1		6			15	1	6308	4	14	1	6368
South Canterbury	1				1		1				1		2					18	608	12	1	645
Otago			3		1		1						2		1	1		20	2	1913	33	1977
Southland		1	1		1	1			1					1		2		11		60	1434	1513
Not stated	1	4	3		3								1		1			1		6	10	30
Total	2069	6861	7952	8078	5216	1589	2799	716	2275	1488	2247	693	3948	2069	489	1602	337	6422	614	2013	1484	60,961

Data source: NMDS (mother's record)

2.2 Miscarriages

Miscarriages are defined as pregnancies that end spontaneously before 20 weeks of gestation. Induced terminations of pregnancy are excluded from this analysis.

Note on data integrity

This data includes all women who have been referred to a hospital during or after a miscarriage. Miscarriages that occur outside a hospital setting (and where the woman is not subsequently admitted to hospital) will not be captured by this publication.

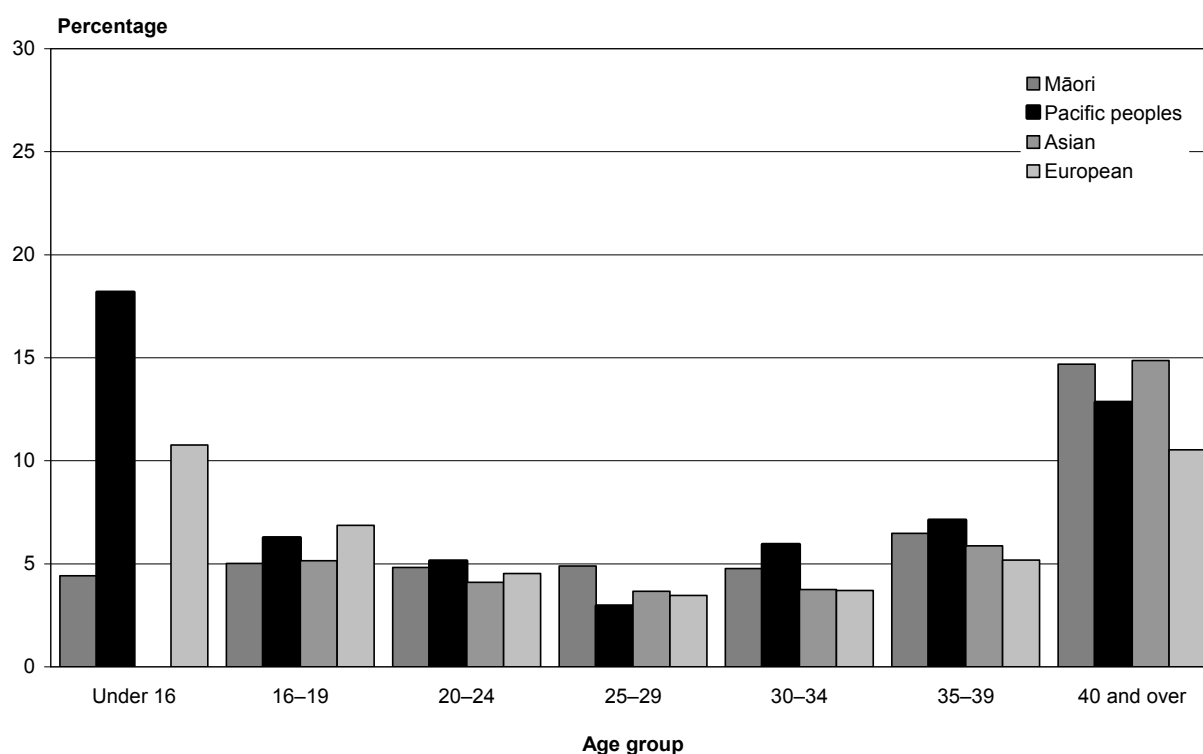
Because there are low numbers of hospital miscarriages, rates of miscarriage fluctuate widely and caution should be exercised when making any comparisons.

Figure 2.7 shows the percentage of pregnant women miscarrying, by age and ethnicity. Women at both ends of the reproductive age range were more likely to have their pregnancies end in miscarriage (5.9 percent of pregnant women aged less than 20 years and 11.3 percent of pregnant women aged 40 years and over).

Pacific and Māori¹ women had the highest levels of pregnancies ending in miscarriage (5.8 percent and 5.5 percent, respectively). The percentage of Asian and European women miscarrying was the lowest at 4.9 and 4.8 percent of pregnant women, respectively.

¹ The comparison does not include mothers of 'Unknown' ethnicity.

Figure 2.7: Percentage of pregnancies ending in miscarriage, by ethnicity and age group of woman, 2007



Data source: NMDS (mother's record)

Note: Hospital miscarriages include all women who are referred to a publicly funded hospital during a miscarriage. Women who miscarry outside hospital and are not admitted to hospital are not included in this data.

2.3 Pregnancy complications

Pregnancy complications (other than miscarriage) are summarised in Tables 2.4 and 2.5 using the AR-DRG classification scheme (see Appendix A for a detailed description of DRGs). Total recorded antenatal admissions may include more than one admission for individual women, but exclude transfers between facilities.

Table 2.4: Antenatal hospital admissions (excluding transfers) and average length of stay for mothers, by selected DRGs¹ and ethnicity, 2007

DRG	Description	Ethnic group	Admissions		Average length of stay (days)
			Number	Percentage	
O64A ²	False labour before 37 weeks or with catastrophic CC ³	Māori	365	2.1	1.2
		Pacific peoples	73	0.4	0.9
		Asian	73	0.4	1.3
		European	673	3.8	1.5
		Other	22	0.1	1.1
		Not stated	7	0.0	2.4
		O64A total	1213	6.9	1.3
O64B ²	False labour after 37 weeks without catastrophic CC ³	Māori	315	1.8	0.4
		Pacific peoples	254	1.4	0.4
		Asian	231	1.3	0.2
		European	575	3.3	0.3
		Other	46	0.3	0.3
		Not stated	10	0.1	0.4
		O64B total	1431	8.1	0.3
O66A	Antenatal and other obstetric admission	Māori	1917	10.9	2.3
		Pacific peoples	1313	7.4	2.2
		Asian	665	3.8	2.2
		European	4456	25.3	2.2
		Other	278	1.6	2.1
		Not stated	61	0.3	2.5
		O66A total	8690	49.3	2.2
O66B	Antenatal and other obstetric admission – same day	Māori	1399	7.9	...
		Pacific peoples	1002	5.7	...
		Asian	602	3.4	...
		European	3071	17.4	...
		Other	187	1.1	...
		Not stated	46	0.3	...
		O66B total	6307	35.8	...
Total			17,641	100.0	1.2

Data source: NMDS (mother's record)

... = not applicable.

1 DRGs O64A, O64B, O66A and O66B.

2 Admission due to false labour refers to women who were admitted to hospital for three or more hours but discharged because they were not in established labour.

3 Co-morbid or complicating conditions

Table 2.5 presents grouped principal diagnoses for antenatal admissions and average length of stay for each grouping. The principal diagnosis is the primary reason for the hospital admission. Maternal care for known or suspected abnormality of pelvic organs was associated with the longest average length of stay (4.6 days). The complete list of principal diagnoses for each antenatal admission is presented in Appendix G, Table G2.1.

Table 2.5: Antenatal and other obstetric admission (excluding transfers and same-day events) and average length of stay for mothers, by grouped principal diagnosis,* 2007

Principal diagnosis – most common	Antenatal admission		Average length of stay (days)	Antenatal admission – same day	
	Number	Percentage		Number	Percentage
Other maternal diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium	2098	24.1	2.1	1720	27.3
Excessive vomiting in pregnancy	1487	17.1	2.2	422	6.7
Antepartum haemorrhage, not elsewhere classified	870	10.0	1.8	307	4.9
Infections of genitourinary tract in pregnancy	704	8.1	2.0	240	3.8
Gestational [pregnancy-induced] hypertension without significant proteinuria	513	5.9	1.9	299	4.7
Gestational [pregnancy-induced] hypertension with significant proteinuria	380	4.4	2.8	179	2.8
Haemorrhage in early pregnancy	250	2.9	1.4	420	6.7
Placenta praevia	256	2.9	4.3	49	0.8
Premature rupture of membranes	286	3.3	3.3	276	4.4
Maternal care for other known or suspected fetal problems	166	1.9	2.8	307	4.9
Maternal care for known or suspected abnormality of pelvic organs	174	2.0	4.6	136	2.2
Diabetes mellitus in pregnancy	190	2.2	2.7	73	1.2
Antenatal screening	92	1.1	1.3	344	5.5
Prolonged pregnancy	70	0.8	1.4	203	3.2
Abnormalities of forces of labour	89	1.0	1.0	179	2.8
Other	1065	12.3	–	1153	18.3
Total	8690	100.0	2.3	6307	100.0

Data source: NMDS (mother's record)

* DRG O66A and O66B.

3 Labour and Birth

This section presents analyses of events relating to labour and birth, with an emphasis on the type of birth (delivery).

3.1 Type of birth

In 2007 nearly two-thirds (65.4 percent) of birth procedures were spontaneous vaginal births (normal births), and almost a quarter (24.2 percent) were caesarean sections. The remaining 10.4 percent of birth procedures were either assisted births (8.9 percent), breech births (0.6 percent) or not stated (0.9 percent), as shown in Figure 3.1.

Assisted births are births (excluding breech) aided by forceps and/or vacuum extraction. Table 3.1 shows the number of mothers by type of birth.

Table 3.1: Number of birth procedures, by type of birth, 2007

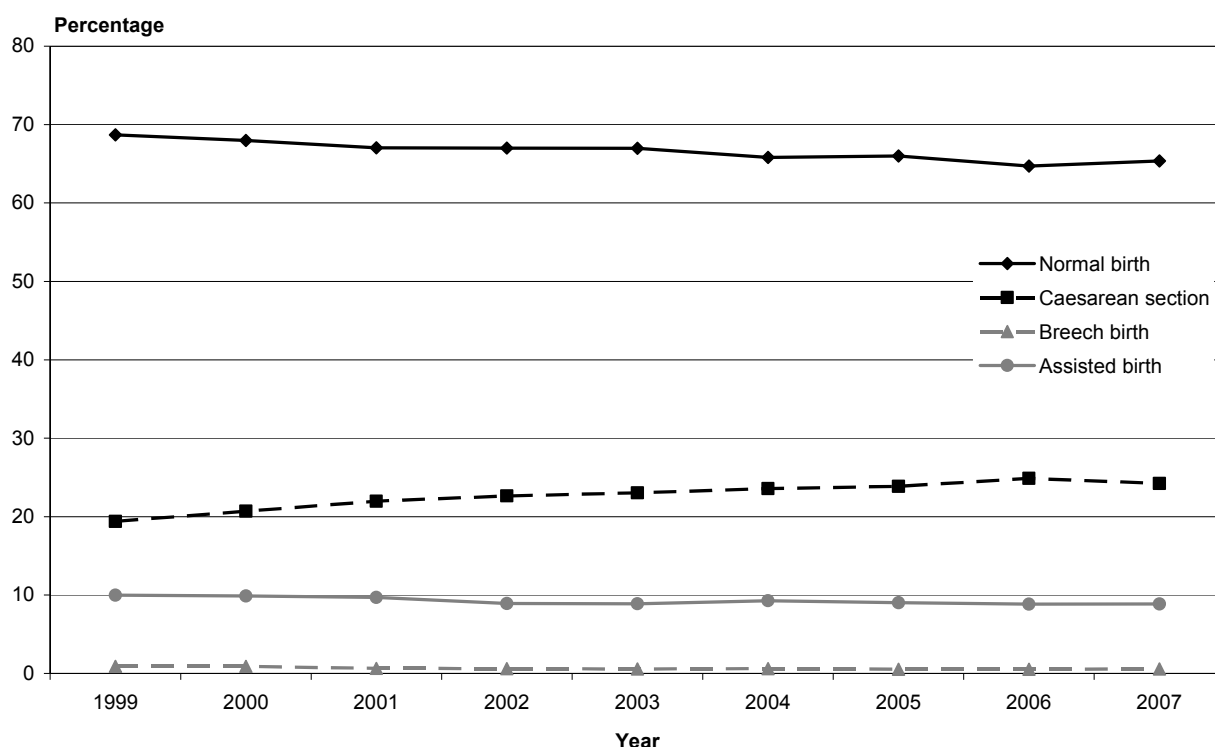
Type of birth	Number	Percentage
Number of mothers	60,961	
Normal birth	40,026	65.4
Assisted birth	5428	8.9
Forceps only	1854	3.0
Vacuum extraction only	3532	5.8
Forceps and vacuum extraction	42	0.1
Breech birth	358	0.6
Spontaneous breech birth (unassisted)	168	0.3
Assisted breech birth	180	0.3
Assisted breech birth with forceps	10	0.0
Caesarean section	14,845	24.2
Emergency caesarean section	8509	13.9
Elective caesarean section	6336	10.3
Not stated	581	0.9
Total*	61,238	100.0

Data source: NMDS (mother's record)

* The total is higher than the number of mothers because some mothers had more than one birth procedure.

As shown in Figure 3.1, between 1999 and 2007 the percentage of procedures coded as caesarean sections increased from 19.4 percent to 24.2 percent. This trend has been observed in many developed countries (Anderson 2004). The percentage of normal and assisted births decreased during the same period (from 68.7 to 65.4 percent for normal births, and from 10.0 to 8.9 percent for assisted births).

Figure 3.1: Percentage of birth procedures, by year and type of birth, 1999–2007



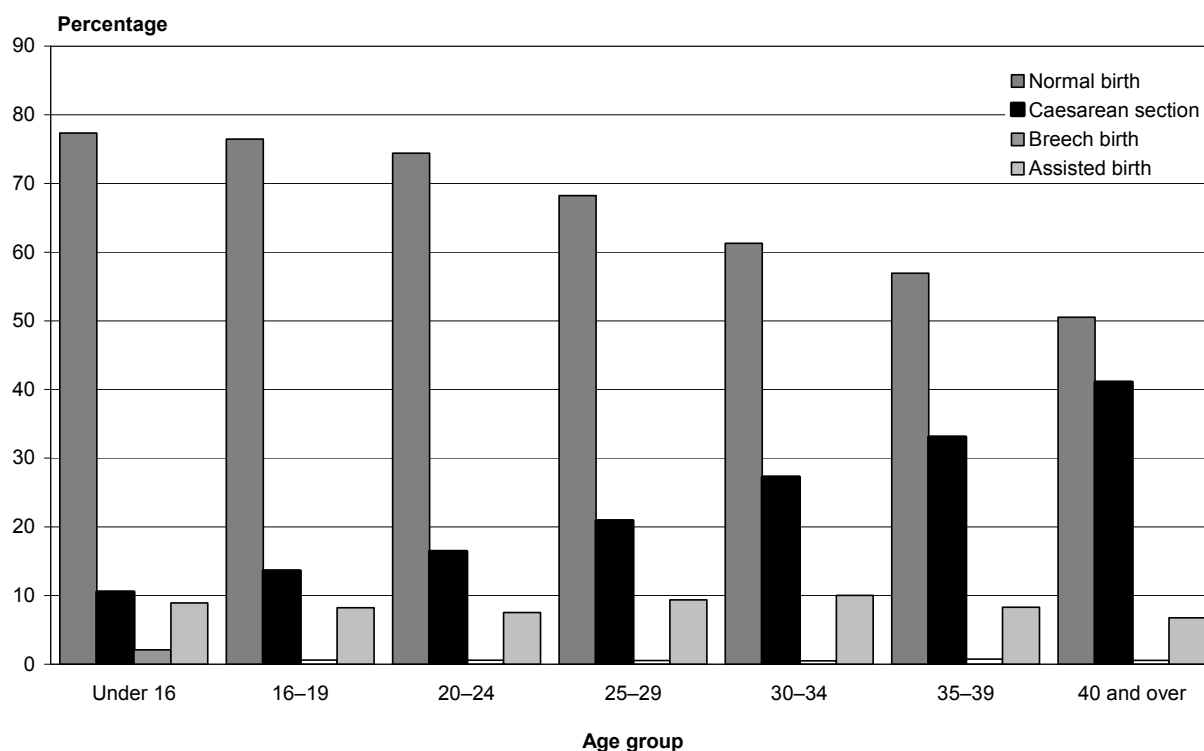
Data source: NMDS (mother's record)

Note: A caesarean section is a procedure whereby an incision or incisions are made to a woman's abdomen to assist birth (see Glossary for a further definitions).

The following table and figures show the type of birth experienced, by the mother's age group, ethnicity and place of residence. Figure 3.2 shows that the likelihood of experiencing a caesarean section birth increases with increasing age. Conversely, the likelihood of experiencing a normal birth decreases with increasing age.

In 2007, caesarean sections made up 41.1 percent of procedures on mothers aged 40 years and over compared with 10.5 percent of mothers younger than 16 years.

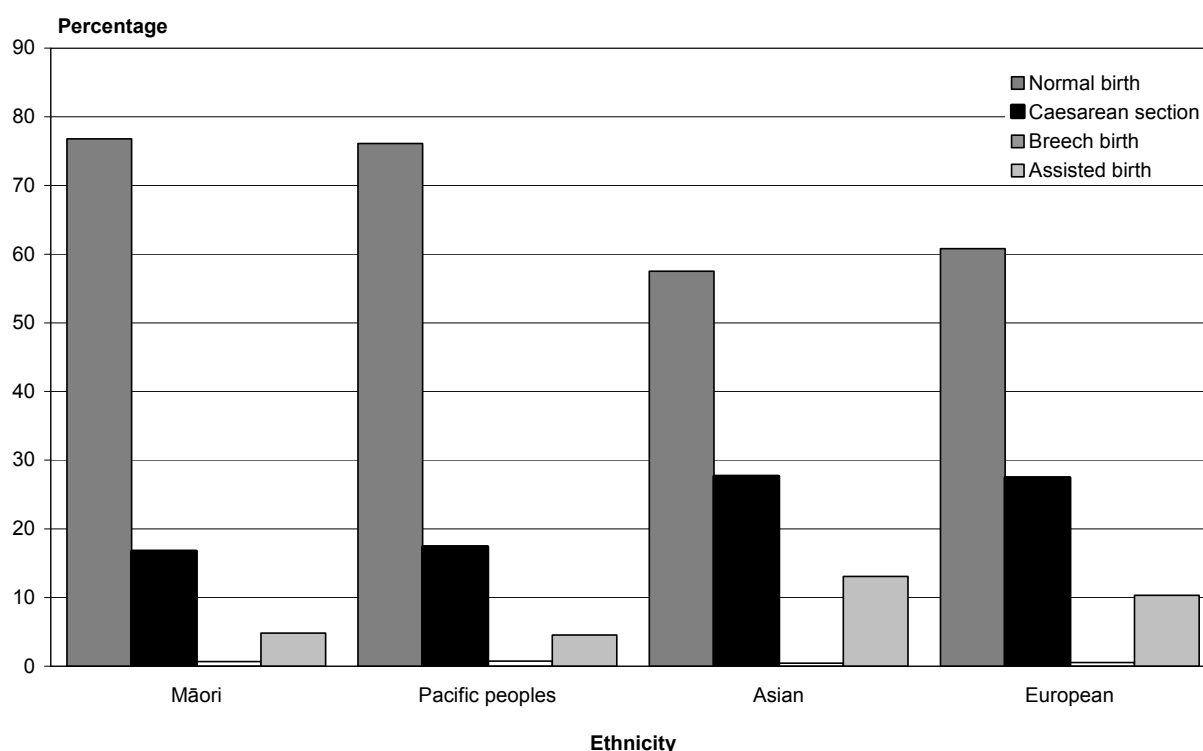
Figure 3.2: Percentage of birth procedures, by type of birth and age group, 2007



Data source: NMDS (mother's record)

Māori and Pacific women were more likely to have a normal birth (76.8 and 76.1 percent of procedures, respectively) compared with women in other ethnic groups (Figure 3.3). Caesarean sections were most common among Asian and European mothers (27.7 and 27.5 percent, respectively).

Figure 3.3: Percentage of birth procedures, by birth type and ethnicity, 2007



Data source: NMDS (mother's record)

The type and volume of birth procedures varied by the DHB of mother's residence (see Appendix G.3 for the complete table). Canterbury and West Coast DHBs had the highest percentage of caesarean section births in 2007 (31.6 percent and 29.9 percent of total birth procedures, respectively), while Northland DHB had the lowest (15.8 percent). Otago DHB had the highest proportion of assisted births (12.7 percent), and Tairāwhiti DHB had the lowest (4.0 percent).

Table 3.2: Number and percentage of birth procedures, by type of birth and DHB region of mother's place of residence, 2007

DHB region	Normal birth	Caesarean section	Breech birth	Assisted birth	Not stated	Total
Northland	77.7	15.8	0.5	5.0	1.0	2150.0
Waitemata	59.8	26.8	0.6	9.4	3.4	7529.0
Auckland	61.1	26.1	0.6	11.6	0.6	6596.0
Counties Manukau	71.2	19.0	0.7	8.2	1.0	8734.0
Waikato	71.5	19.6	0.7	7.7	0.5	5267.0
Lakes	74.7	18.5	0.7	6.0	0.1	1573.0
Bay of Plenty	68.7	22.5	0.4	7.2	1.3	2847.0
Tairāwhiti	73.8	21.4	0.5	4.0	0.3	748.0
Hawke's Bay	71.5	21.7	0.7	5.7	0.4	2298.0
Taranaki	70.2	24.2	0.3	5.1	0.1	1512.0
MidCentral	67.3	24.0	0.5	7.8	0.3	2159.0
Whanganui	71.9	21.2	0.6	6.2	0.1	841.0
Capital & Coast	59.9	28.1	0.5	10.9	0.5	3823.0
Hutt Valley	64.7	25.4	0.6	9.0	0.4	2098.0
Wairarapa	62.0	28.8	0.6	8.2	0.4	497.0
Nelson Marlborough	67.4	24.7	0.6	6.7	0.7	1614.0
West Coast	60.4	29.9	0.0	7.5	2.1	374.0
Canterbury	55.5	31.6	0.6	11.9	0.4	6398.0
South Canterbury	67.6	24.7	0.5	6.6	0.6	649.0
Otago	59.1	27.7	0.4	12.7	0.2	1982.0
Southland	62.1	28.4	0.5	8.6	0.5	1519.0
Not stated	73.3	10.0	3.3	13.3	0.0	30.0
Total	65.4	24.2	0.6	8.9	0.9	61,238.0

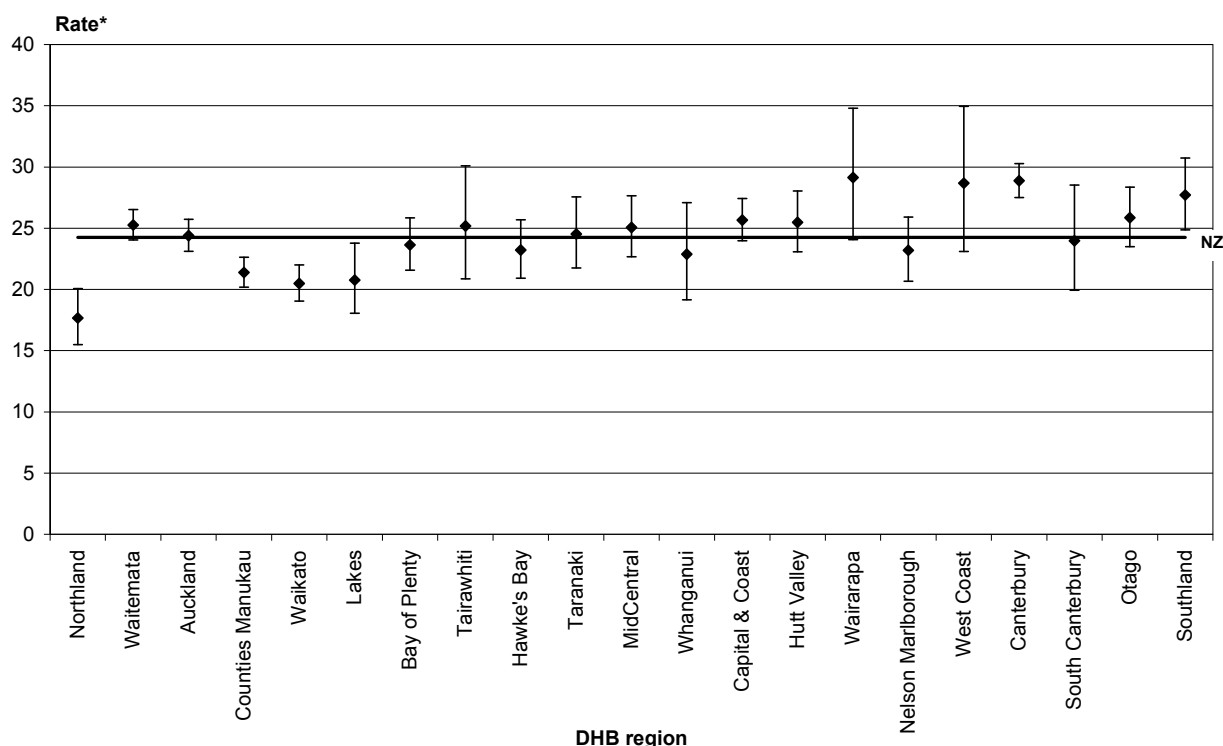
Data source: NMDS (mother's record)

3.2 Caesarean sections

This section presents information on women who had a caesarean section performed for the birth of their baby.

