Hospital-based Maternity Events 2006

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 were 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 2006*. Wellington: Ministry of Health.

Published in July 2010 by the
Ministry of Health
PO Box 5013, Wellington, New Zealand

ISBN: 978-0-478-35997-7 (online)
HP 5136

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

Contents

Appendices

List of Tables

List of Figures

Executive Summary

Hospital-based Maternity Events 2006 presents information on women delivering in hospital, their newborns and the maternity services provided to them by New Zealand hospitals in 2006. This is based on all publicly funded hospital events as reported to the National Minimum Dataset (NMDS).

In 2006, Births, Deaths and Marriages registered 59,193 liveborn babies (as reported by Statistics New Zealand), with a further 1081 liveborn babies born in 2006 but registered in later years. Of those liveborn babies, 58,532 were reported by the New Zealand hospital sector to have been either born in hospital or subsequently admitted to hospital following their birth outside a hospital setting.

The NMDS records that 57,559 women gave birth in hospital to 58,372 babies, of which 57,927 were liveborn. These in-hospital liveborn babies account for around 96 percent of the liveborn babies registered with Births, Deaths and Marriages. Births outside hospitals may account for the difference between the in-hospital birth numbers and the Statistics New Zealand numbers.

In 2006, the median age of mothers was 30.3 years. This has decreased slightly from 2005, thereby slowing the gradual increase in the median age of mothers observed in previous years. The first year in which the median age of mothers was over 30 years was 2003. In 2006, nearly thirty percent of all mothers who gave birth in hospital were in the 30–34 age group, which thereby formed the largest of the reproductive age groups. The most likely age for Māori and Pacific mothers to give birth (20–24 years and 25–29 years respectively) was younger than that of European and Asian mothers.

Nearly two-thirds (64.7 percent) of mothers had a normal vaginal birth, and 24.9 percent had a caesarean section. The remaining 9.3 percent of birth procedures involved assisted births or breech births. In 2006, the percentage of caesarean sections continued to increase at a slow steady rate. This is in keeping with recent trends observed in other developed countries (Anderson 2004).

In 2006, the majority of mothers (84.3 percent) were discharged home following an average length of stay of 2.6 days. 58.3 percent of mothers were discharged from hospital within two days of admission. Three-quarters of mothers (74.5 percent) gave birth on the day they were admitted to hospital. The time that mothers tended to remain in hospital following the birth of their baby was on average 2.1 days. Nearly 44 percent of mothers were discharged between two and four days after the birth (43.7 percent).

Pacific and Asian mothers were more likely to give birth in tertiary maternity care facilities (62.8 percent and 60.2 percent respectively). This may be because the District Health Board region in which the majority of those mothers resided had fewer primary maternity units per capita than other regions. In comparison, 49.1 percent of Māori mothers used secondary maternity facilities, while European mothers used secondary and tertiary facilities to a broadly similar extent (44.9 percent and 40.7 percent respectively).

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 health outcomes for women who gave birth and their babies in 2006. It will be useful to those who plan health services, as well as being of interest to other 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

The *Hospital-based Maternity Events* publication provides health statistics on the pregnancy and childbirth characteristics of mothers who gave birth in hospital (to babies liveborn or stillborn), and their babies. It presents regional and national comparisons. The information is presented by calendar year and is drawn from the National Minimum Dataset (NMDS).

At the time of writing, data on community-based primary maternity services (provided by Lead Maternity Carers) was not available. Therefore 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 presented in the *Report on Maternity*, which reports on maternity services provided in a community and/or hospital setting.

1.3 Data sources and processing

Unless otherwise stated, the information presented in the tables and graphs in this publication is sourced from the NMDS.

1.3.1 The National Minimum Dataset (NMDS)

Information is collected routinely for all publicly funded events in which a patient is discharged from a facility in New Zealand. This information contains a substantial amount of clinical data, including health conditions and procedures that are assigned clinical codes according to the classification system in use (refer section 1.5.1). 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 classifies the underlying cause of death for all deaths registered in New Zealand, including all registered fetal deaths (stillbirths), using the ICD-10-AM and the WHO Rules and Guidelines for Mortality Coding. The mortality statistics are compiled according to the year the death is registered.

Fetal and infant death data forms a subset of the Mortality Collection. Extra variables such as gestation and birth weight are collected for these records.

Each month Births, Deaths and Marriages (BDM) sends the Ministry of Health electronic death registration and stillbirth information data (for the previous month's registrations), Medical Certificates of Causes of Death and coroners' reports. Additional information on underlying causes of death is obtained from electronic hospital discharge data from the NMDS, private hospital discharge returns, the New Zealand Cancer Registry (NZCR), the Department for Courts, the Police, the Land Transport Safety Authority, Water Safety New Zealand and Media Search, and from certifying doctors, coroners and medical records officers in public hospitals.

1.3.3 Birth, Deaths and Marriages

Births, Deaths and Marriages registers and maintains New Zealand's birth information and provides access to this data via Statistics New Zealand.

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, providing a 'snapshot' of our society at a point in time by counting and collecting data on everyone who was in New Zealand on Census night. Census information pertaining to females of a reproductive age residing within New Zealand is used as a denominator for various rates in this publication.

1.4 Coverage

Table 1.1 shows the number of women who gave birth (hereafter referred to as mothers) and live babies as recorded in the NMDS in 2006, with a comparison to the corresponding figures registered with BDM and reported by Statistics New Zealand.

Statistics New Zealand reports the number of births registered to mothers resident in New Zealand where the date of registration was within the calendar year ended 31 December. It is important to note that Statistics New Zealand reports on the date of registration rather than the date of birth. Therefore, some births that took place in one year may not be registered until the following year. This under-count is likely to be counterbalanced by registrations of births that took place in the previous year and were registered in 2006.

Table 1.1: Number of mothers and live babies in 2006, by data source

	Number
Mothers*	58,675
Mothers recorded in NMDS (discharged from hospital)	57,559
Live babies*	59,193
Live babies recorded in NMDS (hospital births)	58,532

Data source: NMDS and Statistics New Zealand

* Registered in 2006 with BDM, reported by Statistics New Zealand in 2007.

The NMDS has complete coverage of all publicly funded hospital births, and it is likely that the difference between the NMDS and Statistics New Zealand numbers presented in Table 1.1 represents birth events outside of a 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

In this publication, a mother is defined as a woman who gave birth in a facility; a birth is defined as a woman giving birth/delivering a live or stillborn baby (or babies, in the case of a multiple birth); and reproductive age is defined as the 15–44 age bracket.

A facility is the place mothers attend, or are resident in, for the primary purpose of receiving maternity care. A facility is either a hospital or a birthing centre. In this publication both types of facilities are referred to as hospitals.

A hospital antenatal event is defined as a hospital admission during a woman's pregnancy prior to delivery in a particular year, irrespective of the diagnosis.

A hospital readmission is defined as 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 birth, irrespective of the diagnosis.

See the Glossary within this publication for full definitions.

Throughout this publication, type of birth is classified by delivery method as normal birth, caesarean section, spontaneous breech birth and assisted vaginal birth (assisted birth). Caesarean sections are further classified as acute caesarean sections (performed urgently for clinical reasons once labour has started) or elective caesarean sections (performed as a planned procedure before or after the onset of labour, the decision having been made before the commencement of labour). Assisted births are further classified as assisted breech births and births using forceps and/or vacuum extractions.

1.5.1 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 designed for classification of morbidity and mortality information for statistical purposes and for indexing hospital records by disease and operations, for data storage and retrieval. Its codes are used to classify clinical descriptions of conditions, causes of intentional and unintentional injuries, underlying cause of death, operations or procedures performed and the pathological nature of tumours.

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 monitoring and managing health care services. For further information, see Appendix A.

1.6 Data presentation

The information in this publication presents data by the calendar year of maternity events.

1.6.1 Confidence intervals

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.

A confidence interval is a range of values used to describe the uncertainty around a single value, such as an age-standardised rate. It is used to estimate the true value in a population, such as the underlying or true rate. 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.

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.

1.6.2 Numbers and rates

Some tables in this publication present information by multiple categories: for example low birthweight full-term babies by maternal age, ethnicity and the New Zealand Index of Deprivation quintile of place of residence. For clarity, one total is shown in each table, and applies to all categories within the table.

Rounding issues may affect percentages stated. For example, percentages may not sum to 100, or the addition of percentages for individual categories may not equal the stated percentage for a grouped category.

Small numbers can affect the reliability, and therefore the interpretability, of results through the appearance of large variations in trends over time. Therefore, it is important to treat all rates derived from small numbers with caution.

Three-year moving average rates are the average rates for a rolling three-year period, for example 2001–2003 or 2002–2004. The three-year moving average is plotted against the final year of the three-year period; for example, the 2002–2004 three-year moving average is plotted against 2004. Three-year moving averages can be used to smooth out the effect of small numbers, for example in maternal death rates, which tend to produce large variations between years. The underlying trend can thereby be more clearly demonstrated in a graphical representation. The term 'three-year moving average' is further defined in the Glossary.

1.6.3 Symbols

Symbols used throughout this publication are as follows:

– zero or nil
.. figures not available
... calculation of rates not applicable
-- number not published due to potential confidentiality issues.

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
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

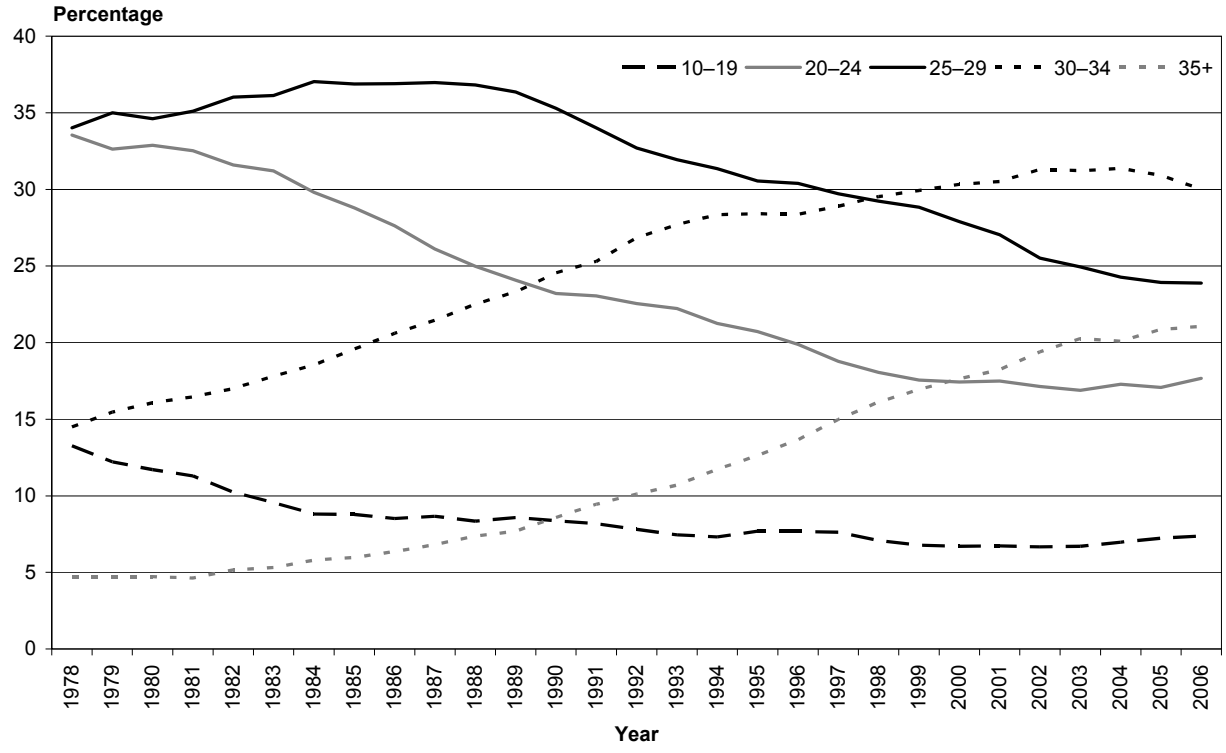
This section provides a brief demographic profile of mothers who gave birth in hospitals. Information on pregnancy complications, including miscarriage and events leading to a hospital admission in the antenatal period, is also discussed.

2.1 Demographic profile

In 2006, Statistics New Zealand reported that 59,193 liveborn babies were registered by BDM to 58,675 mothers.[1] In the same year, New Zealand hospitals reported that 57,559 women gave birth in hospital to 58,372 babies, of which 57,927 were liveborn (as reported in the NMDS). The in-hospital liveborn babies account for around 97–98 percent of the liveborn babies registered with BDM. Births outside hospitals may account for the difference between the in-hospital birth numbers and the BDM (Statistics New Zealand) numbers.

Figure 2.1 presents trends from 1978 to 2006 in the percentages of live births by age of mother (presented in five-year age groups). The proportion of live births to mothers over 30 years of age increased steadily until 2003; since then it appears to have stabilised at around 51 percent of live births. In comparison, live births to mothers aged less than 25 years (that is, 10–19 or 20–24) decreased until 2003, after which point they appear to have risen slightly.

Figure 2.1: Percentage of live birth registrations by age of mother, 1978–2006



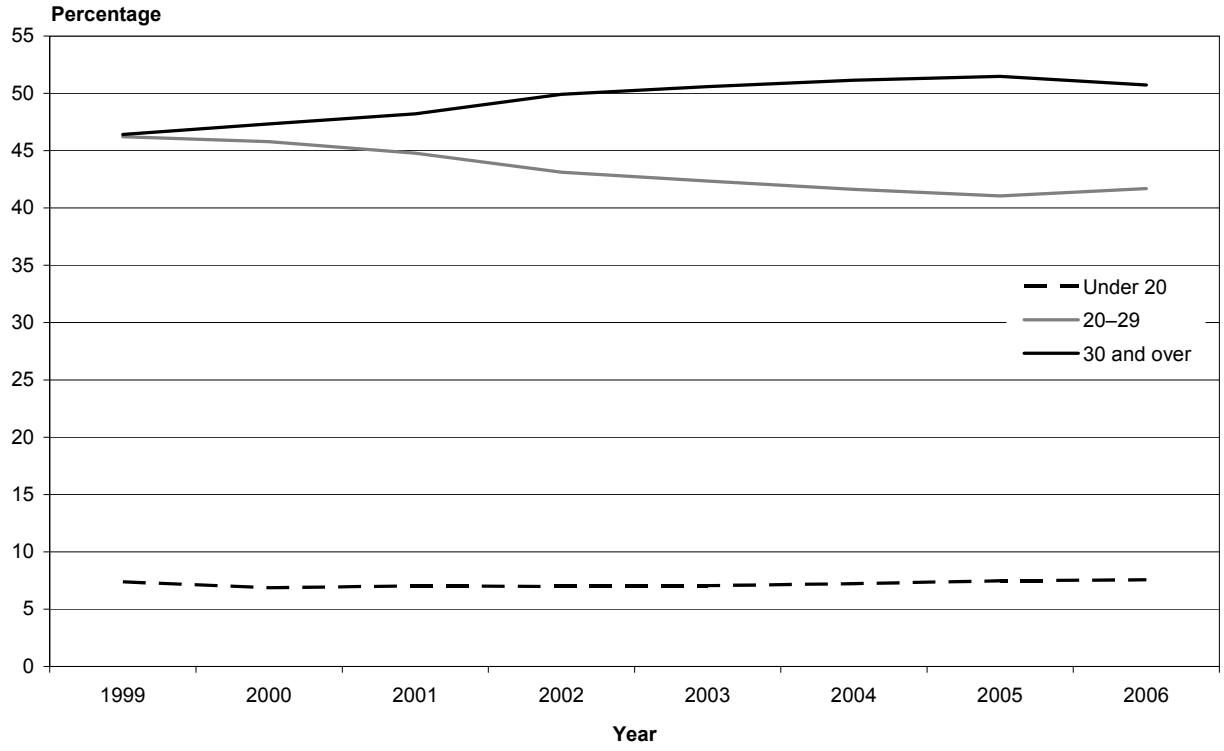
Data source: Ministry of Health

[1] Statistics New Zealand 2008; excludes late registrations.

In 2006, Statistics New Zealand reported that the median age of New Zealand women giving birth was 30.3 years. In terms of ethnicity, the median ages of Māori and Pacific mothers were lower (25.9 years and 27.6 years respectively).[2] This trend is reflected in the NMDS data.

Figure 2.2 shows that the percentage of mothers aged 30 years and over has generally continued to increase gradually, accounting for 50.7 percent of births in 2006. Correspondingly, the percentage of mothers aged 20–29 years has generally continued to decrease (41.7 percent of births in 2006).

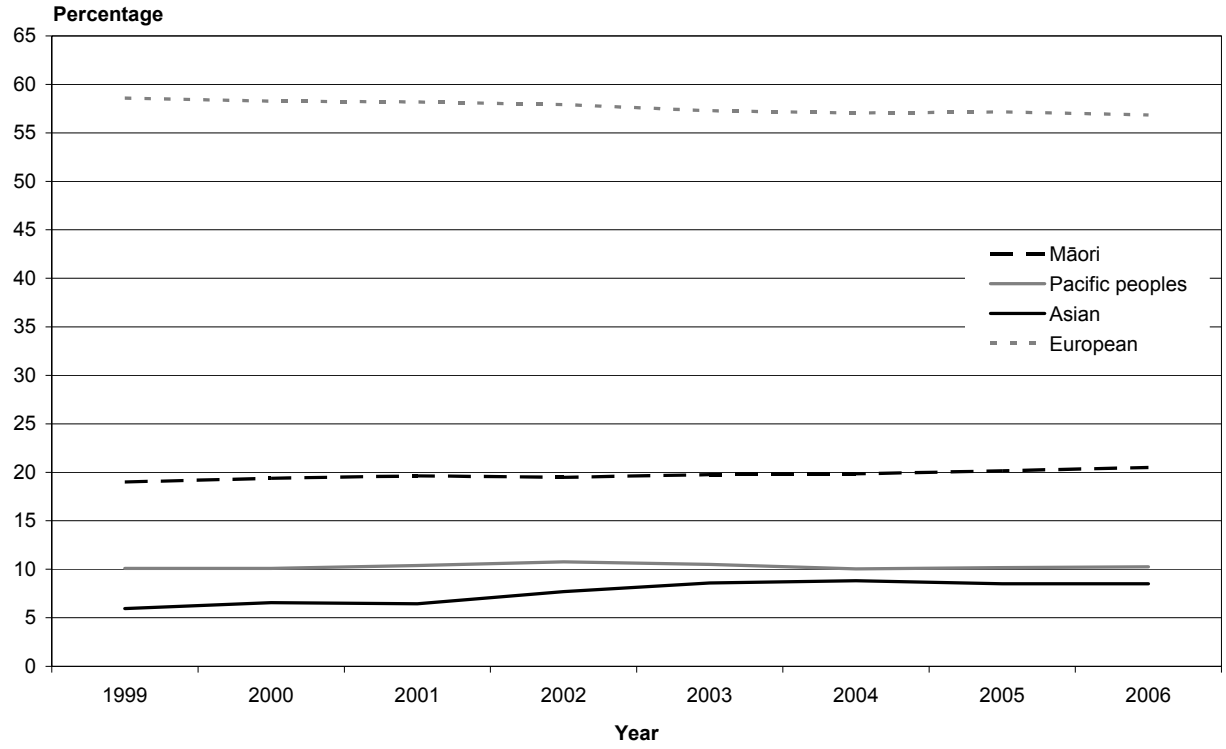
Figure 2.2: Percentage of mothers birthing in hospital, by age group and year of delivery, 1999–2006



Data source: NMDS

[2] Statistics New Zealand 2008; excludes late registrations.

Figure 2.3: Percentage of mothers birthing in hospital, by ethnicity and year of delivery, 1999–2006



Data source: NMDS

Table 2.1 shows that the majority of women who gave birth in hospital in 2006 indicated they were of European ethnicity (56.8 percent), while the lowest proportion (8.5 percent) indicated they were of Asian ethnicity. Māori and Pacific women accounted for 20.5 percent and 10.3 percent respectively. As Figure 2.3 shows, these proportions remained fairly consistent between 1999 and 2006.

Note

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 Māori, Pacific peoples, Asian or European. For further information on ethnicity, see Appendix B.

Table 2.1: Age distribution of mothers, by ethnicity of mother, 2006

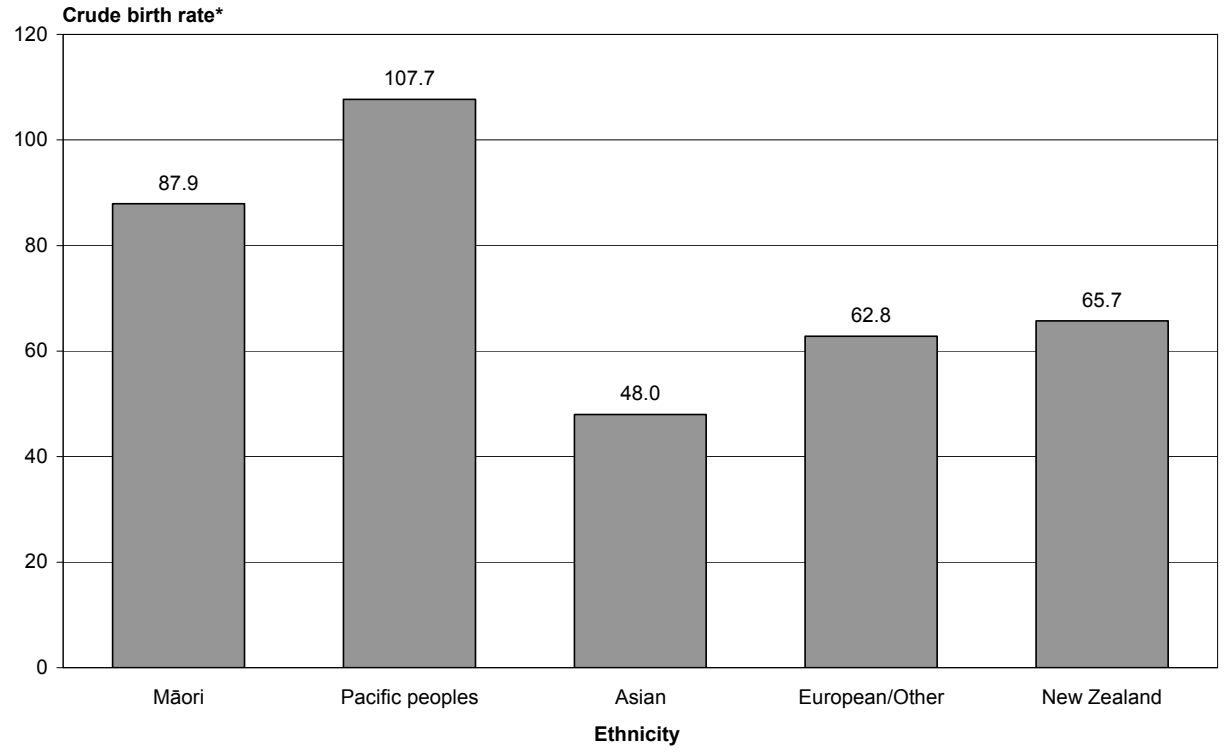
Age group	Ethnicity						Total	
	Māori	Pacific peoples	Asian	European	Other	Not stated	No	%
Under 16	95	15	0	49	4	1	164	0.3
16–19	1,983	421	56	1,614	77	37	4,188	7.3
20–24	3,497	1,473	657	4,241	255	120	10,243	17.8
25–29	2,841	1,679	1,451	7,247	387	155	13,760	23.9
30–34	1,976	1,297	1,651	11,487	573	161	17,145	29.8
35–39	1,091	797	885	6,842	307	87	10,009	17.4
40 and over	313	220	199	1,235	63	20	2,050	3.6
Not stated	0	0	0	0	0	0	0	0.0
Total number	11,796	5,902	4,899	32,715	1,666	581	57,559	
Total percentage	20.5	10	8.5	56.8	2.9	1.0		100.0

Data source: NMDS

In 2006, the national crude birth rate[3] was 65.7 births per 1000 women of reproductive age. Pacific mothers had the highest crude birth rate, at 107.7 births per 1000 women of reproductive age. Māori mothers had a crude birth rate of 87.9 births per 1000 women of reproductive age. European/Other and Asian mothers had crude birth rates below the national crude birth rate (62.8 and 48.0 births per 1000 women of reproductive age respectively; see Figure 2.4).

[3] Crude birth rate is the ratio between the total number of mothers giving birth and the total number of women of reproductive age (that is, women aged from 15 to 44 years). See the Glossary.

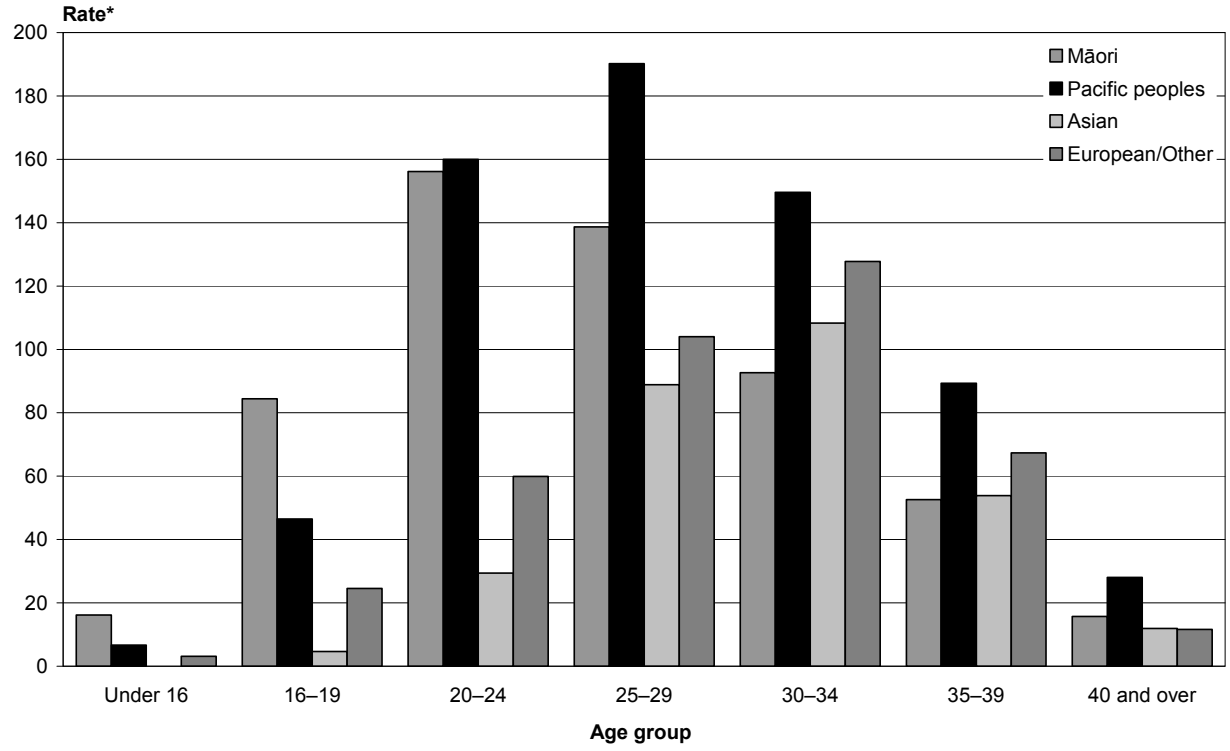
Figure 2.4: Crude birth rate, by ethnicity of mother, 2006



Data source: NMDS

* Rate per 1000 women of reproductive age.

Figure 2.5: Hospital delivery crude birth rate per 1000 women of reproductive age, by ethnicity and age group of mother, 2006



Data source: NMDS

* Crude birth rate per 1000 women of reproductive age (Usually Resident Census Population).

Māori women tend to have children at a younger age than women within other ethnic groups. In 2006 the Māori fertility rate peaked in the 20–24 age group (as Figure 2.5 shows). In comparison, the peak for Pacific women was in the 25–29 age group, and for Asian and European women the 30–34 age group. This has been a consistent pattern over the years.

District Health Boards (see Appendix C) are responsible for funding and providing facility-based maternity services for the population in their specific geographical area, whereas the Ministry of Health directly funds primary Lead Maternity Carer (LMC) maternity services.

The majority of women who gave birth in 2006 resided in the major cities, which is consistent with the distribution of the general population. Mothers residing in the greater Auckland region (Waitemata, Auckland and Counties Manukau DHBs) accounted for over one-third of all mothers (37.4 percent).

In 2006 Counties Manukau DHB had the highest number of women giving birth (8148 births; 14.2 percent of total), while West Coast DHB had the lowest (325 births; 0.6 percent of total). The largest proportion of Māori and Pacific mothers resided in Counties Manukau (16.3 percent and 42.5 percent respectively). The largest proportion of Asian mothers (24.9 percent) resided in Auckland, and the largest proportion of European mothers (14.4 percent) resided in Canterbury (see Table 2.2).