Figure 3.4 illustrates the rates of caesarean section for each DHB (standardised by age and ethnicity) compared with the New Zealand rate of caesarean sections. The highest rates in the North Island were in Wairarapa DHB (29.1 per 100 deliveries) and Capital & Coast DHB (25.7 per 100 deliveries). Canterbury and West Coast DHBs (28.9 and 28.7 per 100 deliveries, respectively) had the highest rates in the South Island. Northland, Waikato and Lakes DHBs had the lowest standardised caesarean section rates (17.7, 20.5 and 20.8 per 100 deliveries, respectively).

Figure 3.4: Standardised hospital caesarean section rates (standardised by age and ethnicity) and 99 percent confidence intervals, by DHB region of mother's place of residence, 2007



Data source: NMDS (mother's record)

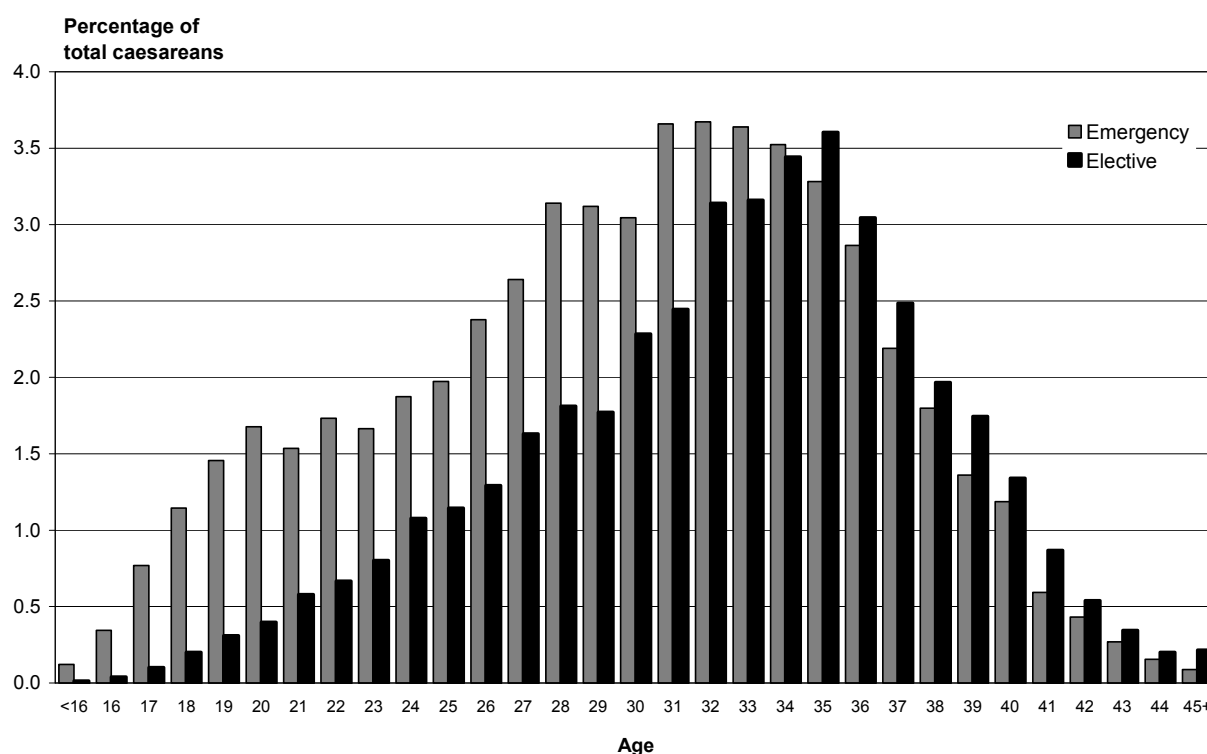
Caesarean sections can be classified into two categories.²

- An elective caesarean is a planned caesarean section where the decision is made before the onset of labour, irrespective of whether it is performed prior to or following the onset of labour.
- An emergency (acute) caesarean section is a caesarean section required because of an emergency situation (for example, obstructed labour or fetal distress) and when the decision was not made prior to the onset of labour.

Of the 14,845 women who had a caesarean section in 2007, the majority had an emergency caesarean section (57.3 percent). Figure 3.5 shows that women younger than 35 years were more likely to have an emergency caesarean section, while women aged 35 years and over were more likely to have an elective caesarean section.

² NCCH 1998b.

Figure 3.5: Percentage of hospital caesarean sections, by type of caesarean section and maternal age at delivery, 2007



Data source: NMDS (mother's record)

As shown in Table 3.3, nearly all (99.3 percent) caesarean sections performed were lower segment caesarean section (LSCS)³ rather than a classical caesarean section.⁴ Of the LSCS, 57.4 percent were performed in emergency situations (see Glossary for full definitions.)

³ In an LSCS, an incision is made just under the bikini line into the lower segment of the uterus.

⁴ In a classical caesarean section, an incision is made vertically down the centre of the abdomen.

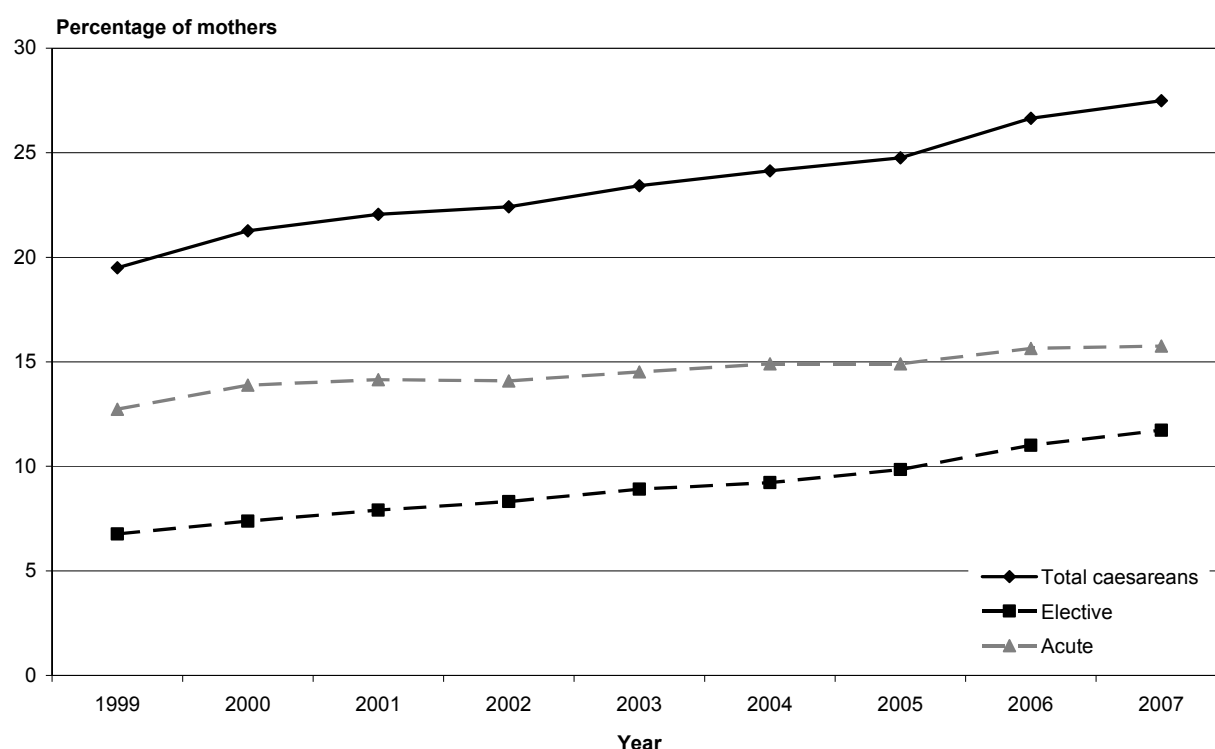
Table 3.3: Number of hospital caesarean sections, by type of caesarean section, maternal ethnicity and age group of mother, 2007

		LSCS		Classical		Total
		Emergency	Elective	Emergency	Elective	
Age group	Under 16	18	2	0	0	20
	16–19	544	95	7	2	648
	20–24	1252	518	7	5	1782
	25–29	1952	1123	16	13	3104
	30–34	2596	2133	7	15	4751
	35–39	1699	1889	7	18	3613
	40 and over	402	519	2	4	927
Ethnicity	Māori	1340	743	11	9	2103
	Pacific peoples	708	407	3	6	1124
	Asian	924	638	4	7	1573
	European	5167	4271	25	34	9497
	Other	258	190	3	1	452
	Not stated	66	30	0	0	96
Total		8463	6279	46	57	14,845

Data source: NMDS (mother's record)

In 1985 the WHO issued a consensus statement suggesting that no additional health benefits were associated with a caesarean section rate above 10–15 percent. In 2009 it released a revised statement, which indicated that while very low and very high rates of caesarean sections are dangerous, an optimal rate has not been determined. The WHO also suggested that countries either use a range of 5–15 percent as an acceptable level for caesarean sections or set their own standards (WHO 2009). Currently, no consensus exists in New Zealand regarding the optimal caesarean section rate for the best health outcomes. However, there is a general consensus that the current rate is too high.

Figure 3.6: Percentage of mothers delivering by caesarean section, 1999–2007



Data source: NMDS (mother's record)

3.3 Other birth procedures and events

Common procedures used during childbirth include: induction,⁵ epidural,⁶ episiotomy,⁷ manual removal of the placenta, and the management of postpartum haemorrhage (see Glossary for full definitions). Tables 3.4 and 3.5 summarise common birth-related procedures and events during childbirth in 2007.

Nationally, there were 33 hysterectomies related to childbirth in 2007. This number is too small to allow for meaningful comparisons between DHBs and has not been included in this analysis.

⁵ Induction is a procedure used to stimulate the onset of labour.

⁶ An epidural is a regional analgesic agent injected into the epidural space of the spinal cord.

⁷ An episiotomy is an incision of the perineal tissue surrounding the vagina at the time of birth.

Table 3.4: Number of mothers, by birth-related procedures and events, and DHB region of mother's place of residence, 2007

DHB region	Induction	Epidural	Episiotomy	Manual removals of placenta	Postpartum haemorrhage*
Northland	415	268	86	27	237
Waitemata	1453	2462	674	126	579
Auckland	1372	2297	937	104	937
Counties Manukau	1204	1853	803	136	918
Waikato	806	921	243	68	523
Lakes	183	65	81	12	129
Bay of Plenty	446	459	192	39	207
Tairāwhiti	98	67	26	7	82
Hawke's Bay	332	586	180	50	173
Taranaki	314	96	91	36	123
MidCentral	259	434	194	30	230
Whanganui	179	142	32	11	55
Capital & Coast	821	1453	479	55	327
Hutt Valley	425	604	187	25	174
Wairarapa	83	70	63	2	34
Nelson Marlborough	317	464	159	29	68
West Coast	86	39	28	1	33
Canterbury	841	1751	994	73	638
South Canterbury	127	125	48	12	45
Otago	307	523	192	37	230
Southland	320	252	147	12	65
Not stated	7	6	5	1	3
Total	10,395	14,937	5841	893	5810

* Blood loss of greater than 500 ml. Estimating the volume of blood loss may vary in clinical practice and may impact on numbers reported. This analysis does not differentiate between primary and secondary postpartum haemorrhages.

Data source: NMDS (mother's record)

In Table 3.5, rates for inductions and epidurals are expressed per 100 procedures (excluding elective caesarean sections). Rates for episiotomies, manual removals of placentas and postpartum haemorrhages are expressed per 100 vaginal procedures (excluding all caesarean sections).

In 2007 almost one in five births (18.9 percent) were induced, while an epidural was administered for more than one in four births (27.2 percent). Table 3.5 shows that the national rate for episiotomies was 12.6 per 100 vaginal deliveries. The regional rate ranged from 22.7 per 100 vaginal deliveries in Canterbury DHB to 4.4 per 100 vaginal deliveries in Tairāwhiti DHB.

Table 3.5: Crude rate of birth-related procedures and events, by DHB region of mother's place of residence, 2007

DHB region	Induction ¹	Epidural ¹	Episiotomy ²	Manual removals of placenta ²	Postpartum haemorrhage ²
Northland	20.4	13.2	4.7	1.5	13.1
Waitemata	21.9	37.1	12.2	2.3	10.5
Auckland	23.8	39.8	19.2	2.1	19.2
Counties Manukau	14.9	23.0	11.3	1.9	13.0
Waikato	16.6	18.9	5.7	1.6	12.4
Lakes	12.7	4.5	6.3	0.9	10.1
Bay of Plenty	17.4	17.9	8.7	1.8	9.4
Tairāwhiti	14.3	9.8	4.4	1.2	13.9
Hawke's Bay	15.8	27.9	10.0	2.8	9.6
Taranaki	23.0	7.0	7.9	3.1	10.7
MidCentral	13.2	22.1	11.8	1.8	14.0
Whanganui	23.3	18.5	4.8	1.7	8.3
Capital & Coast	23.9	42.3	17.4	2.0	11.9
Hutt Valley	22.5	32.0	11.9	1.6	11.1
Wairarapa	19.6	16.5	17.8	0.6	9.6
Nelson Marlborough	21.8	32.0	13.1	2.4	5.6
West Coast	26.6	12.1	10.7	0.4	12.6
Canterbury	15.4	32.0	22.7	1.7	14.6
South Canterbury	21.6	21.3	9.8	2.5	9.2
Otago	18.0	30.7	13.4	2.6	16.1
Southland	24.1	19.0	13.5	1.1	6.0
Not stated	24.1	20.7	18.5	3.7	11.1
Total rate	18.9	27.2	12.6	1.9	12.5

Data source: NMDS (mother's record)

1 Rate per 100 deliveries (excluding elective caesarean sections).

2 Rate per 100 vaginal deliveries.

Tables 3.6 and 3.7 show numbers and rates of inductions and epidurals, by age and ethnicity. Māori mothers had the lowest rates for induction and epidural administration (15.2 and 15.6 per 100 deliveries, respectively; see Tables 3.6 and 3.7). The rate of induction increased with the age of the mother, and was slightly higher for European mothers. Mothers aged 40 years and over had the highest rate of inductions (33.9 per 100 deliveries).

Rates of epidural use differed markedly between ethnic groups (Table 3.7). Asian mothers had the highest epidural rate (35.6 per 100 deliveries). Asian and European mothers aged 25 years and over had approximately double the epidural rate of Māori and Pacific mothers of the same age. Epidural rates peaked in mothers aged 30 to 34 years.

Table 3.6: Use of inductions, by age group and ethnicity of mother, 2007

Age group	Number of inductions							Rate per 100 deliveries*					
	Māori	Pacific peoples	Asian	European	Other	Not stated	Total	Māori	Pacific peoples	Asian	European	Other	Total
Under 16	20	2	0	6	1	0	29	18.7	11.1	0.0	10.5	25.0	15.4
16–19	309	73	12	331	5	4	734	13.7	13.7	13.0	19.6	8.2	15.7
20–24	489	207	91	803	45	5	1640	13.7	13.3	13.2	19.0	20.1	15.9
25–29	400	253	297	1399	75	18	2442	14.8	15.0	17.8	19.5	19.7	17.8
30–34	303	198	289	2007	79	24	2900	16.1	15.5	18.1	20.1	19.5	19.0
35–39	211	170	187	1433	47	14	2062	20.3	22.2	22.1	23.6	20.4	22.9
40 and over	56	79	54	381	16	2	588	23.0	38.2	36.7	35.4	31.4	33.9
Total	1788	982	930	6360	268	67	10,395	15.2	16.3	18.5	21.0	19.8	18.9

* Rate excludes elective caesarean sections.

Data source: NMDS (mother's record)

Table 3.7: Use of epidurals, by age group and ethnicity of mother, 2007

Age group	Number of epidurals							Rate per 100 deliveries*					
	Māori	Pacific peoples	Asian	European	Other	Not stated	Total	Māori	Pacific peoples	Asian	European	Other	Total
Under 16	27	5	0	13	1	1	47	25.2	27.8	0.0	22.8	25.0	25.0
16–19	472	138	29	522	20	5	1186	21.0	25.9	31.5	30.9	32.8	25.4
20–24	541	319	219	1225	58	11	2373	15.2	20.5	31.8	29.0	25.9	23.0
25–29	358	288	619	2165	142	37	3609	13.2	17.1	37.1	30.2	37.4	26.3
30–34	266	205	607	3336	148	34	4596	14.1	16.1	38.1	33.4	36.5	30.1
35–39	149	107	272	2014	89	15	2646	14.3	14.0	32.2	33.2	38.7	29.4
40 and over	21	34	47	359	17	2	480	8.6	16.4	32.0	33.4	33.3	27.7
Total	1834	1096	1793	9634	475	105	14,937	15.6	18.1	35.6	31.8	35.0	27.2

* Rate excludes elective caesarean sections.

Data source: NMDS (mother's record)

3.4 Multiple births

Table 3.8 shows that in 2007 the majority of mothers (98.1 percent) gave birth to one baby (or singleton). Nearly 2 percent of mothers either had twins or multiple babies (1.6 percent). Of the singleton births, 0.7 percent were stillbirths while 4 percent of twin deliveries resulted in at least one stillborn baby. The ratio of mothers delivering twin or multiple births to mothers delivering singletons was 1:61 and 1:5983, respectively.

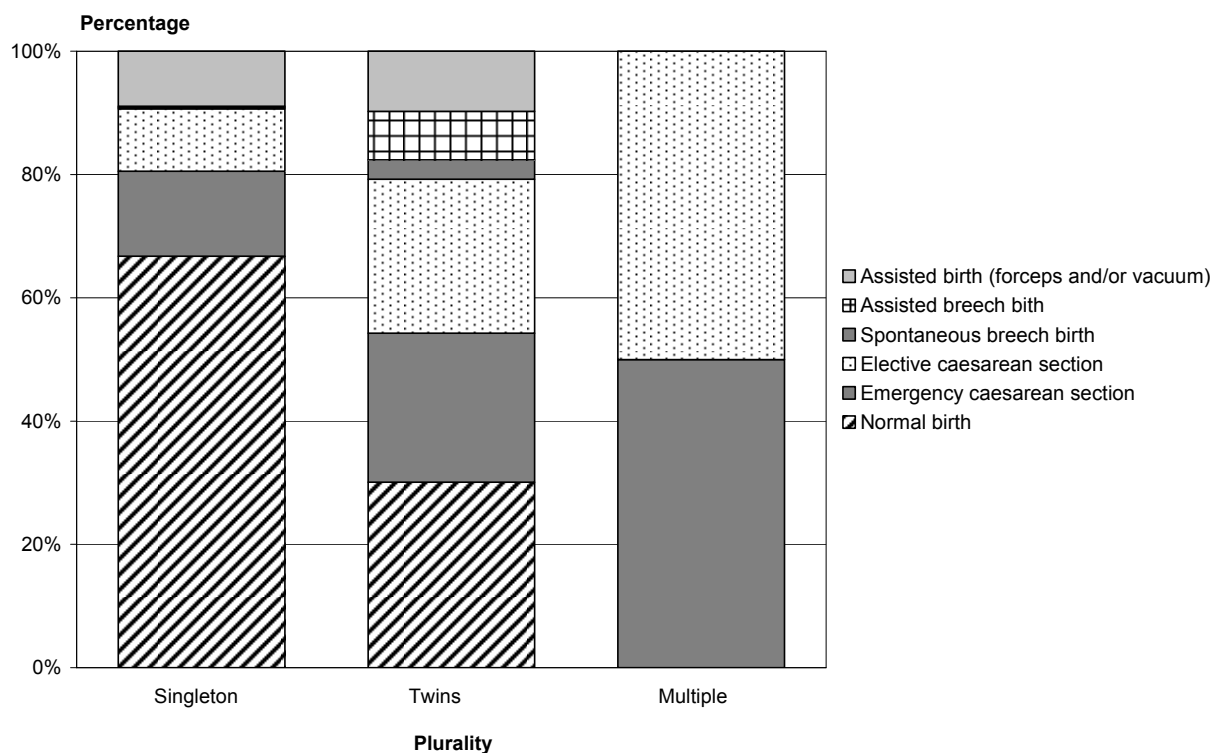
Table 3.8: Number of mothers, by baby's birth status and plurality, 2007

Baby's birth status	Plurality				Total
	Singleton	Twins	Multiple	Not stated	
Live births	59,419	943	9	0	60,371
Some live, some still	0	30	1	0	31
Stillbirths	412	9	0	138	559
Total hospital births	59,831	982	10	138	60,961

Data source: NMDS (mother's record)

Figure 3.7 shows that mothers who gave birth to twins were more likely to have a caesarean section (49.0 percent) than a normal birth (30.1 percent). All mothers having three or more babies gave birth via caesarean section.

Figure 3.7: Percentage of birth procedures, by mode of birth and plurality, 2007



Data source: NMDS (mother's record)

4 Babies

This section contains information on newborn babies, as reported by New Zealand maternity facilities. The babies included in this section were either born in hospital or admitted to hospital soon after their birth.

4.1 Babies at birth

In 2007 BDM registered a total of 65,121 live births (including late registrations), while maternity facilities reported contact with 62,045 liveborn babies.

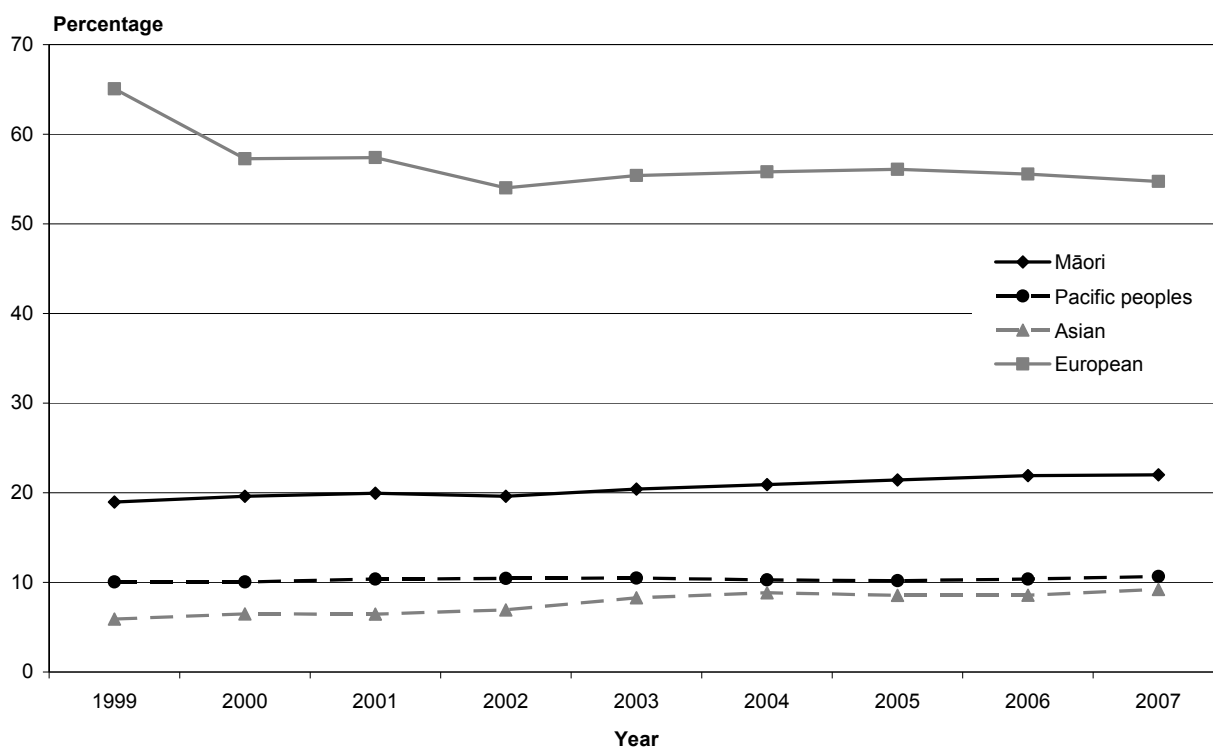
Note on data integrity

NMDS and BDM numbers are not directly comparable because BDM numbers are reported by year of baby's birth registration and NMDS numbers are reported by year of baby's birth.

Also, babies born outside hospital with no subsequent contact with a maternity facility will not be captured by the NMDS.

As Figure 4.1 shows, the relative percentages of liveborn babies by ethnicity showed no major shifts from 2000 to 2007.

Figure 4.1: Percentage of total live births, by ethnicity, 2000–2007



Data source: NMDS (baby's record)

Of the babies recorded in the NMDS, less than 1 percent (0.7 percent) were born outside a maternity facility and subsequently admitted (Table 4.1). Slightly more liveborn babies were male (51.4 percent) than female.

Table 4.1: Number of liveborn babies, by place of birth, sex and ethnicity, 2007

Ethnic group	Born in hospital			Born outside hospital			Total number of babies		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Māori	6974	6493	13,467	90	89	179	7064	6583	13,647
Pacific peoples	3350	3215	6565	20	40	60	3370	3255	6625
Asian	2954	2743	5697	7	11	18	2961	2754	5715
European	17,315	16,487	33,802	82	72	154	17,397	16,560	33,957
Other	779	720	1499	1	2	3	780	722	1502
Not stated	316	277	593	3	3	6	319	280	599
Total	31,688	29,935	61,623	203	217	420	31,891	30,154	62,045

Data source: NMDS (baby's record)

The average birthweight of liveborn babies was 3.43 kg (Table 4.2). Male babies were, on average, heavier (3.48 kg) than female babies (3.38 kg). Asian babies had the lowest average birthweight (3.23 kg), while Pacific babies had the highest (3.55 kg). The average birthweight of babies within each ethnic group has remained fairly constant since 1999 (see Appendix G.4).

Table 4.2: Average birthweight of liveborn babies, by sex and ethnicity, 2007

Ethnic group	Average birthweight (kg) ± standard deviation (kg)		
	Male	Female	Total
Māori	3.40 ± 0.65	3.34 ± 0.65	3.37 ± 0.65
Pacific peoples	3.58 ± 0.65	3.51 ± 0.65	3.55 ± 0.65
Asian	3.27 ± 0.57	3.19 ± 0.54	3.23 ± 0.56
European	3.53 ± 0.62	3.41 ± 0.61	3.47 ± 0.62
Other	3.41 ± 0.67	3.34 ± 0.54	3.37 ± 0.61
Not stated	3.40 ± 0.68	3.35 ± 0.57	3.38 ± 0.63
Total	3.48 ± 0.64	3.38 ± 0.62	3.43 ± 0.63

Data source: NMDS (baby's record)

Prematurity, multiple pregnancy and restricted fetal (intrauterine) growth are possible contributors to a baby's low weight at birth. Low birthweight (under 2.5 kg) is associated with fetal and neonatal mortality and morbidity, as well as inhibited growth and cognitive development (WHO and UNICEF 2004). Low birthweight babies generally have the highest mortality and morbidity, and contribute disproportionately to the workloads of New Zealand's neonatal units.

Table 4.3 shows that in 2007, 6.0 percent of liveborn babies were of low birthweight while 2.8 percent were of high birth weight (4.5 kg and over). Asian babies had the highest incidence (7.5 percent of Asian babies) of low birthweight and Pacific babies the highest incidence of high birthweight (5.4 percent of Pacific babies).

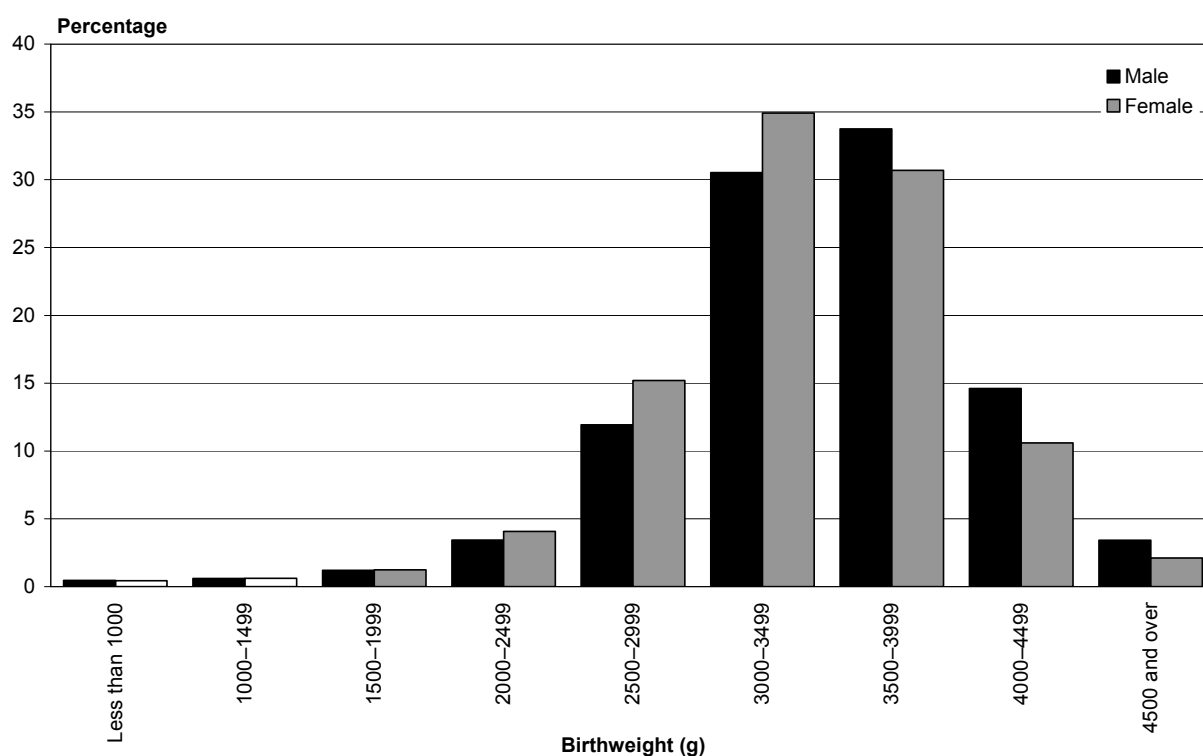
Table 4.3: Percentage of liveborn babies, by birthweight and ethnicity, 2007

Ethnic group	Birthweight (grams)							Total	
	Less than 1000	1000–1499	1500–1999	2000–2499	2500–4499	4500 or more	Not stated	Number	%
Māori	0.5	0.6	1.4	4.2	90.8	2.3	0.2	13,647	100
Pacific peoples	0.6	0.6	0.9	2.9	89.6	5.4	0.0	6625	100
Asian	0.4	0.8	1.2	5.1	91.7	0.7	0.0	5715	100
European	0.4	0.6	1.2	3.5	91.4	2.9	0.1	33,957	100
Other	0.8	0.7	1.4	4.2	91.1	1.9	0.0	1502	100
Not stated	0.7	0.8	1.2	4.3	90.5	2.5	0.0	599	100
Total number	280	375	761	2324	56,526	1734	45	62,045	
Total percentage	0.5	0.6	1.2	3.7	91.1	2.8	0.1		100

Data source: NMDS (baby's record)

Figure 4.2 shows the percentage of liveborn babies, by birthweight and sex. The peak for female birthweight was in the 3000–3499 grams group, and the peak for male babies was in the 3500 to 3999 grams group.

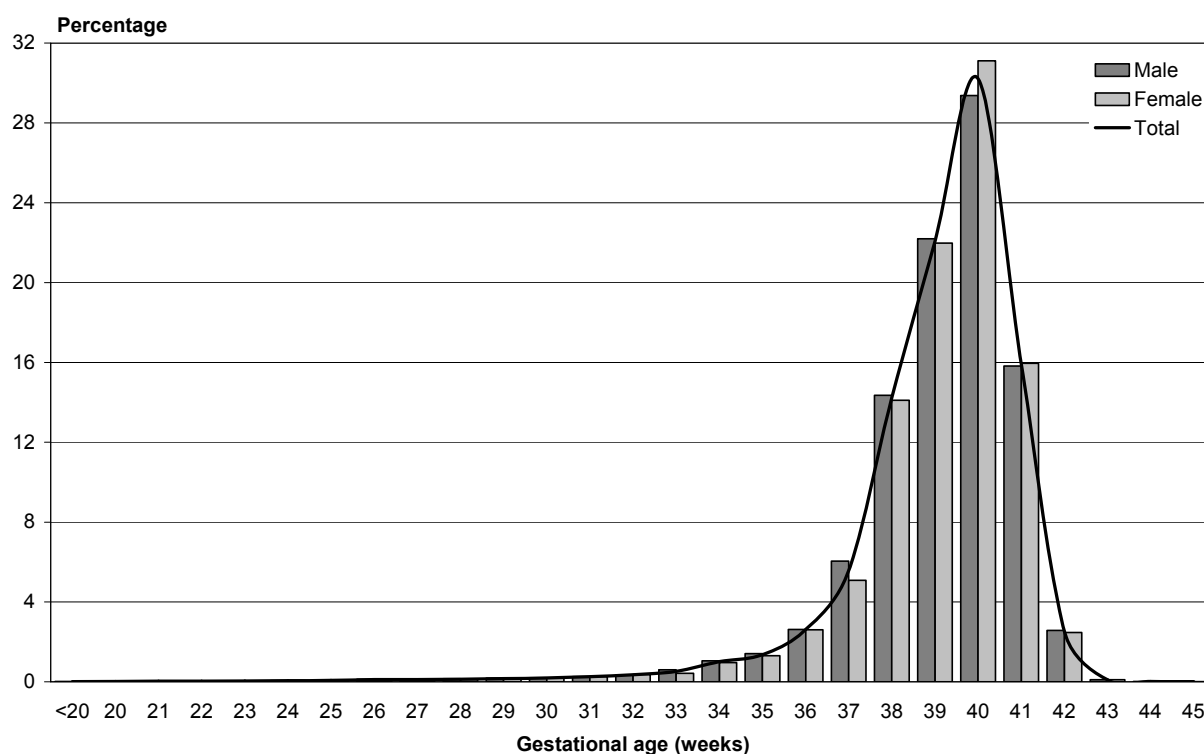
Figure 4.2: Percentage of liveborn babies, by birthweight and sex, 2007



Data source: NMDS (baby's record)

Figure 4.3 and Table 4.4 show that 90.7 percent of liveborn babies were full term (37 or more weeks' gestation). There was no marked variation in gestational age by sex or ethnic group.

Figure 4.3: Percentage of liveborn babies, by gestational age and sex, 2007



Data source: NMDS (baby's record)

Table 4.4: Percentage of liveborn babies, by gestational age and ethnicity, 2007

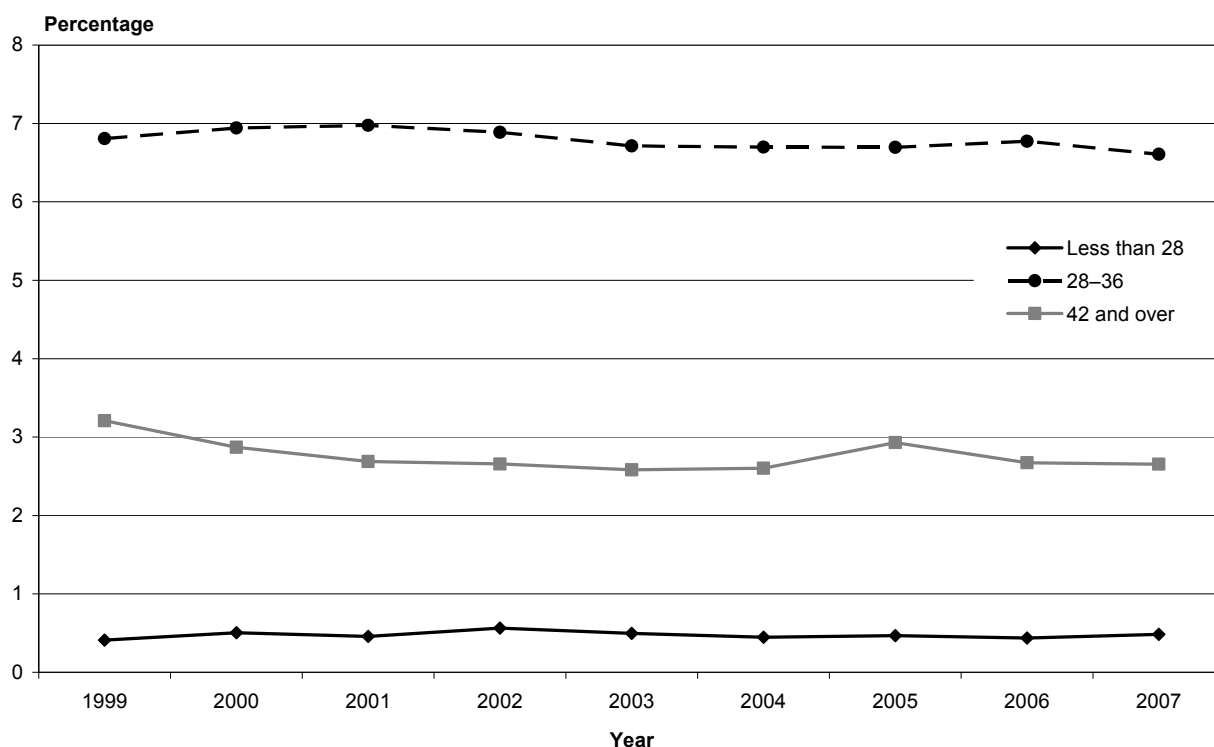
Ethnic group	Liveborn babies by gestational age (weeks)								Total	
	Less than 20	20–23	24–27	28–31	32–36	37–41	42 and over	Not stated	%	Number
Māori	0.0	0.2	0.5	0.8	5.7	86.7	2.6	3.6	100	13,647
Pacific peoples	0.0	0.2	0.4	0.8	4.8	88.9	3.0	1.9	100	6625
Asian	0.0	0.1	0.3	0.8	5.9	90.0	1.9	0.9	100	5715
European	0.0	0.1	0.3	0.7	6.1	88.0	2.8	2.0	100	33,957
Other	0.0	0.3	0.5	0.6	6.7	88.6	2.7	0.6	100	1502
Not stated	0.2	0.0	0.3	1.0	5.7	84.6	1.8	6.3	100	599
Total number	8	72	220	463	3636	54,601	1647	1398		62,045
Total percentage	0.0	0.1	0.4	0.7	5.9	88.0	2.7	2.3	100	

Data source: NMDS (baby's record)

Note: Percentage totals may not equal 100 due to rounding.

In 2007 pre-term babies born very early (less than 28 weeks) or near term (28–36 weeks) accounted for 0.5 percent and 6.6 percent of births, respectively. As seen in Figure 4.4, these percentages remained fairly stable between 1999 and 2007.

Figure 4.4: Percentage of liveborn babies, by early and late gestational age (excluding babies born between 37 and 41 weeks' gestation), 1999–2007



Data source: NMDS (baby's record)

Of babies born before 37 weeks gestational age, 57.6 percent were of low birthweight, whereas only 2.0 percent of full-term babies (37 weeks gestational age and over) were of low birthweight (see Table 4.5).

Table 4.5: Numbers of liveborn babies, by gestational age and birthweight, 2007

Gestational age (weeks)	Birthweight (g)			
	Less than 2500	2500 and over	Not stated	Total
Less than 37	2535	1862	2	4399
37 and over	1103	55,107	38	56,248
Not stated	102	1291	5	1398
Total	3740	58,260	45	62,045

Data source: NMDS (baby's record)

Between the years 2000 and 2007, Asian babies comprised the highest proportion of low birthweight full-term babies and Pacific babies the lowest (see Table 4.6).

Table 4.6: Percentage of full-term liveborn babies (37 or more weeks' gestation) with a low birthweight (under 2500 g), by ethnicity and year, 2000–2007

Year	2000	2001	2002	2003	2004	2005	2006	2007
Māori	2.7	3.2	2.9	2.5	2.6	2.9	2.3	2.5
Pacific peoples	1.6	1.2	1.4	1.4	1.2	1.5	1.3	1.6
Asian	2.5	3.0	4.0	3.4	2.9	3.7	3.2	3.5
European	1.8	1.8	1.8	1.7	1.7	1.7	1.6	1.6
Other	2.6	1.9	1.8	1.8	1.7	2.0	1.8	1.9
Not stated	1.6	1.8	1.6	1.1	3.6	2.1	1.4	1.9
Total	2.0	2.1	2.1	2.0	2.0	2.1	1.9	2.0

Data source: NMDS (baby's record)

Table 4.7 shows that full-term liveborn babies were most likely to be of low birthweight if born to mothers aged less than 16 years of age or to Asian mothers (3.4 percent and 3.2 percent, respectively).

Table 4.7: Proportion of full-term liveborn babies (37 or more weeks' gestation) with a low birthweight (under 2500 g), by mother's age group and ethnicity, 2007

		Total number of full-term babies	Low-birthweight full-term babies	
			Number	Percentage
Age group	Under 16	178	6	3.4
	16–19	4572	83	1.8
	20–24	10,730	222	2.1
	25–29	14,766	231	1.6
	30–34	17,409	283	1.6
	35–39	11,241	221	2.0
	40+	2412	57	2.4
	Not stated	737	0	0.0
Ethnic group	Māori	13,647	305	2.2
	Pacific peoples	6625	97	1.5
	Asian	5715	184	3.2
	European	33,957	481	1.4
	Other	1502	26	1.7
	Not stated	599	10	1.7
Total		62,045	1103	1.8

Data source: NMDS (baby's record)

Table 4.8 shows the numbers of babies born with a low or high birthweight, by DHB. Numbers of pre-term or full-term babies and percentages of babies born full-term but of low birthweight are also shown. Some of the numbers in this table are small and therefore susceptible to random variations, so caution is advised when making comparisons between DHBs.

Table 4.8: Number of liveborn babies, by birthweight, gestational age and DHB region of mother's place of residence, 2007

DHB region	Low birthweight (< 2500 g)	High birthweight (> 4500 g)	Pre-term birth (< 37 weeks)	Full-term (37+ weeks)	Low-birthweight full-term babies	
					No.	%
Northland	150	63	148	2011	51	2.3
Waitemata	405	210	538	6983	117	1.6
Auckland	402	185	479	6205	127	1.9
Counties Manukau	599	287	638	8095	201	2.3
Waikato	303	164	363	4817	93	1.8
Lakes	96	51	98	1497	34	2.1
Bay of Plenty	168	71	192	2566	45	1.6
Tairāwhiti	50	26	54	706	13	1.7
Hawke's Bay	155	58	138	1542	33	1.4
Taranaki	78	40	99	1398	24	1.6
MidCentral	131	51	150	2035	43	2.0
Whanganui	68	23	74	769	16	1.9
Capital & Coast	221	119	281	3488	60	1.5
Hutt Valley	118	64	148	1911	31	1.5
Wairarapa	21	10	28	470	10	2.0
Nelson Marlborough	73	59	97	1518	19	1.2
West Coast	22	8	26	340	4	1.1
Canterbury	426	146	507	6054	119	1.8
South Canterbury	43	23	48	595	19	2.9
Otago	114	44	165	1842	25	1.2
Southland	96	31	123	1359	19	1.3
Not stated	1	1	5	47	0	0.0
Total	3740	1734	4399	56,248	1103	1.8

Data source: NMDS (baby's record)

Note: Babies of unknown gestation are not included in these figures.

5 Length of Stay and Readmissions

This section presents information on antenatal and postnatal stays in hospital, including length of stay, mode of separation (discharge) and readmission details. Length of stay is calculated by subtracting the event end date from the event start date.

5.1 Length of stay (birth event)

5.1.1 Length of stay of the mother

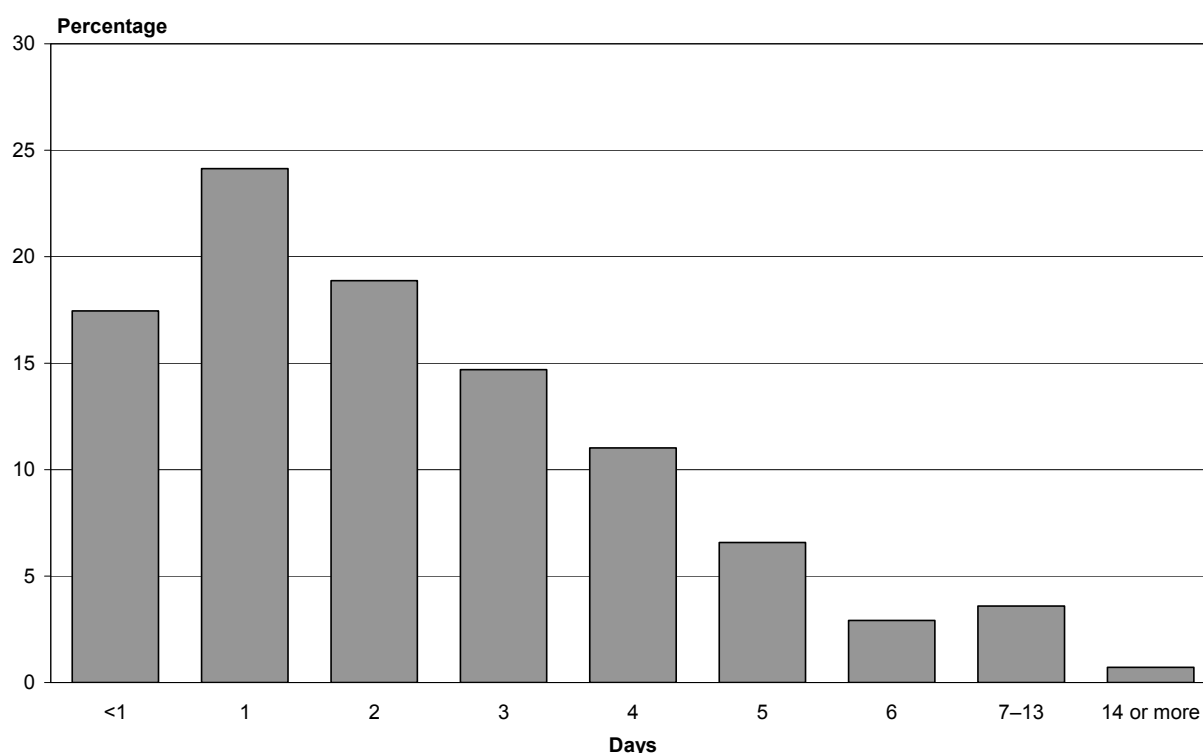
In this publication, maternal length of stay is defined as the period of hospital stay between admission and discharge (inclusive) from the hospital of birth. Discharges include transfers to other services or facilities. Maternal length of stay is dependent on a number of variables, including clinical need, personal choice and availability of beds.