Table 2.2: Number of mothers, by DHB region of mother's place of residence and ethnicity, 2006

DHB region	Māori	Pacific peoples	Asian	European	Other	Not stated	Total	%	Crude birth rate*
Northland	896	26	35	1,000	8	65	2,030	3.5	74.4
Waitemata	919	814	990	4,134	240	29	7,126	12.4	65.7
Auckland	599	1,179	1,222	2,700	386	111	6,197	10.8	59.2
Counties Manukau	1,918	2,507	1,038	2,345	252	88	8,148	14.2	82.8
Waikato	1,443	140	252	2,879	84	52	4,850	8.4	68.2
Lakes	719	35	46	728	33	4	1,565	2.7	77.3
Bay of Plenty	951	50	120	1,516	14	63	2,714	4.7	73.4
Tairawhiti	426	16	9	237	5	4	697	1.2	78.8
Hawke's Bay	831	117	62	1,137	34	13	2,194	3.8	75.6
Taranaki	297	14	34	986	40	12	1,383	2.4	67.8
MidCentral	430	79	67	1,465	28	17	2,086	3.6	62.2
Whanganui	317	6	24	476	3	0	826	1.4	70.9
Capital & Coast	493	395	335	2,388	71	4	3,686	6.4	55.4
Hutt Valley	420	210	140	1,083	33	8	1,894	3.3	64.5
Wairarapa	117	11	11	369	6	2	516	0.9	76.1
Nelson Marlborough	145	29	41	1,238	13	18	1,484	2.6	60.1
West Coast	22	2	4	291	4	2	325	0.6	54.9
Canterbury	459	192	365	4,726	162	67	5,971	10.4	59.4
South Canterbury	52	8	11	503	1	0	575	1.0	60.4
Otago	145	43	65	1,539	42	17	1,851	3.2	46.8
Southland	195	27	28	961	205	4	1,420	2.5	63.3
Not stated	2	2	0	14	2	1	21	0.0	…
Total	11,796	5,902	4,899	32,715	1,666	581	57,559	100.0	65.7

Data source: NMDS

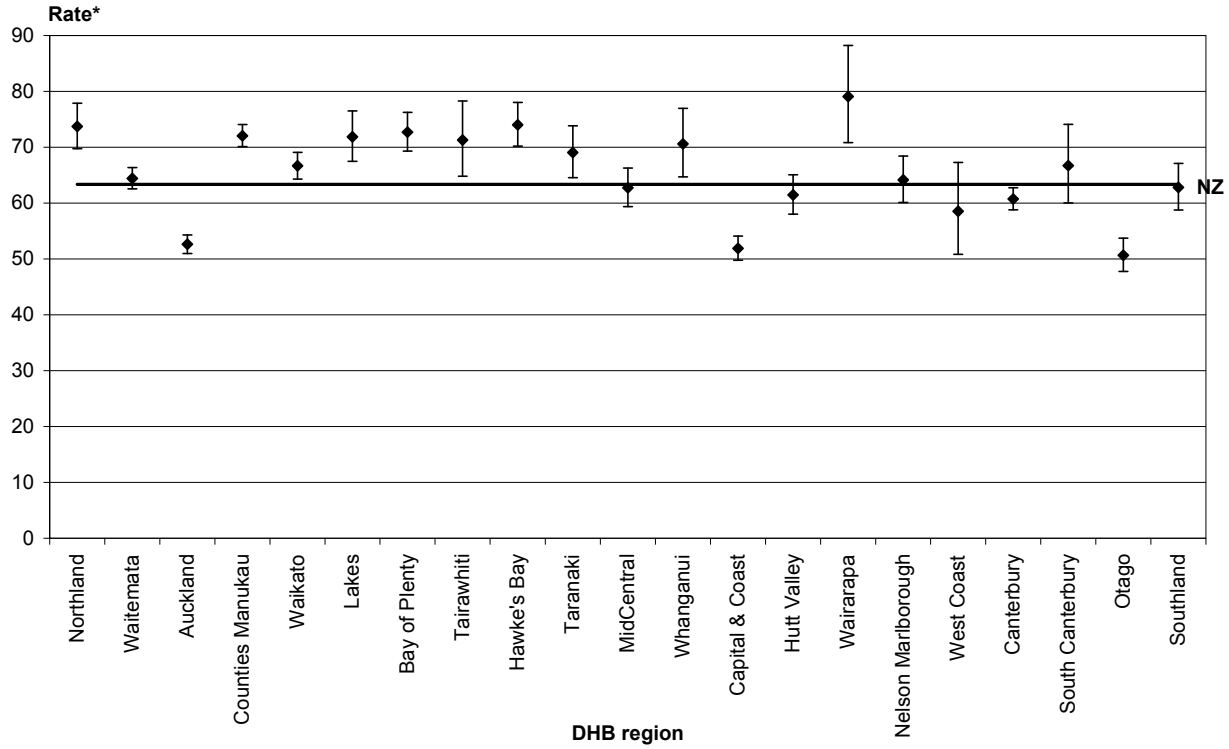
… = calculation of rates not applicable.

* Crude birth rate per 1000 women of reproductive age (Usually Resident Census Population).

Figure 2.6 presents hospital birth rates for each DHB, standardised by age and ethnicity and presented with 99 percent confidence intervals. The rate is calculated by multiplying the ratio between observed and expected in-hospital births by the national crude birth rate (see Appendix E).

When the crude birth rate is standardised by age and ethnicity, the birth rate for New Zealand decreases from of 65.7 to 63.4 per 1000 women of reproductive age. As shown in Figure 2.6, the majority of DHBs in the upper and central North Island had higher birth rates than the national rate, with the exception of Auckland and MidCentral DHBs.

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, 2006



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

The highest standardised birth rates were, in the North Island, Wairarapa and Hawke's Bay DHBs (79.1 and 74.0 per 1000 women of reproductive age respectively) and, in the South Island, South Canterbury and Nelson Marlborough DHBs (66.7 and 64.1 per 1000 women of reproductive age respectively). Otago, Capital & Coast and Auckland DHBs had the lowest standardised birth rates (50.7, 51.9 and 52.6 per 1000 women of reproductive age respectively).

As Table 2.3 shows, in 2006 the majority of women used the maternity services in their own region, although some women accessed maternity services outside the DHB region where they resided. Women residing in DHB regions without major tertiary maternity facilities access these services in neighbouring DHB regions, which is in line with Ministry of Health and governmental expectations and policy. For example, of the mothers that resided in the Auckland region, 84.6 percent accessed services provided by the Auckland DHB, which includes Auckland's major tertiary maternity facility. The remainder accessed services provided by Counties Manukau and Waitemata (9.9 percent and 5.1 percent respectively) Appendix D lists 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, 2006

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	Not stated	
Northland	1927	45	38	8	2	3	2		1		1			1				2					2,030
Waitemata	11	6079	1007	22	1	2								1		1		1			1		7,126
Auckland	9	317	5241	612	4	2		1			2		3					5			1		6,197
Counties Manukau	10	24	1006	7076	19	1	4				3		2					3					8,148
Waikato	2	12	29	21	4660	17	82	5	3	6	6	1		1		1		3				1	4,850
Lakes	1	2	5	5	59	1479	6		3	1	1		1					1			1		1,565
Bay of Plenty	1	1	11	2	54	69	2572	1			1							2					2,714
Tairawhiti			3		10	1		646	32		4			1									697
Hawke's Bay		2	5	2		1		8	2139		11		19					7					2,194
Taranaki	1	1	1	4	7					1348	2	14	3	1				1					1,383
MidCentral	1	1	6	6	2	2			4		1969	10	63	2	19			1					2,086
Whanganui		1		2	2		3				136	661	16	4				1					826
Capital & Coast	2	2	2	2							15	3	3516	139	1			3			1		3,686
Hutt Valley		2	1		3					1	4		147	1730	4			1		1			1,894
Wairarapa					1						3		20	18	474								516
Nelson Marlborough			1		1								22			1452		5		1	2		1,484
West Coast		1	1													6	269	45		3			325
Canterbury		5	4	2	6		1		1		1		1			17		5925		7	1		5,971
South Canterbury	1				1		1				1						1	8	554	6	2		575
Otago		1	3		2	1	1	1			2		1			1		8	4	1801	25		1,851
Southland			2			1												14	1	55	1347		1,420
Not stated		1	1													1		1		9	8		21
Total	1966	6497	7367	7764	4834	1579	2672	662	2183	1356	2162	689	3814	1898	498	1479	270	6037	559	1883	1389	1	57,559

Source: NMDS

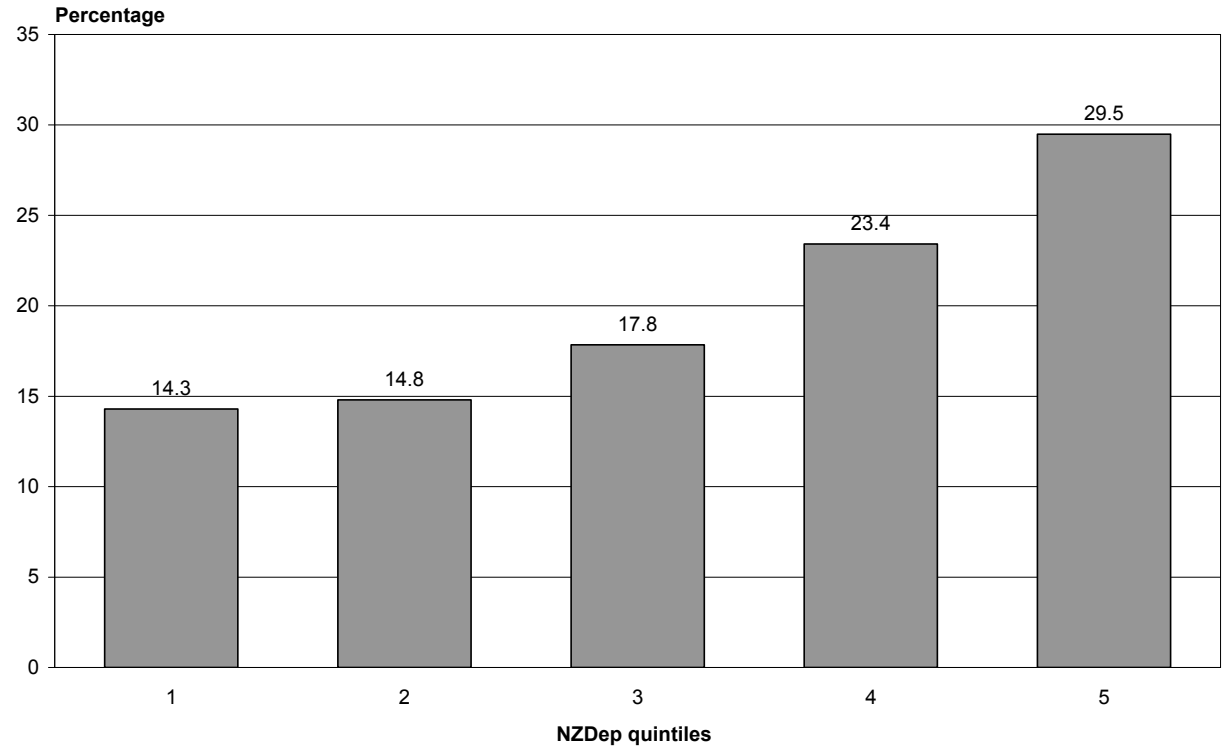
2.2 Deprivation

The New Zealand Index of Deprivation is an index of neighbourhood socioeconomic deprivation calculated using data from the 2006 Census of Population and Dwellings. The scale runs from decile 1 (domicile areas that are deemed the least deprived) to decile 10 (domicile areas that are deemed the most deprived). Appendix G provides a fuller description of the New Zealand Index of Deprivation.

The deprivation deciles are grouped into quintiles to minimise the wide fluctuations in annual rates that arise when small numbers of births are analysed. Quintile 1 (deciles 1 and 2) represents areas that are least deprived and quintile 5 (deciles 9 and 10) represents the most deprived areas.

Figures 2.7 to 2.10 present the percentage of women who gave birth in hospital in 2006 by deprivation quintile. Nearly 30 percent resided in the most deprived neighbourhoods (quintile 5), compared with the 14.3 percent who were living in the least deprived areas (quintile 1).

Figure 2.7: Percentage of women giving birth, by deprivation quintile of mother's place of residence, 2006



Data source: NMDS

As noted earlier, Counties Manukau recorded the highest percentage of women giving birth in New Zealand hospitals (14.2 percent). Figure 2.8 shows that in regards to those births, the majority of mothers resided in quintile 5 areas (60.2 percent), while only 11.7 percent resided in a quintile 1 area. In comparison, Waitemata DHB had the next highest percentage of women giving birth in hospital (12.4 percent), yet only 7.7 percent of these women resided in a quintile 5 area; 23.0 percent resided in a quintile 1 area. A detailed table can be found in Appendix H.2.

Figure 2.8: Percentage of women who gave birth in hospital, by DHB region and deprivation quintile of mother's place of residence, 2006

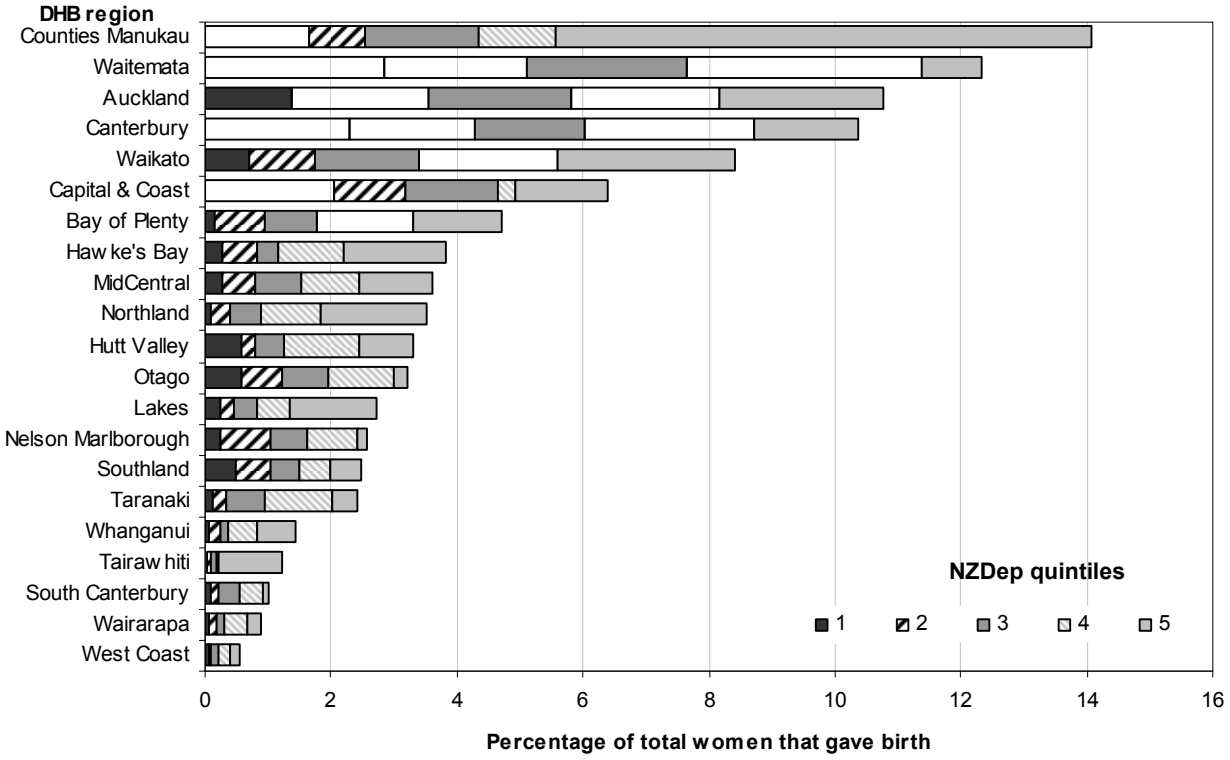


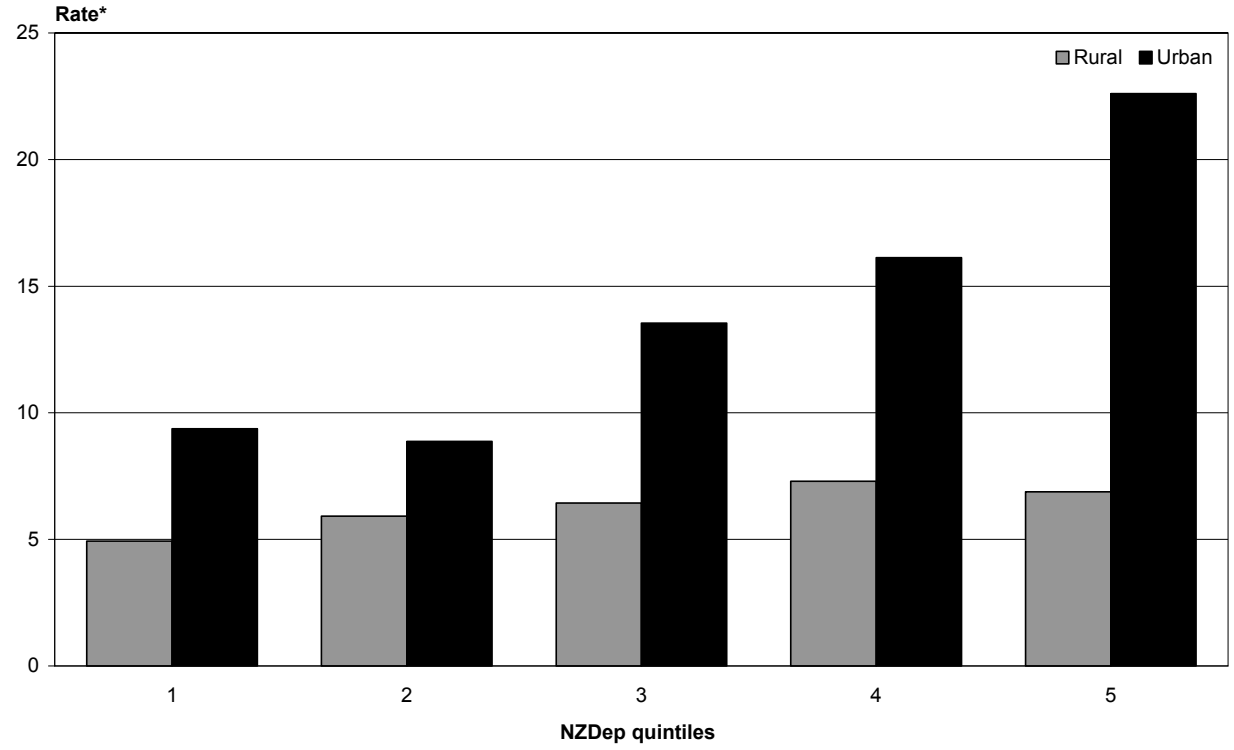
Table 2.4 shows that, overall, the majority of women who gave birth in 2006 lived in urban areas (69.0 percent). Women that resided in the most deprived urban neighbourhoods, quintile 5, accounted for 22.6 percent of all women who had a hospital birth (see Figure 2.9).

Table 2.4: Number of mothers, by deprivation decile of mother's place of residence and rural/urban status, 2006

NZDep decile	Number				Socioeconomic distribution (%)		
	Rural	Urban	Overseas/ not stated	Total	Rural	Urban	Total
1 (least deprived)	1,333	2,337	0	3,670	7.5	5.9	6.4
2	1,504	3,056	0	4,560	8.5	7.7	7.9
3	1,717	2,491	0	4,208	9.7	6.3	7.3
4	1,689	2,615	0	4,304	9.5	6.6	7.5
5	1,669	3,494	0	5,163	9.4	8.8	9.0
6	1,700	3,406	0	5,106	9.6	8.6	8.9
7	2,005	4,386	0	6,391	11.3	11.0	11.1
8	2,195	4,895	0	7,090	12.3	12.3	12.3
9	1,985	6,269	0	8,254	11.2	15.8	14.3
10 (most deprived)	1,974	6,745	0	8,719	11.1	17.0	15.1
Not stated	5	0	89	94	0.0	0.0	0.2
Total	17,776	39,694	89	57,559	100.0	100.0	100.0

Data source: NMDS

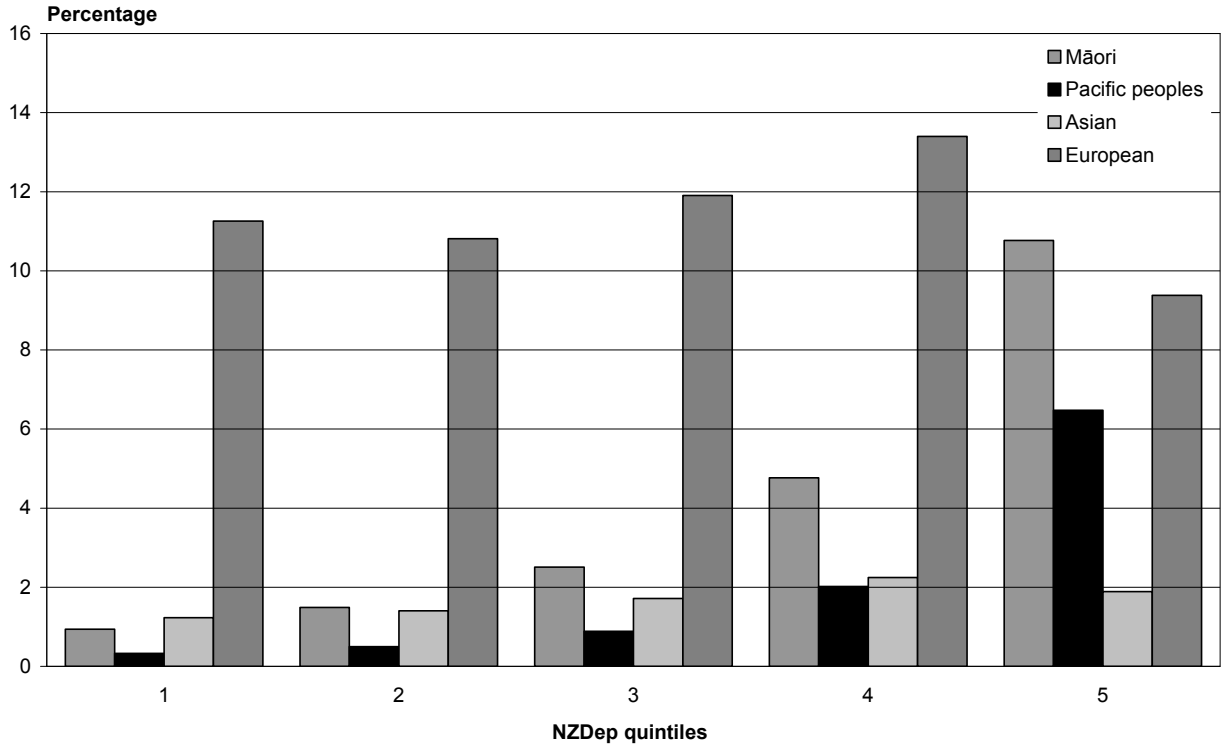
Figure 2.9: Percentage of mothers, by deprivation quintile of mother's place of residence and rural/urban status, 2006



* Rate per 100 mothers.

Figure 2.10 shows that the majority of Pacific and Māori mothers in 2006 resided in quintile 5 areas (63.1 percent and 52.5 percent respectively). This is consistent with policy observations which indicate that Māori and Pacific women are over-represented in the most deprived deciles and that these ethnic groups have younger age structures and higher birth rates than the national average.

Figure 2.10: Percentage of women giving birth, by deprivation quintile of mother's place of residence and ethnicity, 2006



Source: NMDS

Note: The 'Other' and 'Not Reported' ethnic groups have not been included.

2.3 Miscarriages

Spontaneous miscarriage is a common complication of pregnancy. Miscarriages are defined as pregnancies that end spontaneously before 20 weeks' gestation. Induced terminations of pregnancy are excluded.

Data integrity

Data on women who miscarry should be interpreted with caution. This data takes into account all women who are referred to a hospital during a miscarriage. However, miscarriages may occur at home or elsewhere, and may not be referred to a hospital, in which case they are not included in the hospital data presented will not appear here.

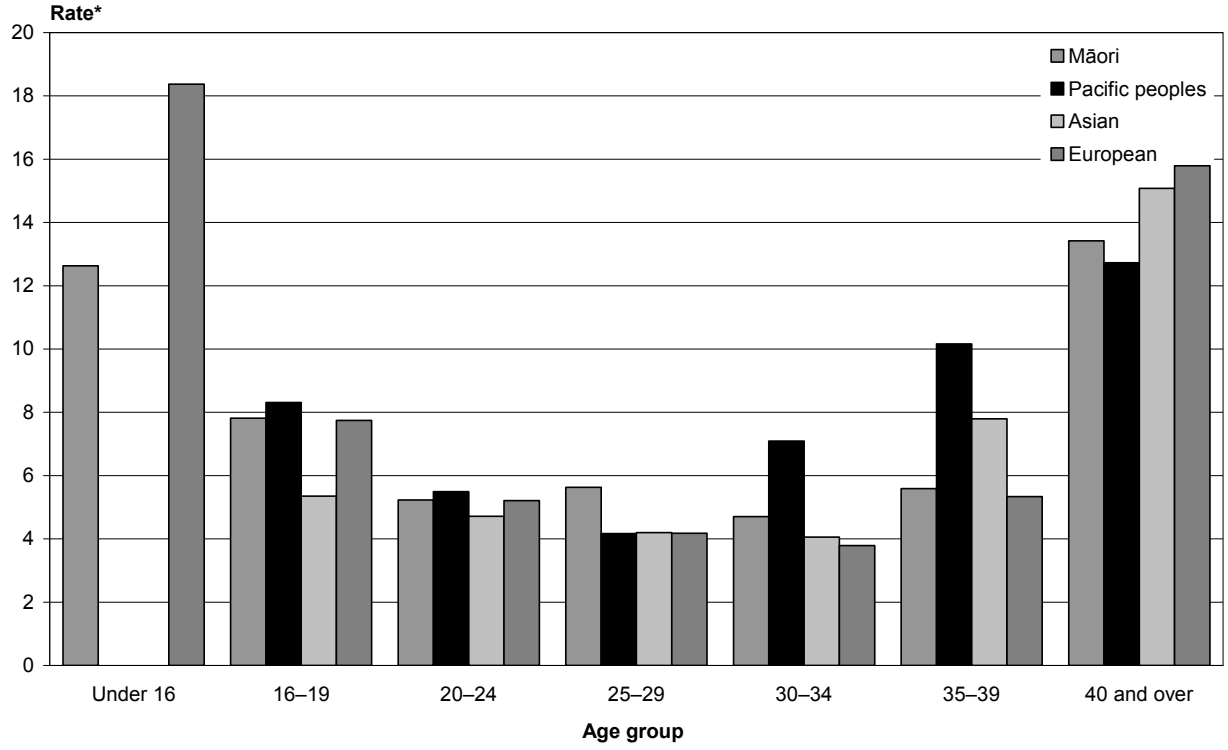
Because of the low number of hospital miscarriages each year in New Zealand, the hospital miscarriage rate fluctuates markedly from year to year. Therefore caution should be exercised when interpreting hospital miscarriage rates over time.

Figure 2.11 illustrates the 2006 rate of hospital miscarriages per 100 mothers[4] by age and ethnicity. Women at both ends of the reproductive age range tended to have higher rates of miscarriage. The hospital miscarriage rate for women under 20 years of age was 8.0 per 100 mothers, and for women aged 40 years and over it was 15.3 per 100 mothers.

In 2006, Pacific women had the highest hospital miscarriage rate of 6.6 miscarriages per 100 mothers. Māori women had a similar rate with 6.0 miscarriages per 100 mothers. While Asian and European women had lower rates (5.3 and 5.1 hospital miscarriages per 100 mothers respectively).

Asian women under 20 years were less likely to have a hospital miscarriage than women in other ethnic groups in this age group (5.4 miscarriages per 100 mothers). Pacific women aged 30–39 years had the highest miscarriage rate in this age group, at 8.3 hospital miscarriages per 100 mothers.

Figure 2.11: Rate of hospital miscarriages per 100 mothers, by ethnicity and age group of mother, 2006



* Rate per 100 mothers.

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 these data.

[4] In this case, mothers are defined as women that gave birth in hospital.

2.4 Pregnancy complications

Pregnancy complications (other than miscarriage) are summarised in Tables 2.5 and 2.6 using the AR-DRG classification scheme. Diagnosis Related Groups (DRGs) are commonly used in clinically meaningful analyses involving the number and type of patients treated in a hospital. Diagnosis Related Groups are characterised by both clinical homogeneity and resources used during hospital treatment. (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. Admission due to false labour in Table 2.5 refers to women who were admitted to hospital for three or more hours but discharged because they were not in established labour.