Note on data integrity

The length of stay is the number of days between the event start date and the event end date. Mothers transferred between hospitals are counted as a discharge and readmission, inflating the same-date readmission rate. Hospitals may transfer women having uncomplicated births to primary maternity facilities. Equally, complicated cases requiring more intensive care may be transferred to tertiary facilities.

In 2007 the average maternal length of hospital stay was 2.5 days. As Figure 5.1 shows, the majority (60.5 percent) of mothers were discharged from hospital within two or less days of admission (see data integrity note above).

Figure 5.1: Percentage of mothers, by length of stay in hospital (days), 2007



Data source: NMDS (mother's record)

5.1.2 Pre-delivery length of stay

Pre-delivery length of stay is defined as the period between a mother's admission to hospital and delivery (inclusive). In 2007 almost three-quarters of mothers (74 percent) gave birth on the day they were admitted to hospital. The proportion of mothers that gave birth either on the day of admission or the day after was 92.8 percent. Only 0.9 percent of mothers had an antenatal length of stay greater than seven days. Table 5.1 shows the distribution of antenatal length of stay by ethnic group.

Table 5.1: Number of mothers, by antenatal length of stay (days) and maternal ethnicity, 2007

Ethnicity	Antenatal length of stay (days)						Total
	Less than 1	1	2-6	7-13	14 or more	Not stated	
Māori	9273	2360	624	84	29	117	12,487
Pacific peoples	4723	1187	362	48	23	77	6420
Asian	4132	1098	320	26	21	70	5667
European	25,556	6383	1856	177	130	303	34,405
Other	1108	314	79	20	8	10	1539
Not stated	329	79	30	1	2	2	443
Total	45,121	11,421	3271	356	213	579	60,961

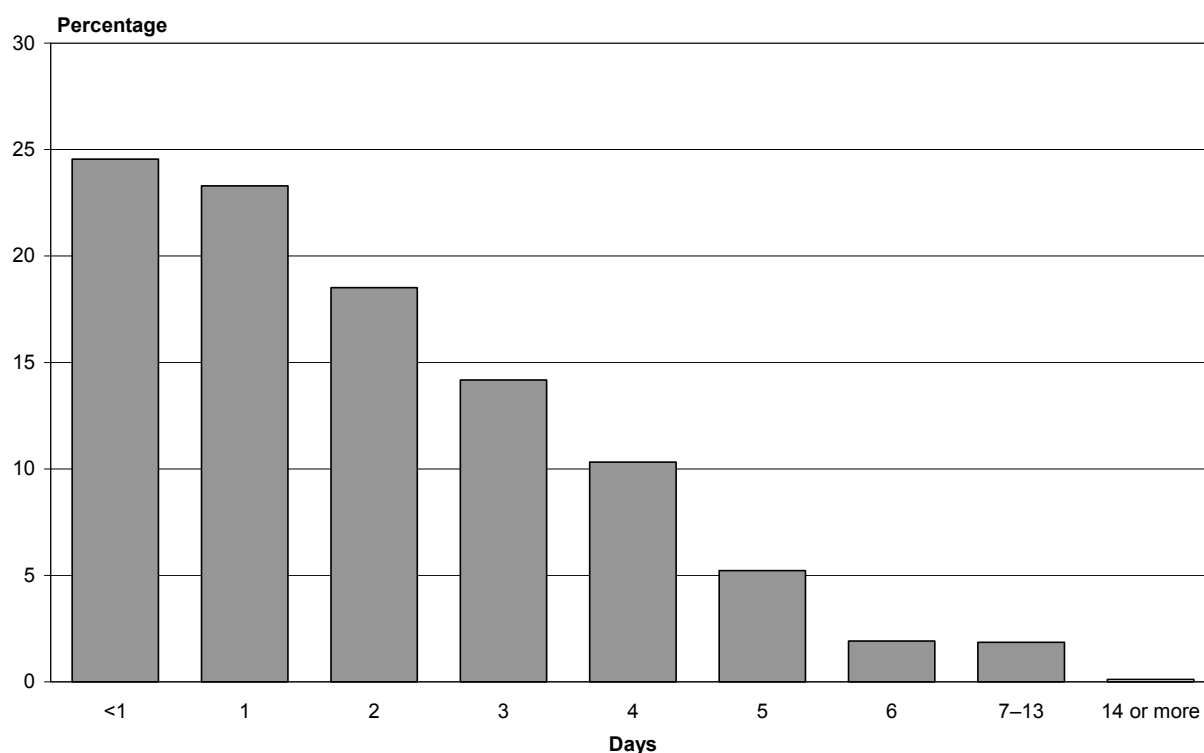
Data source: NMDS (mother's record)

5.1.3 Postnatal length of stay

Postnatal length of stay is the period between the date of delivery and the date of discharge (inclusive).

In 2007 the average postnatal stay was 2.0 days. Figure 5.2 shows that the largest proportion of mothers were discharged on the day of delivery. Almost half of all women were discharged from hospital less than two days after giving birth (47.8 percent).

Figure 5.2: Percentage of mothers, by postnatal length of stay (days), 2007



Data source: NMDS (mother's record)

Table 5.2 shows the postnatal length of stay, by mother's age group and ethnicity. The subgroups with the shortest average postnatal length of stay were mothers aged between 20 and 24 years (1.7 days) and mothers of Māori ethnicity (1.7 days).

Table 5.2: Number of mothers, by postnatal length of stay (days), maternal ethnicity and age group, 2007

		Postnatal length of stay (days)										Total	Average
		< 1	1	2	3	4	5	6	7-13	14 or more	Not stated		
Age group	Under 16	33	52	40	26	22	6	6	4	0	0	189	2.1
	16-19	1126	1311	991	654	348	168	72	63	3	1	4737	1.9
	20-24	2830	2860	2214	1436	810	376	131	144	10	0	10,811	1.7
	25-29	3776	3666	2742	2138	1342	660	235	226	17	0	14,802	1.9
	30-34	4231	3750	3198	2532	1961	947	357	332	18	0	17,326	2.1
	35-39	2541	2141	1765	1543	1467	809	284	282	20	1	10,853	2.3
	40+	432	419	342	319	343	220	83	81	4	0	2243	2.6
Ethnic group	Māori	3558	3649	2305	1458	773	369	160	199	15	1	12,487	1.7
	Pacific peoples	1601	1973	1222	698	460	242	107	109	7	1	6420	1.8
	Asian	1345	1169	965	793	710	381	138	156	10	0	5667	2.2
	European	8030	6983	6457	5381	4112	2062	717	626	37	0	34,405	2.1
	Other	334	332	253	237	201	102	41	37	2	0	1539	2.2
	Not stated	101	93	90	81	37	30	5	5	1	0	443	2.1
Total		14,969	14,200	11,292	8648	6293	3186	1168	1132	72	2	60,961	2.0

Data source: NMDS (mother's record)

Table 5.3 shows the average length of stay, by procedure. Normal births required the shortest average length of stay in hospital (1.4 days) while caesarean sections required the longest average length of stay at 3.7 days.

Table 5.3: Number of birth procedures, by mode of birth and postnatal length of stay (days), 2007

Postnatal length of stay (days)	Normal birth	Caesarean section	Breech birth	Assisted birth	Not stated	Total
< 1	13,187	396	78	1242	87	14,990
1	11,656	958	90	1359	175	14,238
2	8055	1966	53	1113	147	11,334
3	4273	3425	55	855	90	8698
4	1598	4227	30	441	45	6341
5	652	2319	26	208	19	3224
6	298	763	9	107	6	1183
7-13	286	746	16	99	10	1157
14 or more	21	45	1	4	1	72
Not stated	1	0	0	0	2	2
Total	40,026	14,845	358	5428	581	61,238
Average	1.4	3.7	1.8	1.9	2.6	2.0

Data source: NMDS (mother's record)

Table 5.4 shows the maternal postnatal length of stay, by DHB region of mother's residence, in 2007. The DHB region with the longest average length of stay was West Coast (2.7 days), and the DHB region with the shortest length of stay was Hutt Valley (1.1 days).

Table 5.4: Number of mothers, by DHB region of mother's place of residence and postnatal length of stay (days), 2007

DHB region	Average postnatal length of stay (days)	Postnatal length of stay (days)						Total
		< 1	1	2-6	7-13	14 or more	Not stated	
Northland	1.8	526	629	926	54	3	0	2138
Waitemata	2.2	1156	1754	4457	113	6	0	7486
Auckland	2.0	2126	1511	2700	213	15	0	6565
Counties Manukau	2.1	1677	2437	4381	186	9	1	8691
Waikato	1.6	2076	986	2105	82	2	1	5252
Lakes	1.7	375	510	649	28	5	0	1567
Bay of Plenty	2.0	508	789	1491	45	7	0	2840
Tairāwhiti	2.0	127	252	352	13	2	0	746
Hawke's Bay	2.1	419	523	1307	30	1	0	2280
Taranaki	2.3	215	338	934	21	0	0	1508
MidCentral	2.0	361	571	1194	27	1	0	2154
Whanganui	2.3	117	198	509	15	0	0	839
Capital & Coast	1.7	1271	834	1630	69	3	0	3807
Hutt Valley	1.1	1235	262	571	11	0	0	2079
Wairarapa	2.3	62	128	300	6	0	0	496
Nelson Marlborough	2.3	167	385	1031	21	3	0	1607
West Coast	2.7	45	67	246	15	0	0	373
Canterbury	1.9	2060	1138	3124	42	4	0	6368
South Canterbury	2.6	39	126	467	12	1	0	645
Otago	2.5	235	452	1205	81	4	0	1977
Southland	2.5	168	298	994	47	6	0	1513
Not stated	2.4	4	11	14	1	0	0	30
Total	2.0	14,969	14,199	30,587	1132	72	2	60,961

Data source: NMDS (mother's record)

5.1.4 Length of stay of babies in hospital of birth

In 2007 the average length of stay for liveborn babies was 2.9 days (Table 5.5). Pre-term babies on average stayed in hospital longer than term babies. The average length of stay for pre-term and term babies was 15.1 days and 2.0 days, respectively.

Table 5.5: Number of liveborn babies, by length of stay (days) and gestation, 2007

Length of stay (days)	Pre-term babies		Term babies		Total*	
	Number	%	Number	%	Number	%
Average	15.1		2.0		2.9	
Less than 1	298	6.8	14,124	25.1	14,762	23.8
1	304	6.9	13,553	24.1	14,201	22.9
2	300	6.8	10,579	18.8	11,167	18.0
3	283	6.4	7877	14.0	8329	13.4
4	280	6.4	5576	9.9	5942	9.6
5	263	6.0	2539	4.5	2853	4.6
6	174	4.0	932	1.7	1128	1.8
7–13	969	22.0	881	1.6	1893	3.1
14–20	608	13.8	97	0.2	723	1.2
21–27	274	6.2	40	0.1	329	0.5
28 or more	646	14.7	50	0.1	718	1.2
Total	4399	100.0	56,248	100.0	62,045	100.0

Data source: NMDS (baby's record)

* Includes babies not classified according to term or pre-term.

Table 5.6 shows that of the babies with a reported ethnicity, European babies had the longest stay (on average 3.1 days) and Māori babies the shortest stay (on average 2.6 days).

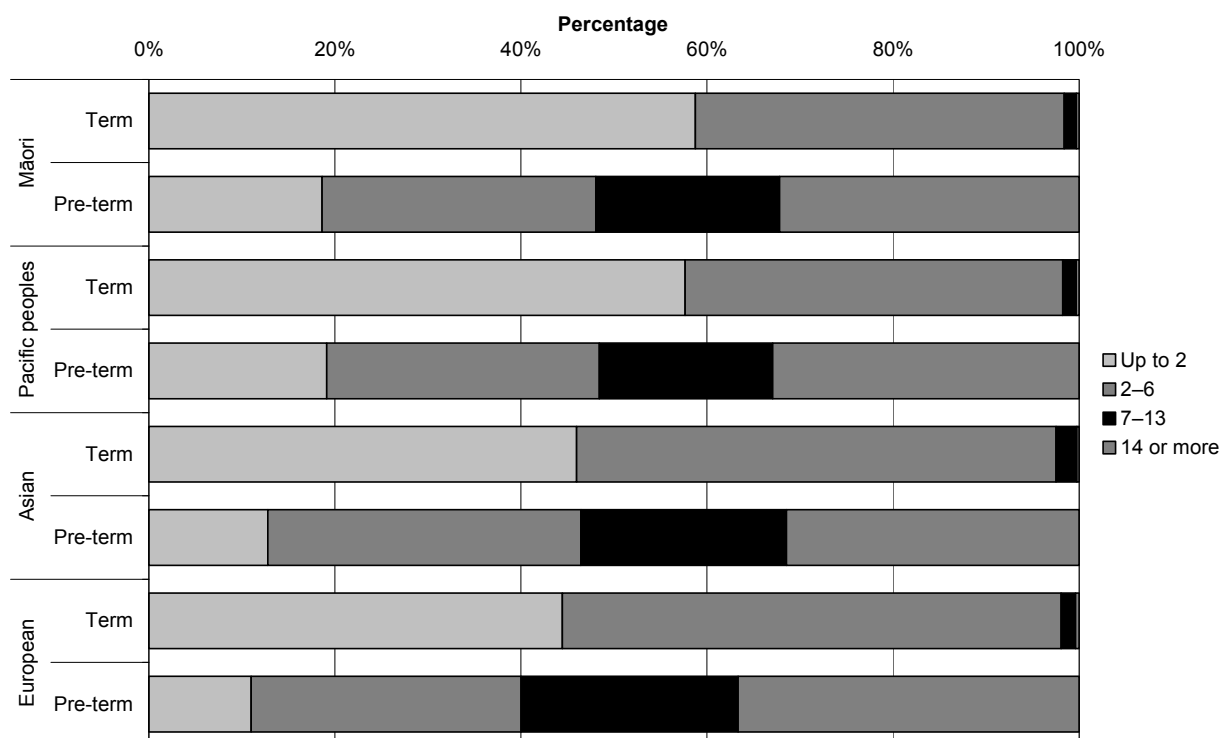
Table 5.6: Number of liveborn babies, by length of stay (days) and ethnicity, 2007

Length of stay (days)	Ethnic group						Total
	Māori	Pacific peoples	Asian	European	Other	Not stated	
Average	2.6	2.7	3.0	3.1	3.1	3.4	2.9
Less than 1	3764	1630	1384	7486	366	132	14,762
1	3863	2033	1111	6758	313	123	14,201
2	2465	1178	972	6230	202	120	11,167
3	1526	726	731	5058	205	83	8329
4	756	441	690	3821	176	58	5942
5	358	198	352	1811	100	34	2853
6	171	95	124	687	38	13	1128
7–13	369	168	209	1074	58	15	1893
14–20	143	48	55	446	22	9	723
21–27	78	28	22	190	7	4	329
28 or more	154	80	65	396	15	8	718
Total	13,647	6625	5715	33,957	1502	599	62,045

Data source: NMDS (baby's record)

Figure 5.3 shows the percentage of babies, by gestational group and postnatal stay. As expected, pre-term babies of all ethnicities stayed in hospital longer than term babies.

Figure 5.3: Percentage of babies, by ethnicity, gestational group and postnatal length of stay (days), 2007



Data source: NMDS (baby's record)

5.2 Discharge type from hospital

Discharge type (separation) describes the method by which a hospital event ends. It may take into account destination after discharge, such as discharge home or transfer to another facility or to another service within the same facility.

5.2.1 Mother's mode of separation

In 2007 the majority of mothers giving birth in hospital were discharged home at the end of their birth event (83.5 percent). The majority of the remaining mothers (16.3 percent) were transferred to another service or different facility, usually for the continuation of the mother's postnatal care. Pacific and Māori mothers were more likely to be discharged home than other ethnicities (90.6 percent and 89.0 percent, respectively). European and Asian mothers were more likely to be transferred to another service or facility (19.4 percent and 18.4 percent, respectively).

Table 5.7: Number and percentage of mothers, by mode of separation and ethnicity, 2007

Mode of separation	Total		Ethnic group					
	Number	Percentage	Māori	Pacific peoples	Asian	European	Other	Not stated
Discharge home	50,901	83.5	89.0	90.6	81.6	80.5	83.8	83.3
Transfer to:	9910	16.3	10.4	8.9	18.4	19.4	16.1	16.3
– another facility	9333	15.3	9.1	8.1	18.0	18.5	15.3	14.4
– service within same facility	577	0.9	1.3	0.8	0.4	0.9	0.8	1.8
Other*	150	0.2	0.6	0.5	0.1	0.1	0.1	0.5
Total	60,961	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Data source: NMDS (mother's record)

* 'Other' includes deaths, statistical discharges and transfers to accommodation other than acute hospitals, such as community care, and mothers discharged against medical advice.

Note that the number of separations ending in maternal death has been added to the 'other' category because the small numbers may compromise confidentiality. Maternal death data received from the mortality section will be covered in section 6 of this publication.

5.2.2 Babies' mode of separation

In 2007, 83.1 percent of liveborn babies were discharged home at the end of their birth event (Table 5.8); 16.6 percent of babies were transferred to another service or facility. Babies dying in hospital accounted for 0.2 percent of separations.

For complete information and analyses on all newborn and infant deaths registered in New Zealand, see the Fetal and Infant Death Series produced by the Ministry of Health.⁸

Table 5.8: Number of babies, by mode of separation, 2007

Mode of separation	Total		Born in hospital	Admitted to hospital following birth
	Number	Percentage		
Discharge home	51,557	83.1	51,173	382
Transfer to:	10,310	16.6	10,274	36
– another facility	9543	15.4	9509	34
– a specialist facility	408	0.7	406	2
– a service within same facility	359	0.6	359	0
Died	138	0.2	136	2
Other	40	0.1	40	0
Total	62,045	100.0	61,623	420

Data source: NMDS (baby's record)

Note: Total includes unknown place of birth.

5.3 Postnatal hospital readmissions of the mother and baby

A maternal hospital readmission is defined as a readmission of a mother within 42 days of a hospital birth. Some mothers were readmitted several times within this period and each readmission is included in these analyses. A newborn readmission is an admission to hospital of a baby within 92 days of date of birth. Transfers between facilities, short-stay emergency department events and boarders⁹ are excluded from this analysis.

The regional rates of readmissions for mothers and babies for all diagnoses are presented in Table 5.9. The DHB regions with the highest rates of maternal readmissions per 1000 deliveries were Capital & Coast (182.3) and Tairāwhiti (177.8). Nelson Marlborough and Wairarapa DHB regions had the lowest rates of maternal readmissions per 1000 deliveries (24.8 and 34.2, respectively). The highest rates of first baby readmission were seen in Tairāwhiti and Hutt Valley DHB regions (131.9 and 117.2 readmissions per 1000 live births).

There was wide variation in readmission rates between DHB regions. This may reflect variation in clinical practice (eg, admission or discharge criteria) or variation in coding practices; further investigation is required.

⁸ <http://www.moh.govt.nz/moh.nsf/indexmh/dataandstatistics-subjects-fetalinfant>

⁹ A boarder is a healthy person (adult or child) accompanying a sick person admitted to hospital.

Table 5.9: Number and rate of hospital readmission¹ for mothers and babies, by DHB region of mother's and baby's place of residence, 2007

DHB region	Mother		Baby			
	Number	Rate per 1000 hospital deliveries	First readmission ²	Rate per 1000 live births	All readmissions ³	Rate per 1000 live births
Northland	161	74.9	192	88.4	235	108.1
Waitemata	412	54.7	509	67.5	603	80.0
Auckland	391	59.3	339	50.6	405	60.4
Counties Manukau	647	74.1	844	95.5	1007	114.0
Waikato	475	90.2	297	56.1	377	71.2
Lakes	167	106.2	162	100.4	204	126.5
Bay of Plenty	219	76.9	303	104.8	378	130.8
Tairāwhiti	133	177.8	101	131.9	118	154.0
Hawke's Bay	229	99.7	167	72.8	197	85.9
Taranaki	131	86.6	91	59.3	103	67.1
MidCentral	119	55.1	197	89.3	230	104.3
Whanganui	56	66.6	96	112.1	111	129.7
Capital & Coast	697	182.3	308	78.6	352	89.8
Hutt Valley	87	41.5	245	117.2	320	153.1
Wairarapa	17	34.2	38	76.0	50	100.0
Nelson Marlborough	40	24.8	100	61.6	115	70.9
West Coast	59	157.8	18	48.8	23	62.3
Canterbury	611	95.5	432	65.4	550	83.2
South Canterbury	27	41.6	50	77.0	58	89.4
Otago	102	51.5	125	61.9	164	81.3
Southland	100	65.8	140	93.2	169	112.5
Not stated	2	66.7	3	54.5	3	54.5
Total	4882	79.7	4757	76.7	5772	93.0

Data source: NMDS (mother's record, baby's record)

1 Readmission within 92 days (baby) and 42 days (mother) after discharge from hospital of birth.

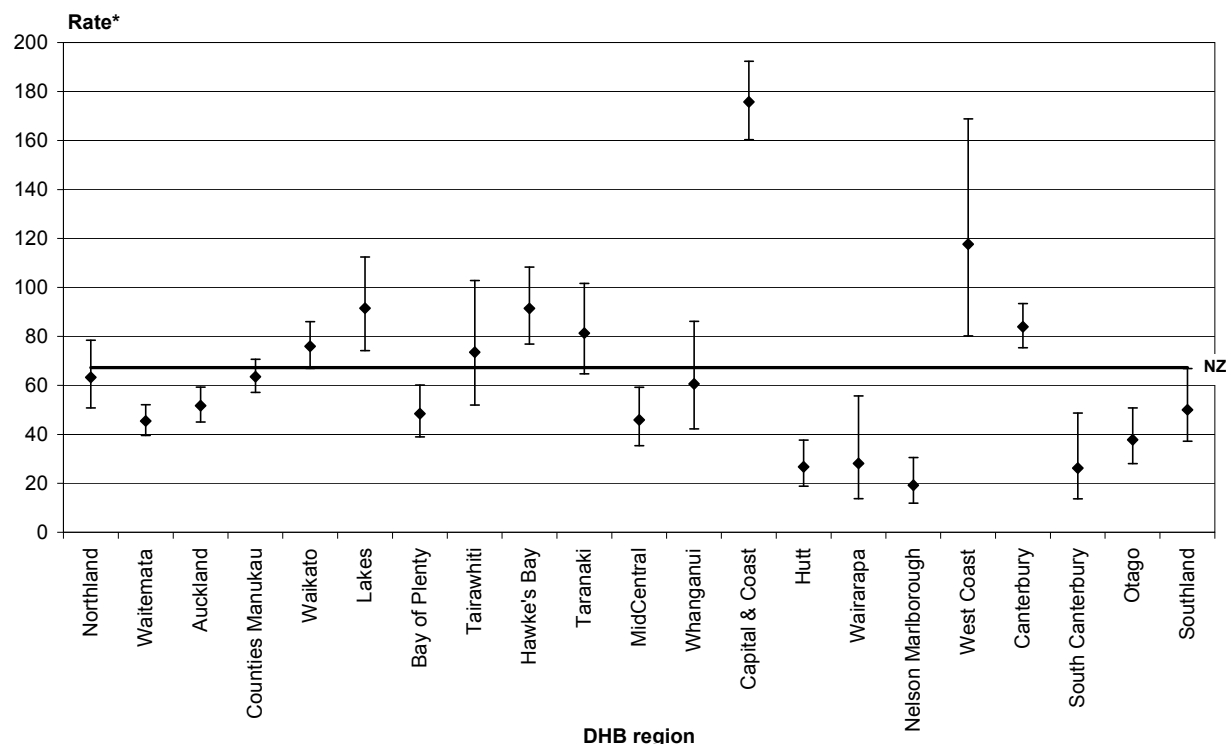
2 First instance that a baby was readmitted to hospital following its birth.

3 First and subsequent readmissions.

5.3.1 Maternal readmission for postpartum and post-abortion care

Of the 4882 maternal hospital readmissions, 4118 were for postpartum and post-abortion diagnoses (see Appendix A). Figure 5.4 shows rates of readmission for maternity-related diagnoses, by individual DHB regions. The DHB regions with the highest rates of readmission per 1000 deliveries were Capital & Coast (175.8) and West Coast (117.6). Nelson Marlborough and South Canterbury DHB had the lowest rates of readmission per 1000 deliveries (19.2 and 26.2, respectively).

Figure 5.4: Rate of hospital readmission of mothers for postpartum and post-abortion diagnoses, with 99 percent confidence intervals, by DHB of mother's place of residence, 2007



Data source: NMDS (mother's record)

* Readmission rate per 1000 hospital deliveries.

As seen in Table 5.10, the diagnoses most commonly associated with maternal readmission were 'postpartum care and examination' and 'infections of breast associated with childbirth' (40.0 percent and 11.2 percent of all readmissions, respectively). The average length of stay for mothers readmitted to hospital with a maternity-related diagnosis was 2.3 days.

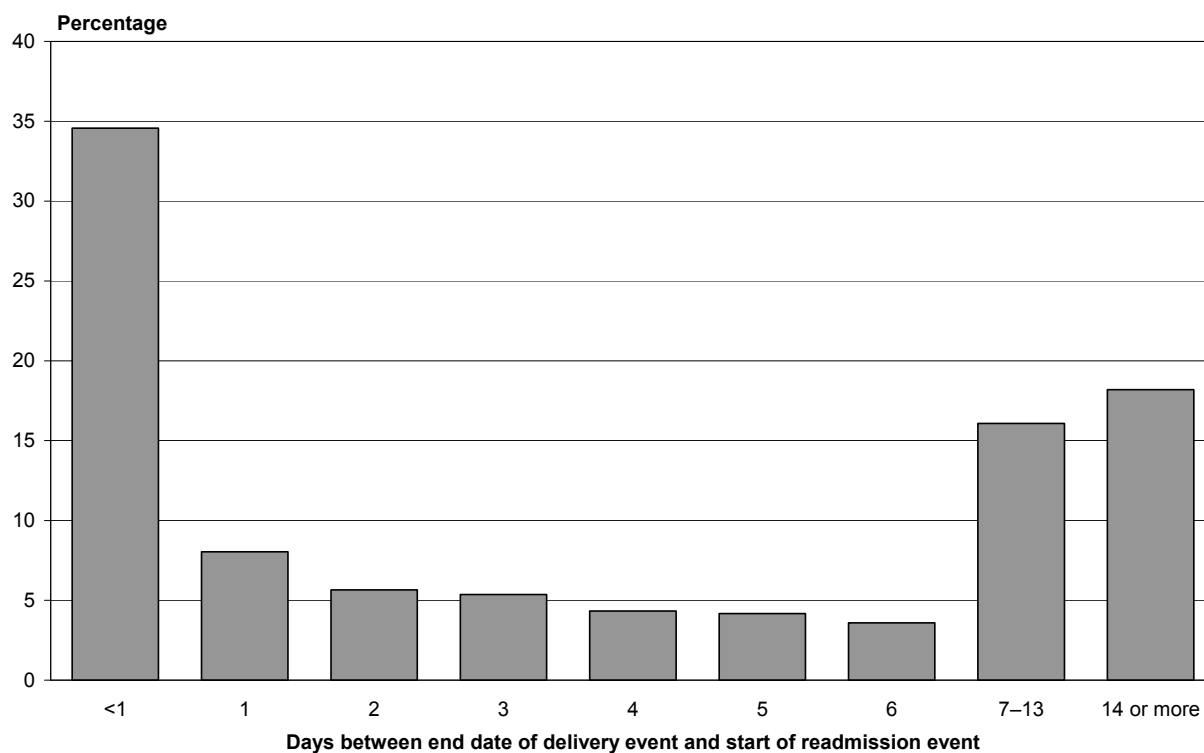
Table 5.10: Postnatal readmissions for mothers with problems relating to pregnancy, by principal diagnosis 2007

Principal diagnosis	Readmissions		Average length of stay (days)	Rate per 1000 hospital deliveries
	Number	%		
Postpartum care and examination	1648	40.0	2.4	26.9
Infections of breast associated with childbirth	462	11.2	2.4	7.5
Other puerperal infections	396	9.6	2.6	6.5
Puerperal sepsis	385	9.3	2.1	6.3
Postpartum haemorrhage	325	7.9	1.3	5.3
Other maternal diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium	305	7.4	2.8	5.0
Complications of the puerperium, not elsewhere classified	141	3.4	1.9	2.3
Other disorders of breast and lactation associated with childbirth	73	1.8	2.3	1.2
Retained placenta and membranes, without haemorrhage	54	1.3	1.3	0.9
Gestational [pregnancy-induced] hypertension with significant proteinuria	52	1.3	1.8	0.8
Venous complications in the puerperium	48	1.2	1.7	0.8
Complications of anaesthesia during the puerperium	41	1.0	1.0	0.7
Gestational [pregnancy-induced] hypertension without significant proteinuria	38	0.9	1.9	0.6
Perineal laceration during delivery	24	0.6	1.0	0.4
Unspecified maternal hypertension	20	0.5	1.7	0.3
Pre-existing hypertension complicating pregnancy, childbirth and the puerperium	19	0.5	2.1	0.3
Mental and behavioural disorders associated with the puerperium, not elsewhere classified	15	0.4	6.4	0.2
Maternal infectious and parasitic diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium	13	0.3	1.6	0.2
Other obstetric trauma	12	0.3	2.5	0.2
Obstetric embolism	8	0.2	3.3	0.1
Diabetes mellitus in pregnancy	6	0.1	1.2	0.1
Eclampsia	6	0.1	2.2	0.1
Pre-existing hypertensive disorder with superimposed proteinuria	3	0.1	1.0	0.0
Complications following abortion and ectopic and molar pregnancy	3	0.1	0.3	0.0
Placenta praevia	1	0.0	2.0	0.0
Other	20	0.5	3.0	0.3
Total	4118	100.0	2.3	67.2

Data source: NMDS (mother's record)

As seen in Figure 5.5, approximately one-third of all readmissions occurred on the day of discharge. Further investigation is required into whether these are genuine readmissions or transfers coded as readmissions.

Figure 5.5: Percentage of mothers, by length of time between delivery and readmission (days) for selected DRGs,* 2007



Data source: NMDS (mother's record)

* DRGs O04Z and O61Z

Table 5.11 shows the number of days between the end date of a mother's delivery event and the readmission start date, by age and ethnicity of mother.

Table 5.11: Length of time (in days) between mother's delivery and readmission for selected DRGs,* by maternal ethnicity and age group, 2007

		Number of days between end date of delivery event and start of readmission event									Total	
		< 1	1	2	3	4	5	6	7–13	14 or more	No.	%
Age group (at admission)	Under 16	6	1	1	0	0	0	1	1	4	14	0.3
	16–19	115	38	29	30	19	16	17	73	71	408	9.9
	20–24	271	58	48	39	34	35	28	146	150	809	19.6
	25–29	328	72	54	48	45	42	40	157	178	964	23.4
	30–34	445	85	47	53	45	47	38	168	199	1127	27.4
	35–39	197	59	45	43	24	23	18	94	121	624	15.2
	40 and over	62	18	9	8	11	9	6	23	26	172	4.2
	Not stated	0	0	0	0	0	0	0	0	0	0	0.0
Ethnic group	Māori	301	79	60	48	44	36	33	138	153	892	21.7
	Pacific peoples	97	60	46	40	27	21	17	91	98	497	12.1
	Asian	73	25	24	21	17	14	13	66	64	317	7.7
	European	905	153	92	102	86	92	81	345	408	2264	55.0
	Other	38	12	9	9	4	9	3	18	20	122	3.0
	Not stated	10	2	2	1	0	0	1	4	6	26	0.6
Total		1424	331	233	221	178	172	148	662	749	4118	
Percentage		34.6	8.0	5.7	5.4	4.3	4.2	3.6	16.1	18.2		100.0

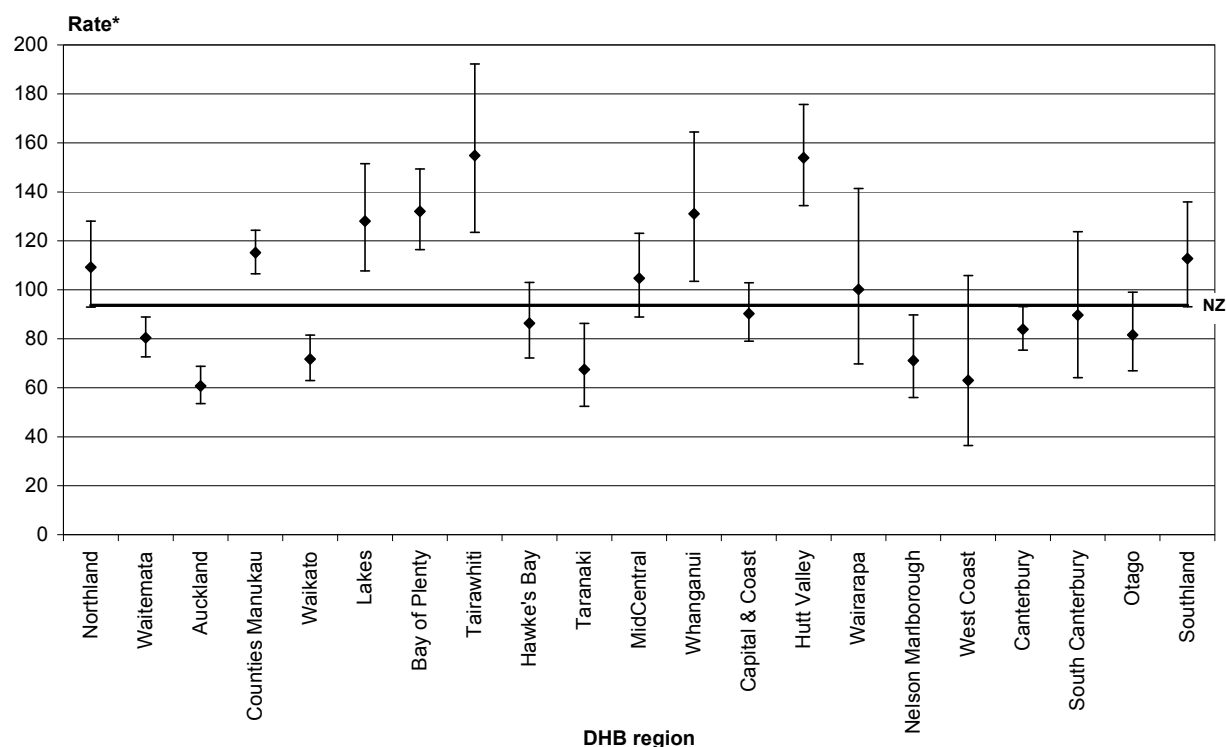
Data source: NMDS (mother's record)

* DRGs O04Z and O61Z

5.3.2 Readmission of babies

Of the 62,045 liveborn babies recorded in the NMDS in 2007, 61,623 were born in hospital. Of those born in hospital, 4757 (7.7 percent) required readmission to hospital (see Table 5.8. Figure 5.6 illustrates the readmission rates for babies born in hospital by DHB compared with the national readmission rate of 93.7 readmissions per 1000 live hospital-born babies. Tairāwhiti and Hutt Valley had the highest readmission rates of all the DHB regions (154.9 and 153.9 per 1000 babies, respectively), while Auckland and West Coast DHBs had the lowest readmission rates (60.7 and 63.0 per 1000 babies, respectively).

Figure 5.6: Rate of hospital readmission of babies discharged from hospital of birth (with 99 percent confidence intervals), by DHB of baby's place of residence, 2007



Data source: NMDS (baby's record)

* Readmission rate per 1000 live babies discharged from hospital of birth; excludes transfers and boarders.

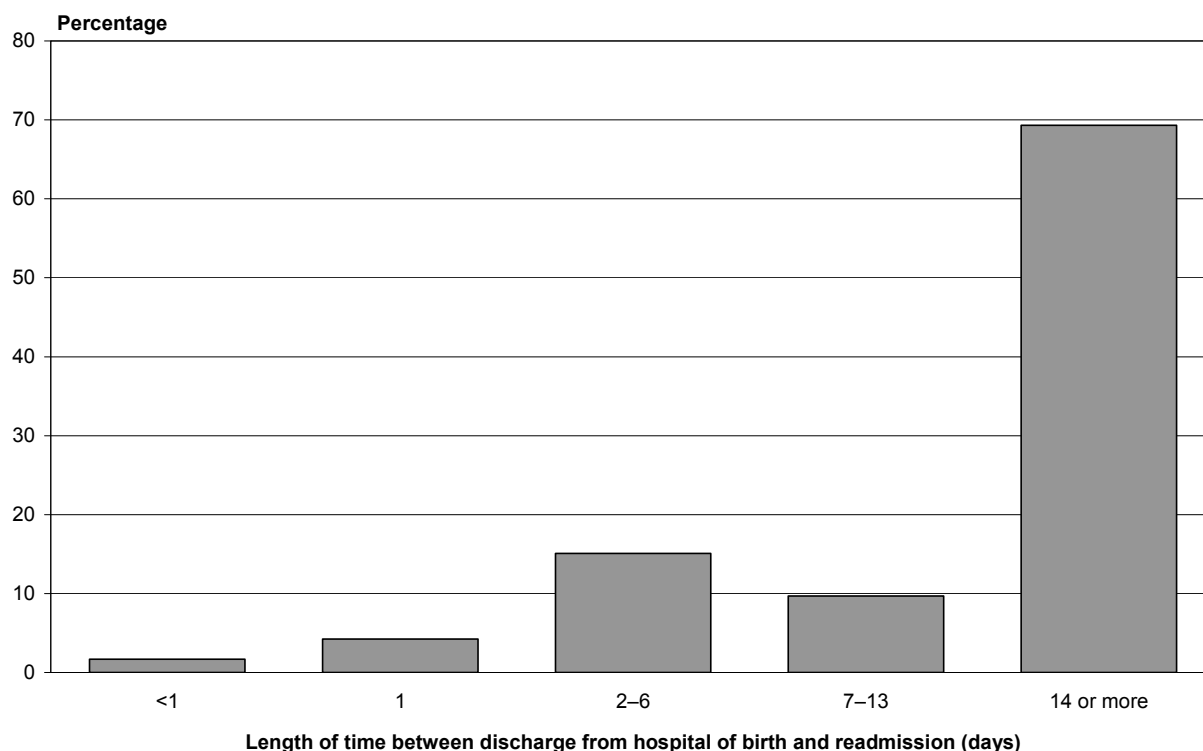
Table 5.12 shows that acute bronchiolitis is the most common reason for babies to be readmitted to hospital (14.2 percent of readmissions). This diagnosis is also associated with the longest average length of stay (3.3 days).

Table 5.12: Postnatal readmission of babies (all), by top 10 principal diagnoses, 2007

Principal diagnosis	All readmissions		Average length of stay (days)	Rate per 1000 live births
	Number	%		
Acute bronchiolitis	821	14.2	3.3	13.2
Neonatal jaundice from other and unspecified causes	627	10.9	1.9	10.1
Acute upper respiratory infections of multiple and unspecified sites	322	5.6	1.2	5.2
Feeding problems of newborn	225	3.9	2.2	3.6
Viral infection of unspecified site	196	3.4	1.6	3.2
Inguinal hernia	231	4.0	1.1	3.7
Gastro-oesophageal reflux disease	166	2.9	1.4	2.7
Symptoms and signs concerning food and fluid intake	142	2.5	3.1	2.3
Abnormalities of breathing	146	2.5	1.3	2.4
Other respiratory conditions originating in the perinatal period	114	2.0	2.0	1.8
Other	2782	48.2	2.4	44.8
Total	5772	100.0	2.3	93.0

Data source: NMDS (baby's record)

Figure 5.7: Percentage of readmitted babies, by length of time between discharge from hospital of birth and readmission (days), 2007

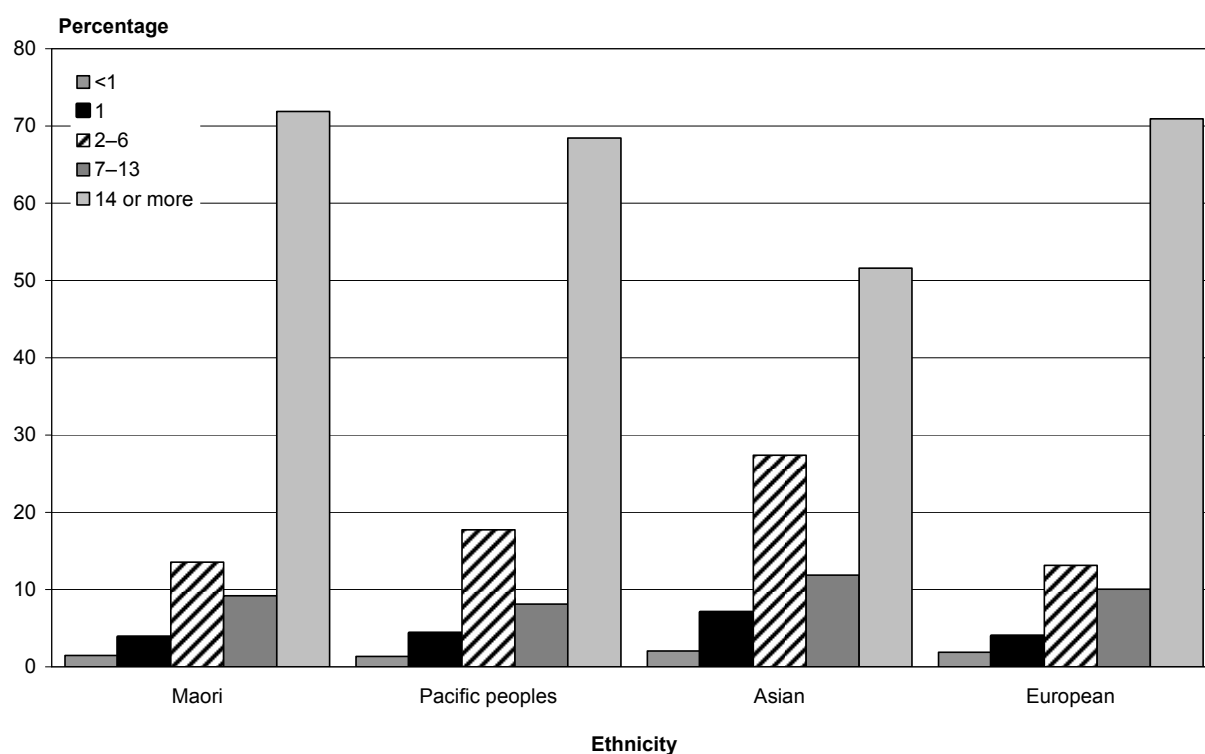


Data source: NMDS (baby's record)

Figure 5.7 shows that the majority of hospital-born babies who were readmitted were readmitted to hospital at least 14 days after they were discharged home (69.3 percent).

Figure 5.8 shows the length of time between discharge and readmission, by ethnic group. Asian babies had the lowest percentage of readmissions to hospital 14 or more days after discharge.

Figure 5.8: Percentage of readmitted babies, by ethnicity and length of time between discharge from hospital of birth and readmission (days), 2007



Data source: NMDS (baby's record)

6 Maternal Deaths

This section presents the numbers, rates and causes of maternal deaths from 1996 to 2007. Data is sourced from the Mortality Collection and defined according to the WHO definition of maternal death:

A maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

The WHO subdivides maternal deaths into two groups:

1. *direct obstetric deaths*: those resulting from obstetric complications of the pregnant state (pregnancy, labour and the puerperium), from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above
2. *indirect obstetric deaths*: those resulting from previously existing disease or disease that developed during pregnancy and which were not due to direct obstetric causes, but which were aggravated by the physiological effects of pregnancy.

These definitions exclude maternal deaths occurring 42 days after the termination (end) of pregnancy.

Note on data integrity

New Zealand has a relatively small number of maternal deaths, so annual maternal death rates may vary substantially and caution is advised when comparing rates over time and between countries. Also, some international comparisons may be invalid because some countries use definitions of maternal death other than the WHO definition.

Table 6.1 shows the numbers and rates of maternal deaths, by year of death.

Table 6.1: Maternal deaths, 1996–2007

Year	Direct		Indirect		Total		Live births
	No.	Rate ¹	No.	Rate ¹	No.	Rate ¹	
1996	4	7.0	0	0.0	4	7.0	57,434
1997	2	3.5	1	1.7	3	5.2	57,734
1998	1	1.7	3	5.2	4	6.9	57,734 ²
1999	3	5.2	1	1.7	4	7.0	57,421
2000	2 ³	1.8 ⁴	3	5.3	5	8.8	56,994
2001	0	0.0	3	5.3	3	5.3	56,224
2002	4	7.3	4	7.3	8	14.7	54,515
2003	3	5.3	1	1.8	4	7.1	56,576
2004	1	1.7	3	5.1	4	6.8	58,723
2005	3	5.1	2	3.4	5	8.5	58,727
2006	4	6.6	3	5.0	7	11.6	60,274
2007	7	10.7	6	9.2	13	20.0	65,121

Data source: Ministry of Health Mortality Collection

1 Rate per 100,000 live births.

2 The 1997 live birth figure has been reused for 1998 because of issues with the 1998 figure. The number of live birth registrations for 1998 was lower than expected because of inconsistencies with the prompt registration of births.