Table 2.5: Antenatal hospital admissions (excluding transfers) and average length of stay for mothers, by selected DRGs (DRGs O64A, O64B, O66A and O66B) and ethnicity, 2006

DRG	Description	Ethnic group	Admissions		Average length of stay (days)
			Number	Percentage	
O64A	False labour before 37 weeks or with catastrophic complications and co-morbidities (CC)	Māori	346	2.1	1.4
		Pacific peoples	86	0.5	0.9
		Asian	63	0.4	1.6
		European	582	3.6	1.5
		Other	30	0.2	2.3
		Not stated	10	0.1	1.4
		O64A total	**1,117**	**6.8**	**1.5**
O64B	False labour after 37 weeks without catastrophic CC	Māori	302	1.8	0.5
		Pacific peoples	203	1.2	0.3
		Asian	169	1.0	0.2
		European	420	2.6	0.4
		Other	48	0.3	0.3
		Not stated	11	0.1	0.1
		O64B total	**1,153**	**7.1**	**0.4**
O66A	Antenatal and other obstetric admission	Māori	1,925	11.8	2.2
		Pacific peoples	1,125	6.9	2.3
		Asian	659	4.0	2.4
		European	4,433	27.1	2.3
		Other	314	1.9	2.6
		Not stated	77	0.5	2.0
		O66A total	**8,533**	**52.2**	**2.3**
O66B	Antenatal and other obstetric admission – same day	Māori	1,277	7.8	…
		Pacific peoples	830	5.1	…
		Asian	542	3.3	…
		European	2,576	15.8	…
		Other	233	1.4	…
		Not stated	79	0.5	…
		O66B total	**5,537**	**33.9**	**…**
Total			16,340	100.0	1.3

... = not applicable.

Table 2.6 presents grouped principal diagnoses for antenatal admissions and average length of stay for each grouping. The principal diagnosis is the primary reason the woman is admitted to hospital. The complete list of principal diagnoses for each antenatal admission is presented in Appendix H, Table H2.1.

Table 2.6: Antenatal hospital admissions (excluding transfers) and average length of stay for mothers, by grouped principal diagnosis (DRGs O66A and O66B), 2006

Principal diagnosis – most common	Antenatal admission		Average length of stay (days)	Antenatal admission – same day	
	Number	%		Number	%
Other maternal diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium	2152	25.2	2.1	1564	28.2
Excessive vomiting in pregnancy	1472	17.3	2.4	359	6.5
Antepartum haemorrhage, not elsewhere classified	803	9.4	1.9	316	5.7
Infections of genitourinary tract in pregnancy	635	7.4	2.0	231	4.2
Gestational (pregnancy-induced) hypertension without significant proteinuria	547	6.4	2.1	282	5.1
Gestational (pregnancy-induced) hypertension with significant proteinuria	365	4.3	2.6	136	2.5
Haemorrhage in early pregnancy	281	3.3	1.3	383	6.9
Placenta praevia	267	3.1	4.0	34	0.6
Premature rupture of membranes	222	2.6	3.6	231	4.2
Maternal care for other known or suspected fetal problems	194	2.3	2.7	215	3.9
Maternal care for known or suspected abnormality of pelvic organs	180	2.1	4.2	105	1.9
Diabetes mellitus in pregnancy	153	1.8	2.8	41	0.7
Antenatal screening	86	1.0	1.2	222	4.0
Prolonged pregnancy	61	0.7	1.3	171	3.1
Abnormalities of forces of labour	61	0.7	1.1	166	3.0
Other	1054	12.4	–	1081	19.5
Total	8533	100.0	2.3	5537	100.0

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

Nearly two-thirds (64.7 percent) of birth procedures in 2006 were spontaneous vaginal births (normal births), and caesarean sections accounted for 24.9 percent. The remaining 10.4 percent of birth procedures either were assisted births (8.8 percent), were breech births (0.5 percent) or the procedure was not stated (1.0 percent), as shown in Figure 3.1.

Assisted births include birth by forceps and/or vacuum extraction, or breech births that require the use of forceps and/or vacuum extraction. Table 3.1 shows the number of women who gave birth in hospital in 2006, by type of birth.

Table 3.1: Number of birth procedures, by type of birth, 2006

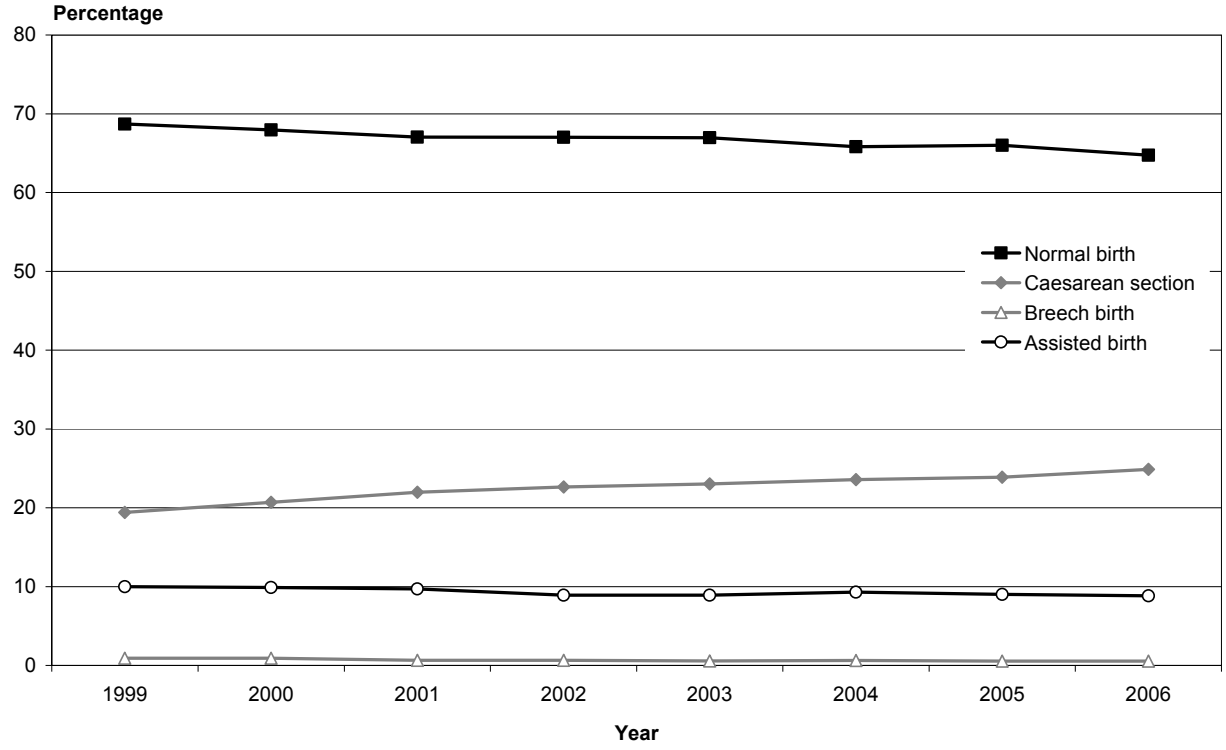
Type of birth	Number	Percentage
Number of mothers	57,559	
Normal birth	37,434	64.7
Caesarean section	14,388	24.9
Emergency caesarean section	8,444	14.6
Elective caesarean section	5,944	10.3
Breech birth	313	0.5
Spontaneous breech birth (unassisted)	162	0.3
Assisted breech birth	140	0.2
Assisted breech birth with forceps	11	0.0
Assisted birth	5109	8.8
Forceps only	1,756	3.0
Vacuum extraction only	3,306	5.7
Forceps and vacuum extraction	47	0.1
Not stated	593	1.0
Total†	57,837	100.0

† The total is higher than the number of mothers, as some mothers had more than one birth procedure.

Between 1999 and 2006, the percentage of mothers who had caesarean sections increased from 19.4 percent to 24.9 percent. This represents a gradual but steady increase, as presented in Figure 3.1. The proportion of women who had an assisted birth decreased slightly over those years (from 10.0 percent in 1999 to 8.8 percent in 2006).

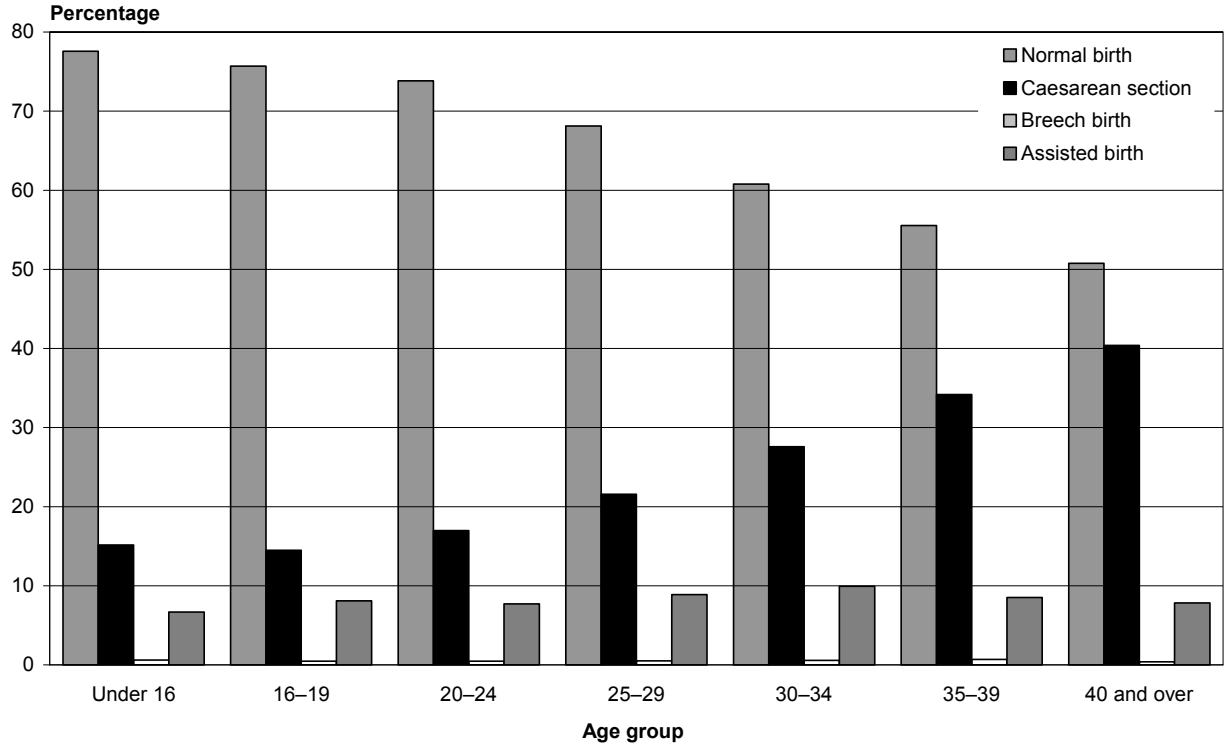
Many factors affect the type of birth, including the mother's age and parity (the number of previous pregnancies resulting in live births or stillbirths). The following tables and figures present the type of birth experienced by mothers by age group, ethnicity and place of residence. The percentage of normal births tends to decrease with the increasing age of the mother, while the percentage of caesarean sections (acute or elective) increases markedly.

Figure 3.1: Percentage of birth procedures, by year and mode of birth, 2006



Source: NMDS

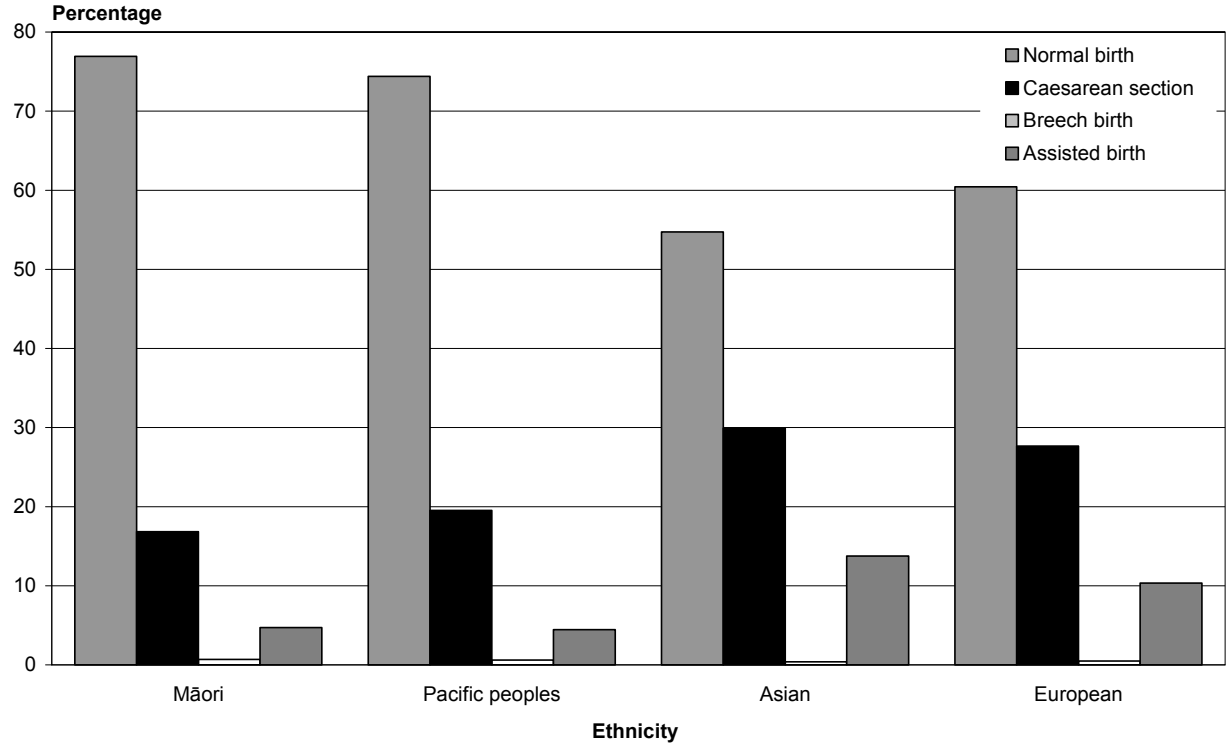
Figure 3.2: Percentage of birth procedures, by mode of birth and age group, 2006



Source: NMDS

As Figure 3.2 shows, in 2006 40.4 percent of women aged 40 years and over had a caesarean section, compared with 14.5 percent of women aged 16–19 years (Figure 3.2). Māori and Pacific women were more likely to have a normal birth compared with women in other ethnic groups (Figure 3.3). Caesarean sections were more common among Asian and European mothers.

Figure 3.3: Percentage of birth procedures, by birth type and ethnicity, 2006



Source: NMDS

The number of birth procedures by mode of birth for each DHB (Table 3.2) presents an overview of the size and volume of service required. (See Appendix H.3 for the complete table.) Southland and Canterbury DHBs had the highest percentage of caesarean section births in 2006 (33.1 percent and 30.1 percent respectively), while Lakes DHB had the lowest (18.2 percent). Auckland DHB had the highest proportion of assisted births (12.0 percent), and Whanganui DHB had the lowest (3.7 percent).

Table 3.2: Number of birth procedures, by mode of birth and DHB region of mother's place of residence, 2006

DHB region	Normal birth	Caesarean section	Breech birth	Assisted birth	Not stated	Total
Northland	1,499	410	16	93	22	2,040
Waitemata	4,236	1,944	33	733	209	7,155
Auckland	3,628	1,771	32	749	41	6,221
Counties Manukau	5,827	1,619	49	643	43	8,181
Waikato	3,509	899	29	409	26	4,872
Lakes	1,181	287	10	89	7	1,574
Bay of Plenty	1,854	619	11	238	4	2,726
Tairawhiti	508	151	7	30	4	700
Hawke's Bay	1,530	491	15	156	19	2,211
Taranaki	997	303	8	80	0	1,388
MidCentral	1,419	521	13	135	5	2,093
Whanganui	634	153	4	31	5	827
Capital & Coast	2,184	1,080	26	390	22	3,702
Hutt Valley	1,170	558	7	159	8	1,902
Wairarapa	313	152	0	53	0	518
Nelson Marlborough	856	379	11	112	133	1,491
West Coast	209	91	2	19	6	327
Canterbury	3,448	1,816	31	716	24	6,035
South Canterbury	412	127	0	33	4	576
Otago	1,142	539	7	164	4	1,856
Southland	867	470	1	75	7	1,420
Not stated	11	8	1	2	0	22
Total	37,434	14,388	313	5,109	593	57,837

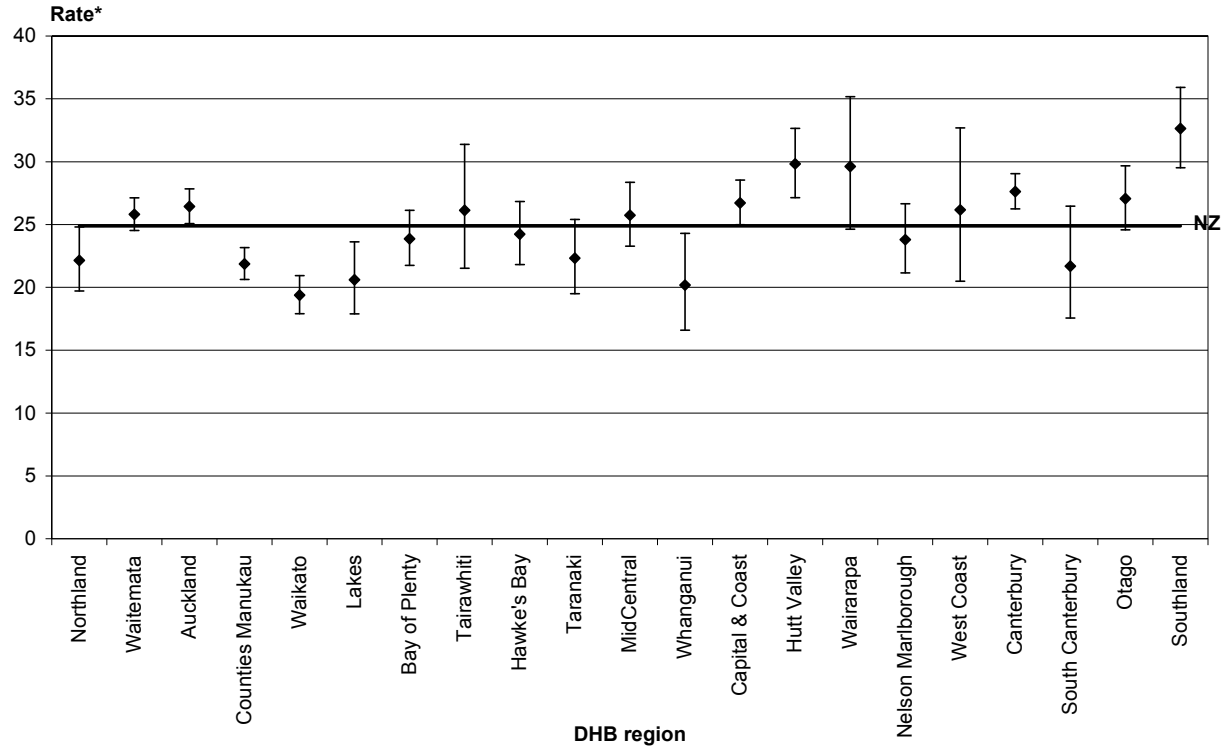
3.2 Caesarean sections

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

A caesarean section is a surgical procedure in which incisions are made through a woman's abdomen and uterus to deliver her baby. Caesarean sections are generally performed whenever abnormal conditions complicate labour and the ability to have a normal birth (vaginal delivery), threatening the life or health of the mother or the baby. There are a variety of reasons why women may be advised or may choose to have a caesarean section, including breech presentation, fetal distress, obstetric complications and placenta praevia.

Figure 3.4 illustrates the standardised rates of caesarean section for each DHB (standardised by age and ethnicity) compared with the New Zealand rate of caesarean sections. The highest standardised caesarean section rates were, in the North Island, Hutt Valley and Wairarapa DHBs (29.8 and 29.6 per 100 deliveries respectively) and, in the South Island, Southland and Canterbury DHBs (32.6 and 27.6 per 100 deliveries respectively). Waikato, Whanganui and Lakes DHBs had the lowest standardised caesarean section rates (19.4, 20.2 and 20.6 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, 2006



* Hospital caesarean rate per 100 deliveries.

Source: NMDS

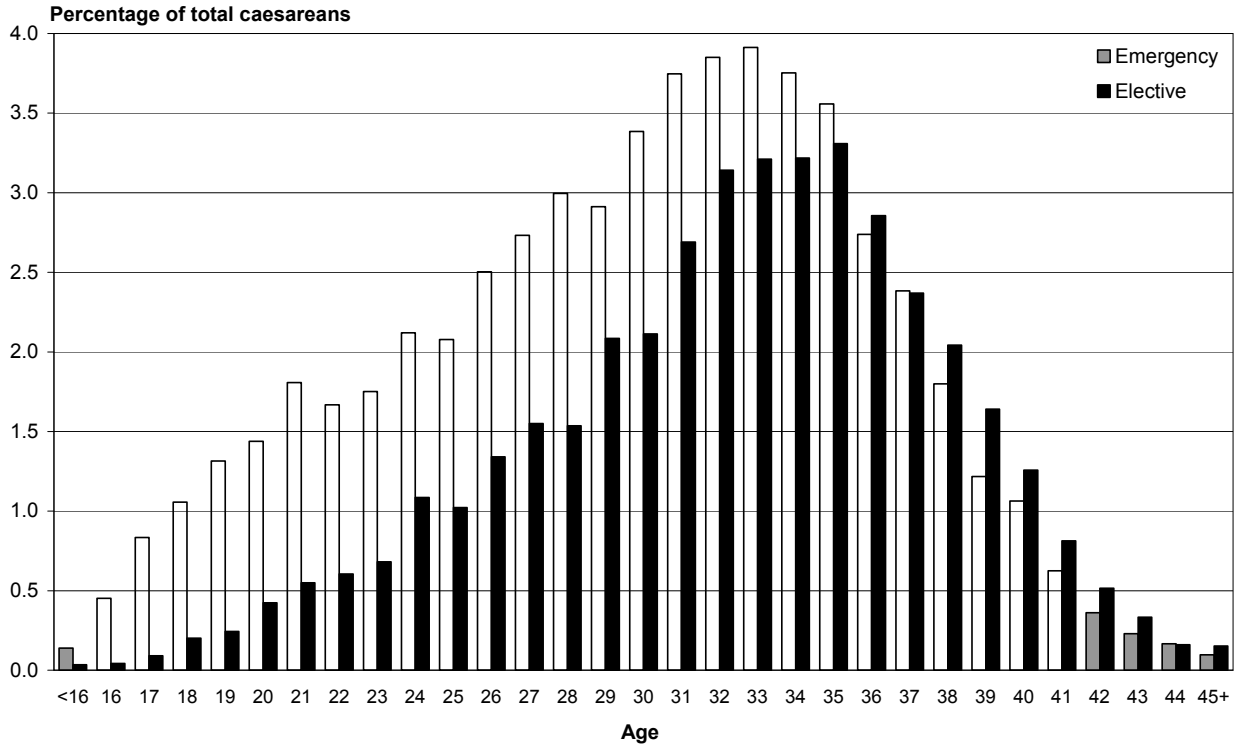
Caesarean sections can be classified into two types.[5]

- An elective caesarean is defined as a caesarean section carried out as a planned procedure before or following the onset of labour, when the decision was made before labour.
- An emergency caesarean section is defined as a caesarean section required because of an emergency situation (for example obstructed labour or fetal distress), carried out when the need was not previously considered necessary. An emergency caesarean section is also referred to as an acute caesarean section.

[5] NCCH 1998b.

Of the 14,388 women who had a caesarean section in 2006, the majority had an emergency caesarean section (58.7 percent). Figure 3.5 shows that women aged 35 years and under are more likely to have an emergency caesarean section, while elective caesarean sections are more likely to be performed on women aged 36 years and over.

Figure 3.5: Percentage of hospital caesarean sections, by type of caesarean section and maternal age at delivery, 2006



Source: NMDS

As shown in Table 3.3, nearly all women that had a caesarean section had a lower segment caesarean section (LSCS)[6] rather than a classical caesarean section.[7] Around 60 percent of women had an emergency LSCS performed (58.4 percent), while elective LSCS accounted for 40.7 percent of caesarean sections performed. (See the Glossary for full definitions.)

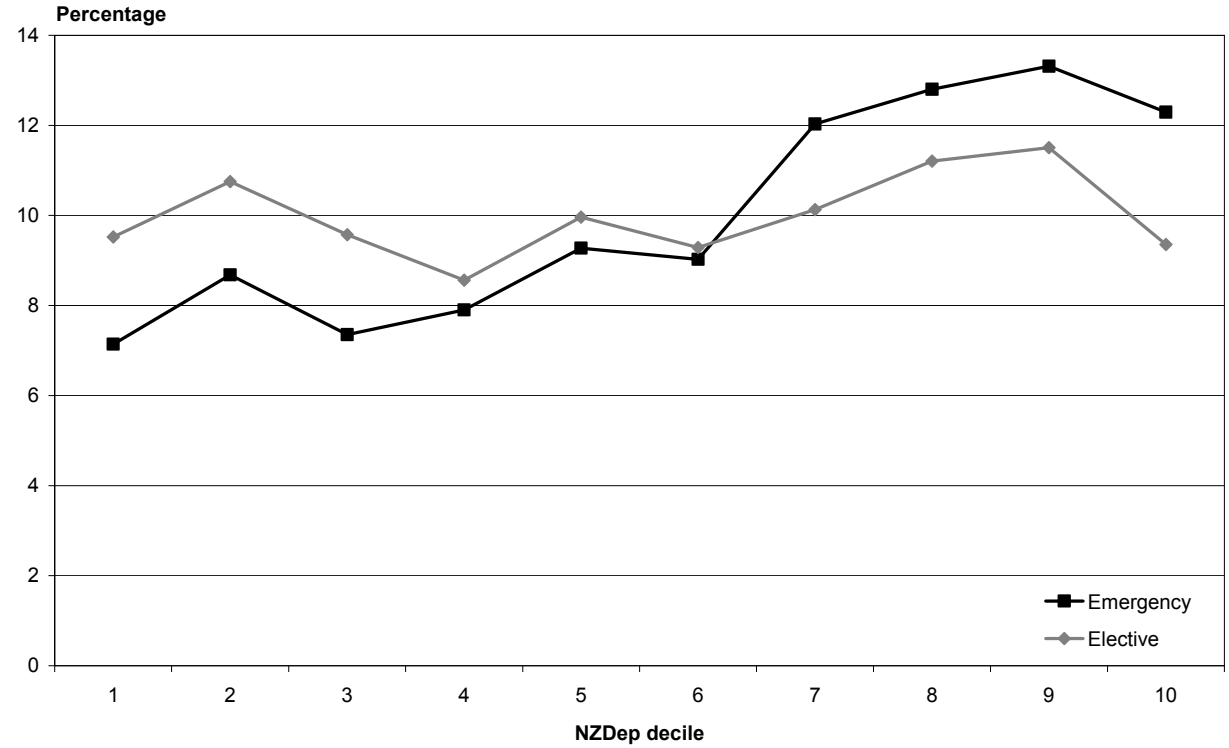
[6] In a LSCS, an incision is made just under the bikini line into the lower segment of the uterus.