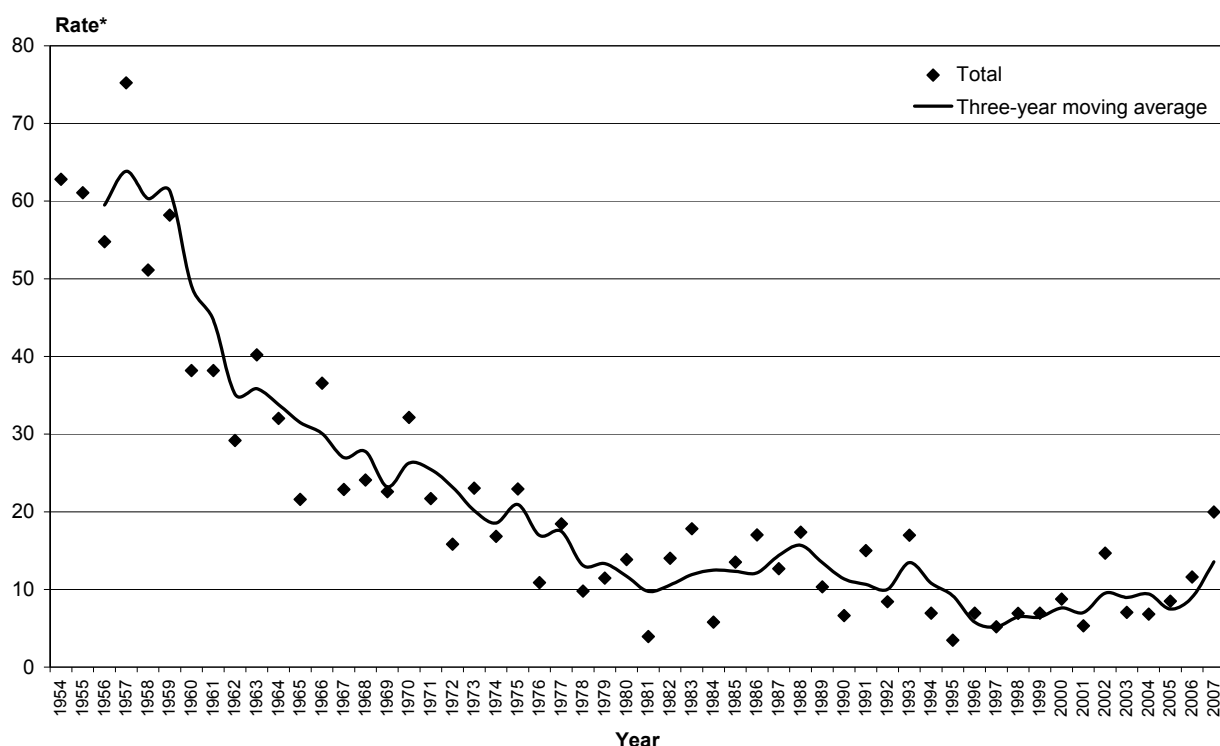
3 One direct maternal death occurred in 1932 but was not registered until 2000.

4 This rate excludes one maternal death that occurred in 1932. If this death is included, the rate increases to 3.5.

Figure 6.1 shows rates of maternal death from 1954 to 2007 using a three-year moving average. In 1954 the maternal death rate was reported to be 62.8 maternal deaths per 100,000 live births (34 maternal deaths). In 2007 the maternal death rate was 20 maternal deaths per 100,000 live births (13 deaths).

The maternal death rate decreased markedly from the 1950s to the late 1970s. Subsequently the decline in the rate of maternal deaths slowed until 1995, when it was at its lowest (3.5 maternal deaths per 100,000 live births: 2 maternal deaths). Since 1995 the maternal death rate has fluctuated, but generally remains stable at around 8 to 9 maternal deaths per 100,000 live births. Caution should be exercised when comparing yearly rates due to the high volatility of the small number of maternal deaths each year in New Zealand.

Figure 6.1: Rates of maternal deaths, annual rate and three-year moving average, 1954–2007



Data source: Ministry of Health Mortality Collection

* Rate per 100,000 live births.

Note: Maternal deaths are reported according to the WHO definition.

Table 6.2 shows maternal deaths by underlying cause of death. Of the 33 maternal deaths that occurred during 2003–2007, over half were the result of direct obstetric complications (54.5 percent). Of the 18 women whose death had a direct maternal cause, six died due to an obstetric embolism. The majority of women dying from indirect causes (eight women, or 53.3 percent) died from diseases of the circulatory system.

Table 6.2: Number of maternal deaths, by underlying cause, 2003–2007

Underlying cause of maternal death	Number of deaths
Direct	18
Obstetric embolism	6
Complications of the puerperium, not elsewhere classified	2
Gestational (pregnancy-induced) hypertension with significant proteinuria	2
Ectopic pregnancy	1
Excessive vomiting in pregnancy	1
Venous complications in pregnancy	1
Puerperal sepsis	1
Venous complications in the puerperium	1
Spontaneous abortion	1
Diabetes mellitus in pregnancy	1
Obstetric death of unspecified cause	1
Indirect	15
Maternal infectious and parasitic diseases complicating pregnancy, childbirth and the puerperium	0
Other maternal diseases complicating pregnancy, childbirth and the puerperium:	15
– diseases of the circulatory system	8
– mental disorders and diseases of the nervous system	2
– other specified diseases and conditions	2
– diseases of the respiratory system	1
– anaemia	1
– endocrine, nutritional and metabolic diseases	1
Total	33

Data source: Ministry of Health Mortality Collection

7 Maternity Facilities

This section presents maternal and newborn data by facility of birth. For more detailed tables see Appendix G.

A maternity facility is a place that mothers attend, or are resident in, for the primary purpose of receiving maternity care. Such a facility can be primary, secondary or tertiary (see the Glossary for full definitions). Primary facilities also include birthing units. Differences in facility use may reflect clinical need, bed availability or geographic access.

Table 7.1: Total live and stillbirths delivered in hospital, by facility type, 2007

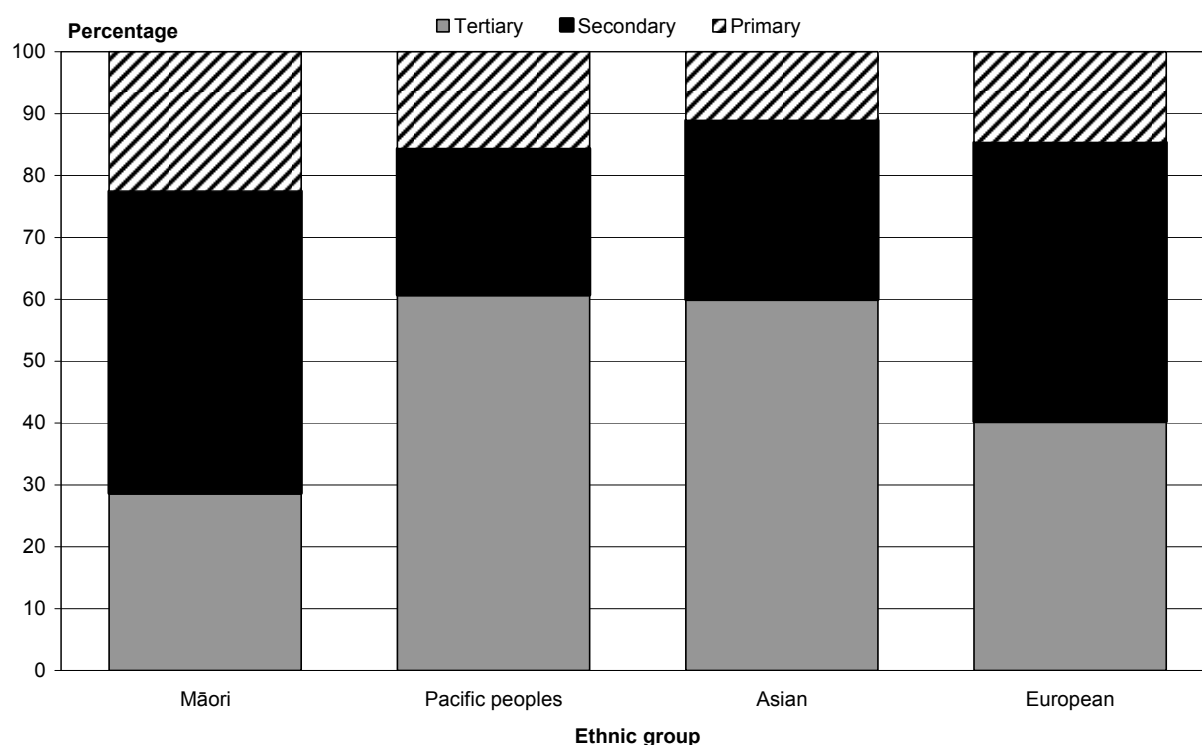
Facility type	Total number of mothers		Mothers delivering at least one liveborn		Mothers delivering all stillborn		Mothers delivering baby of unknown status	
	No.	%	No.	%	No.	%	No.	%
Tertiary	25,688	42.1	25,393	42.0	248	58.9	14	58.9
Secondary	25,437	41.7	25,193	41.7	167	39.7	77	39.7
Primary	9836	16.1	9816	16.3	6	1.4	47	1.4
Total	60,961	100.0	60,402	100	421	100.0	138	100.0

Data source: NMDS (mother's record)

In 2007, 42.1 percent of mothers gave birth in one of the six large tertiary facilities. Secondary facilities were used by 41.7 percent of mothers. The remaining 16.3 percent of mothers gave birth in a primary facility.

The majority of stillbirths occurred in tertiary or secondary facilities (58.9 percent and 39.7 percent, respectively), while only six (1.4 percent) stillbirths occurred in primary facilities. This probably reflects the referral of women with high-risk pregnancies to the specialist services available in secondary and tertiary facilities.

Figure 7.1: Percentage of mothers giving birth in primary, secondary and tertiary facilities, by ethnicity, 2007



Data source: NMDS (mother's record)

As shown in Figure 7.1, Pacific and Asian women were most likely to give birth in a tertiary facility (60.7 percent and 60.0 percent, respectively). Almost half of all Māori mothers (48.8 percent) gave birth in a secondary facility. European mothers used secondary and tertiary facilities to a similar degree (45.1 and 40.2 percent, respectively).

Tables 7.2 to 7.4 show the number of antenatal admissions, types of births and birth interventions by facility type. Tertiary hospitals reported both the longest average antenatal length of stay (1.4 days) and the smallest proportion of normal births (56.9 percent compared to 87.3 percent at primary facilities).

Table 7.2: Antenatal hospital admissions* and average length of stay, by facility type, 2007

Facility type	Number	Percentage	Average length of stay (days)
Tertiary	9914	56.2	1.4
Secondary	6451	36.6	1.1
Primary	1265	7.2	0.4
Other	11	0.1	...
Total	17,641	100.0	1.2

Data source: NMDS (mother's record)

* Hospital events ending before the start date of the delivery event.

Table 7.3: Type of hospital birth (rate per 100 deliveries), by facility type, 2007

Type of hospital birth		Facility type			
		Tertiary	Secondary	Primary	Total
Normal birth		56.9	65.5	87.3	65.4
Assisted delivery	Total	12.1	7.8	3.1	8.9
	Forceps only	4.5	2.4	0.8	3.0
	Vacuum extraction only	7.6	5.3	2.3	5.8
	Forceps and vacuum extraction	0.1	0.1	0.0	0.1
Breech delivery	Total	0.8	0.5	0.2	0.6
	Spontaneous breech birth	0.4	0.2	0.2	0.3
	Assisted breech birth	0.4	0.3	0.1	0.3
	Assisted breech birth with forceps	0.0	0.0	0.0	0.0
Caesarean section	Total	29.7	24.7	8.7	24.2
	Emergency	17.6	14.4	2.9	13.9
	Elective	12.2	10.2	5.9	10.3
Not stated		0.5	1.5	0.7	0.9
Total		100.0	100.0	100.0	100.0

Data source: NMDS (mother's record)

As seen in Table 7.4, tertiary facilities had the highest rates of inductions, epidurals and episiotomies. Primary facilities had the lowest rates of these procedures.

Table 7.4: Number and rate of inductions, epidurals and episiotomies, by facility type, 2007

Facility type	Number			Rate		
	Induction	Epidural	Episiotomy	Induction ¹	Epidural ¹	Episiotomy ²
Tertiary	5188	8482	3331	22.9	37.4	18.4
Secondary	4748	5779	2055	20.7	25.2	10.7
Primary	459	676	455	4.9	7.3	5.1
Total	10,395	14,937	5841	18.9	27.2	12.6

Data source: NMDS (mother's record)

1 Rate per 100 procedures (excluding elective caesarean sections).

2 Rate per 100 procedures.

The Patient Clinical Complexity Level (PCCL) measures the complexity of co-morbid and complicating conditions for each woman relative to all other women with the same condition. It is a measure of the cumulative effect of a patient's complications and co-morbidities, and is calculated for each episode. A PCCL value is assigned according to the severity of co-morbid or complicating conditions (CC), as follows:

- 0 = no CC
- 1 = minor CC
- 2 = moderate CC
- 3 = severe CC
- 4 = catastrophic CC.

Table 7.5 shows that the average length of hospital stay increased with the level of complexity. In 2007 the majority of women had no co-morbid or complicating conditions at the time of birth (69.8 percent), while 2.5 percent of women had the highest level of co-morbidity or complicating condition.

Table 7.5: Number and percentage of mothers and average length of stay, by PCCL and facility type, 2007

Facility type	Total number	Percentage					Average length of stay (days)				
		PCCL 0	PCCL 1	PCCL 2	PCCL 3	PCCL 4	PCCL 0	PCCL 1	PCCL 2	PCCL 3	PCCL 4
Tertiary	25,688	59.9	0.0	21.1	14.8	4.2	1.7	3.0	3.1	4.4	8.1
Secondary	25,437	72.2	0.0	16.8	9.3	1.6	2.0	4.0	3.3	4.2	7.0
Primary	9836	89.6	0.0	6.6	3.5	0.3	2.2	0.0	3.3	4.0	6.3
Total	60,961	69.8	0.0	17.0	10.7	2.5	1.9	3.5	3.2	4.3	7.7

Data source: NMDS (mother's record)

As seen in Table 7.6, the majority of babies are born either in a tertiary or secondary facility (42.4 and 41.5 percent, respectively). Most babies born before 37 weeks' gestation were born in a tertiary facility (58.4 percent) or a secondary facility (35.7 percent). This probably reflects, as previously stated, the referral of women with high-risk pregnancies to the specialist services available through secondary and tertiary hospitals.

Table 7.6: Numbers of live babies born, by gestational age and facility type, 2007

Facility type	Gestational age (weeks)						Total
	Less than 28	28–31	32–36	37–41	42 and over	Not stated	
Tertiary	243	367	1959	22,805	707	212	26,293
Secondary	45	75	1449	22,622	685	861	25,737
Primary	12	21	228	9174	255	325	10,015
Total	300	463	3636	54,601	1647	1398	62,045

Data source: NMDS (baby's record)

Appendix A: Diagnosis Related Group (DRG)

The Australian Refined Diagnosis Related Groups (AR-DRGs) comprise a patient classification scheme that provides a clinically meaningful way of relating the number and types of patients treated in hospital to the resources required by the hospital. DRGs are allocated by 'grouper' software based on the patient's diagnosis and procedure codes, and their age. Clinical coding staff assign the appropriate diagnosis and procedure codes. Version 5.0 of the AR-DRG was used in this publication.

Version 5.0 involved rewriting the major diagnostic category for 'Pregnancy, childbirth and the puerperium' in order to perform PCCL grouping for deliveries, based on new complications and/or co-morbidities (CC), and CC-exclusion lists for obstetric diagnosis codes. The new structure includes a DRG for uncomplicated delivery to assist in obstetric benchmarking, and a same-day DRG for antenatal admissions.

The grouper software evaluates the following decisions to allocate events into DRGs. This section looks specifically at the four DRG codes analysed in this publication:

- O64A – False labour before 37 weeks or with catastrophic CC
- O64B – False labour after 37 weeks without catastrophic CC
- O66A – Antenatal and other obstetric admission
- O66B – Antenatal and other obstetric admission, same day.

For an event to be classified into one of these four DRGs, it must pass through the following steps.

1. The principal diagnosis relates to pregnancy, childbirth and the puerperium.
2. The patient is female.
3. The procedure and diagnoses are not related to a caesarean birth.
4. The procedure and diagnoses are not related to a normal birth.
5. The procedure or principal diagnosis is not related to an ectopic pregnancy.
6. The diagnoses and procedures are not postpartum or post-abortion events with operating room procedures (OR Proc).
7. The diagnoses and procedures do not describe an abortion with operating room procedures (that is dilation and curettage, aspiration curettage or hysterectomy).
8. The diagnoses and procedures do not describe postpartum or post-abortion procedures.
8. The patient did not have an abortion.
10. If the diagnosis is for false labour, go to 10A (if this is not the case, go to 11).
 - 10A If there is a severe or complicating diagnosis, assign DRG O64A (if this is not the case, go to 10B).
 - 10B If there is not a severe or complicating diagnosis and the gestation is less than 37 weeks, assign DRG O64A (if this is not the case, go to 10C).
 - 10C If there is not a severe or complicating principal diagnosis and the gestation is 37 or more weeks, assign DRG O64B (if this is not the case, go to 11).

11. If the diagnosis is not for false labour, and is for antenatal and other obstetric admissions, go to 11A.

11A If there was an overnight stay, assign 066A (if this is not the case, go to 11B).

11B If there was an overnight stay, assign 066B.

O64A – False labour before 37 weeks or with catastrophic CC

Events are given DRG O64A when they have the following principal diagnosis code or PCCL is greater than 3:

10 O470 – False labour < 37 completed weeks' gestation.

O64B – False labour after 37 weeks without catastrophic CC

Events are given DRG O64B when they have any of the following principal diagnosis codes:

11 O471 – False labour ≥ 37 completed weeks' gestation

12 O479 – False labour unspecified.

This includes any labour pains that did not lead to a birth in this hospital event.

Antenatal and other obstetric admission

Events are given either DRG O66A or DRG O66B when the principal diagnosis is one of a large number of codes, including such conditions as:

13 pregnancy with abortive outcomes

14 pre-existing hypertension

15 gestational oedema, proteinuria and hypertension

16 pre-eclampsia or eclampsia

17 diabetes

18 pre-existing insulin-dependent diabetes mellitus or non-insulin-dependent diabetes mellitus

19 poor fetal growth

20 late vomiting in pregnancy

21 infections in kidney or urinary tract or genital tract

22 malnutrition

23 twins or triplets

24 suspected damaged fetus due to alcohol, drugs or radiation.

This list includes admissions where pre-existing conditions complicate the pregnancy or childbirth: for example, an obstetric patient admitted for an asthma-complicating pregnancy.

O66A – Antenatal and other obstetric admission (not same-day patient)

Events are given DRG O66A where the mode of separation is not same day.

O66B – Antenatal and other obstetric admission, same day

Events are given DRG O66B where the mode of separation is on the same day as admission.

Table A.1: Obstetric DRGs

AR-DRG 5.0	DRG description
O01A	Caesarean delivery with multiple complicating diagnoses 1+ severe
O01B	Caesarean delivery with severe complicating diagnoses
O01C	Caesarean delivery with moderate complicating diagnoses
O01D	Caesarean delivery without complicating diagnoses
O02Z	Vaginal delivery with complicating OR proc
O03Z	Ectopic pregnancy
O60A	Vaginal delivery with multiple complicating diagnoses, 1+ severe
O60B	Vaginal delivery with severe complicating diagnoses
O60C	Vaginal delivery with moderate complicating diagnoses
O60D	Vaginal delivery with no complicating diagnosis
O61Z	Postpartum and post-abortion without OR proc
O62Z	Threatened abortion
O63Z	Abortion no d&c, aspiration curette/hysterotomy
O64Z	False labour
O65A	Other antenatal admission with severe complicating diagnoses
O65B	Other antenatal admission with moderate/no complicating diagnoses

Appendix B: Ethnicity

Ethnicity data used for hospital-based maternity events is sourced from the National Minimum Dataset (NMDs), which records up to three different ethnicities for each individual. For ease of analysis, multiple ethnic groups recorded for individuals are prioritised as one ethnic group using the prioritisation system outlined below.

Ethnicity data for the New Zealand population is based on prioritised ethnicity. Changes in ethnicity recording occurred in September 1995. Previously, ethnicity had been based on ancestry, with only one ethnic group ascribed to each individual ('sole ethnic origin'). The 1995 changes introduced the self-identified ethnicity model. Self-identified ethnicity allows an individual to choose multiple ethnicities based on their preferences or self-concept. Multiple selected ethnicities are then prioritised into a hierarchy.

This system recognises certain key characteristics of ethnicity.

- Ethnicity is self-perceived, so people should identify their ethnic affiliation themselves wherever feasible.
- A person can belong to more than one ethnic group.
- The ethnicities with which a person identifies can change over time.

The concept of ethnicity is that of a social construct of group affiliation and identity. The present Ministry of Health statistical standard for ethnicity states that 'ethnicity is the ethnic group or groups that people identify with or feel they belong to'. Thus, ethnicity is self-perceived, complex and multidimensional, and not only can people belong to more than one ethnic group, they can, and do, change their ethnic affiliation, both over time and in different contexts.

This definition is based on the work of Anthony Smith (Smith 1986).

B.1 Prioritisation

The prioritised ethnicity classification system is a hierarchical structure with four levels, starting with a single digit at Level 1. Further digits are added with each move to a more detailed level, thereby increasing differentiation. Each more detailed level can be mapped up, or aggregated, to a higher level, as the following example illustrates.

- Level 4 (most detailed level) code 12111 is Celtic.
- Level 3 code 121 is British and Irish.
- Level 2 code 12 is Other European.
- Level 1 (least detailed level) code 1 is European.

The prioritisation hierarchy used by the Ministry of Health is shown in Table B.1 below (for Level 2 ethnicity). This hierarchy enables ease of analysis. Multiple ethnic groups recorded for individuals are prioritised using this system.

Table B.1: Standard prioritisation of Level 2 ethnicity

Priority order	Ethnic group code (L2)	Ethnic group code description
1	21	Māori
2	35	Tokelauan
3	36	Fijian
4	34	Niuean
5	33	Tongan
6	32	Cook Island Māori
7	31	Samoa
8	37	Other Pacific Island
9	30	Pacific Island NFD (not further defined)
10	41	South East Asian
11	43	Indian
12	42	Chinese
13	44	Other Asian
14	40	Asian NFD
15	52	Latin American/ Hispanic
16	53	African
17	51	Middle Eastern
18	54	Other
19	12	Other European
20	10	European NFD
21	11	NZ European

For example, if a data provider has indicated four ethnicities and these have been aggregated to Level 2 as 40 – Asian, 21 – Māori, 51 – Middle Eastern and 11 – NZ European, the prioritised responses would be:

21 – Māori

40 – Asian

51 – Middle Eastern

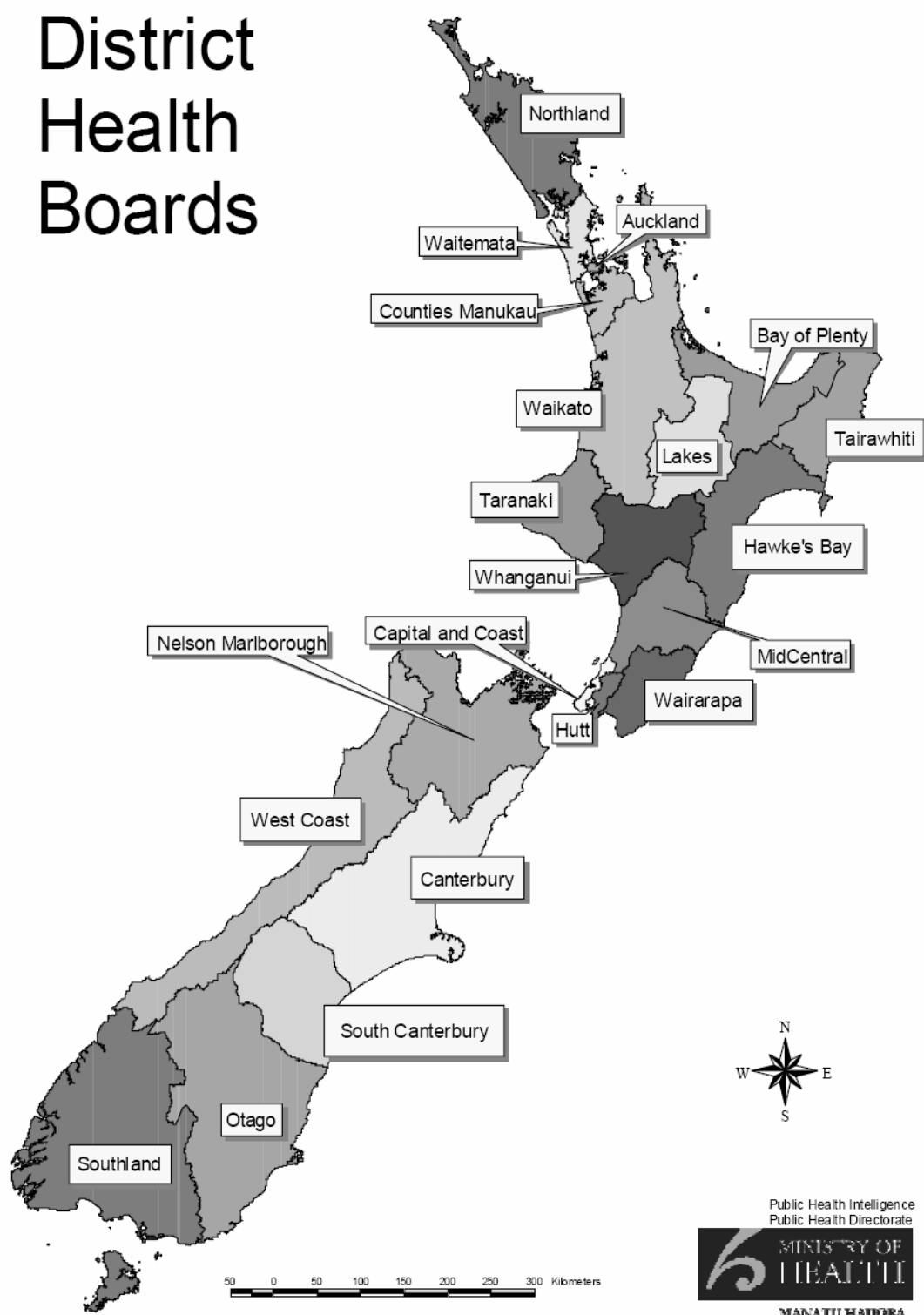
11 – NZ European.

If only three responses are able to be recorded, the 'NZ European' response is omitted.

Further information on ethnicity data protocols for the health and disability sector is available at <http://www.nzhis.govt.nz/moh.nsf/pagesns/228>.

Appendix C: District Health Board Regions

District Health Boards



Appendix D: Catchment Areas

DHB region	Tertiary maternity and level III specialist neonatal services	Secondary maternity and level II specialist neonatal services	Primary maternity
Auckland	Auckland City		Birthcare Auckland
Northland		Whangarei	Bay of Islands (Kawakawa) Dargaville Kaitaia Hokianga
Waitemata		North Shore Waitakere	Wellsford Warkworth Helensville
Counties Manukau	Middlemore		Pukekohe Papakura Botany Downs
Waikato	Waikato		Waihi Birthcare Huntly Thames Rhoda Read (Morrinsville) Matariki (Te Awamutu) Te Kuiti Taumarunui Tokoroa Pohlen (Matamata) River Ridge East Birthing Centre Waterford Birthing Centre
Lakes		Rotorua	Taupo
Bay of Plenty		Tauranga Whakatane	Opotiki Murupara
Tairāwhiti		Gisborne	Te Puia Springs
Taranaki		Taranaki Base (New Plymouth)	Hawera Elizabeth R (Stratford)
Wanganui	Wellington	Wanganui	Waimarino (Raetihi) Marton Taihape
Hawke's Bay		Hastings	Wairoa Chatham Islands Napier Waipukurau
Wairarapa		Masterton	

DHB region	Tertiary maternity and level III specialist neonatal services	Secondary maternity and level II specialist neonatal services	Primary maternity
MidCentral		Palmerston North	Otaki Horowhenua (Levin) Feilding Dannevirke
Hutt Valley		Hutt	
Capital & Coast			Paraparaumu Kenepuru (Porirua)
Nelson Marlborough		Wairau (Blenheim), Nelson	Motueka Golden Bay (Takaka)
Canterbury	Christchurch Women's		Kaikoura St Georges (Christchurch) Avonlea (Christchurch) Burwood Darfield Akaroa Waikari Lincoln Rangiora Ashburton
West Coast		Greymouth	Buller (Westport)
South Canterbury		Timaru	
Otago	Dunedin		Oamaru Charlotte Jean (Alexandra) Dunstan Maniototo Health Services (Ranfurly) Clutha Health First (Balclutha)
Southland		Southland (Invercargill)	Gore Lakes District (Queenstown) Tuatapere Northern Southland (Lumsden) Winton

Appendix E: Standardisation

The purpose of standardisation is to control for potential confounding by outside factors, such as age or ethnic structure, when making comparisons. For example, a researcher may be interested in whether one region has a certain rate higher than the national average. If the region's population has a particular age structure that might strongly influence the observed result, then the effect of age should be removed before making the comparison.

Indirect, rather than direct, standardisation is used for comparisons between District Health Board (DHB) regions. The principal reason for this choice is that indirect standardisation is less sensitive to large differences in age- and ethnicity-specific rates than direct standardisation. This means that the standard deviation of an indirectly standardised rate is generally smaller than its directly standardised equivalent. Therefore, the confidence intervals generated around an indirectly standardised rate are narrower (implying that the rate is more precise) than those found through direct standardisation.

Two forms of standardisation have been used in this publication.

- 1) Standardisation for age and ethnicity has been used for comparing outcomes by DHB region.
- 2) Standardisation for age only (age standardised) has been used in making other comparisons.

E.1 Rates standardised by age and ethnicity

The standardisation methodology used to standardise for age and ethnicity is as follows.

- Step 1: Calculate the national rate for each age and ethnic group for women of reproductive age (15–44 years).
- Step 2: Multiply these rates by the number of reproductive-aged women in each age and ethnic group for each DHB.
- Step 3: Sum the numbers obtained from Step 2 to derive the total expected number of cases in each DHB.
- Step 4: Divide the observed number of cases (including birth events to females aged 45 years or over or aged less than 15 years) in each DHB by the expected number obtained from Step 3. This is the standardised prevalence ratio.
- Step 5: Multiply the standardised prevalence ratio by the national rate, to obtain the standardised rate for each DHB.

Algebraically, the standardised rate for each DHB (SR_{DHB}) is expressed as:

$$SR_{DHB} = \frac{Observed_{DHB}}{Expected_{DHB}} * NR \quad (\text{Steps 4 and 5})$$

where:

$Observed_{DHB}$ is the total number of observed events in the DHB region (including birth events to females aged 45 years or over or aged less than 15 years).

$$Expected_{DHB} = \sum_i N_i \times \frac{p_i}{P_i} \quad (\text{Steps 1 to 3})$$

N_i being the national number of observed events in each age group in each ethnicity group.

p_i being the number of women of reproductive age (15–44 years) in each age group in each ethnicity group within the DHB.

P_i being the number of women of reproductive age (15–44 years) in each age group in each ethnicity group within the New Zealand population.

National rate or $NR = \frac{Observed_{National}}{Population_{National}} * v$

$Observed_{National}$ the number of events (including birth events to females aged 45 years or over or aged less than 15 years).

$Population_{National}$ the number of women of reproductive age in New Zealand.

v being a rate value. For example, v is 1000 if the rate is per 1000 live births.

Age groups: 15–24, 25–44.

Ethnicity: Māori, Pacific, Other.

E.2 Age-standardised rates

Age-standardised rates are calculated by multiplying *age-specific* rates by a standard population. The standard population used in these calculations is the World Health Organization (WHO) world population (see Appendix F).

An age-specific rate is the rate at which a particular health event (for example, birth, death or disease incidence) occurs in each age group of a population as some unit of the population at risk or person-years at risk.

An age-specific rate is simply the crude rate for the specific age group. For example, to calculate the age-specific rate of caesarean sections for women aged 20–24, the total number of cases in the age group is divided by the population in that age group and multiplied by a constant (a unit of population, such as 1000 or, as in the present report, 100). This process produces birth rates showing the number of caesarean sections per 100 deliveries in each age group in a particular year. Further information on age-specific and age-standardised rates can be found in the document *Standardising Rates of Disease* (Public Health Commission and Ministry of Health 1995).

Appendix F: Population Data

F.1 New Zealand population

The 2006 Census of Population and Dwellings was used to calculate all population rates in this publication. Many of the calculations in this publication are based on women of reproductive age. For the purposes of this publication, women of reproductive age are those aged 15–44 years.

Table F.1: Prioritised female population projections, 2007, by ethnicity and age group for New Zealand

Age group	Female population			Total
	Māori	Pacific peoples	Other	
0–4 years	38,020	14,645	90,655	143,320
5–9 years	34,540	13,755	93,260	141,555
10–14 years	33,960	13,375	101,845	149,180
15–19 years	33,560	13,250	110,555	157,365
20–24 years	26,420	11,120	106,935	144,475
25–29 years	22,640	10,160	103,175	135,975
30–34 years	22,540	9975	112,670	145,185
35–39 years	22,930	9850	131,835	164,615
40–44 years	21,140	9150	134,480	164,770
45–49 years	19,450	7325	133,785	160,560
50–54 years	14,590	5715	116,865	137,170
55–59 years	11,250	4525	107,155	122,930
60–64 years	7780	3460	88,880	100,120
65–69 years	6100	2645	75,185	83,930
70–74 years	4030	1820	57,980	63,830
75–79 years	2560	1150	52,780	56,490
80–84 years	1250	660	41,850	43,760
85 and over	710	360	40,890	41,960
Total	323,470	132,940	1,700,780	2,157,190

Data source: Statistics New Zealand (customised extract)

Note: Because of rounding, individual figures in this table do not always sum to the stated totals. Ethnicity data in this table is based on prioritised self-identified ethnicity ('mixed ethnicity'), where individuals select up to three ethnic groups to which they feel they belong.

F.2 World Health Organization (WHO) standard population

Table F.2: WHO world population weight

Age group (years)	Population
0–4	8860
5–9	8690
10–14	8600
15–19	8470
20–24	8220
25–29	7930
30–34	7610
35–39	7150
40–44	6590
45–49	6040
50–54	5370
55–59	4550
60–64	3720
65–69	2960
70–74	2210
75–79	1520
80–84	910
85+	635
Total	100,035

Source: WHO 2001

Appendix G: Additional Tables and Figures

G.1 Mothers' demographics

This table relates to Chapter 2: Mother and Pregnancy.

Table G.1.1: Number of women giving birth, by age and DHB region of mother's place of residence, 2007

DHB region	Under 16	16–19	20–24	25–29	30–34	35–39	40 and over	Total
Northland	17	261	512	484	484	309	71	2138
Waitemata	15	374	1065	1779	2353	1568	332	7486
Auckland	8	275	805	1439	2146	1564	328	6565
Counties Manukau	39	806	1844	2303	2150	1260	289	8691
Waikato	20	496	1149	1325	1364	739	159	5252
Lakes	7	200	348	395	377	195	45	1567
Bay of Plenty	12	310	554	704	747	439	74	2840
Tairāwhiti	3	92	188	181	164	96	22	746
Hawke's Bay	9	243	468	550	618	335	57	2280
Taranaki	6	150	313	370	418	207	44	1508
MidCentral	10	237	487	579	494	290	57	2154
Whanganui	3	97	206	207	183	115	28	839
Capital & Coast	7	201	464	725	1280	906	224	3807
Hutt Valley	5	166	348	565	559	365	71	2079
Wairarapa	1	41	98	139	138	69	10	496
Nelson Marlborough	6	95	271	407	471	300	57	1607
West Coast	2	31	71	95	98	62	14	373
Canterbury	14	373	894	1462	2031	1355	239	6368
South Canterbury	2	61	107	188	177	89	21	645
Otago	1	112	315	504	643	340	62	1977
Southland	2	112	301	391	426	243	38	1513
Not stated		4	3	10	5	7	1	30
Total	189	4737	10,811	14,802	17,326	10,853	2243	60,961

Source: NMDS

G.2 Antenatal admissions

This table relates to the pregnancy complications section within Chapter 2: Mother and Pregnancy. The number of antenatal admissions may appear low in Table G2.1 because only the principal diagnosis is presented for each admission.

Table G.2.1: Antenatal hospital admissions (excluding transfers) and average length of stay for mothers, by principal diagnosis (DRGs O66A and O66B), 2007

Principal diagnosis	Antenatal admission		Average length of stay (days)	Antenatal admission – same day	
	No.	%		No.	%
Other obstetric conditions, not elsewhere classified	2181	25.1	2.1	1762	27.9
Maternal infectious and parasitic diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium	83	1.0	2.0	42	0.7
Other maternal diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium	2098	24.1	2.1	1720	27.3
Other maternal disorders predominantly related to pregnancy	2766	31.8	2.1	1241	19.7
Abnormal findings on antenatal screening of mother	250	2.9	1.4	420	6.7
Complications of anaesthesia during pregnancy	1487	17.1	2.2	422	6.7
Diabetes mellitus in pregnancy	38	0.4	2.1	17	0.3
Excessive vomiting in pregnancy	704	8.1	2.0	240	3.8
Haemorrhage in early pregnancy	190	2.2	2.7	73	1.2
Malnutrition in pregnancy	92	1.1	2.2	66	1.0
Maternal care for other conditions predominantly related to pregnancy	5	0.1	1.2	3	0.0
Maternal care related to the fetus and amniotic cavity and possible delivery problems	2045	23.5	2.7	1557	24.7
Antepartum haemorrhage, not elsewhere classified	21	0.2	2.2	35	0.6
Complications specific to multiple gestation	3	0.0	6.7	2	0.0
Maternal care for known or suspected abnormality of pelvic organs	77	0.9	3.5	169	2.7
Maternal care for known or suspected disproportion	1	0.0	1.0	3	0.0
Maternal care for known or suspected fetal abnormality and damage	174	2.0	4.6	136	2.2
Maternal care for known or suspected malpresentation of fetus	18	0.2	2.4	16	0.3
Maternal care for other known or suspected fetal problems	166	1.9	2.8	307	4.9
Multiple gestation	36	0.4	2.8	12	0.2
Other disorders of amniotic fluid and membranes	35	0.4	1.9	32	0.5
Placenta praevia	286	3.3	3.3	276	4.4
Placental disorders	11	0.1	2.2	4	0.1
Polyhydramnios	256	2.9	4.3	49	0.8
Premature rupture of membranes	21	0.2	2.4	6	0.1
Premature separation of placenta [abruptio placentae]	870	10.0	1.8	307	4.9
Prolonged pregnancy	70	0.8	1.4	203	3.2

Principal diagnosis	Antenatal admission		Average length of stay (days)	Antenatal admission – same day	
	No.	%		No.	%
Oedema, proteinuria and hypertensive disorders in pregnancy, childbirth and the puerperium	1197	13.8	2.3	647	10.3
Eclampsia	99	1.1	1.9	58	0.9
Gestational [pregnancy-induced] hypertension with significant proteinuria	46	0.5	4.4	7	0.1
Gestational [pregnancy-induced] hypertension without significant proteinuria	35	0.4	1.3	47	0.7
Gestational [pregnancy-induced] oedema and proteinuria without hypertension	513	5.9	1.9	299	4.7
Pre-existing hypertension complicating pregnancy, childbirth and the puerperium	380	4.4	2.8	179	2.8
Pre-existing hypertensive disorder with superimposed proteinuria	28	0.3	2.8	6	0.1
Unspecified maternal hypertension	96	1.1	1.6	51	0.8
Complications of labour and delivery	333	3.8	1.4	570	9.0
Abnormalities of forces of labour	94	1.1	1.5	145	2.3
Failed induction of labour	45	0.5	1.9	5	0.1
Labour and delivery complicated by fetal stress [distress]	89	1.0	1.0	179	2.8
Labour and delivery complicated by intrapartum haemorrhage, not elsewhere classified	53	0.6	1.7	125	2.0
Labour and delivery complicated by umbilical cord complications	16	0.2	1.0	36	0.6
Long labour	1	0.0	1.0	1	0.0
Obstructed labour due to malposition and malpresentation of fetus	7	0.1	1.0	5	0.1
Obstructed labour due to maternal pelvic abnormality	1	0.0	1.0	2	0.0
Other complications of labour and delivery, not elsewhere classified	12	0.1	1.0	49	0.8
Other obstetric trauma	2	0.0	10.0	4	0.1
Other obstructed labour	5	0.1	1.2	1	0.0
Pre-term delivery	8	0.1	1.3	18	0.3
Persons encountering health services in circumstances related to reproduction	148	1.7	1.5	515	8.2
Antenatal screening	26	0.3	1.1	133	2.1
Supervision of high-risk pregnancy	30	0.3	2.3	38	0.6
Supervision of normal pregnancy	92	1.1	1.3	344	5.5
Complications predominantly related to the puerperium	12	0.1	2.3	1	0.0
Infections of breast associated with childbirth	2	0.0	2.0	1	0.0
Obstetric embolism	10	0.1	2.3	0	0.0
Pregnancy with abortive outcome	8	0.1	2.0	14	0.2
Ectopic pregnancy	8	0.1	2.0	14	0.2
Total	8690	100.0	2.2	6307	100.0

G.3 Labour and birth

These tables relate to the type of birth section within Chapter 3: Labour and Birth. The total will be higher than that of previous tables, as some mothers had more than one delivery procedure.

Table G.3.1: Number of birth procedures, by birth type and maternal age group, 2007

		Age group							Total
		Under 16	16–19	20–24	25–29	30–34	35–39	40 and over	
Normal birth		147	3640	8069	10,140	10,676	6214	1140	40,026
Caesarean section	Total	20	648	1782	3104	4751	3613	927	14,845
	Emergency	18	551	1259	1968	2603	1706	404	8509
	Elective	2	97	523	1136	2148	1907	523	6336
Breech birth	Total	4	29	64	79	89	80	13	358
	Spontaneous breech birth	1	18	32	42	38	29	8	168
	Assisted breech birth	3	11	31	34	50	47	4	180
	Assisted breech birth with forceps	0	0	1	3	1	4	1	10
Assisted birth	Total	17	391	819	1395	1747	906	153	5428
	Forceps	5	133	274	474	604	313	51	1854
	Vacuum extraction	12	253	540	912	1128	586	101	3532
	Forceps and vacuum extraction	0	5	5	9	15	7	1	42
Not stated		2	52	108	143	150	102	24	581
Total		190	4760	10,842	14,861	17,413	10,915	2257	61,238

Table G.3.2: Number of birth procedures, by birth type and maternal ethnicity, 2007

		Ethnicity						Total
		Māori	Pacific peoples	Asian	European	Other	Not stated	
Normal birth		9626	4911	3270	21,017	903	299	40,026
Caesarean section	Total	2103	1124	1573	9497	452	96	14,845
	Emergency	1351	711	928	5192	261	66	8509
	Elective	752	413	645	4305	191	30	6336
Breech birth	Total	84	47	25	188	13	1	358
	Spontaneous breech birth	40	27	14	77	9	1	168
	Assisted breech birth	43	19	10	105	3	0	180
	Assisted breech birth with forceps	1	1	1	6	1	0	10
Assisted birth	Total	608	293	744	3567	169	47	5428
	Forceps	215	93	210	1250	68	18	1854
	Vacuum extraction	390	198	529	2287	99	29	3532
	Forceps and vacuum extraction	3	2	5	30	2	0	42
Not stated		115	77	71	306	10	2	581
Total		12,536	6452	5683	34,575	1547	445	61,238

Table G.3.3: Number of birth procedures, by birth type and DHB region of mother's place of residence, 2007

DHB region	Normal birth	Caesarean section			Breech birth				Assisted birth				Not stated	Total
		Total	Acute	Elective	Total	Spontaneous	Assisted	Assisted with forceps	Total	Forceps	Vacuum extraction	Forceps and vacuum extraction		
Northland	1670	340	220	120	11	6	5	0	107	24	83	0	22	2150
Waitemata	4499	2017	1120	897	46	22	22	2	710	137	565	8	257	7529
Auckland	4030	1722	897	825	41	16	23	2	765	238	523	4	38	6596
Counties Manukau	6216	1658	998	660	60	38	22	0	713	196	513	4	87	8734
Waikato	3765	1033	627	406	38	22	14	2	404	129	273	2	27	5267
Lakes	1175	291	164	127	11	7	3	1	95	26	63	6	1	1573
Bay of Plenty	1956	640	361	279	11	4	7	0	204	70	133	1	36	2847
Tairāwhiti	552	160	95	65	4	2	2	0	30	6	24	0	2	748
Hawke's Bay	1643	498	297	201	16	3	11	2	131	60	70	1	10	2298
Taranaki	1062	366	221	145	5	3	2	0	77	23	54	0	2	1512
MidCentral	1454	519	325	194	11	3	7	1	168	33	134	1	7	2159
Whanganui	605	178	105	73	5	2	3	0	52	10	42	0	1	841
Capital & Coast	2291	1076	689	387	20	7	13	0	415	221	192	2	21	3823
Hutt Valley	1357	532	324	208	12	7	5	0	188	109	79	0	9	2098
Wairarapa	308	143	69	74	3	2	1	0	41	9	32	0	2	497
Nelson Marlborough	1088	398	235	163	9	5	4	0	108	83	24	1	11	1614
West Coast	226	112	61	51	0	0	0	0	28	10	18	0	8	374
Canterbury	3554	2019	1088	931	37	12	25	0	762	269	489	4	26	6398
South Canterbury	439	160	98	62	3	0	3	0	43	33	10	0	4	649
Otago	1171	549	273	276	7	3	4	0	252	125	123	4	3	1982
Southland	943	431	240	191	7	4	3	0	131	41	86	4	7	1519
Not stated	22	3	2	1	1	0	1	0	4	2	2	0	0	30
Total	40,026	14,845	8509	6336	358	168	180	10	5428	1854	3532	42	581	61,238

Table G.3.4: Number of birth procedures, by plurality and birth type, 2007

Plurality	Normal birth	Caesarean section			Breech delivery				Assisted delivery				Not stated	Total†
		Total	Emergency	Elective	Total	Spontaneous breech birth	Assisted breech birth	Assisted breech birth with forceps	Total	Forceps	Vacuum extraction	Forceps and vacuum extraction		
Singleton	39,617	14,197	8182	6015	225	129	89	7	5301	1821	3449	31	579	59,919
Twins	352	574	282	292	129	37	89	3	114	30	73	11	2	1171
Multiple	0	10	5	5	0	0	0	0	0	0	0	0	0	10
Not stated	57	64	40	24	4	2	2	0	13	3	10	0	0	138
Total	40,026	14,845	8509	6336	358	168	180	10	5428	1854	3532	42	581	61,238

G.4 Babies

These tables and figures relate to Chapter 4: Babies. Data on the number of babies born in New Zealand was extracted from the National Minimum Dataset (NMDS).