[7] 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, age group and deprivation quintile of mother's place of residence, 2006

		LSCS		Classical		Total
		Emergency	Elective	Emergency	Elective	
Age group	Under 16	20	5	0	0	25
	16–19	526	81	0	2	609
	20–24	1,261	476	3	5	1,745
	25–29	1,893	1,072	9	12	2,986
	30–34	2,667	2,037	16	31	4,751
	35–39	1,670	1,731	13	27	3,441
	40 and over	365	456	1	9	831
Ethnicity	Māori	1,292	677	10	15	1,994
	Pacific peoples	757	394	2	4	1,157
	Asian	944	518	5	5	1,472
	European	4,989	4,024	23	60	9,096
	Other	335	186	0	2	523
	Not stated	85	59	2	0	146
NZ quintile	1	1,331	1,190	5	15	2,541
	2	1,279	1,063	9	15	2,366
	3	1,537	1,127	8	17	2,689
	4	2,087	1,251	10	17	3,365
	5	2,152	1,218	10	22	3,402
	Not stated	16	9	0	0	25
Total		8,402	5,858	42	86	14,388

Figure 3.6: Percentage of caesarean section type, by deprivation decile, 2006



Source: NMDS

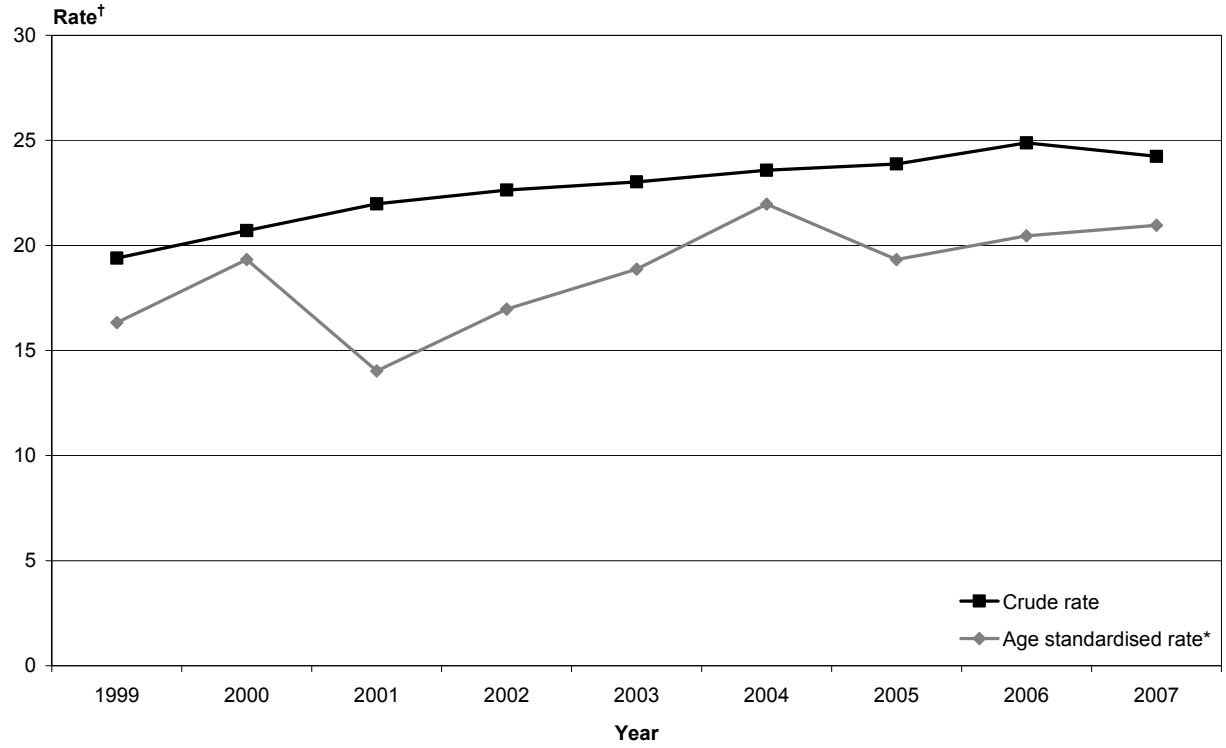
As shown in Figure 3.6, women residing in more deprived areas (deciles 9 and 10) were more likely to have an emergency caesarean section than those living in less deprived areas (13.3 percent and 12.3 percent respectively, compared with 7.1 percent for decile 1).

The crude rate of caesarean sections performed in New Zealand has increased steadily, from 11.7 percent of mothers in 1988 to 24.9 percent in 2006. This trend is being observed in many developed countries (Anderson 2004).

In 1985, WHO issued a consensus statement suggesting no additional health benefits were associated with a caesarean section rate above 10–15 percent. In 2009, it released a revised statement in which it indicated that while very low and very high rates of caesarean sections are dangerous, it has not been able to determine an optimal rate. It also suggests 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.

While the crude caesarean section rate for 2006 was 24.9 caesarean sections per 100 deliveries, when the rate is standardised for age using the WHO world population, it decreases to 20.5 per 100 deliveries (see Figure 3.7). The lower rate indicates that age can be considered to be a contributing factor to New Zealand's high rate of caesarean sections.

Figure 3.7: Crude and age-standardised hospital caesarean section rates, 1999–2006



Notes:

* Age-standardised to WHO world population.

† Hospital caesarean rates per 100 deliveries.

Source: NMDS

3.3 Other birth interventions and events

Common interventions used during childbirth include: induction,[8] epidural,[9] episiotomy,[10] manual removal of placenta and the management of postpartum haemorrhage (see the Glossary for full definitions). Tables 3.4 and 3.5 summarise common birth-related procedures and events during childbirth in 2006.

Postpartum haemorrhage is clinically defined as blood loss over 500 ml within 24 hours of birth (primary) or between 24 hours and six weeks after birth (secondary) (Medsafe 1998). Estimating the volume of blood lost during a haemorrhage may vary in clinical practice, and does not necessarily explain the variance between DHB regions. This analysis does not differentiate between primary and secondary postpartum haemorrhages.

In 2006, 40 hysterectomies were related to childbirth. This number is too small to allow for meaningful comparisons between DHBs.

[8] Inductions are used to stimulate the onset of labour.

[9] An epidural is an analgesic agent injected outside the dura mater covering the spine.

[10] 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, by DHB region of mother's place of residence, 2006

DHB region	Induction	Epidural	Episiotomy	Manual removal of placenta	Postpartum haemorrhage
Northland	314	287	94	29	297
Waitemata	1,519	2,503	709	108	509
Auckland	1,341	2,467	891	96	768
Counties Manukau	1,299	1,855	636	134	664
Waikato	688	933	220	63	440
Lakes	210	72	86	18	106
Bay of Plenty	452	461	171	40	176
Tairawhiti	81	38	30	5	75
Hawke's Bay	308	554	194	42	164
Taranaki	272	99	84	25	129
MidCentral	278	448	155	24	261
Whanganui	141	139	22	10	78
Capital & Coast	766	1,516	455	64	309
Hutt Valley	387	528	190	23	180
Wairarapa	121	110	74	8	29
Nelson Marlborough	283	550	177	29	74
West Coast	67	41	31	4	25
Canterbury	956	1,628	872	80	582
South Canterbury	123	112	42	5	40
Otago	373	452	142	32	212
Southland	302	141	111	19	74
Not stated	6	6	3	1	2
Total	10,287	14,940	5,389	859	5,194

Rates for inductions and epidurals are expressed per 100 deliveries (excluding elective caesarean sections), and rates for episiotomies, manual removal of placentas and postpartum haemorrhages are expressed per 100 vaginal deliveries (excluding all caesarean sections).

In 2006, around one in five births (19.8 percent) were induced, while an epidural was administered for around one in three births. Table 3.5 shows the national rate for episiotomies was 12.4 per 100 vaginal deliveries, and ranged from 20.7 per 100 vaginal deliveries in Canterbury DHB to 3.3 per 100 vaginal deliveries in Whanganui DHB.

Table 3.5: Rate of birth-related procedures and events, by DHB region of mother's place of residence, 2006

DHB region	Induction*	Epidural*	Episiotomy†	Manual removals of placenta†	Postpartum haemorrhage†
Northland	16.5	15.0	5.8	1.8	18.2
Waitemata	24.0	39.6	13.6	2.1	9.8
Auckland	24.5	45.0	20.0	2.2	17.3
Counties Manukau	17.2	24.5	9.7	2.0	10.1
Waikato	15.2	20.6	5.5	1.6	11.1
Lakes	14.6	5.0	6.7	1.4	8.2
Bay of Plenty	18.3	18.6	8.1	1.9	8.4
Tairawhiti	12.8	6.0	5.5	0.9	13.7
Hawke's Bay	15.3	27.6	11.3	2.4	9.5
Taranaki	22.1	8.0	7.7	2.3	11.9
MidCentral	14.5	23.4	9.9	1.5	16.6
Whanganui	18.6	18.3	3.3	1.5	11.6
Capital & Coast	23.1	45.7	17.4	2.4	11.8
Hutt Valley	23.1	31.5	14.1	1.7	13.4
Wairarapa	26.4	24.0	20.2	2.2	7.9
Nelson Marlborough	21.4	41.5	15.9	2.6	6.7
West Coast	23.7	14.5	13.1	1.7	10.6
Canterbury	18.4	31.3	20.7	1.9	13.8
South Canterbury	23.7	21.6	9.4	1.1	8.9
Otago	22.8	27.6	10.8	2.4	16.1
Southland	25.4	11.9	11.7	2.0	7.8
Not stated	28.6	28.6	21.4	7.1	14.3
Total rate	19.8	28.8	12.4	2.0	12.0

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

† Rate per 100 vaginal deliveries.

Table 3.7 shows that differences in epidural use existed between ethnic groups in 2006: rates for Asian and European mothers were double those for Māori and Pacific mothers. This trend was observed in mothers aged 25 years and over.

Māori mothers had the lowest rates for induction and epidural administration (14.8 and 16.7 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 (32.7 per 100 deliveries) and epidural administration (31.8 per 100 deliveries).

Table 3.6: Use of inductions, by age group and ethnicity of mother, 2006

Age group	Number of inductions							Rate per 100 deliveries*						
	Māori	Pacific peoples	Asian	European	Other	Not stated	Total	Māori	Pacific peoples	Asian	European	Other	Not stated	Total
Under 16	18	3	0	10	0	0	31	19.4	20.0	0.0	21.3	0.0	0.0	19.4
16–19	263	65	10	321	14	5	678	13.4	15.9	18.5	20.3	18.4	13.9	16.5
20–24	402	220	100	780	49	19	1,570	11.9	15.4	15.7	19.5	20.2	15.8	16.0
25–29	401	278	256	1,364	72	25	2,396	15.1	17.5	18.5	20.6	20.4	18.4	18.8
30–34	300	221	285	2,130	123	27	3,086	16.4	18.5	19.3	21.3	24.6	18.8	20.3
35–39	205	186	140	1,392	67	15	2,005	21.1	26.5	20.0	24.8	26.3	20.3	24.1
40 and over	58	73	45	324	16	5	521	21.1	39.5	30.6	35.2	32.0	33.3	32.7
Total	1,647	1,046	836	6,321	341	96	10,287	14.8	18.9	19.0	21.9	23.0	18.3	19.8

* Rate excludes elective caesarean sections.

Table 3.7: Use of epidurals, by age group and ethnicity of mother, 2006

Age group	Number of epidurals							Rate per 100 deliveries*						
	Māori	Pacific peoples	Asian	European	Other	Not stated	Total	Māori	Pacific peoples	Asian	European	Other	Not stated	Total
Under 16	26	4	0	15	0	0	45	28.0	26.7	0.0	31.9	0.0	0.0	28.1
16–19	437	98	17	490	17	5	1,064	22.3	23.9	31.5	31.0	22.4	13.9	25.8
20–24	586	337	225	1176	69	28	2,421	17.4	23.5	35.4	29.4	28.5	23.3	24.7
25–29	364	301	533	2133	111	42	3,484	13.7	18.9	38.5	32.2	31.4	30.9	27.3
30–34	271	198	566	3510	194	43	4,782	14.8	16.6	38.4	35.0	38.8	29.9	31.5
35–39	140	117	259	2000	94	27	2,637	14.4	16.7	37.0	35.7	36.9	36.5	31.7
40 and over	37	33	61	356	15	5	507	13.5	17.8	41.5	38.7	30.0	33.3	31.8
Total	1,861	1,088	1,661	9,680	500	150	14,940	16.7	19.7	37.8	33.6	33.8	28.5	28.8

* Rate excludes elective caesarean sections.

3.4 Multiple births

Of the 57,559 mothers who gave birth in hospital in 2006, the majority (98.3 percent) gave birth to one baby (or singleton), of whom 56,175 mothers had a single liveborn baby (97.6 percent of total mothers) and 398 (0.7 percent of total mothers) had a single stillborn baby. Nearly two percent of mothers either had twins or multiple babies (889, 1.5 percent), as Table 3.8 shows.

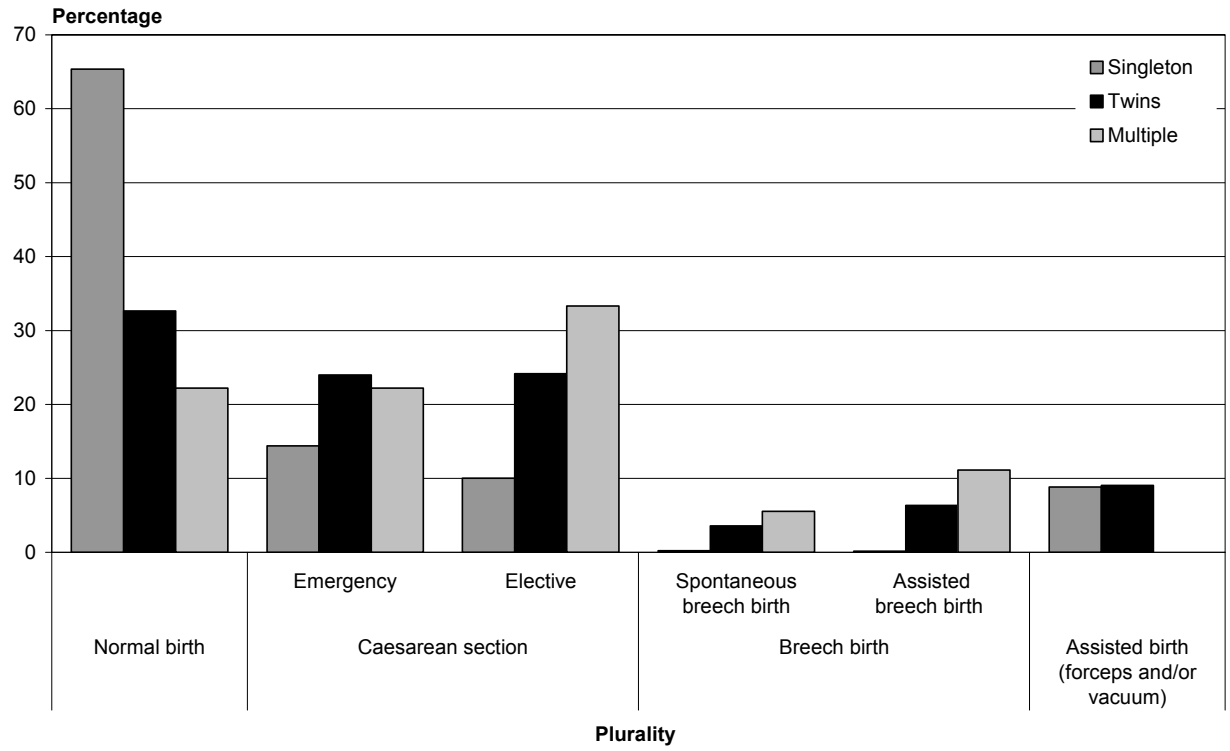
Table 3.8: Number of mothers, by babies' birth status and plurality, 2006

Babies' birth status	Plurality				Total
	Singleton	Twins	Multiple	Not stated	
Live births	56,175	848	13	0	57,036
Some live, some still	0	19	0	0	19
Stillbirths	398	8	1	0	407
Total hospital births	56,573	875	14	97	57,559

Of mothers who gave birth in hospital, there were 875 twin and 14 triplet births, compared with 56,573 births of a single baby. Therefore there was one twin birth to every 65 single babies born, and one birth of multiple babies to every 4041 singletons born.

Figure 3.8 shows that mothers who gave birth to more than one baby were more likely to have a caesarean section than a normal birth (48.2 percent compared with 32.5 percent).

Figure 3.8: Percentage of birth procedures, by mode of birth and plurality, 2006



Source: NMDS

4 Babies

This section presents information as reported by hospitals on the outcome of births within their facilities. It presents information based on selected demographic characteristics of live babies born in New Zealand.

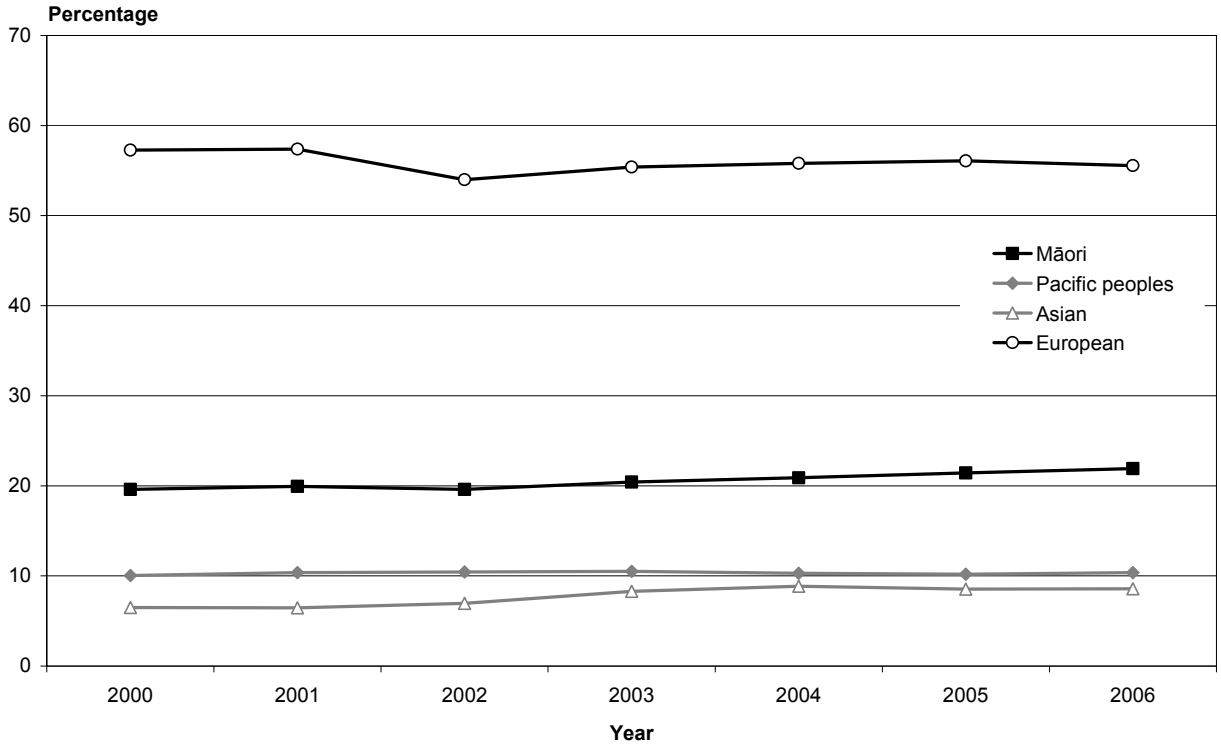
4.1 Babies at birth

In 2006, BDM registered a total of 60,274 live births (including late registrations), while the hospital sector reported that 58,532 liveborn infants were born either in hospital or prior to their mother's admission to hospital (usually following a birth outside hospital).

Data integrity

Data on the number of live babies born is derived using the ICD codes reported to the NMDS. These codes specify the number of liveborn infants born in hospital, as well as the number delivered outside hospital but subsequently admitted, for example, 'Singleton, born in hospital' or 'Other multiple, born outside hospital'.

Figure 4.1: Percentage of total live births, by ethnicity, 1999–2006



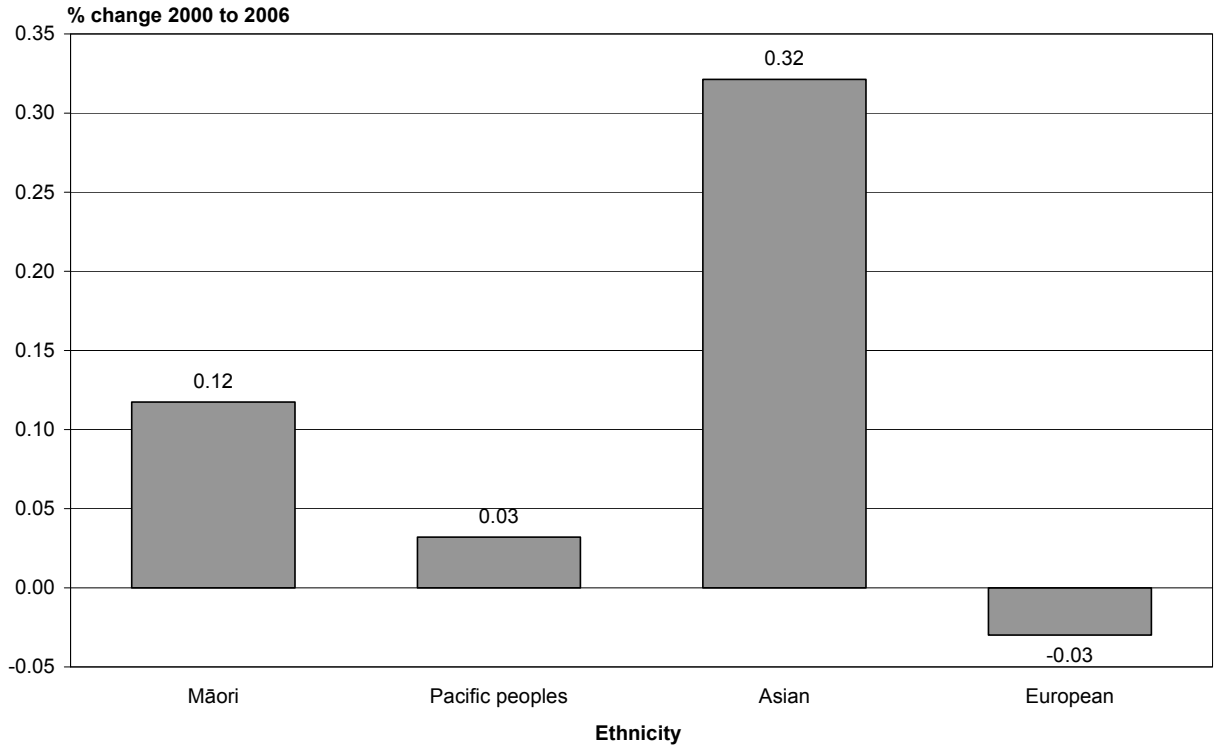
Source: NMDS

Figure 4.1 shows the percentage of liveborn infants (that is, live babies born in hospital or subsequently admitted to hospital following birth outside hospital) in 2006 by ethnicity. Table 4.1 shows that most liveborn infants were born in hospital (99.3 percent), and that more were male (51.1 percent) than female. The male:female sex ratio was 1.04:1. This ratio has remained consistent since 1999.

Table 4.1: Number of liveborn babies, by place of birth, sex and ethnicity, 2006

Ethnic group	Total number of babies			Born in hospital			Born outside hospital		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Māori	6,548	6,275	12,823	6,479	6,191	12,670	69	82	151
Pacific peoples	3,086	2,983	6,069	3,061	2,948	6,009	25	34	59
Asian	2,588	2,431	5,019	2,581	2,420	5,001	7	11	18
European	16,651	15,864	32,515	16,553	15,781	32,334	98	82	180
Other	718	742	1,460	718	739	1,457	0	2	2
Not stated	316	330	646	313	329	642	3	1	4
Total	29,907	28,625	58,532	29,705	28,408	58,113	202	212	414

Figure 4.2: Percentage change of total liveborn infants, by ethnicity, 1999–2006



Source: NMDS

Figure 4.2 shows that there was a marginal increase in the percentage of Māori, Pacific and Asian babies born since 2000, whereas there was a slight decrease for European babies.

In New Zealand, the average birthweight of liveborn infants was 3.42 kg (Table 4.2). Male babies were, on average, heavier (with an average weight of 3.48 kg) than female babies (with an average of 3.37 kg). Asian babies had the lowest average birthweight (3.23 kg), while Pacific babies had the highest (3.56 kg). The average birthweight of babies within each ethnic group has remained fairly constant from 1999 onwards (see Appendix H.4).

Table 4.2: Average birthweight of liveborn infants, by sex and ethnicity, 2006

Ethnic group	Average birthweight (kg) ± standard deviation (kg)		
	Male	Female	Total
Māori	3.40 ± 0.66	3.31 ± 0.63	3.36 ± 0.65
Pacific peoples	3.59 ± 0.65	3.53 ± 0.63	3.56 ± 0.64
Asian	3.28 ± 0.58	3.17 ± 0.55	3.23 ± 0.56
European	3.52 ± 0.63	3.39 ± 0.60	3.46 ± 0.62
Other	3.38 ± 0.63	3.30 ± 0.59	3.34 ± 0.61
Not stated	3.39 ± 0.82	3.42 ± 0.68	3.40 ± 0.75
Total	3.48 ± 0.64	3.37 ± 0.61	3.42 ± 0.63

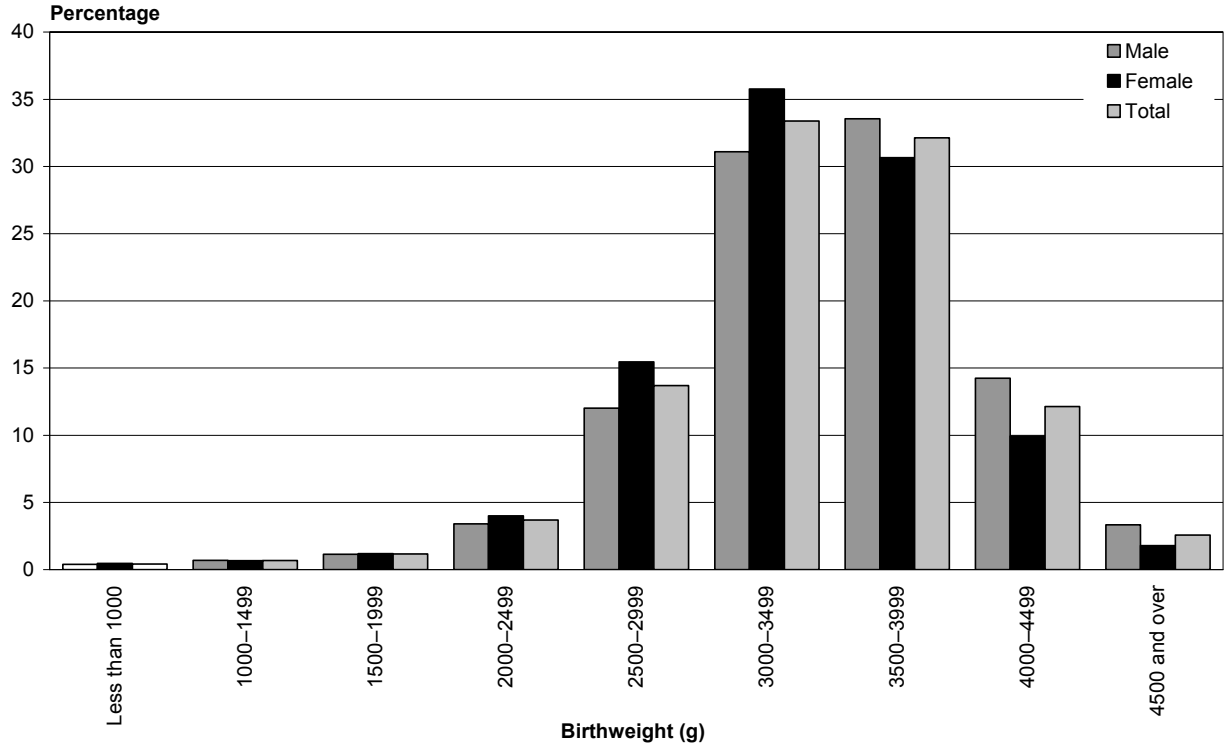
Prematurity, multiple pregnancy and restricted fetal (intrauterine) growth are possible contributors to a baby's low weight at birth. Low birthweight (under 2.5 kg) is associated with fetal and neonatal mortality and morbidity, and inhibited growth and cognitive development (WHO and UNICEF 2004). Low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

Table 4.3 shows that in 2006, 6.0 percent of liveborn infants weighed less than 2.5 kg (that is, of low birthweight). Pacific babies were more likely to have a high birthweight (of or over 4.5 kg: 5.2 percent) compared with babies born to other ethnic groups (for which this likelihood varied from 0.7 percent to 2.7 percent). Figure 4.3 shows that a higher proportion of female babies were of low birthweight than male babies (6.3 percent and 5.7 percent respectively).

Table 4.3: Percentage of liveborn infants, by birthweight and ethnicity, 2006

Ethnic group	Birthweight (grams)							Total	
	Less than 1000	1000–1499	1500–1999	2000–2499	2500–4499	4500 or more	Not stated	No.	%
Māori	0.5	0.9	1.5	4.1	91.1	1.9	0.1	12,823	100
Pacific peoples	0.4	0.6	0.8	2.4	90.5	5.2	0.0	6,069	100
Asian	0.4	0.8	1.3	5.2	91.5	0.7	0.0	5,019	100
European	0.4	0.6	1.1	3.5	91.6	2.7	0.1	32,515	100
Other	0.3	0.7	1.8	4.5	90.8	1.9	0.0	1,460	100
Not stated	0.3	1.1	1.7	3.7	90.7	1.5	0.9	646	100
Total number	250	398	688	2167	53,467	1511	51	58,532	
Total percentage	0.4	0.7	1.2	3.7	91.3	2.6	0.1		100

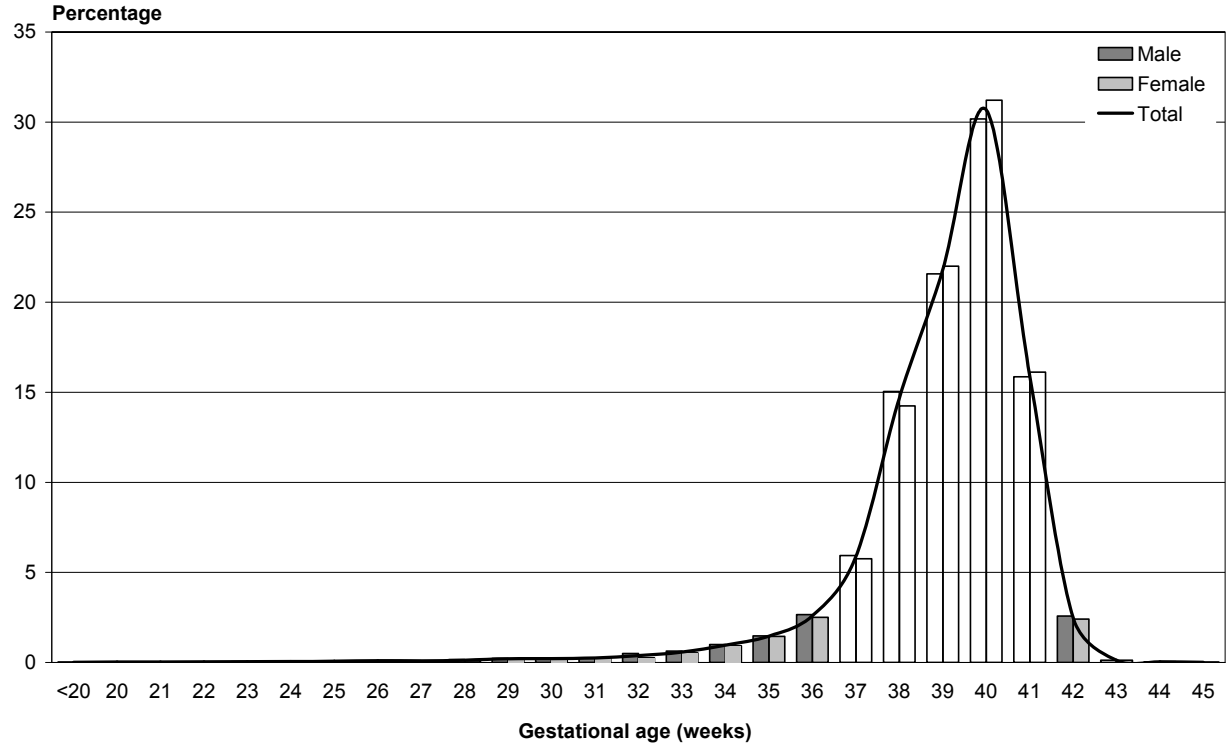
Figure 4.3: Percentage of liveborn infants, by birthweight and sex, 2006



Source: NMDS

Figure 4.4 and Table 4.4 show that 91.7 percent of liveborn infants were full-term (37 or more weeks' gestation). There was no marked variation between ethnic groups in gestational age. Pre-term babies (born at less than 37 weeks' gestation) accounted for 7.2 percent of liveborn infants. Babies of Māori and European mothers were more likely to be pre-term (7.6 percent and 7.2 percent respectively).

Figure 4.4: Percentage of liveborn infants, by gestational age and sex, 2006



Source: NMDS

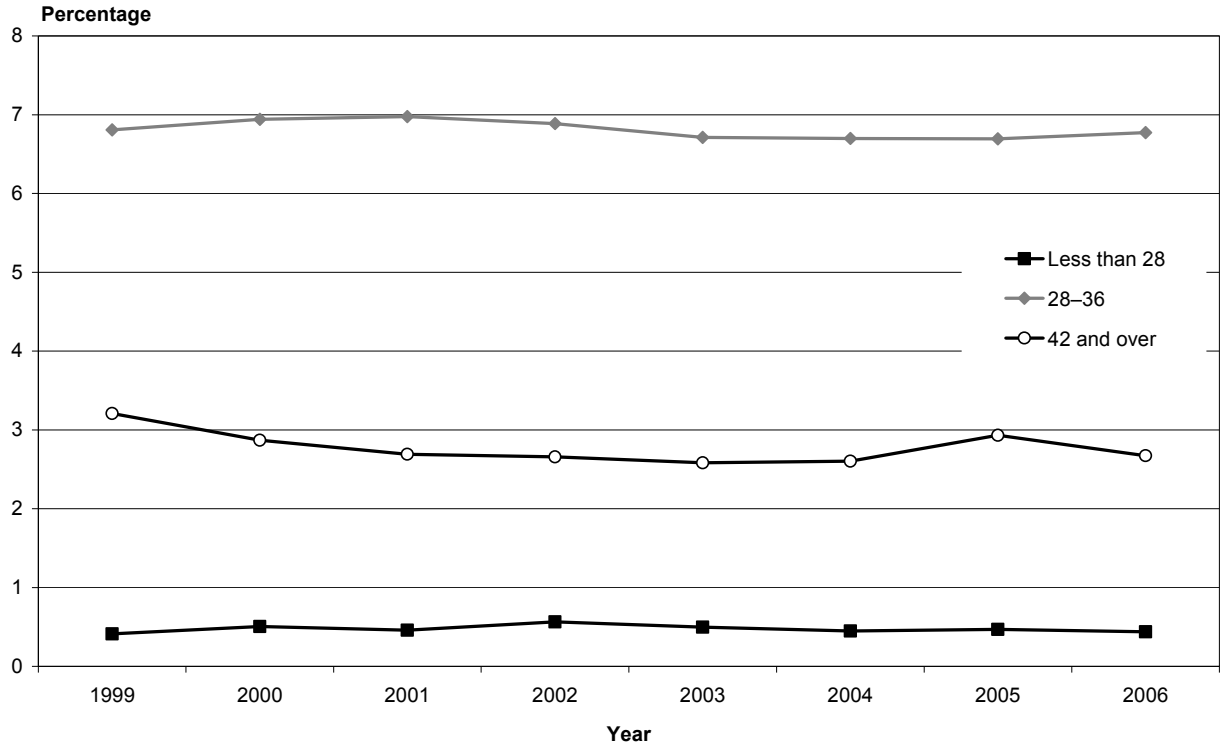
Table 4.4: Percentage of liveborn infants, by gestational age and ethnicity, 2006

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	No.	%
Māori	0.0	0.1	0.4	1.1	6.0	88.1	2.6	1.6	12,823	100.0
Pacific peoples	0.0	0.2	0.4	0.6	4.8	89.7	3.2	1.1	6,069	100.0
Asian	0.0	0.1	0.2	0.7	5.9	90.8	1.7	0.6	5,019	100.0
European	0.0	0.1	0.3	0.7	6.1	89.0	2.7	1.1	32,515	100.0
Other	0.0	0.2	0.1	1.0	6.9	87.4	4.0	0.4	1,460	100.0
Not stated	0.0	0.0	0.5	0.6	7.7	86.8	2.8	1.5	646	100.0
Total number	6	69	181	468	3,497	52,067	1,565	679	58,532	
Total percentage*	0.0	0.1	0.3	0.8	6.0	89.0	2.7	1.2		100.0

* Totals may not equal 100 due to rounding.

Babies that were born early pre-term (less than 28 weeks) or near pre-term (28–36 weeks) accounted for 0.4 percent and 6.8 percent of births respectively in 2006. Figure 4.5 shows that these proportions remained fairly consistent between 1999 and 2006.

Figure 4.5: Percentage of liveborn infants, by early and late gestational age (excluding babies born between 37 and 41 weeks' gestation), 1999–2006



Source: NMDS

Table 4.5: Numbers of liveborn infants, by gestational age and birthweight at birth, 2006

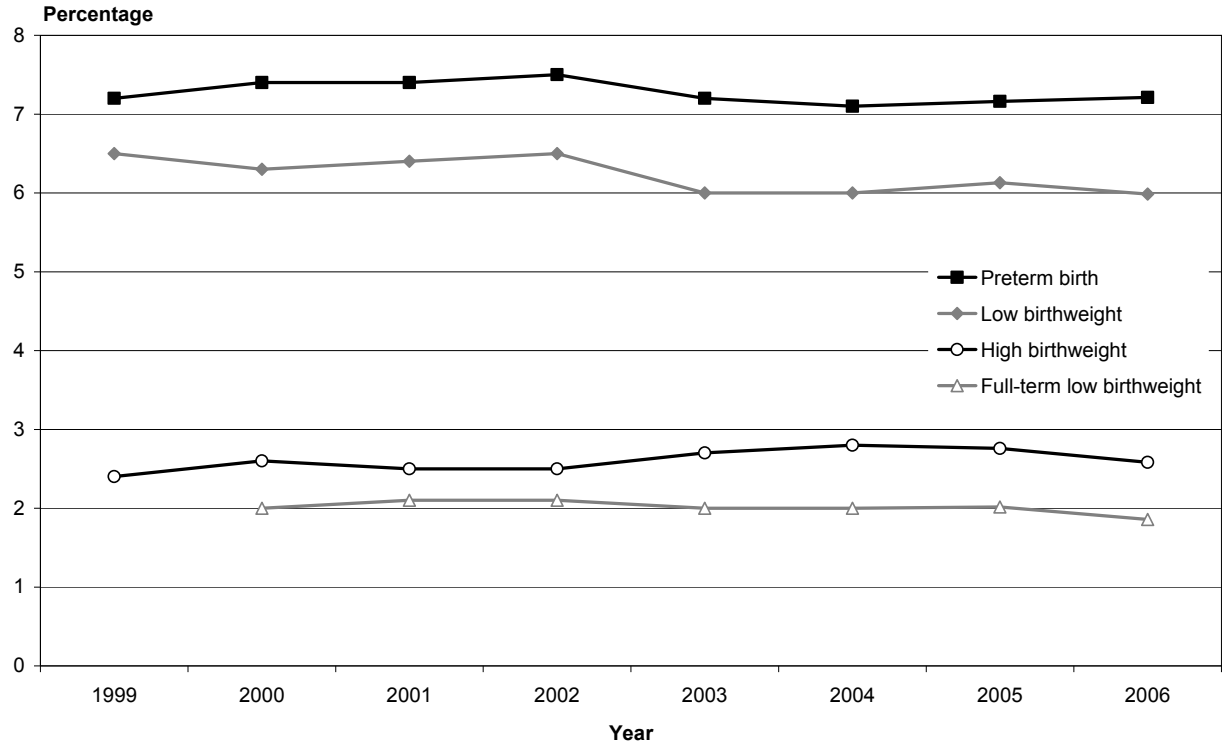
Gestational age (weeks)	Birthweight (grams)			
	Less than 2500	2500 and over	Not stated	Total
Less than 37	2,410	1,809	2	4,221
37 and over	996	52,596	40	53,632
Not stated	97	573	9	679
Total	3,503	54,978	51	58,532

Of babies born before 37 weeks gestational age in 2006, 57.1 percent weighed less than 2.5 kg (that is, were of low birthweight), whereas only 1.9 percent of full-term babies (37 weeks gestational age and over) were of low birthweight (see Table 4.5). Overall, the proportion of full-term babies with a low birthweight varied minimally from 2000 to 2006 (see Figure 4.6). Asian babies comprised the highest proportion of low birthweight term babies, and Pacific babies the lowest (see Table 4.6).

Table 4.6: Percentage of full-term liveborn infants (37 or more weeks' gestation) with a low birthweight (under 2500g), by ethnicity and year, 2000–2006

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

Figure 4.6: Percentage of liveborn infants, by low birthweight, high birthweight, pre-term and full-term low birthweight, 1999–2006



NB: No full-term low birthweight data available for 1999.

Source: NMDS

Table 4.7 shows that, in terms of age, ethnicity and deprivation quintiles, full-term liveborn infants were most likely to be of low birthweight if born to mothers aged under 20 years, Asian or living in the most deprived areas (NZDep quintile 5) (5.9 percent, 2.9 percent and 2.0 percent respectively).

South Canterbury DHB had the lowest proportion of pre-term (3.8 percent) and low birthweight babies (3.8 percent), while West Coast DHB had the highest (10.3 percent and 9.7 percent respectively), and the lowest proportion of births compared to other DHBs. The proportion of full-term babies with low birthweight ranged from 2.5 percent for Wairarapa DHB to 1.3 percent for Hawke's Bay, Nelson Marlborough and Canterbury DHBs (see Table 4.8). (See Appendix H.4 for tables presenting gestational age and birthweight by DHB.)

Table 4.7: Proportion of full-term liveborn infants (37 or more weeks' gestation) with a low birthweight (under 2500 g), by mother's age group, ethnicity and NZDep quintile of place of residence, 2006

		Total number of full-term babies	Low-birthweight full-term babies	
			Number	% of term babies
Age group	Under 16	160	6	3.8
	16–19	4,122	85	2.1
	20–24	10,206	192	1.9
	25–29	13,787	219	1.6
	30–34	17,256	257	1.5
	35–39	10,272	190	1.8
	40+	2,206	47	2.1
	Not stated	523	0	0.0
Ethnic group	Māori	12,823	262	2.0
	Pacific peoples	6,069	73	1.2
	Asian	5,019	148	2.9
	European	32,515	481	1.5
	Other	1,460	24	1.6
	Not stated	646	8	1.2
NZ quintile	1	8,252	107	1.3
	2	8,587	132	1.5
	3	10,384	154	1.5
	4	13,697	251	1.8
	5	17,521	350	2.0
	Not stated	91	2	2.2
Total		58,532	996	1.7

Table 4.8: Number of liveborn infants, by birthweight, gestational age and DHB region of mother's place of residence, 2006

DHB region	Low birthweight (<2500 g)	High birthweight (>4500 g)	Pre-term birth (<37 weeks)	Full-term (37+ weeks)	Low-birthweight full-term babies	
					Number	%
Northland	141	51	157	1,880	31	1.5
Waitemata	415	164	557	6,620	101	1.4
Auckland	381	132	455	5,846	117	1.9
Counties Manukau	506	239	571	7,577	175	2.1
Waikato	292	127	339	4,486	83	1.7
Lakes	95	40	99	1,488	31	1.9
Bay of Plenty	170	58	200	2,463	58	2.1
Tairawhiti	45	24	46	661	15	2.1
Hawke's Bay	144	51	162	1,935	28	1.3
Taranaki	92	35	113	1,270	20	1.4
MidCentral	143	74	165	1,982	38	1.7
Whanganui	53	25	47	786	19	2.2
Capital & Coast	191	101	242	3,516	60	1.6
Hutt Valley	97	59	139	1,767	30	1.6
Wairarapa	35	10	43	483	13	2.5
Nelson Marlborough	66	50	88	1,413	20	1.3
West Coast	32	7	34	289	7	2.1
Canterbury	352	158	472	5,609	81	1.3
South Canterbury	22	17	22	547	8	1.4
Otago	121	52	150	1,718	33	1.8
Southland	110	37	120	1,277	28	2.0
Not stated	0	0	0	19	0	0.0
Total	3,503	1,511	4,221	53,632	996	1.7

5 Postnatal Period

This section describes services and care provided to mothers and babies in the days following the baby's birth.

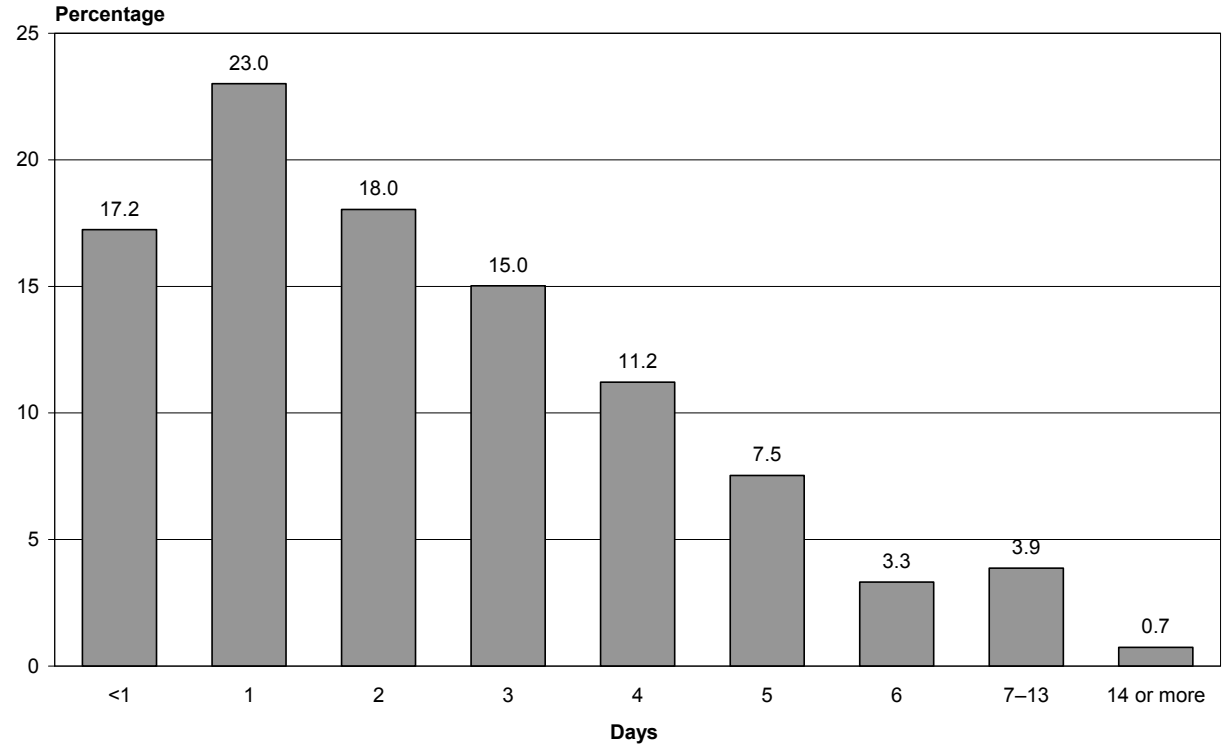
5.1 Length of stay

5.1.1 Length of stay of the mother

The length of a mother's stay in the hospital where she gave birth to her baby is dependent on a variety of factors, including whether the mother chooses to go home early (on early discharge), whether the mother or baby are unwell, whether either develops any health complications (clinical need) and availability of beds.

Length of stay for mothers in the hospital where they gave birth is defined as the period from the date she was admitted to hospital up to and including the date of discharge (the date on which the mother was separated from hospital: refer section 5.2). In 2006, the average length of hospital stay was 2.6 days. As Figure 5.1 shows, 58.3 percent of mothers were discharged from hospital within two days of admission.

Figure 5.1: Percentage of mothers, by length of stay in hospital (days), 2006



Source: NMDS

5.1.2 Antenatal length of stay

Antenatal length of stay is defined as the period between a mother's admission to hospital and her giving birth. In 2006 three-quarters of mothers (74.5 percent) gave birth on the day they were admitted to hospital. The proportion of mothers that gave birth within one day of admission was 93.5 percent. Only 0.9 percent of mothers were in hospital for seven days or more before they gave birth. Māori and European mothers were more likely to give birth on the same day as admission (75.7 and 74.9 percent respectively). Asian and Pacific mothers had the highest proportions of mothers giving birth the day after admission (20.8 and 20.0 percent respectively; see Table 5.1).

Table 5.1: Percentage of mothers, by antenatal length of stay (days) and maternal ethnicity, 2006

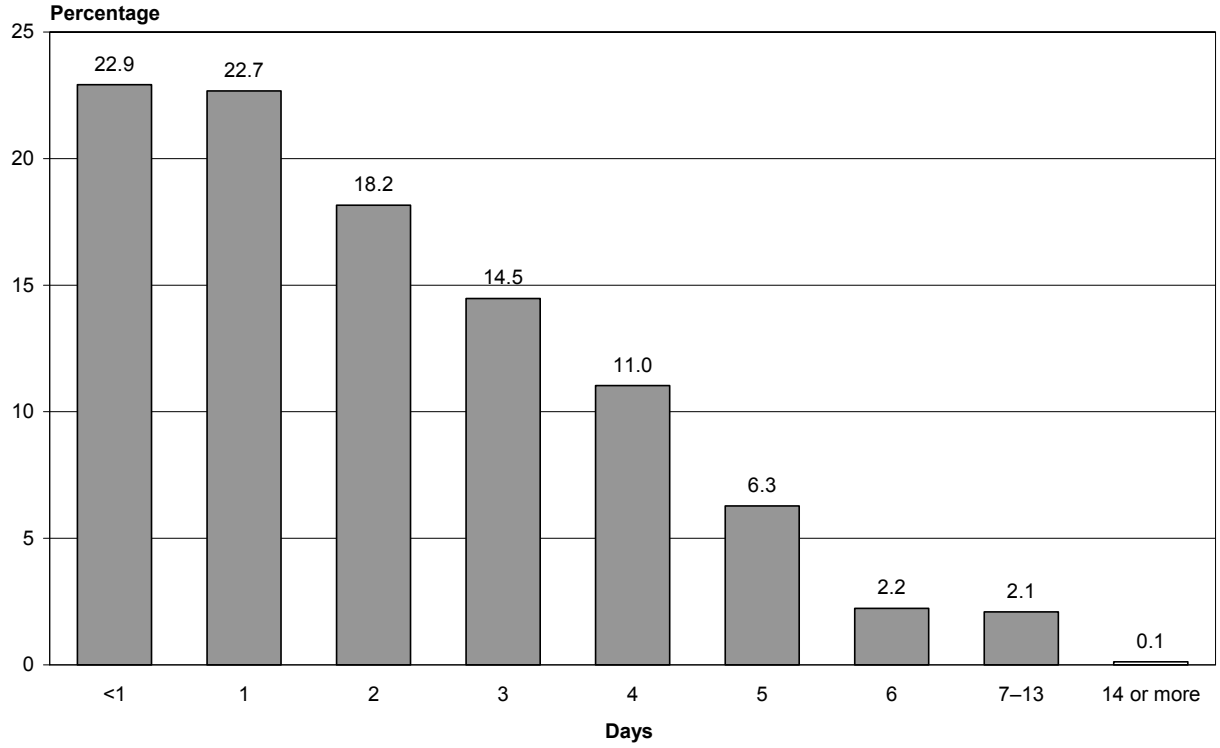
Ethnicity	Antenatal length of stay (days)						Total
	Less than 1	1	2–6	7–13	14 or more	Not stated	
Māori	8,929	2,104	570	64	31	98	11,796
Pacific peoples	4,254	1,183	352	30	25	58	5,902
Asian	3,542	1,018	240	22	18	59	4,899
European	24,518	6,152	1,389	168	131	357	32,715
Other	1,208	341	81	11	6	19	1,666
Not stated	418	129	26	4	3	1	581
Total	42,869	10,927	2,658	299	214	592	57,559

5.1.3 Postnatal length of stay

Postnatal length of stay is defined as the period from the date the mother gave birth up to and including the date of discharge from the hospital (the date on which she was separated from hospital: refer section 5.2).

In 2006, mothers were likely to have a short postnatal length of stay, with an average length of 2.1 days. Figure 5.2 shows the high proportion of mothers who were discharged from hospital less than two days after giving birth (45.6 percent). Nearly 44 percent of mothers were discharged between two and four days after the birth (43.7 percent).

Figure 5.2: Percentage of mothers, by postnatal length of stay (days), 2006



Source: NMDS

As shown in Table 5.2, mothers aged over 30 years were more likely to stay in hospital for longer than mothers aged between 16 and 24 years. Māori and Pacific mothers had shorter average lengths of stay than Asian and European mothers. Mothers who resided in the least deprived areas (quintile 1) stayed in hospital longer (on average 2.3 days) than those who lived in the most deprived areas (quintile 5) (on average 1.9 days).

Table 5.2: Number of mothers, by postnatal length of stay (days) and maternal ethnicity, age group and deprivation quintile of mother's place of residence, 2006

		Postnatal length of stay (days)										
		<1	1	2	3	4	5	6	7–13	14 or more	Total	Average
Age group	Under 16	34	39	31	29	14	12	2	3	0	164	2.1
	16–19	949	1,099	907	566	363	154	82	66	2	4,188	1.9
	20–24	2,536	2,717	2,011	1,386	883	411	159	132	8	10,243	1.8
	25–29	3,305	3,325	2,594	1,952	1,349	714	257	249	15	13,760	2.0
	30–34	3,864	3,636	3,001	2,590	2,032	1,208	406	385	23	17,145	2.2
	35–39	2,111	1,883	1,588	1,511	1,425	901	276	299	15	10,009	2.4
	40+	393	350	324	298	287	215	103	73	7	2,050	2.7
Ethnic group	Māori	3,180	3,395	2,249	1,359	823	398	186	194	12	11,796	1.7
	Pacific peoples	1,373	1,864	1,049	667	471	216	119	137	6	5,902	1.8
	Asian	1,087	896	815	680	664	443	158	152	4	4,899	2.4
	European	7,029	6,454	5,999	5,298	4,102	2,383	757	649	44	32,715	2.2
	Other	390	321	247	239	227	134	48	58	2	1,666	2.3
	Not stated	133	119	97	89	66	41	17	17	2	581	2.3
NZ quintile	1	1,811	1,536	1,406	1,331	1,091	670	203	171	11	8,230	2.3
	2	1,949	1,668	1,499	1,334	1,031	630	194	200	7	8,512	2.2
	3	2,309	2,120	1,878	1,578	1,239	677	229	225	14	10,269	2.2
	4	2,875	3,114	2,509	1,969	1,546	868	318	264	18	13,481	2.1
	5	4,233	4,590	3,143	2,104	1,432	765	339	347	20	16,973	1.9
	Not stated	15	21	21	16	14	5	2	0	0	94	2.2
Total		13,192	13,049	10,456	8,332	6,353	3,615	1,285	1207	70	57,559	2.1

Table 5.3: Number of birth procedures, by mode of birth and postnatal length of stay (days), 2006

Postnatal length of stay (days)	Normal birth	Caesarean section	Breech birth	Assisted birth	Not stated	Total
<1	11,778	183	79	1,113	88	13,241
1	10,889	782	75	1,171	166	13,083
2	7,483	1,748	51	1,065	150	10,497
3	4,236	3,131	45	869	103	8,384
4	1,703	4,146	32	464	49	6,394
5	680	2,716	13	218	17	3,644
6	310	875	8	99	8	1,300
7–13	335	760	10	108	11	1,224
14 or more	20	47	0	2	1	70
Total	37,434	14,388	313	5,109	593	57,837
Average	1.4	3.9	1.8	2.0	2.0	2.1

As Table 5.3 shows, while the average length of stay for women after birth was 2.1 days, it was 1.4 days for those who had a normal birth and 3.9 days for those who had a caesarean section.

Table 5.4 shows that in 2006, Otago DHB had the highest average length of stay (2.6 days), while Waikato DHB had the lowest (1.6 days). Mothers who resided in Waikato and Canterbury DHBs were more likely to be discharged from hospital on the same day as giving birth (39.0 percent and 35.2 percent respectively) than in other DHB regions, whereas mothers in South Canterbury and Nelson Marlborough DHBs recorded a higher proportion of stays of between two and six days than the rest of the country (68.2 percent and 68.1 percent respectively).

Table 5.4: Percentage of mothers, by DHB region of mother's place of residence and postnatal length of stay (days), 2006

DHB region	Average postnatal length of stay (days)	Postnatal length of stay (days)					Total
		<1	1	2–6	7–13	14 or more	
Northland	1.9	456	572	951	47	4	2,030
Waitemata	2.3	1,016	1,577	4,379	146	8	7,126
Auckland	2.1	2,039	1,298	2,642	205	13	6,197
Counties Manukau	2.1	1,613	2,215	4,093	213	14	8,148
Waikato	1.6	1,891	863	2,016	78	2	4,850
Lakes	1.7	364	499	679	20	3	1,565
Bay of Plenty	2.1	465	771	1,417	56	5	2,714
Tairawhiti	2.1	116	215	345	19	2	697
Hawke's Bay	2.3	385	441	1,339	29	0	2,194
Taranaki	2.4	204	304	849	26	0	1,383
MidCentral	2.1	326	580	1,140	37	3	2,086
Whanganui	2.1	134	203	480	8	1	826
Capital & Coast	2.0	990	860	1,756	78	2	3,686
Hutt Valley	2.1	482	396	983	31	2	1,894
Wairarapa	2.4	46	132	325	13	0	516
Nelson Marlborough	2.4	115	341	1,011	16	1	1,484
West Coast	2.5	79	32	200	12	2	325
Canterbury	1.9	2,099	959	2,854	54	5	5,971
South Canterbury	2.4	55	118	392	10	0	575
Otago	2.6	167	397	1,216	69	2	1,851
Southland	2.5	147	272	960	40	1	1,420
Not stated	2.4	3	4	14	0	0	21
Total	2.1	13,192	13,049	30,041	1,207	70	57,559

5.1.4 Length of stay of babies in hospital of birth

In 2006, the average length of stay for liveborn infants was 3.0 days (Table 5.5), with a median stay of 2.0 days. Pre-term babies on average stayed in hospital longer than term babies. The average length of stay for pre-term and term babies was 14.3 days and 2.1 days respectively, and the median length of stay was 7.0 and 2.0 days respectively.