Table G.4.1: Percentage of liveborn babies, by gestational age and DHB region of mother's place of residence, 2007

DHB region	Live babies by gestational age (weeks)						Total	
	Less than 28	28–31	32–36	37–41	42 and over	Not stated	No.	%
Northland	0.5	1.0	5.3	90.5	2.0	0.6	2173	100.0
Waitemata	0.3	0.7	6.1	90.3	2.3	0.3	7540	100.0
Auckland	0.4	0.5	6.2	90.2	2.4	0.3	6703	100.0
Counties Manukau	0.7	0.8	5.7	89.0	2.6	1.2	8837	100.0
Waikato	0.5	0.9	5.4	85.2	5.7	2.2	5297	100.0
Lakes	0.3	0.8	5.0	89.7	3.1	1.1	1613	100.0
Bay of Plenty	0.7	0.7	5.3	86.6	2.2	4.6	2891	100.0
Tairāwhiti	0.8	0.3	6.0	91.0	1.2	0.8	766	100.0
Hawke's Bay	0.4	0.4	5.2	62.9	4.3	26.8	2294	100.0
Taranaki	0.3	0.4	5.8	88.0	3.1	2.4	1534	100.0
MidCentral	0.2	0.9	5.7	89.1	3.2	0.9	2205	100.0
Whanganui	0.7	1.1	6.9	86.0	3.9	1.5	856	100.0
Capital & Coast	0.4	0.9	5.9	87.8	1.1	3.9	3921	100.0
Hutt Valley	0.5	0.7	5.9	89.4	2.0	1.5	2090	100.0
Wairarapa	0.8	0.4	4.4	91.8	2.2	0.4	500	100.0
Nelson Marlborough	0.6	0.5	4.9	91.2	2.3	0.5	1623	100.0
West Coast	0.5	1.4	5.1	91.3	0.8	0.8	369	100.0
Canterbury	0.5	0.8	6.4	89.3	2.3	0.7	6609	100.0
South Canterbury	0.3	0.9	6.2	87.7	4.0	0.9	649	100.0
Otago	0.6	1.0	6.6	89.8	1.5	0.5	2018	100.0
Southland	0.3	1.1	6.8	89.3	1.1	1.3	1502	100.0
Not stated	0.0	0.0	9.1	85.5	0.0	5.5	55	100.0
Total number	300	463	3636	54,601	1647	1398	62,045	
Total percentage	0.5	0.7	5.9	88.0	2.7	2.3		100.0

Table G.4.2: Percentage of liveborn babies, by birthweight and DHB region of mother's place of residence, 2007

DHB region	Live babies by birthweight (g)						Total	
	Less than 1500	1500–1999	2000–2499	2500–4499	4500 or more	Not stated	No.	%
Northland	1.3	1.1	4.5	89.9	2.9	0.3	2173	100.0
Waitemata	0.8	0.9	3.6	91.7	2.8	0.1	7540	100.0
Auckland	1.0	1.0	4.0	91.2	2.8	0.0	6703	100.0
Counties Manukau	1.3	1.5	4.0	90.0	3.2	0.0	8837	100.0
Waikato	1.0	1.5	3.3	91.1	3.1	0.1	5297	100.0
Lakes	1.2	0.6	4.2	90.8	3.2	0.1	1613	100.0
Bay of Plenty	1.2	1.4	3.2	91.6	2.5	0.1	2891	100.0
Tairāwhiti	1.2	1.7	3.7	89.8	3.4	0.3	766	100.0
Hawke's Bay	1.0	1.5	4.3	90.7	2.5	0.0	2294	100.0
Taranaki	0.7	1.1	3.3	92.3	2.6	0.0	1534	100.0
MidCentral	1.0	1.3	3.6	91.7	2.3	0.0	2205	100.0
Whanganui	1.6	1.5	4.8	89.4	2.7	0.0	856	100.0
Capital & Coast	0.9	1.2	3.6	91.3	3.0	0.0	3921	100.0
Hutt Valley	1.2	0.7	3.7	91.3	3.1	0.0	2090	100.0
Wairarapa	0.6	0.8	2.8	93.8	2.0	0.0	500	100.0
Nelson Marlborough	0.9	0.5	3.1	91.9	3.6	0.0	1623	100.0
West Coast	1.1	1.1	3.8	91.9	2.2	0.0	369	100.0
Canterbury	1.0	1.6	3.8	91.2	2.2	0.1	6609	100.0
South Canterbury	0.9	2.0	3.7	89.7	3.5	0.2	649	100.0
Otago	1.4	0.9	3.3	91.9	2.2	0.3	2018	100.0
Southland	0.9	1.5	3.9	91.5	2.1	0.0	1502	100.0
Not stated	0.0	1.8	0.0	96.4	1.8	0.0	55	100.0
Total number	655	761	2324	56,526	1734	45	62,045	
Total percentage	1.1	1.2	3.7	91.1	2.8	0.1		100.0

Figure G.4.1: Average birthweight of female babies, by ethnicity, 1999–2007

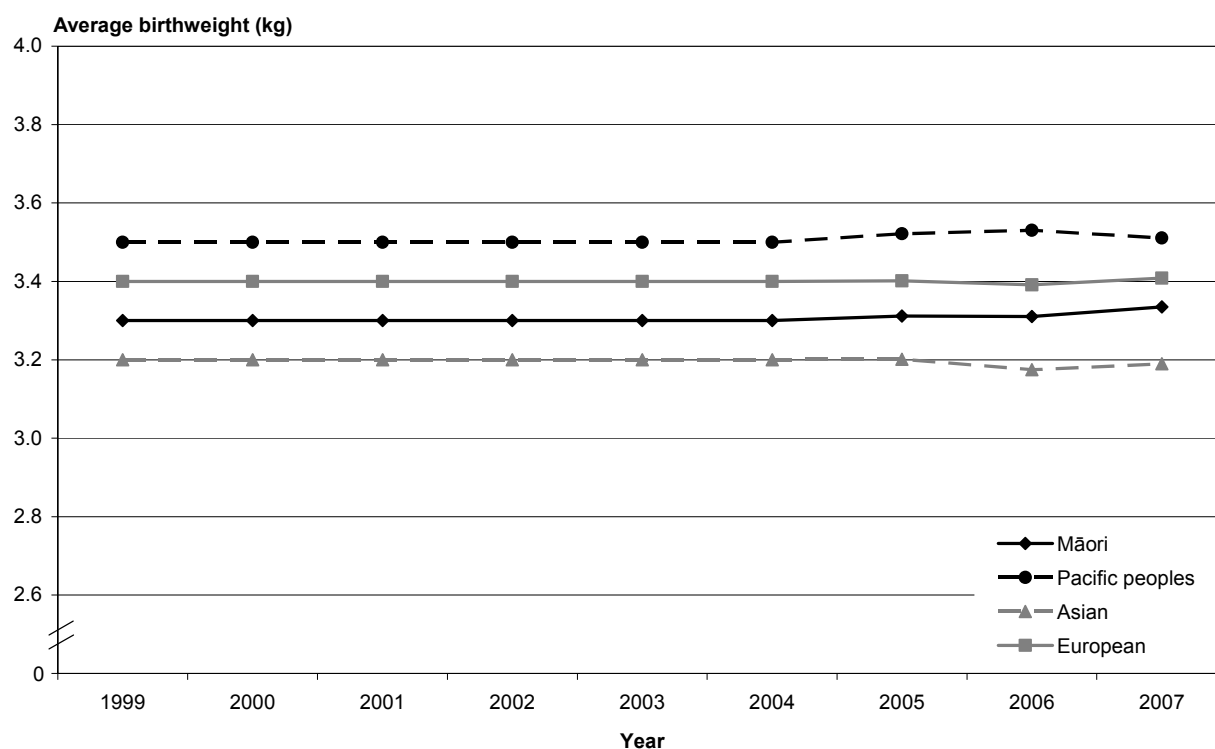
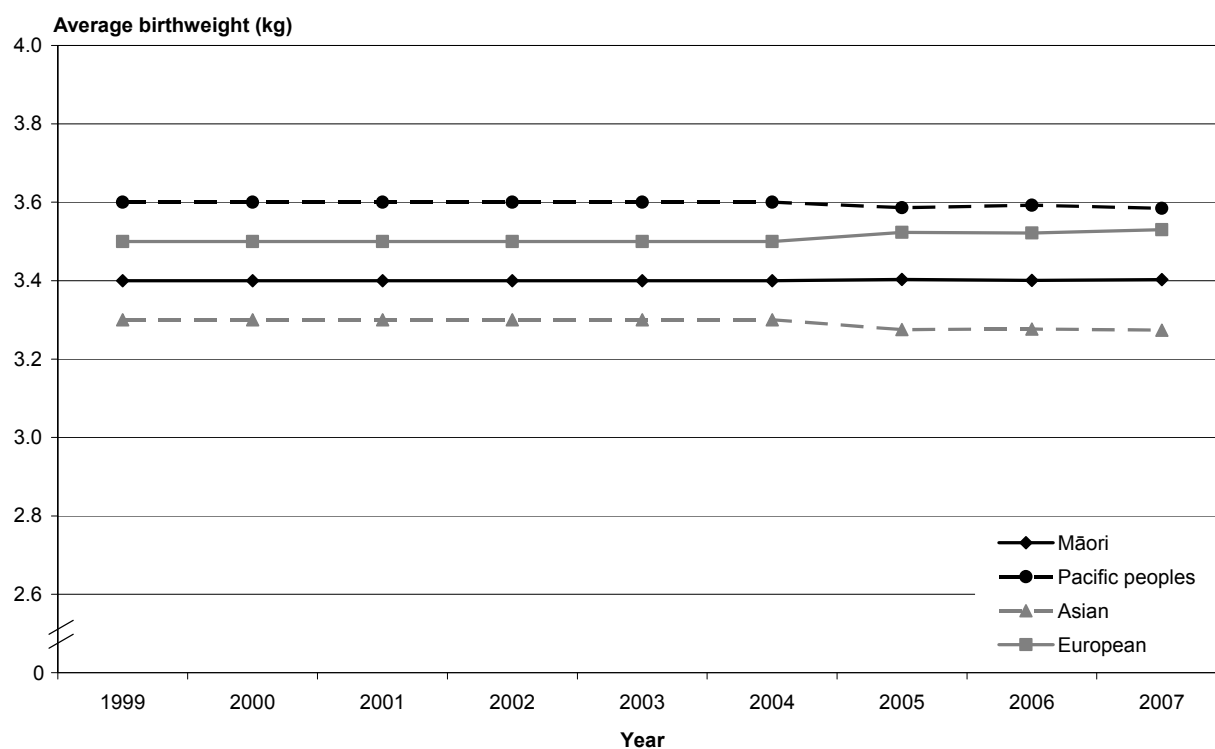


Figure G.4.2: Average birthweight of male babies, by ethnicity, 1999–2007



Glossary

Term	Definition
Abortion, induced	An abortion brought about intentionally. Also called an artificial or therapeutic abortion, as opposed to a spontaneous abortion (a miscarriage). See also <i>Abortion, spontaneous</i> ; <i>Miscarriage</i> .
Abortion, spontaneous	The spontaneous expulsion of a fetus of less than 20 weeks' gestation and a birthweight of less than 400 g. Also referred to as a miscarriage. See also <i>Abortion, induced</i> ; <i>Birthweight</i> ; <i>Miscarriage</i> .
Admission	The documentation process, which may include entry on to the National Health Index, by which a person becomes resident in a health care facility. Health care users who attend a health care facility for more than three hours should be admitted. See also <i>National Health Index (NHI) number</i> .
Antenatal hospital event	The admission to hospital of a pregnant woman before the date of her baby's birth, irrespective of any diagnosis. In this report, events in which the admission was a transfer from another facility have been excluded. See also <i>Admission</i> .
AR-DRG code	See <i>Diagnosis Related Groups, Australian Refined (AR-DRG)</i> .
Assisted vaginal birth	A vaginal birth that needs assistance; for example, with forceps.
Assisted vaginal birth, forceps	An assisted vaginal birth using a metallic obstetric instrument. See also <i>Assisted vaginal birth</i> .
Assisted vaginal birth, vacuum extraction	An assisted vaginal birth using a suction cap applied to the baby's head. See also <i>Assisted vaginal birth</i> .
Assisted vaginal birth, vaginal breech birth	An assisted vaginal birth in which the baby's buttocks or lower limbs precede its head. See also <i>Assisted vaginal birth</i> .
Birth	The birth of a live or stillborn baby (or babies, in the case of a multiple birth).
Birthing unit	A facility that has a contract for services relating to labour and birth but not for those relating to inpatient postnatal care. Such a facility does not provide support staff during labour and birth. See also <i>Inpatient postnatal care</i> .
Birthweight	The first weight of the baby obtained after birth (usually measured to the nearest 5 g and obtained within one hour of birth).
Birthweight, low	A birthweight of less than 2500 g. See also <i>Birthweight</i> .
Birthweight, very low	A birthweight of less than 1500 g. See also <i>Birthweight</i> .
Birthweight, extremely low	A birthweight of less than 1000 g. See also <i>Birthweight</i> .
Birthweight, low for gestation	The birthweight of a newborn of 37 weeks' gestation or over if less than 2500 g. See also <i>Birthweight</i> ; <i>Newborn</i> .
Boarder	A healthy person who is receiving food and/or accommodation in a hospital but for whom the hospital does not accept responsibility for treatment or care.
Caesarean section	An operative birth through an abdominal incision.

Term	Definition
Caesarean section, acute	A caesarean section performed urgently for clinical reasons (such as the health of the mother or baby) once labour has started.
Caesarean section, elective	A caesarean section performed as a planned procedure before or following the onset of labour, when the decision to have a caesarean section was made before labour.
Caesarean section, classical	A caesarean section in which an incision is made down the centre of the abdomen (midline longitudinal), which allows a larger space from which to deliver the baby. It is rarely performed today because it is more prone to complications. This type of caesarean section incision is done in extreme emergency situations.
Caesarean section, lower segment caesarean section (LSCS)	A caesarean section in which an incision is made just under the bikini line (transverse), through the abdominal muscle and lower segment of the womb. This procedure is most commonly used, due to the reduced blood loss and ease of repair.
Confidence intervals	<p>A confidence interval is a range of values used to describe the uncertainty around a single value and is used to estimate the true value in a population. Confidence intervals describe how different the estimate could have been if chance had led to a different set of data. They are calculated with a stated probability, and indicate that there is a 99 percent chance that the true value lies within the confidence intervals.</p> <p>Confidence intervals may assist in comparing the rates, for example, between DHBs and the national rate. If two confidence intervals do not overlap, it is reasonable to conclude that the difference between the rates is not due to chance. If they do overlap, it is not possible to make a conclusion about the significance of any difference between the rates.</p>
Crude birth rate (CBR) per 1000 women of reproductive age	$CBR = \frac{n}{P_r} * 1000$ <p>Where:</p> <p>n = total number of mothers giving birth</p> <p>P_r = total number of women of reproductive age.</p> <p>See also <i>Reproductive age</i>.</p>
Diagnosis Related Groups, Australian Refined (AR-DRG)	Diagnosis Related Groups are produced by a programme that compares all diagnostic and procedure codes in a health event and assigns a code based on a complex series of decision trees. This provides a way of analysing event information by classifying episodes of inpatient care into clinically meaningful groups that use similar amounts of resources.
District Health Board (DHB)	An organisation established as such by or under section 19 of the New Zealand Public Health and Disability Act 2000.
Domicile code	A code representing a mother's or baby's usual residential address.
Epidural	An injection of analgesic agent outside the dura mater that covers the spinal canal: includes lumbar, spinal (inside dura mater) and epidural anaesthetics.
Episiotomy	An incision of the perineal tissue surrounding the vagina at the time of birth.

Term	Definition
Ethnic code	A code that defines a mother's or baby's ethnic group.
Facility	A place mothers attend or are resident in for the primary purpose of receiving maternity care.
Full-term birth, full-term labour	Birth or labour at 37 or more weeks' gestation.
Gestational age	The duration of pregnancy in completed weeks, calculated from the date of the first day of a woman's last menstrual period and her baby's date of birth, or derived from clinical assessment during pregnancy, or derived from an examination of the baby after birth.
Hospital antenatal event	Any hospital admission during a woman's pregnancy prior to delivery, irrespective of diagnosis.
Hospital readmission	The readmission of a mother to hospital in the six weeks after an in-hospital birth, or the admission of a baby up to three months after the date of its birth, irrespective of diagnosis.
Hypertension	A repeatedly elevated blood pressure exceeding 140 over 90 mm Hg (a systolic pressure above 140 with a diastolic pressure above 90). Also called high blood pressure.
Hysterectomy	A surgical operation to remove the uterus and sometimes the cervix: removal of the body of the uterus without removing the cervix is a subtotal hysterectomy; removal of the entire uterus and the cervix is a total hysterectomy.
Induced abortion	See <i>Abortion, induced</i> .
Induction (of labour)	An intervention to stimulate the onset of labour by pharmacological or other means.
Inpatient postnatal care	Care provided to a woman or her baby remaining in a facility for 12 hours or more after giving birth.
International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM) clinical codes	Codes based on the official version of the World Health Organization's International Classification of Diseases. They are designed for classifying morbidity and mortality information for statistical purposes, and for indexing hospital records by disease and operations for data storage and retrieval. The codes are used to classify clinical descriptions of conditions, causes of intentional or unintentional injury, underlying causes of death, and the pathological nature of tumours.
International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification – Australian Classification of Health Interventions (ICD-10-AM ACHI) codes	Codes based on the official version of the World Health Organization's International Classification of Diseases. They are designed for classifying interventions for statistical purposes. The codes are used to classify the operation or procedure performed.
Length of antenatal stay, mother	The number of days between the admission date and the baby's date of birth (the date the delivery procedure is performed).
Length of postnatal stay, mother	The number of days between a baby's date of birth (the date the delivery procedure is performed) and the mother's separation date from the hospital where birth occurred.

Term	Definition
Length of stay, baby	The number of days between the date of birth and date of separation from the hospital of birth. The interval is calculated by subtracting the date of birth from the date of separation.
Length of stay, mother	The number of days between the admission date (during the admission resulting in a birth) and date of separation from the hospital of birth. The interval is calculated by subtracting the date of admission from the date of separation.
Live birth	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 1975). See also <i>Liveborn baby</i> .
Liveborn baby	A product of conception, irrespective of duration of pregnancy, which, after expulsion or extraction from its mother, 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.
Lower segment caesarean section (LSCS)	See <i>Caesarean section, lower segment caesarean section (LSCS)</i> .
Major surgery	Any surgery that requires opening a body cavity.
Maternity facility	A facility that provides labour and birth services and inpatient postnatal care, as described in the relevant service specification issued by the Ministry of Health. See also <i>Facility</i> .
Median	The middle data point if data is ranked from the lowest to the highest. It is used instead of the mean when data is not normally distributed.
Ministry of Health	The Government's principal advisor on health and disability in New Zealand.
Miscarriage	The spontaneous termination of a pregnancy before 20 weeks' gestation. A 'hospital miscarriage' occurs when a woman is referred to a hospital during a miscarriage.
Mother	For the purposes of this document: a woman who gave birth in a facility. See also <i>Facility</i> .
Multiple births	When two or more babies are produced in the same pregnancy. For ease of analysis, in this publication multiple births are assumed to be triplets. See also <i>plurality, singleton and twin</i>
National Health Index (NHI) number	A unique identifier number allocated to individual service users by the National Health Index, managed by the Ministry of Health.
National Minimum Dataset (NMDS)	An integrated collection of health data that is collected routinely from all people discharged from a hospital in New Zealand.
Newborn	A baby from birth to four weeks of life.
Patient clinical complexity level (PCCL)	A measure of the complexity and/or severity of an individual's co-morbidities and complications compared with others in the same Diagnosis Related Groups. See also <i>Diagnosis Related Groups, Australian Refined (AR-DRG)</i> .

Term	Definition
Placenta praevia	A condition in which the placenta is positioned below the baby and covers part or all of the cervix, blocking the baby's exit from the uterus.
Placental abruption	A condition in which the placenta separates before the baby is born, cutting off the flow of oxygen to the baby.
Plurality	The number of births resulting from a pregnancy. <i>See singleton, twin or multiple births</i>
Postnatal	All pregnancy-related events following birth.
Postnatal admission, baby	Admission to hospital of a liveborn baby in the first three months after birth.
Postpartum haemorrhage (PPH)	Abnormal bleeding experienced by a mother soon after labour or childbirth.
Postpartum haemorrhage, primary	A blood loss of greater than 500 ml from the genital tract within 24 hours of delivery.
Postpartum haemorrhage, secondary	A blood loss of greater than 500 ml from the genital tract between 24 hours and six weeks after delivery.
Post-term birth	A birth at 42 or more completed weeks' gestation.
Pre-term birth, pre-term labour	Birth or labour before 37 completed weeks' gestation.
Primary maternity facility	A facility that does not have inpatient secondary maternity services or 24-hour on-site availability of specialist obstetricians, paediatricians and anaesthetists. This includes birthing units. <i>See also Birthing unit, Facility.</i>
Puerperium	The period between childbirth and the return of the uterus to its normal size.
Readmission, mother	<i>See Hospital readmission.</i>
Reproductive age	Women aged between 15 and 44 years of age.
Rural area	A census area unit (domicile) located in an area with fewer than 10,000 people.
Secondary maternity care facility	A facility that provides additional care during the antenatal, labour and birth, and postnatal periods for women and babies who experience complications and who have a clinical need for either consultation or transfer (Health Funding Authority 2000). <i>See also Facility.</i>
Singleton	Single born baby. <i>See plurality, twin or multiple births</i>
Spontaneous abortion	<i>See Abortion, spontaneous.</i>
Tertiary maternity care facility	A facility that provides a multidisciplinary specialist team for women and babies with complex or rare maternity needs; for example, babies with major fetal disorders requiring prenatal diagnostic and fetal therapy services, or women with obstetric histories that significantly increase the risks during pregnancy, labour and delivery (for example, those who have already had two placental abruptions). Includes neonatal intensive care units. <i>See also Facility.</i>

Term	Definition
Three-year moving average	<p>A statistic that effectively ‘smoothes out’ large variations in a set of data caused by small numbers. In this report, the Prior Moving Average method was used to calculate the three-year moving average:</p> $\frac{M_{t-2} + M_{t-1} + M_t}{P_{t-2} + P_{t-1} + P_t}$ <p>where: M_t = deaths t = calendar years P_t = population.</p>
Twin birth	Two offspring produced in the same pregnancy <i>See plurality, singleton and multiple births.</i>
Urban area	A census area unit (domicile) located in an area with more than 10,000 people.
Vacuum extraction	<i>See Assisted vaginal birth, vacuum extraction.</i>
Vaginal birth	The birth of a baby without obstetric intervention. Also called a normal birth.
Vaginal breech birth	<i>See Assisted vaginal birth, vaginal breech birth.</i>
World Health Organization (WHO)	The United Nations’ specialised agency for health. It was established in 1948 with the objective of attaining the highest possible level of health for all peoples. WHO’s constitution defines health as a state of complete physical, mental and social wellbeing, and not merely the absence of disease or infirmity.

References

- Anderson GM. 2004. Making sense of rising caesarean section rates. *British Medical Journal* 329: 696–7.
- Medsafe. 1998. Management of postpartum haemorrhage. *Prescriber Update* 16: 4–9. URL: <http://www.medsafe.govt.nz/profs/puarticles/mpph.htm#Act>. Accessed 20 November 2007.
- Ministry of Health. *Fetal and Infant Deaths* series. Wellington: Ministry of Health. URL: <http://www.moh.govt.nz/moh.nsf/indexmh/dataandstatistics-subjects-fetalinfant>. Accessed 17 May 2010.
- NCCH (National Centre for Classification in Health). 1998a. *The International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM), First Edition, Volume 1*. Sydney: National Centre for Classification in Health.
- NCCH (National Centre for Classification in Health). 1998b. *The International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM), Volume 5: Australian Coding Standards*. Sydney: National Centre for Classification in Health.
- Public Health Commission, Ministry of Health. 1996. *Standardising Rates of Disease*. Wellington: Public Health Commission and Ministry of Health.
- WHO. 1975. *International Classification of Diseases (Vol 1) 1975 revision*. Geneva: World Health Organization.
- WHO. 2001. *Age Standardization of Rates: A new WHO standard*. Geneva: World Health Organization.
- WHO. 2005. *Maternal and Newborn Health in the WHO European Region: The challenges and the way forward*. Fact sheet EURO/03/05. Copenhagen: World Health Organization.
- WHO. 2009. *Monitoring Emergency Obstetric care: A handbook*. Geneva: World Health Organization.
- WHO, UNICEF. 2004. *Low Birthweight: Country, regional and global estimates*. New York: United Nations Children's Fund.