Table 5.5: Number of liveborn infants, by length of stay (days) and gestation, 2006

Length of stay (days)	Pre-term babies		Term babies		Total	
	Number	%	Number	%	Number	%
Average	14.3		2.1		3.0	
Less than 1	325	7.7	13,116	24.5	13,579	23.2
1	330	7.8	12,341	23.0	12,832	21.9
2	294	7.0	9897	18.5	10,312	17.6
3	265	6.3	7614	14.2	7958	13.6
4	269	6.4	5610	10.5	5909	10.1
5	244	5.8	2964	5.5	3242	5.5
6	203	4.8	923	1.7	1144	2.0
7–13	885	21.0	976	1.8	1902	3.2
14–20	501	11.9	104	0.2	623	1.1
21–27	322	7.6	37	0.1	368	0.6
28 or more	583	13.8	50	0.1	663	1.1
Total	4221	100.0	53,632	100.0	58,532	100.0

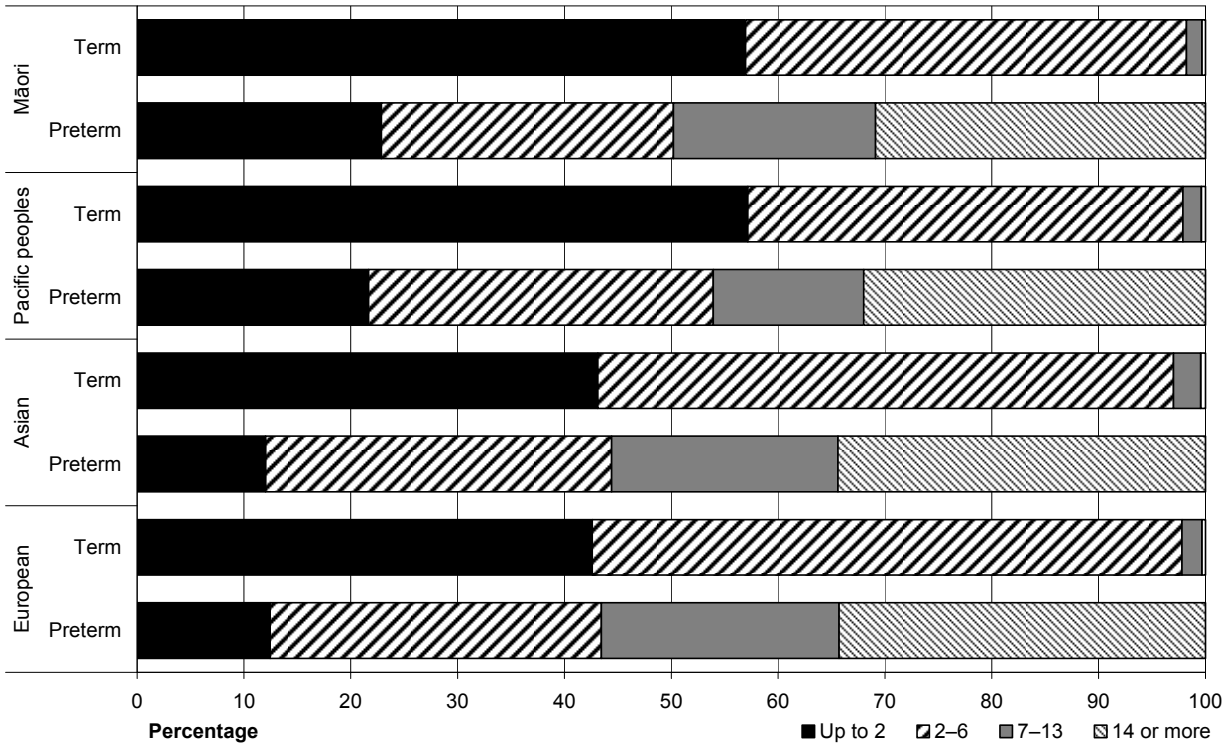
Table 5.6 shows that Asian babies were more likely to remain in hospital longer (on average 3.2 days) than Pacific babies (on average 2.6 days). Māori and Pacific babies were more likely to be discharged from hospital less than two days after birth (54.2 percent and 54.9 percent respectively), while European and Asian babies were more likely to be discharged between two and four days after birth (44.6 percent and 41.9 percent respectively).

Of babies born prematurely, Māori babies had the shortest average length of stay, while Asian babies had the longest (13.9 days and 15.6 days respectively). Figure 5.3 shows that pre-term Māori and Pacific babies were more likely to have a hospital stay of up to two days, while pre-term Asian babies were more likely to be in hospital for between two and six days (22.9 percent, 21.7 percent and 32.4 percent respectively).

Table 5.6: Number of liveborn infants, by length of stay (days) and ethnicity, 2006

Length of stay (days)	Ethnic group						Total
	Māori	Pacific peoples	Asian	European	Other	Not stated	
Average	2.7	2.6	3.2	3.1	3.0	3.6	3.0
Less than 1	3,376	1,467	1,141	7,065	389	141	13,579
1	3,584	1,866	911	6,071	264	136	12,832
2	2,408	1,040	813	5,755	183	113	10,312
3	1,420	658	655	4,951	184	90	7,958
4	787	439	636	3,791	193	63	5,909
5	355	202	389	2,163	98	35	3,242
6	167	104	134	684	42	13	1,144
7–13	366	152	193	1,097	67	27	1,902
14–20	137	50	51	359	18	8	623
21–27	59	25	34	234	8	8	368
28 or more	164	66	62	345	14	12	663
Total	12,823	6069	5019	32,515	1,460	646	58,532

Figure 5.3: Number of babies, by ethnicity, gestation and postnatal length of stay (days), 2006



Source: NMDS

5.2 Mode of separation from hospital

'Mode of separation', also known as discharge, describes the method by which a woman or liveborn infant ends the health care event, or separate with the facility. It may take into account destination after discharge or sign-out, transfer to another facility, or death. Information relating to the health care event is collated at the time of separation.

5.2.1 Mother's mode of separation

In 2006 the majority of mothers that gave birth in hospital were discharged home at the end of their birth event (84.3 percent). Nearly 16 percent transferred to another service or different facility: this usually occurs for the purpose of continuing the mother's postnatal care. Pacific and Māori mothers were more likely to be discharged home than those of other ethnicities (90.7 percent and 89.8 percent respectively), while European mothers were more likely to be transferred to another service or facility (18.3 percent) than mothers of other ethnicities. Section 6 within this publication contains information and analyses on maternal deaths reported in New Zealand for 2006.

Table 5.7: Number of mothers, by mode of separation and ethnicity, 2006

Mode of separation	Total		Ethnic group					
	Number	%	Māori	Pacific peoples	Asian	European	Other	Not stated
Discharge home	48,514	84.3	10,588	5,356	4,060	26,704	1,333	473
Transfer	8,919	15.5	1,141	526	834	5981	329	108
• to another facility	8,478	14.7	1,013	495	807	5732	324	107
• to a service within the same facility	441	0.8	128	31	27	249	5	1
Died	--	…	--	--	--	--	--	--
Other*	126	0.2	67	20	5	30	4	0
Total	57,559	100.0	11,796	5,902	4,899	32,715	1,666	581

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

-- Number not presented due to potential confidentiality issues.

5.2.2 Babies' mode of separation

In 2006, 84.1 percent of liveborn infants were discharged home at the end of the health care event (Table 5.8). A total of 15.6 percent of babies were transferred to another service or facility.

Babies dying in hospital accounted for 0.3 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.[11]

[11] http://www.moh.govt.nz/moh.nsf/indexmh/dataandstatistics-subjects-fetalinfant

Table 5.8: Number of babies, by mode of separation, 2006

Mode of separation	Total∞		Born in hospital	Admitted to hospital following birth
	Number	%		
Discharge home	49,247	84.1	48,884	359
Transfer	9104	15.6	9051	52
• to another facility	8574	14.6	8531	43
• to a specialist facility	344	0.6	336	7
• to a service within same facility	186	0.3	184	2
Fetal or neonatal death	160	0.3	157	3
Other	21	0.0	21	0
Total	58,532	100.0	58,113	414

∞ 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 to hospital within 42 days (six weeks) of a hospital birth. Some mothers were readmitted several times within this period; thereby each readmission is included in these analyses.

A postnatal readmission is defined as the readmission to hospital of a liveborn infant within the first three months following their discharge from the hospital in which they were born. Transfers between facilities, short-stay emergency department events and boarders[12] are excluded from this analysis.

Regional rates of readmissions of mothers and babies in 2006 for any diagnosis are presented in Table 5.9. West Coast and Tairawhiti DHBs had the highest rates of maternal readmissions for any diagnosis (137.6 and 124.3 readmissions per 1000 deliveries respectively), while Nelson Marlborough, Otago and Whanganui DHBs had the lowest (38.2, 39.9 and 39.9 readmissions per 1000 deliveries respectively). There was wide variation in readmission rates between DHBs. This variation may reflect several different practices (for example, admission criteria or coding practices) between DHBs: further investigation is required.

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

Table 5.9: Number and rate of hospital readmission† for mothers and babies, by DHB region of mother's and baby's place of residence, 2006

DHB region	Mother		Baby			
	Number	Rate*	First╚	Rate‡	All╝	Rate‡
Northland	158	77.5	161	78.3	238	115.8
Waitemata	390	54.5	536	74.3	618	85.7
Auckland	407	65.4	407	64.5	473	74.9
Counties Manukau	587	71.8	807	98.2	961	117.0
Waikato	379	77.8	275	56.2	343	70.1
Lakes	130	82.6	160	100.1	204	127.6
Bay of Plenty	174	63.8	286	103.7	370	134.2
Tairawhiti	87	124.3	84	118.0	107	150.3
Hawke's Bay	131	59.2	153	69.9	188	85.9
Taranaki	129	92.9	80	56.9	92	65.5
MidCentral	110	52.6	174	80.1	203	93.4
Whanganui	33	39.9	77	91.0	100	118.2
Capital & Coast	271	73.3	341	88.9	390	101.7
Hutt Valley	84	44.2	247	128.3	347	180.3
Wairarapa	26	50.2	52	98.7	60	113.9
Nelson Marlborough	57	38.2	84	55.4	103	67.9
West Coast	45	137.6	15	45.5	18	54.5
Canterbury	585	97.0	334	54.6	405	66.2
South Canterbury	28	48.6	48	83.3	58	100.7
Otago	74	39.9	135	71.6	161	85.4
Southland	78	54.9	122	85.6	148	103.8
Not stated	1	45.5	4	210.5	4	210.5
Total	3964	68.5	4582	78.3	5591	95.5

* Readmission rate per 1000 hospital deliveries.

† Readmission within 92 days after discharge from hospital of birth.

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

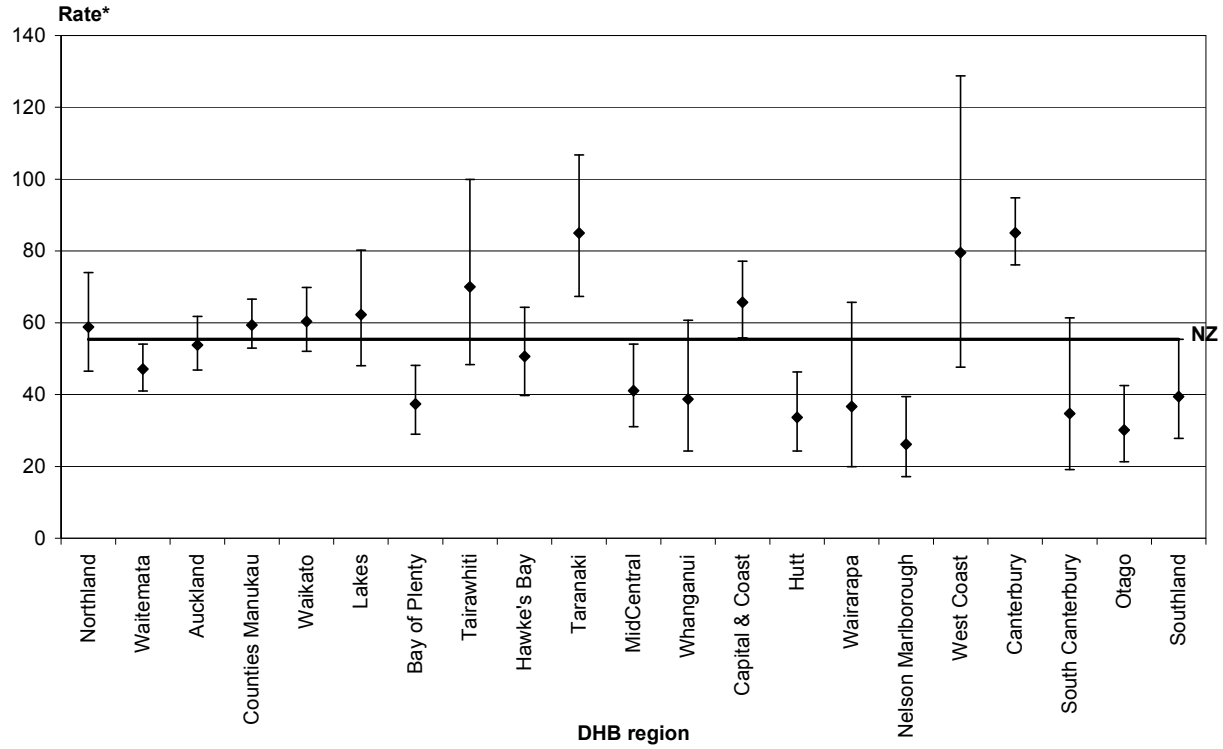
╝ First and subsequent readmissions.

‡ Readmission rate per 1000 live births.

5.3.1 Maternal readmission for postpartum and post-abortion care

In 2006, there were 3964 maternal readmissions to hospital. Of these 3206 were for postpartum and post-abortion diagnoses (DRGs O04Z and O61Z). Figure 5.4 presents rates of readmission specifically for postpartum and post-abortion diagnoses, and indicates that Canterbury and Taranaki DHBs had the highest readmission rates (both recorded 85.0 readmissions per 1000 deliveries), while Nelson Marlborough and Otago DHBs had the lowest (26.2 and 30.2 readmissions per 1000 deliveries 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, 2006



* Rate per 1000 hospital deliveries.

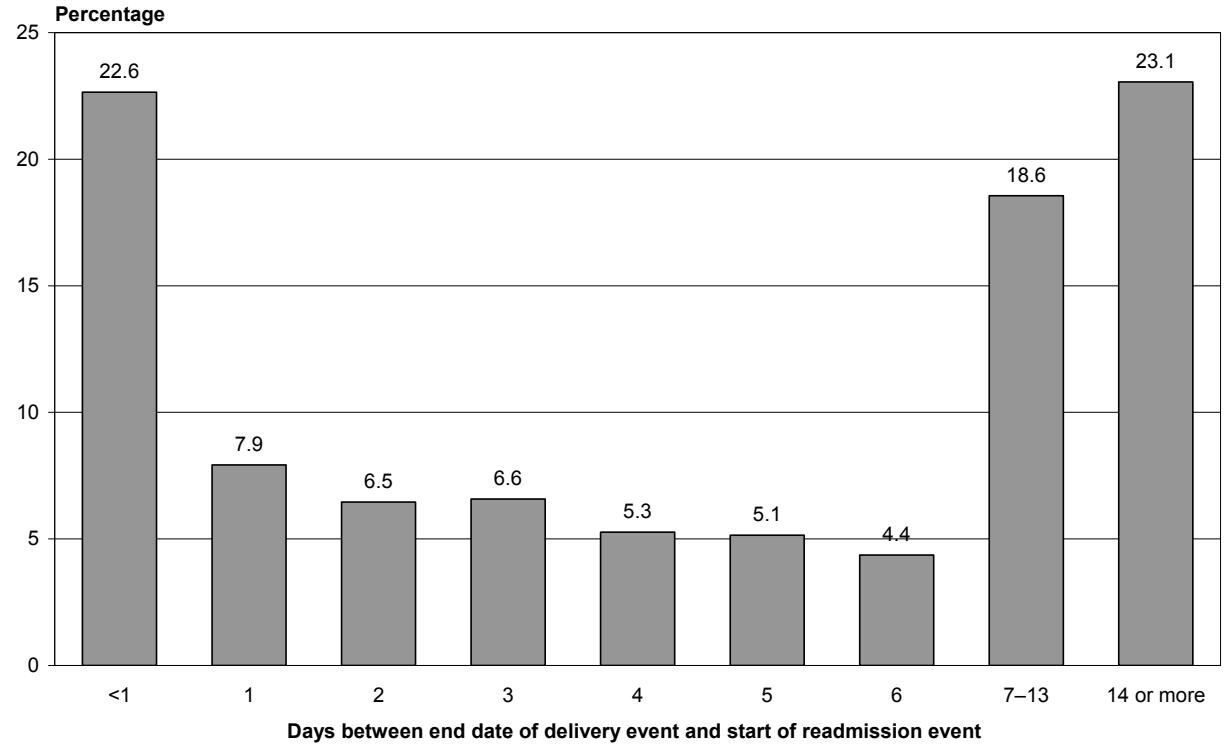
Source: NMDS

The majority of these mothers were readmitted for 'postpartum care and examination' and 'infection of breast associated with childbirth' (29.6 percent and 13.8 percent respectively; see Table 5.10). Mothers who were treated for puerperal sepsis and postpartum haemorrhage accounted for approximately 20 percent of readmissions (10.0 percent and 9.5 percent respectively). The average length of stay for mothers readmitted to hospital with a postpartum or post-abortion diagnosis was 2.3 days.

Table 5.10: Postnatal readmissions for mothers with problems relating to pregnancy, by principal diagnosis (DRGs O04Z and O61Z), 2006

Principal diagnosis	Readmissions		Average length of stay (days)	Rate per 1000 hospital deliveries
	Number	%		
Postpartum care and examination	949	29.6	2.8	16.4
Infections of breast associated with childbirth	444	13.8	2.3	7.7
Other puerperal infections	400	12.5	2.7	6.9
Puerperal sepsis	319	10.0	2.2	5.5
Postpartum haemorrhage	306	9.5	1.4	5.3
Other maternal diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium	267	8.3	1.7	4.6
Complications of the puerperium, not elsewhere classified	117	3.6	1.9	2.0
Other disorders of breast and lactation associated with childbirth	58	1.8	2.1	1.0
Gestational (pregnancy-induced) hypertension without significant proteinuria	55	1.7	1.6	1.0
Venous complications in the puerperium	48	1.5	2.4	0.8
Gestational (pregnancy-induced) hypertension with significant proteinuria	38	1.2	2.6	0.7
Retained placenta and membranes, without haemorrhage	35	1.1	1.4	0.6
Complications of anaesthesia during the puerperium	29	0.9	0.9	0.5
Unspecified maternal hypertension	19	0.6	1.6	0.3
Mental and behavioural disorders associated with the puerperium, not elsewhere classified	16	0.5	10.4	0.3
Perineal laceration during delivery	16	0.5	1.7	0.3
Other obstetric trauma	14	0.4	1.9	0.2
Maternal infectious and parasitic diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium	13	0.4	2.4	0.2
Pre-existing hypertensive disorder with superimposed proteinuria	8	0.2	0.9	0.1
Pre-existing hypertension complicating pregnancy, childbirth and the puerperium	7	0.2	1.7	0.1
Diabetes mellitus in pregnancy	6	0.2	2.8	0.1
Obstetric embolism	6	0.2	4.0	0.1
Eclampsia	5	0.2	4.6	0.1
Other complications of labour and delivery, not elsewhere classified	5	0.2	3.8	0.1
Venous complications in pregnancy	5	0.2	2.0	0.1
Maternal care for other conditions predominantly related to pregnancy	4	0.1	1.5	0.1
Maternal care for known or suspected abnormality of pelvic organs	4	0.1	4.8	0.1
Complications following abortion and ectopic and molar pregnancy	3	0.1	1.0	0.1
Other	10	0.3	1.8	0.2
Total	3206	100.0	2.3	55.4

Figure 5.5: Percentage of mothers, by length of time between delivery and readmission (days) for selected DRGs (DRGs O04Z and O61Z), 2006



Source: NMDS

Figure 5.5 illustrates that the highest proportion of mothers were readmitted at least 14 days after discharge from hospital following birth (23.1 percent), while 18.6 percent of mothers were readmitted within 7 to 13 days after birth. Approximately 23 percent of mothers were readmitted to hospital on the same day they were discharged: this requires further investigation.

Of mothers readmitted to hospital, 25.9 percent of Asian mothers, the largest proportion, were readmitted between 7 and 13 days following the birth, while the largest proportion of Pacific mothers (20.1 percent) were readmitted after 14 or more days. As Table 5.11 shows, mothers aged between 25 and 34 years or mothers residing in the least deprived areas (quintiles 1 and 2) were more likely to be readmitted after 14 or more days.

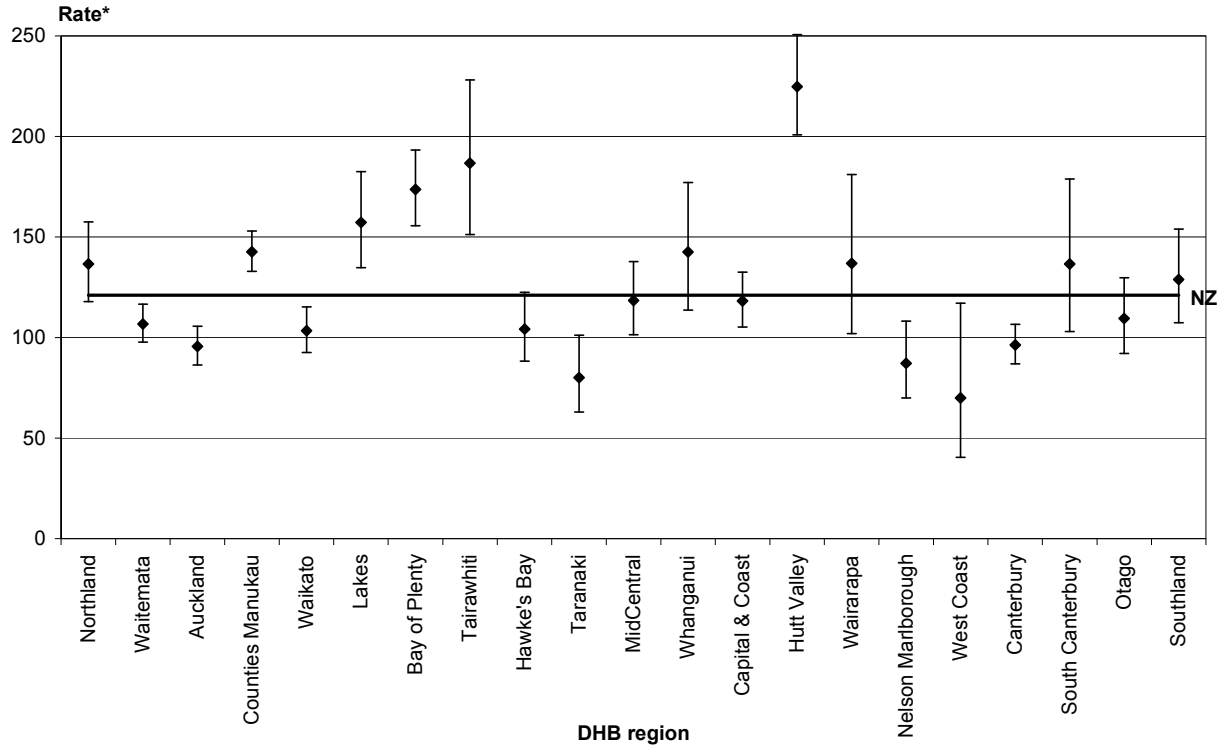
Table 5.11: Length of time in days between mother's delivery and readmission for selected DRGs (DRGs O04Z and O61Z), by maternal ethnicity, age group and deprivation quintile of mother's place of residence, 2006

		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	1	2	1	0	1	1	0	1	1	8	0.2
	16–19	60	23	23	16	7	9	10	56	57	261	8.1
	20–24	138	56	39	37	47	39	20	87	126	589	18.4
	25–29	157	57	54	50	36	36	44	144	177	755	23.5
	30–34	206	63	54	54	43	45	36	165	214	880	27.4
	35–39	137	42	33	42	31	28	24	116	131	584	18.2
	40 and over	27	11	3	12	4	7	6	26	33	129	4.0
	Not stated	0	0	0	0	0	0	0	0	0	0	0.0
Ethnic group	Māori	170	58	52	49	44	30	27	116	149	695	21.7
	Pacific peoples	54	48	34	36	28	26	22	54	76	378	11.8
	Asian	26	17	27	15	15	15	12	64	56	247	7.7
	European	456	122	83	104	75	88	72	330	427	1757	54.8
	Other	13	7	8	5	5	6	4	27	24	99	3.1
	Not stated	7	2	3	2	2	0	3	4	7	30	0.9
NZ quintile	1	95	20	22	28	21	22	14	88	118	428	13.3
	2	120	29	25	36	21	18	26	101	125	501	15.6
	3	116	47	38	28	35	32	19	102	134	551	17.2
	4	148	63	48	56	32	35	31	142	170	725	22.6
	5	244	94	74	63	59	58	50	162	190	994	31.0
	Not stated	7	2	3	2	2	0	3	4	7	30	0.9
Total		726	254	207	211	169	165	140	595	739	3206	
Percentage		22.6	7.9	6.5	6.6	5.3	5.1	4.4	18.6	23.1		100.0

5.3.2 Readmission of babies

Of the 58,532 liveborn infants born in 2006, 58,113 were born in hospital, and of these 5591 (9.6 percent) required readmission to hospital (see Table 5.9). Figure 5.6 illustrates the readmission rates for babies born in hospital by DHB compared with the national readmission rate of 121.1 readmissions per 1000 hospital-born live babies. Hutt Valley and Tairawhiti DHBs had the highest readmission rates of all the DHBs (224.8 and 186.7 per 1000 hospital-born live babies respectively), while West Coast and Taranaki DHBs had the lowest (69.9 and 80.1 per 1000 hospital-born live 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, 2006



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

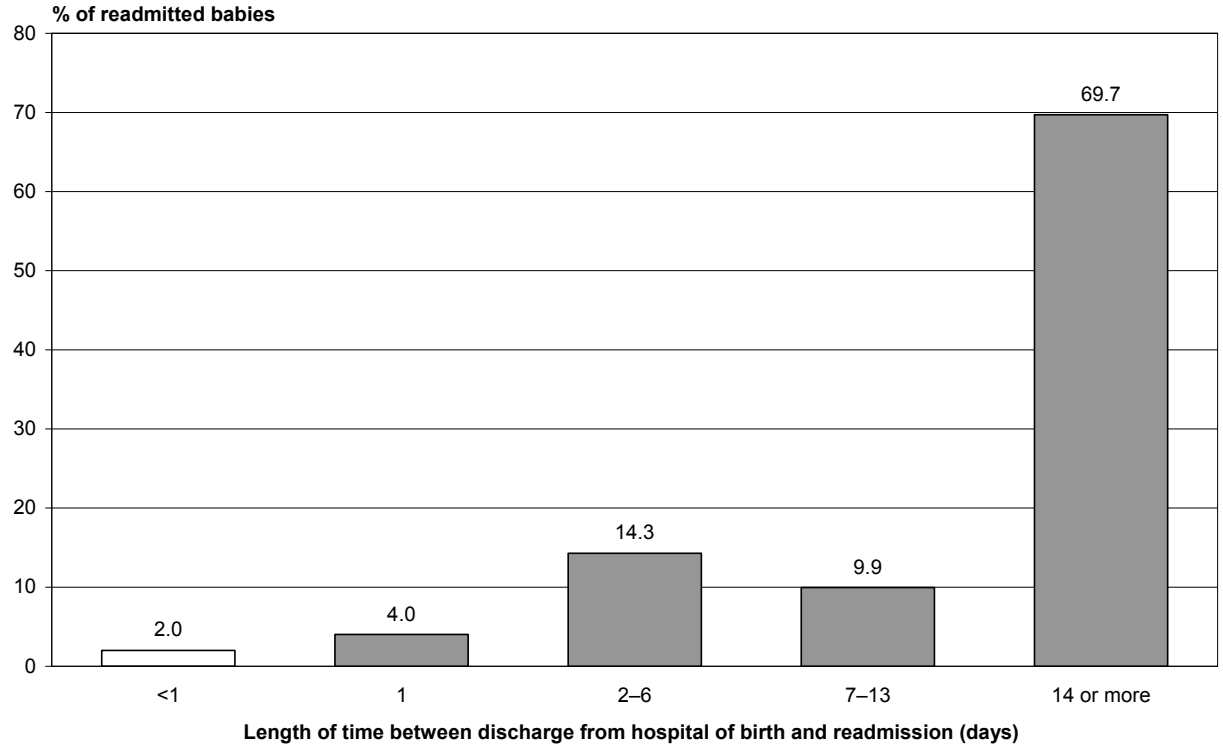
Source: NMDS

As Table 5.12 shows, 15.5 percent of hospital-born babies were readmitted to hospital for acute bronchiolitis, staying an average of 3.2 days. Babies readmitted for neonatal jaundice from other and unspecified causes accounted for 10.1 percent and stayed in hospital on average 2.2 days. Eight percent of babies were readmitted for feeding related problems, while reflux (gastro-oesophageal reflux disease) accounted for 3.1 percent of readmissions.

Table 5.12: Postnatal readmission of babies, by top 10 principal diagnoses, 2006

Principal diagnosis	All readmissions		Average length of stay (days)	Rate per 1000 live births
	Number	%		
Acute bronchiolitis	865	15.5	3.2	14.8
Neonatal jaundice from other and unspecified causes	567	10.1	2.2	9.7
Acute upper respiratory infections of multiple and unspecified sites	323	5.8	1.2	5.5
Feeding problems of newborn	285	5.1	2.2	4.9
Viral infection of unspecified site	208	3.7	1.8	3.6
Inguinal hernia	195	3.5	1.0	3.3
Gastro-oesophageal reflux disease	173	3.1	1.2	3.0
Symptoms and signs concerning food and fluid intake	164	2.9	2.9	2.8
Abnormalities of breathing	130	2.3	1.7	2.2
Other respiratory conditions originating in the perinatal period	122	2.2	2.3	2.1
Other	2559	45.8	2.3	43.7
Total	5591	100.0	2.3	95.5

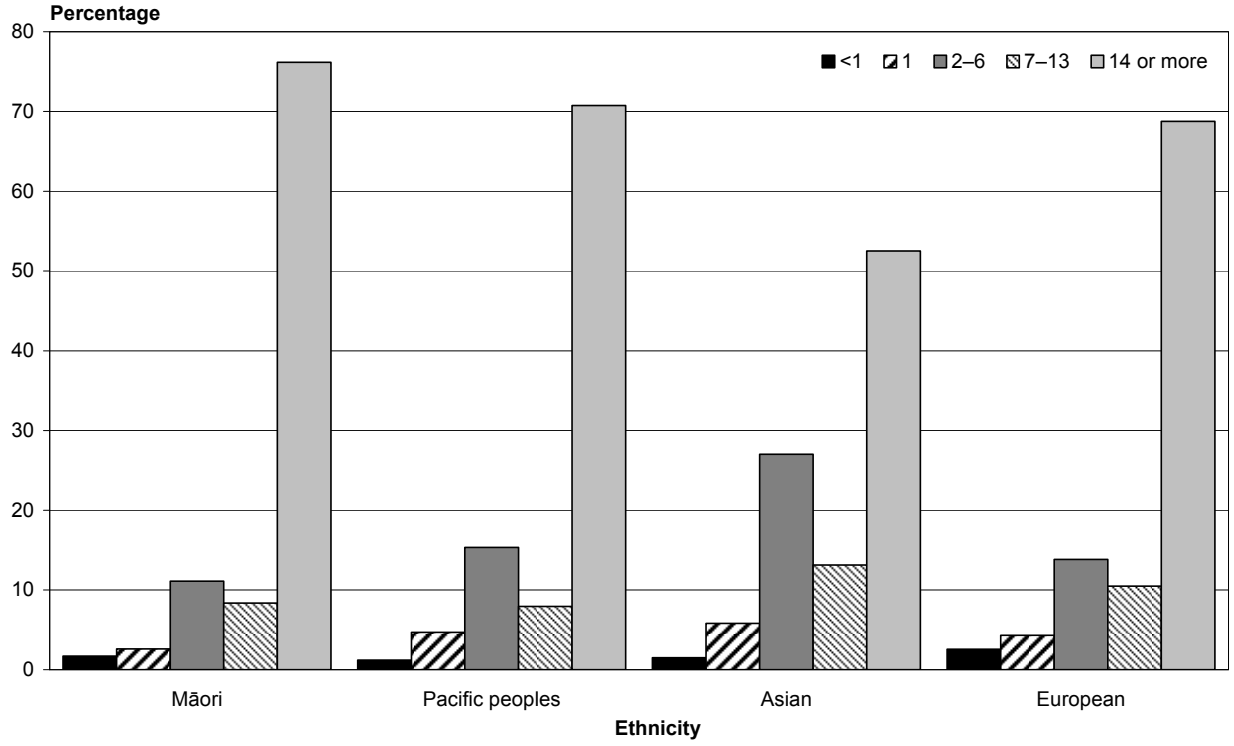
Figure 5.7: Percentage of readmitted babies, by length of time between discharge from hospital of birth and readmission (days), 2006



Source: NMDS

Figure 5.7 shows that the majority of hospital-born babies were readmitted to hospital at least 14 days after they were discharged home (69.7 percent), while 14.3 percent required readmission between two and six days following discharge. Twenty-seven percent of Asian babies required readmission between two and six days following discharge, compared with only 11.1 percent of Māori babies (Figure 5.8). Approximately 2 percent of hospital-born babies were readmitted to hospital on the same day they were discharged: this requires further investigation.

Figure 5.8: Percentage of readmitted babies, by ethnicity and length of time between discharge from hospital of birth and readmission (days), 2006



Source: NMDS

6 Maternal Deaths

Table 6.1 presents the number and rate of maternal deaths from 1996 to 2006 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.

For statistical purposes, 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 previous existing disease or disease that developed during pregnancy and which were not due to direct obstetric causes, but which were aggravated by the physiologic effects of pregnancy.

These definitions exclude maternal deaths occurring after the 42-day reference period.

Data integrity

Because of the relatively small number of maternal deaths each year in New Zealand, the maternal death rate fluctuates markedly from year to year. Therefore, caution should be used when making international comparisons of maternal death rates, especially as some countries may use definitions other than the WHO definition.

Table 6.1: Maternal deaths, 1996–2006

Year	Direct		Indirect		Total		Live births
	Number	Rate*	Number	Rate*	Number	Rate*	
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†
1999	3	5.2	1	1.7	4	7.0	57,421
2000	2‡	1.8§	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

Data source: Ministry of Health Mortality Collection

* Rate per 100,000 live births.

† 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.

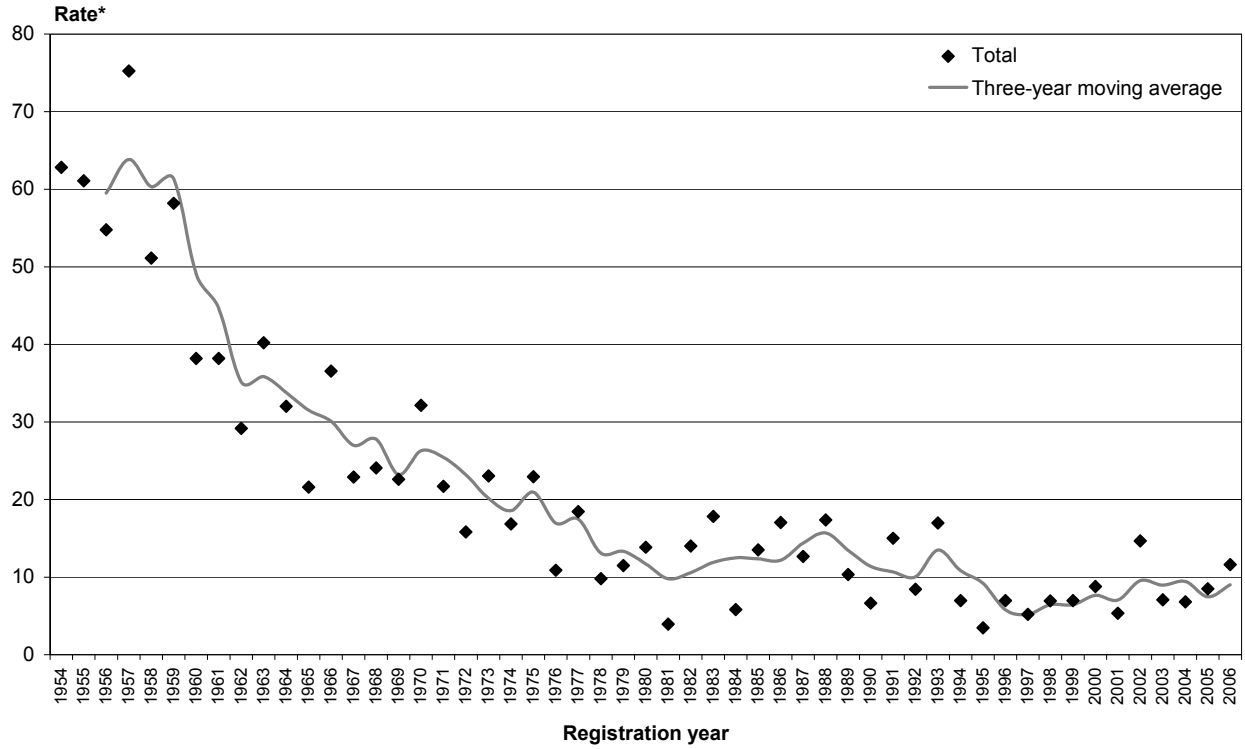
‡ One direct maternal death occurred in 1932 but was not registered until 2000.

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

Figure 6.1 shows the change from 1954 to 2006 using a three-year moving average for maternal deaths. In 1954, the maternal death rate was reported to be 62.8 maternal deaths per 100,000 live births (34 maternal deaths).

The maternal death rate decreased markedly until the late 1970s, after which the decrease was gradual until 1995, when the maternal death rate 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 8.1 maternal deaths per 100,000 live births. However, caution should be exercised when interpreting the moving average due to the high volatility of the relatively small numbers of maternal deaths each year in New Zealand.

Figure 6.1: Rates of maternal deaths, three-year moving average, 1954–2006



* Rate per 100,000 live births.

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

Source: Ministry of Health Mortality Collection

Table 6.2 presents the underlying cause of maternal deaths for the last five years. Of the 28 maternal deaths that occurred during 2002–2006, half were the result of direct obstetric complications (53.6 percent). Of the 15 women whose death had a direct maternal cause, 8 died due to an obstetric embolism. Nine women (69.2 percent of indirect maternal deaths) died from a circulatory system disease.

Table 6.2: Maternal deaths, by underlying cause, 2002–2006

Underlying cause of maternal death	2002–2006
Direct	**15**
Ectopic pregnancy	2
Unspecified abortion	0
Excessive vomiting in pregnancy	1
Venous complications in pregnancy	1
Puerperal sepsis	1
Venous complications in the puerperium	1
Obstetric embolism	8
Complications of the puerperium	1
Indirect	**13**
Maternal infectious and parasitic diseases complicating pregnancy, childbirth and the puerperium*	2
Other maternal diseases complicating pregnancy, childbirth and the puerperium:	11
• Anaemia complicating pregnancy, childbirth and the puerperium	1
• Endocrine, nutritional and metabolic diseases complicating pregnancy, childbirth and the puerperium	1
• Diseases of the circulatory system complicating pregnancy, childbirth and the puerperium	9
Total	28

Source: Ministry of Health Mortality Collection

* Tuberculosis complicating pregnancy, childbirth and the puerperium.

7 Maternity Facilities

The summary information presented in this section is by type of maternity facility, and has been collated from data reported by individual facilities to the NMDS. Detailed tables by individual facility are outlined in Appendix H.5.

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. Primary facilities also include birthing units (see the Glossary).

Table 7.1: Total live and stillbirths delivered in hospital, by facility type, 2006

Facility type	Number of mothers	Live births		Stillbirths	
		Number	%	Number	Rate per 1000 total births
Tertiary	24,455	24,180	42.4	251	10.3
Secondary	24,044	23,835	41.8	146	6.1
Primary	9,058	9,038	15.8	10	1.1
Total	57,559	57,055	100.0	407	7.1

In 2006, 42.4 percent of all live births occurred in one of the six large tertiary facilities. The largest maternity unit is Auckland City Hospital (previously called National Women's), where almost a third of all tertiary facility births took place. Nearly 16 percent of live births occurred in primary facilities (15.8 percent), while 41.8 percent occurred in secondary facilities.

The majority of stillbirths occurred in tertiary or secondary facilities (61.7 percent and 35.9 percent respectively), while only ten stillbirths occurred in primary facilities. This is to be expected, because high-risk births should be referred to secondary or tertiary facilities.

Figure 7.1: Percentage of mothers giving birth in primary, secondary and tertiary facilities, by ethnicity, 2006

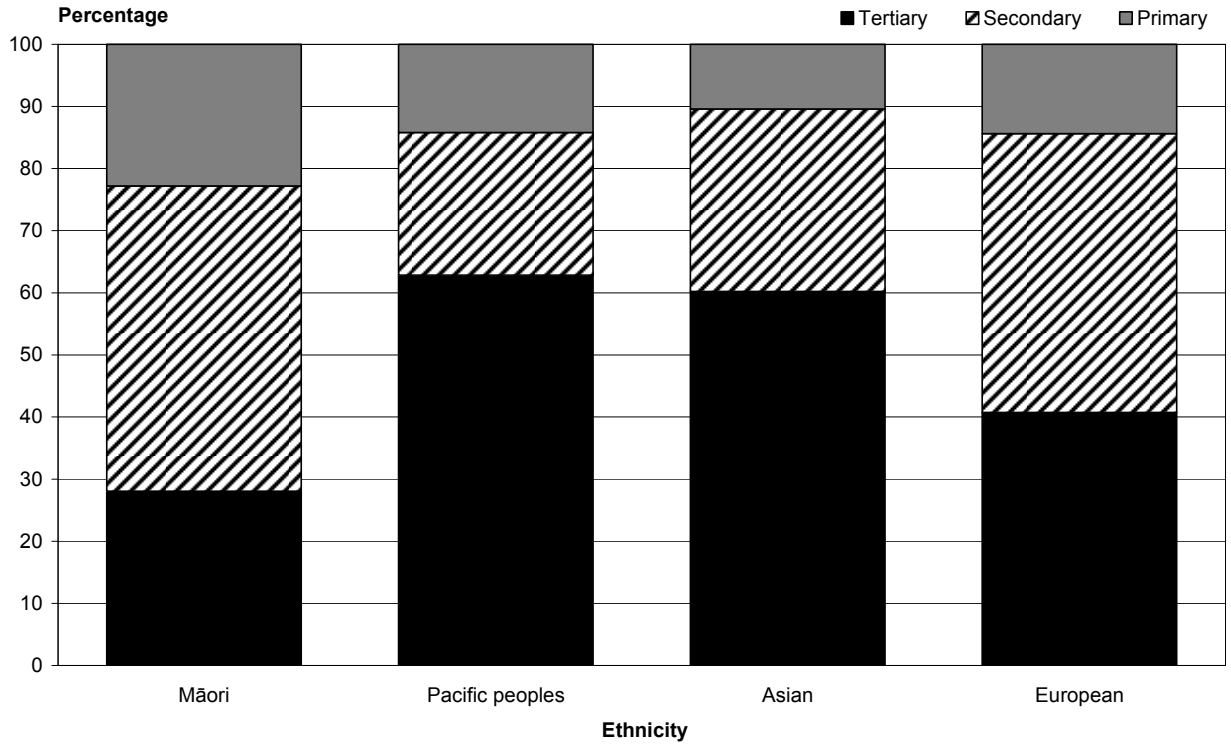


Figure 7.1 shows that, of mothers who gave birth in hospital in 2006, Pacific and Asian mothers were more likely than those of other ethnicities to give birth in a tertiary facility (62.9 percent and 60.2 percent respectively). This may be because the DHB region in which the majority of Pacific and Asian mothers resided had fewer primary units per capita than other regions. In comparison, 49.1 percent of Māori mothers used secondary facilities, while European mothers used secondary and tertiary facilities to a similar extent (44.9 percent and 40.7 percent respectively). Tables 7.2–7.4 present the number of antenatal admissions, types of births and birth interventions required in 2006.

Table 7.2: Antenatal hospital admissions and average length of stay, by facility type, 2006

Facility type	Number	Percentage	Average length of stay (days)
Tertiary	9,343	57.2	1.4
Secondary	5,793	35.5	1.3
Primary	1,193	7.3	0.3
Total	16,340	100.0	1.3

Table 7.3: Type of hospital birth (rate per 100 deliveries), by facility type, 2006

Type of hospital birth		Facility type			
		Tertiary	Secondary	Primary	Total
Normal birth		57.4	64.2	85.9	64.7
Caesarean section	Total	29.6	25.7	9.8	24.9
	Emergency	18.3	14.9	3.7	14.6
	Elective	11.3	10.8	6.1	10.3
Breech delivery	Total	0.7	0.5	0.2	0.5
	Spontaneous breech birth	0.4	0.2	0.1	0.3
	Assisted breech birth	0.4	0.2	0.1	0.2
	Assisted breech birth with forceps	0.0	0.0	0.0	0.0
Assisted delivery	Total	11.8	7.9	3.3	8.8
	Forceps only	4.3	2.6	0.7	3.0
	Vacuum extraction only	7.4	5.2	2.6	5.7
	Forceps and vacuum extraction	0.1	0.1	0.0	0.1
Not stated		0.4	1.7	0.7	1.0
Total		100.0	100.0	100.0	100.0

Table 7.4: Number and rate of inductions, epidurals and episiotomies, by facility type, 2006

Facility type	Number			Rate		
	Induction	Epidural	Episiotomy	Induction*	Epidural*	Episiotomy†
Tertiary	5,245	8,602	3,042	24.0	39.4	17.5
Secondary	4,561	5,622	1,985	21.2	26.1	11.1
Primary	481	716	362	5.6	8.4	4.4
Total	10,287	14,940	5,389	19.8	28.8	12.4

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

† Rate per 100 vaginal deliveries.

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. That is, it is a measure of the cumulative effect of a patient's complications and co-morbidities, and is calculated for each episode. The calculation is complex, and has been designed to prevent similar conditions from being counted more than once.

PCCLs are classified into categories that are defined by the severity of co-morbid or complicating conditions affecting diagnoses. Categories range from 'PCCL 0' to 'PCCL 4'. 'PCCL 0' indicates no complicating diagnoses or co-morbidities. However, some Diagnosis Related Groups (DRGs) do not have a severity split, and thereby are reported under 'PCCL 0'.

In 2006, the majority of women had few or no co-morbid or complicating conditions at the time of birth (70.2 percent), while 2.4 percent of women had a severe or catastrophic level. Table 7.5 shows that the average length of hospital stay increased with the level of complexity. Appendix H.5 presents PCCLs for each facility.

Table 7.5: Number and percentage of mothers and average length of stay, by PCCL and facility type, 2006

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	24,455	62.2	0.0	20.3	13.8	3.8	1.6	6.4	3.2	4.7	8.9
Secondary	24,044	71.0	0.0	17.2	10.0	1.7	2.1	3.0	3.3	4.2	7.2
Primary	9058	89.3	0.0	6.7	3.5	0.4	2.2	4.0	3.4	4.3	7.0
Total	57,559	70.2	0.0	16.9	10.6	2.4	1.9	5.6	3.2	4.5	8.3

As Table 7.6 shows, babies of 37–41 weeks' gestation were more likely to be born in secondary or tertiary facilities. Babies of less than 37 weeks' gestation tended to be born in tertiary facilities, while babies born at 42 and over weeks' gestation tended to be born in secondary or tertiary facilities (Table 7.6).

Table 7.6: Numbers of live babies born, by gestational age and facility type, 2006

Facility type	Gestational age (weeks)						Total
	Less than 28	28–31	32–36	37–41	42 and over	Not stated	
Tertiary	207	349	1,865	21,727	666	155	24,969
Secondary	39	92	1,433	21,831	665	320	24,380
Primary	10	27	199	8,508	234	204	9,182
Total	256	468	3,497	52,067	1,565	679	58,532

Appendix A: Diagnosis Related Group (DRG)

The Australian Refined Diagnosis Related Groups (AR-DRG) make up 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 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 of 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 in 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 do not describe postpartum or post-abortion 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 the is for antenatal and other obstetric admission, go to 11A.

    11A If mode of separation had an overnight stay assign 066A (if this is not the case, go to 11B).

    11B If the mode of separation did not have an overnight stay then 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).

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	Samoan
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

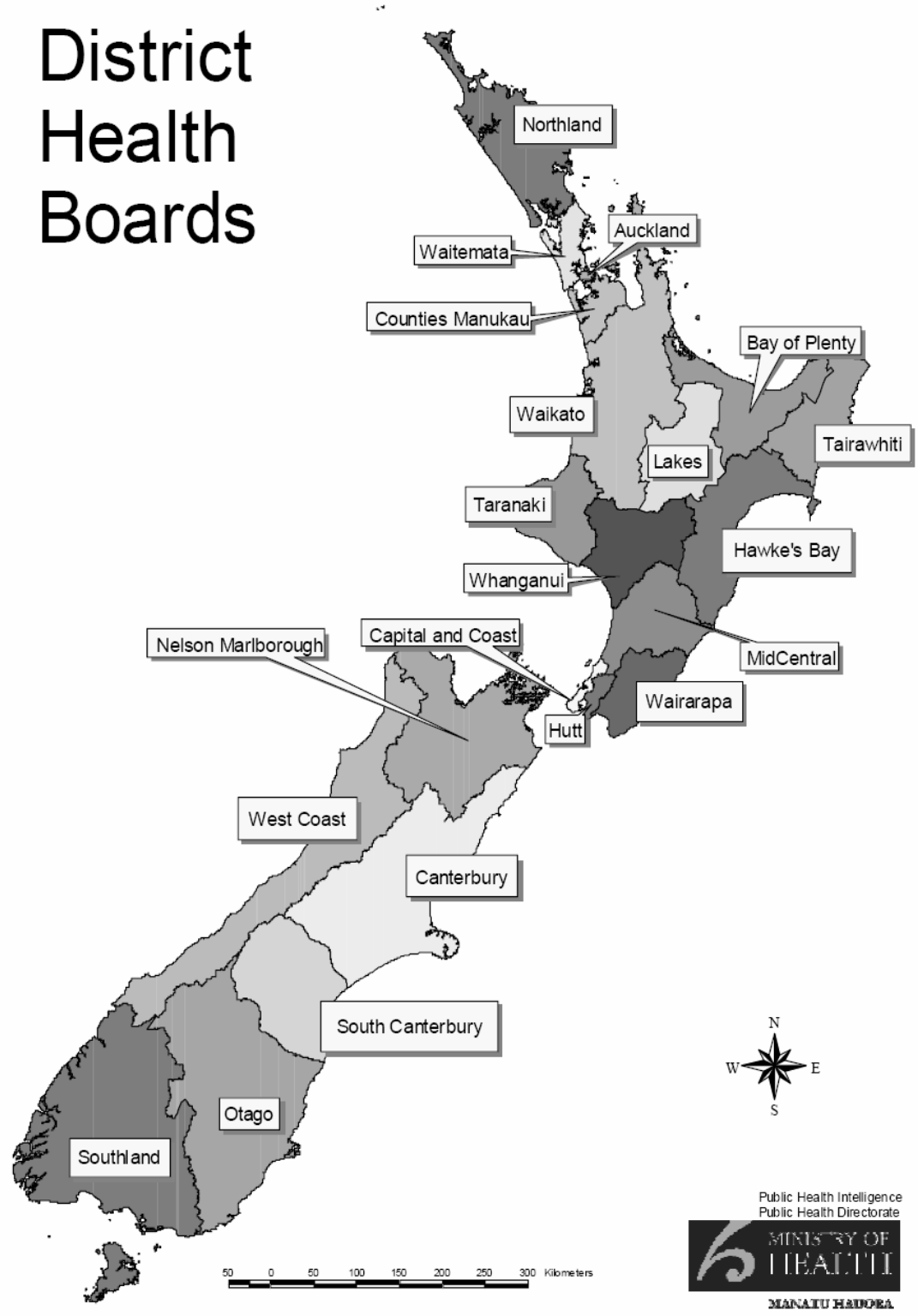
51 – Middle Eastern

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



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
Tairawhiti		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) Fielding 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[13] is to control for potential confounding by outside factors, like 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.

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:

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

[13] Ministry of Health 2004.

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).

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

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

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

$Population_{National}$ being 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.

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 (PHC, Ministry of Health 1995).

Further information on age-specific and age-standardised rates can be found in the Ministry of Health and Public Health Commission document *Standardising Rates of Disease*.

Appendix F: Population Data

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 (2006 base) by ethnicity and age group for New Zealand

Age group (years)	Female population			Total
	Māori	Pacific peoples	Other	
0–4	35,600	13,765	90,425	139,790
5–9	34,910	13,595	94,130	142,635
10–14	34,320	13,290	103,305	150,915
15–19	33,080	12,910	108,195	154,185
20–24	25,890	10,910	108,545	145,345
25–29	22,960	10,175	100,455	133,590
30–34	23,040	9815	116,840	149,695
35–39	22,590	9905	130,915	163,410
40–44	21,360	8810	136,360	166,530
45–49	18,600	7080	130,395	156,075
50–54	13,930	5520	114,265	133,715
55–59	10,860	4365	107,705	122,930
60–64	7370	3240	84,140	94,750
65–69	5930	2575	71,395	79,900
70–74	3780	1740	57,290	62,810
75–79	2400	1095	52,560	56,055
80–84	1230	635	42,140	44,005
85 and over	670	380	38,880	39,930
Total	318,520	129,805	1,687,940	2,136,265

Data source: Statistics New Zealand (customised extract)

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

World Health Organization (WHO) standard population

Table F.2: WHO world population weight

Age group (years)	Population
0–4	8,860
5–9	8,690
10–14	8,600
15–19	8,470
20–24	8,220
25–29	7,930
30–34	7,610
35–39	7,150
40–44	6,590
45–49	6,040
50–54	5,370
55–59	4,550
60–64	3,720
65–69	2,960
70–74	2,210
75–79	1,520
80–84	910
85+	635
Total	100,035

Source: WHO 2001

Appendix G: The New Zealand Index of Deprivation

The New Zealand Index of Deprivation (NZDep) is an index of neighbourhood deprivation generated from data from the 2006 Census of Population and Dwellings. The index combines nine socioeconomic variables from the census, reflecting eight domains of material and economic deprivation (Table G.1; Salmond, Crampton and Atkinson 2007a, 2007b). The index scores are grouped into 10 deciles, with each decile representing an equal or similar proportion of the New Zealand population.

Variables included in the construction of the NZDep have been shown through international literature to be associated with mortality, morbidity and other socioeconomic disadvantages. On the whole, neighbourhoods in high NZDep deciles are more deprived and likely to demonstrate greater need for health services compared with areas in low NZDep deciles.

Table G.1: Nine socioeconomic variables in the NZDep

Dimension of deprivation	Variable description (in order of decreasing weight)
Income	People aged 18-64 receiving a means tested benefit
Income	People living in equivalised* households with income below an income threshold
Owned home	People not living in own home
Support	People aged <65 living in a single-parent family
Employment	People aged 18–64 unemployed
Qualifications	People aged 18–64 without any qualifications
Living space	People living in equivalised* households below a bedroom occupancy threshold
Communication	People with no access to a telephone
Transport	People with no access to a car

Source: Salmond, Crampton and Atkinson 2007b

* Equivalisation: methods used to control for household composition.

Appendix H: Additional Tables and Figures

H.1 Mothers demographics

This table relates to the deprivation section within Chapter 2: Mother and Pregnancy.

Table H1.1: Number of women giving birth, by deprivation quintile and DHB region of mother's place of residence, 2006

DHB region	NZDep quintile						Total
	1	2	3	4	5	Not stated	
Northland	48	173	295	539	975	0	2,030
Waitemata	1,639	1,295	1,460	2,162	549	21	7,126
Auckland	795	1,254	1,292	1,362	1,494	0	6,197
Counties Manukau	956	497	1,048	697	4,906	44	8,148
Waikato	400	610	938	1,275	1,627	0	4,850
Lakes	136	125	209	309	786	0	1,565
Bay of Plenty	85	462	474	885	807	1	2,714
Tairawhiti	20	37	53	5	582	0	697
Hawke's Bay	153	320	190	598	933	0	2,194
Taranaki	73	125	340	624	221	0	1,383
MidCentral	158	294	428	521	685	0	2,086
Whanganui	44	95	69	267	350	1	826
Capital & Coast	1,183	640	845	171	844	3	3,686
Hutt Valley	341	109	277	675	492	0	1,894
Wairarapa	35	71	76	212	122	0	516
Nelson Marlborough	143	450	339	451	101	0	1,484
West Coast	30	31	66	105	93	0	325
Canterbury	1,313	1,160	1,002	1,547	949	0	5,971
South Canterbury	48	83	180	209	54	1	575
Otago	343	364	421	592	129	2	1,851
Southland	287	317	267	275	274	0	1,420
Not stated	0	0	0	0	0	21	21
Total	8,230	8,512	10,269	13,481	16,973	94	57,559

Source: NMDS

H.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 H2.1 because only the principal diagnosis is presented for each admission.

Table H2.1: Antenatal hospital admissions (excluding transfers) and average length of stay for mothers, by principal diagnosis (DRGs O66A and O66B), 2006

Principal diagnosis	Antenatal admission		Average length of stay (days)	Antenatal admission – same day	
	Number	%		Number	%
Other obstetric conditions, not elsewhere classified	**2,259**	**26.5**	**2.1**	**1611**	**29.1**
Maternal infectious and parasitic diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium	107	1.3	2.1	47	0.8
Other maternal diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium	2,152	25.2	2.1	1,564	28.2
Other maternal disorders predominantly related to pregnancy	**2,707**	**31.7**	**2.2**	**1,108**	**20.0**
Abnormal findings on antenatal screening of mother	281	3.3	1.3	383	6.9
Complications of anaesthesia during pregnancy	1,472	17.3	2.4	359	6.5
Diabetes mellitus in pregnancy	33	0.4	2.7	21	0.4
Excessive vomiting in pregnancy	635	7.4	2.0	231	4.2
Haemorrhage in early pregnancy	153	1.8	2.8	41	0.7
Infections of genitourinary tract in pregnancy	1	0.0	3.0	0	0.0
Malnutrition in pregnancy	128	1.5	1.7	70	1.3
Maternal care for other conditions predominantly related to pregnancy	3	0.0	1.0	2	0.0
Venous complications in pregnancy	1	0.0	1.0	1	0.0
Maternal care related to the fetus and amniotic cavity and possible delivery problems	**1,965**	**23.0**	**2.8**	**1,312**	**23.7**
Antepartum haemorrhage, not elsewhere classified	21	0.2	4.0	23	0.4
Complications specific to multiple gestation	2	0.0	4.0	1	0.0
Maternal care for known or suspected abnormality of pelvic organs	103	1.2	4.1	119	2.1
Maternal care for known or suspected disproportion	0	0.0	0.0	1	0.0
Maternal care for known or suspected fetal abnormality and damage	180	2.1	4.2	105	1.9
Maternal care for known or suspected malpresentation of fetus	20	0.2	2.2	50	0.9
Maternal care for other known or suspected fetal problems	194	2.3	2.7	215	3.9
Multiple gestation	28	0.3	2.9	9	0.2
Other disorders of amniotic fluid and membranes	26	0.3	1.9	27	0.5
Placenta praevia	222	2.6	3.6	231	4.2
Placental disorders	16	0.2	2.3	1	0.0
Polyhydramnios	267	3.1	4.0	34	0.6
Premature rupture of membranes	22	0.3	4.3	9	0.2
Premature separation of placenta (abruptio placentae)	803	9.4	1.9	316	5.7
Prolonged pregnancy	61	0.7	1.3	171	3.1

Principal diagnosis	Antenatal admission		Average length of stay (days)	Antenatal admission – same day	
	Number	%		Number	%
Oedema, proteinuria and hypertensive disorders in pregnancy, childbirth and the puerperium	**1,162**	**13.6**	**2.4**	**583**	**10.5**
Eclampsia	85	1.0	2.5	35	0.6
Gestational (pregnancy-induced) hypertension with significant proteinuria	35	0.4	4.6	8	0.1
Gestational (pregnancy-induced) hypertension without significant proteinuria	35	0.4	2.4	52	0.9
Gestational (pregnancy-induced) oedema and proteinuria without hypertension	547	6.4	2.1	282	5.1
Pre-existing hypertension complicating pregnancy, childbirth and the puerperium	365	4.3	2.6	136	2.5
Pre-existing hypertensive disorder with superimposed proteinuria	7	0.1	2.6	4	0.1
Unspecified maternal hypertension	88	1.0	1.5	66	1.2
Complications of labour and delivery	**278**	**3.3**	**1.5**	**576**	**10.4**
Abnormalities of forces of labour	103	1.2	2.0	141	2.5
Failed induction of labour	38	0.4	1.8	6	0.1
Labour and delivery complicated by fetal stress (distress)	61	0.7	1.1	166	3.0
Labour and delivery complicated by intrapartum haemorrhage, not elsewhere classified	44	0.5	1.1	125	2.3
Labour and delivery complicated by umbilical cord complications	6	0.1	1.2	42	0.8
Long labour	2	0.0	1.0	4	0.1
Obstructed labour due to malposition and malpresentation of fetus	5	0.1	1.0	16	0.3
Obstructed labour due to maternal pelvic abnormality	0	0.0	0.0	1	0.0
Other complications of labour and delivery, not elsewhere classified	5	0.1	1.0	51	0.9
Other obstetric trauma	1	0.0	4.0	0	0.0
Other obstructed labour	5	0.1	1.0	6	0.1
Pre-term delivery	8	0.1	1.0	18	0.3
Circumstances requiring health services related to reproduction	**128**	**1.5**	**1.2**	**336**	**6.1**
Antenatal screening	33	0.4	1.2	84	1.5
Supervision of high-risk pregnancy	9	0.1	1.6	30	0.5
Supervision of normal pregnancy	86	1.0	1.2	222	4.0
Pregnancy with abortive outcome	**14**	**0.2**	**1.2**	**9**	**0.2**
Ectopic pregnancy	14	0.2	1.2	9	0.2
Complications predominantly related to the puerperium	**20**	**0.2**	**3.1**	**2**	**0.0**
Infections of breast associated with childbirth	7	0.1	4.4	1	0.0
Obstetric embolism	13	0.2	2.3	1	0.0
Total	8,533	100.0	2.3	5,537	100.0

H.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 H3.1: Number of birth procedures, by birth type and maternal age group, 2006

		Age group							Total
		Under 16	**16–19**	**20–24**	**25–29**	**30–34**	**35–39**	**40 and over**	
Normal birth		128	3,181	7,587	9,425	10,476	5,592	1,045	37,434
Caesarean section	Total	25	609	1,745	2,986	4,751	3,441	831	14,388
	Emergency	20	526	1,264	1,902	2,683	1,683	366	8,444
	Elective	5	83	481	1,084	2,068	1,758	465	5,944
Breech birth	Total	1	19	47	70	98	70	8	313
	Spontaneous breech birth	0	11	22	42	53	31	3	162
	Assisted breech birth	1	7	24	27	41	35	5	140
	Assisted breech birth with forceps	0	1	1	1	4	4	0	11
Assisted birth	Total	11	340	791	1,231	1,716	859	161	5,109
	Forceps	3	101	252	440	599	309	52	1,756
	Vacuum extraction	8	237	533	782	1,095	543	108	3,306
	Forceps and vacuum extraction	0	2	6	9	22	7	1	47
Not stated		0	53	105	123	194	105	13	593
Total		165	4,202	10,275	13,835	17,235	10,067	2,058	57,837

Table H3.2: Number of birth procedures, by birth type and maternal ethnicity, 2006

		Ethnicity						Total
		Māori	Pacific peoples	Asian	European	Other	Not stated	
Normal birth		9,117	4,409	2,693	19,875	968	372	37,434
Caesarean section	Total	1,994	1,157	1,472	9,096	523	146	14,388
	Emergency	1,302	759	949	5,012	335	87	8,444
	Elective	692	398	523	4,084	188	59	5,944
Breech birth	Total	83	36	19	162	9	4	313
	Spontaneous breech birth	44	25	11	74	5	3	162
	Assisted breech birth	37	10	6	82	4	1	140
	Assisted breech birth with forceps	2	1	2	6	0	0	11
Assisted birth	Total	559	264	677	3,398	149	62	5,109
	Forceps	174	73	199	1,234	58	18	1,756
	Vacuum extraction	381	190	472	2,130	90	43	3,306
	Forceps and vacuum extraction	4	1	6	34	1	1	47
Not stated		98	59	59	357	19	1	593
Total		11,851	5,925	4,920	32,888	1,668	585	57,837

Table H3.3: Number of birth procedures, by birth type and DHB region of mother's place of residence, 2006

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	1,499	410	278	132	16	12	4	0	93	29	63	1	22	2,040
Waitemata	4,236	1,944	1,111	833	33	15	18	0	733	164	559	10	209	7,155
Auckland	3,628	1,771	1,034	737	32	20	11	1	749	237	509	3	41	6,221
Counties Manukau	5,827	1,619	1,008	611	49	29	19	1	643	141	496	6	43	8,181
Waikato	3,509	899	548	351	29	13	15	1	409	108	298	3	26	4,872
Lakes	1,181	287	154	133	10	6	4	0	89	25	55	9	7	1,574
Bay of Plenty	1,854	619	365	254	11	3	7	1	238	71	161	6	4	2,726
Tairawhiti	508	151	85	66	7	4	3	0	30	11	19	0	4	700
Hawke's Bay	1,530	491	288	203	15	5	8	2	156	108	48	0	19	2,211
Taranaki	997	303	148	155	8	4	4	0	80	22	58	0	0	1,388
MidCentral	1,419	521	340	181	13	8	5	0	135	21	114	0	5	2,093
Whanganui	634	153	86	67	4	4	0	0	31	11	20	0	5	827
Capital & Coast	2,184	1,080	696	384	26	12	13	1	390	220	169	1	22	3,702
Hutt Valley	1,170	558	333	225	7	5	2	0	159	75	84	0	8	1,902
Wairarapa	313	152	93	59	0	0	0	0	53	12	40	1	0	518
Nelson Marlborough	856	379	212	167	11	4	3	4	112	87	24	1	133	1,491
West Coast	209	91	47	44	2	1	1	0	19	10	9	0	6	327
Canterbury	3,448	1,816	981	835	31	10	21	0	716	286	424	6	24	6,035
South Canterbury	412	127	70	57	0	0	0	0	33	27	6	0	4	576
Otago	1,142	539	322	217	7	6	1	0	164	61	103	0	4	1,856
Southland	867	470	238	232	1	0	1	0	75	30	45	0	7	1,420
Not stated	11	8	7	1	1	1	0	0	2	0	2	0	0	22
Total	37,434	14,388	8,444	5,944	313	162	140	11	5,109	1,756	3,306	47	593	57,837

Table H3.4: Number of birth procedures, by plurality and birth type, 2006

		Plurality				Total
		Singleton	Twins	Multiple	Not stated	
Normal birth		37,048	339	4	43	37,434
Caesarean section	Total	13,836	500	10	42	14,388
	Emergency	8,166	249	4	25	8,444
	Elective	5,670	251	6	17	5,944
Breech delivery	Total	206	103	3	1	313
	Spontaneous breech birth	123	37	1	1	162
	Assisted breech birth	76	62	2	0	140
	Assisted breech birth with forceps	7	4	0	0	11
Assisted delivery	Total	5,005	94	0	10	5,109
	Forceps	1,717	36	0	3	1,756
	Vacuum extraction	3,249	51	0	6	3,306
	Forceps and vacuum extraction	39	7	0	1	47
Not stated		588	3	1	1	593
Total		56,683	1,039	18	97	57,837

H.4 Babies

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

Table H4.1: Percentage of liveborn babies, by gestational age and DHB region of mother's place of residence, 2006

DHB region	Live babies by gestational age (weeks)						Total	
	Less than 28	28–31	32–36	37–41	42 and over	Not stated	Number	%
Northland	0.2	1.0	6.4	89.5	1.9	0.9	2,056	100.0
Waitemata	0.4	0.5	6.8	89.5	2.3	0.5	7,213	100.0
Auckland	0.5	0.9	5.7	90.3	2.3	0.2	6,314	100.0
Counties Manukau	0.5	0.9	5.6	89.5	2.8	0.8	8,215	100.0
Waikato	0.6	0.7	5.7	85.9	5.8	1.4	4,893	100.0
Lakes	0.4	0.9	4.8	89.9	3.1	0.8	1,599	100.0
Bay of Plenty	0.3	1.2	5.7	87.8	1.5	3.4	2,758	100.0
Tairawhiti	0.3	1.1	5.1	90.3	2.5	0.7	712	100.0
Hawke's Bay	0.5	0.5	6.4	81.8	6.7	4.2	2,188	100.0
Taranaki	0.3	0.9	6.8	87.7	2.7	1.6	1,405	100.0
MidCentral	0.6	0.9	6.2	88.7	2.5	1.2	2,173	100.0
Whanganui	0.6	0.7	4.3	88.4	4.5	1.5	846	100.0
Capital & Coast	0.4	0.8	5.1	90.2	1.5	2.0	3,834	100.0
Hutt Valley	0.3	0.7	6.2	89.7	2.1	1.0	1,925	100.0
Wairarapa	0.2	0.9	7.0	89.6	2.1	0.2	527	100.0
Nelson Marlborough	0.5	0.7	4.7	91.7	1.5	1.0	1,516	100.0
West Coast	1.2	1.5	7.6	85.5	2.1	2.1	330	100.0
Canterbury	0.4	0.8	6.5	89.7	1.9	0.7	6,122	100.0
South Canterbury	0.0	0.2	3.6	90.3	4.7	1.2	576	100.0
Otago	0.6	0.6	6.7	89.8	1.4	0.9	1,885	100.0
Southland	0.3	1.2	6.9	88.5	1.1	2.0	1,426	100.0
Not stated	0.0	0.0	0.0	100.0	0.0	0.0	19	100.0
Total number	256	468	3497	52,067	1565	679	58,532	
Total percentage	0.4	0.8	6.0	89.0	2.7	1.2		100.0

Table H4.2: Percentage of liveborn babies, by birthweight and DHB region of mother's place of residence, 2006

DHB region	Live babies by birthweight (grams)						Total	
	Less than 1500	1500–1999	2000–2499	2500–4499	4500 or more	Not stated	Number	%
Northland	1.1	1.6	4.2	90.4	2.5	0.3	2,056	100.0
Waitemata	0.8	1.2	3.7	92.0	2.3	0.0	7,213	100.0
Auckland	1.2	1.0	3.8	91.9	2.1	0.0	6,314	100.0
Counties Manukau	1.1	1.2	3.8	90.9	2.9	0.0	8,215	100.0
Waikato	1.0	1.3	3.7	91.3	2.6	0.1	4,893	100.0
Lakes	0.9	1.1	3.9	91.5	2.5	0.1	1,599	100.0
Bay of Plenty	1.1	1.2	3.9	91.7	2.1	0.1	2,758	100.0
Tairawhiti	1.3	2.0	3.1	90.3	3.4	0.0	712	100.0
Hawke's Bay	1.5	1.3	3.8	91.0	2.3	0.1	2,188	100.0
Taranaki	1.4	1.4	3.8	90.7	2.5	0.2	1,405	100.0
MidCentral	1.2	1.2	4.2	90.0	3.4	0.0	2,173	100.0
Whanganui	1.3	0.8	4.1	90.8	3.0	0.0	846	100.0
Capital & Coast	1.3	0.8	2.9	92.1	2.6	0.2	3,834	100.0
Hutt Valley	0.8	1.0	3.2	91.8	3.1	0.1	1,925	100.0
Wairarapa	1.1	1.7	3.8	91.5	1.9	0.0	527	100.0
Nelson Marlborough	1.0	0.8	2.6	91.8	3.3	0.5	1,516	100.0
West Coast	2.1	1.5	6.1	88.2	2.1	0.0	330	100.0
Canterbury	1.1	1.3	3.3	91.6	2.6	0.1	6,122	100.0
South Canterbury	0.0	0.9	3.0	93.2	3.0	0.0	576	100.0
Otago	1.4	0.9	4.1	90.7	2.8	0.2	1,885	100.0
Southland	1.3	1.2	5.2	89.6	2.6	0.1	1,426	100.0
Not stated	0.0	0.0	0.0	100.0	0.0	0.0	19	100.0
Total number	648	688	2167	53,467	1511	51	58,532	
Total percentage	1.1	1.2	3.7	91.3	2.6	0.1		100.0

Figure H4.1: Average birthweight of female babies by ethnicity, 1999–2006

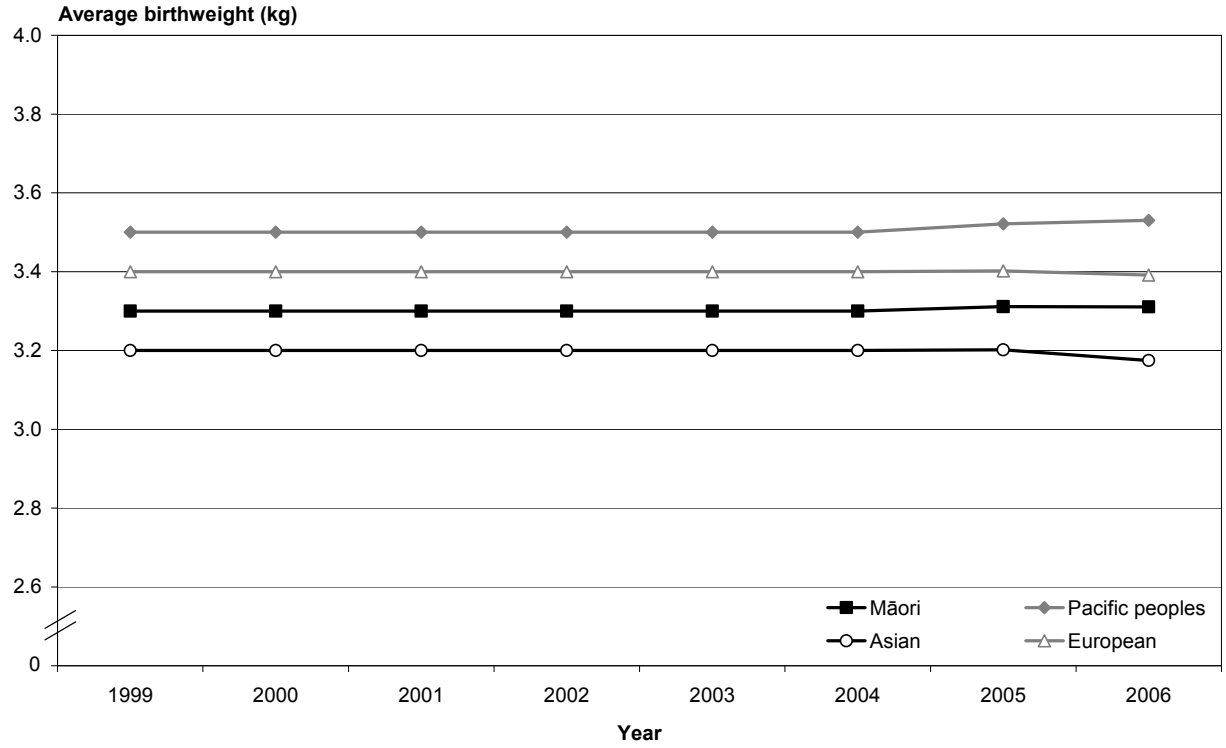
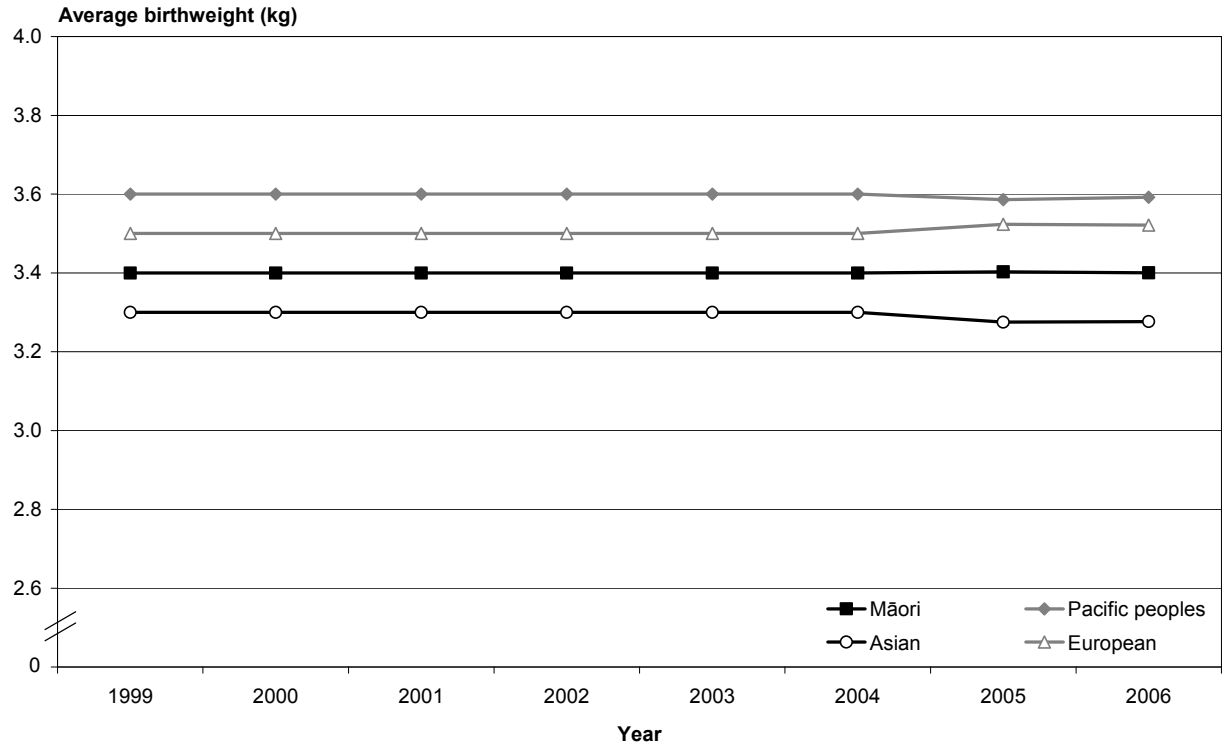


Figure H4.2: Average birthweight of male babies by ethnicity, 1999–2006



H.5 Maternity facilities

Data on maternal facilities are extracted from the National Minimum Dataset (NMDS). Facilities are grouped into tertiary, secondary and primary maternity facilities.

Data integrity

Information on any hospital that did not have a designated maternity contract and reported data in 2005 has been reported in the 'Other facilities' group. Note: Any facilities that did not record an event have not been presented.

Due to the size of the tables, the following list outlines tables available in the downloadable Excel workbook (*Hospital-based Maternity 2006*), available from the Ministry of Health website.

Table H5.1: Number of total live and stillbirths, by facility, 2006

Table H5.2: Number and percentage of mothers, by mother's ethnicity and facility, 2006

Table H5.3: Number of mothers, by facility and DHB region of mother's place of residence, 2006

Table H5.4: Number of mothers, by plurality of babies born and facility, 2006

Table H5.5: Number of antenatal hospital admissions and average length of stay, by facility, 2006

Table H5.6: Number and percentage of mothers, by type of hospital birth and facility, 2006

Table H5.7: Percentage of total caesarean sections performed, by facility, 2006

Table H5.8: Number and rate of inductions, epidurals and episiotomies, by facility, 2006

Table H5.9: Number and percentage of mothers, by patient clinical complexity level (PCCL) and facility, 2006

Table H5.10: Average length of stay (days) for mothers, by patient clinical complexity level (PCCL) and facility, 2006

Table H5.11: Number of live babies born, by gestational age at birth and facility type, 2006

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 Abortion, spontaneous; Miscarriage.
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 Abortion, induced; Birthweight; Miscarriage.
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 National Health Index (NHI) number.
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 Admission.
AR-DRG code	See Diagnosis Related Groups, Australian Refined (AR-DRG).
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 Assisted vaginal birth.
Assisted vaginal birth, vacuum extraction	An assisted vaginal birth using a suction cap applied to the baby's head. See also Assisted vaginal birth.
Assisted vaginal birth, vaginal breech birth	An assisted vaginal birth in which the baby's buttocks or lower limbs precede its head. See also Assisted vaginal birth.
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 (Health Funding Authority 2000). See also Inpatient postnatal care.
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 Birthweight.
Birthweight, very low	A birthweight of less than 1500 g. See also Birthweight.
Birthweight, extremely low	A birthweight of less than 1000 g. See also Birthweight.
Birthweight, low for gestation	The birthweight of a newborn of 37 weeks' gestation or over if less than 2500 g. See also Birthweight; Newborn.
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. Sometimes defined as a 'Healthy person accompanying sick person' or 'healthy infant [or] child' for whom a facility takes on the 'health supervision and care'.
Caesarean section	An operative birth through an abdominal incision.
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.

Term	Definition
Caesarean section, classical	A caesarean section in which an incision is made down the centre of the abdomen (midline longitudinal) that allows a larger space from which deliver the baby. However, it is rarely performed today, as 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.
Crude birth rate (CBR) per 1000 women of reproductive age	$CBR = \frac{n}{P_r} * 1000$ Where: n = total number of mothers giving birth and P_r = total number of women of reproductive age. See also Reproductive age.
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.
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 infant's date of birth, or derived from clinical assessment during pregnancy, or derived from an examination of the infant 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 Abortion, induced.

Term	Definition
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 stay	The number of nights spent in a facility. See also Facility.
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.
Length of antenatal stay, mother	The number of days between the admission date and the baby's date of birth (date delivery procedure performed).
Length of postnatal stay, mother	The number of days between a baby's date of birth (date delivery procedure performed) and the mother's separation date from the hospital where birth occurred.
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 Liveborn.
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 Caesarean section, lower segment caesarean section (LSCS).
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 Facility.
Median	The middle data point if data are ranked from the lowest to the highest. It is used instead of the mean when data are not normally distributed.
Ministry of Health	The Government's principal advisor on health and disability in New Zealand.

Term	Definition
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 Facility.
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 are collected routinely from all people discharged from a hospital in New Zealand.
Newborn	A baby from birth to four weeks of life.
New Zealand Index of Deprivation (NZDep)	An index generated from data from the 2001 Census of Population and Dwellings to measure deprivation. Scores on the index vary from 1 (least deprived) to 10 (most deprived). An area with a high NZDep score is more likely to need health services than one with a low NZDep score.
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 Diagnosis Related Groups, Australian Refined (AR-DRG).
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, and cuts off the flow of oxygen to the baby.
Plurality	The number of births resulting from a pregnancy.
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.
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. See also Birthing unit; Facility.
Post-term birth	A birth at 42 or more completed weeks' gestation.
Readmission, mother	See Hospital readmission.
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). See also Facility.
Spontaneous abortion	See Abortion, spontaneous.

Term	Definition
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. See also Facility.
Three-year moving average	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: $\frac{M_{t-2} + M_{t-1} + M_t}{P_{t-2} + P_{t-1} + P_t}$ Where: M_t = deaths t = calendar years P_t = population.
Urban area	A census area unit (domicile) located in an area with more than 10,000 people.
Vacuum extraction	See Assisted vaginal birth, vacuum extraction.
Vaginal birth	The birth of a baby without obstetric intervention. Also called a normal birth.
Vaginal breech birth	See Assisted vaginal birth, vaginal breech birth.
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.

Department of Health and Ageing. 2002. *Australian Refined Diagnosis Related Groups, Version 5.0, Definitions Manual.* Canberra: Commonwealth of Australia (Department of Health and Ageing).

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. 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. 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.

NCCH. 2000. *The International Statistical Classification of Diseases and Related Health Problems, Australian Modification (ICD-10-AM) – Australian Classification of Health Interventions (ACHI), second edition.* Sydney: National Centre for Classification in Health.

PHC, Ministry of Health. 1996. *Standardising Rates of Disease*. Wellington: Public Health Commission, Ministry of Health.

Salmond C, Crampton P, Atkinson J. 2002a. *NZDep2006 Index of Deprivation*. Wellington: Wellington School of Medicine and Health Sciences.

Salmond C, Crampton P, Atkinson J. 2007b. *NZDep2006 Index of Deprivation: User's Manual.* Wellington: Wellington School of Medicine and Health Sciences.

Smith A. 1986. *The Ethnic Origins of Nations.* Oxford: Blackwell Publishers Ltd.

Statistics New Zealand. 2008. *Demographic Trends: 2007*. Wellington: Statistics New Zealand.

WHO. 1975. *International Classification of Diseases (Vol 1) 1975 revision*. Geneva: World Health Organization.

WHO. 1985. Appropriate technology for birth. *Lancet* 2: 436–7.

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.