



Report on
**NEW ZEALAND'S
MMPO MIDWIVES**

Care activities and outcomes



2016

Report prepared for



New Zealand
College of Midwives
TE KĀRETI O NGĀ KAIWHAKAWHANAU KI AOTEAROA

REPORT AUTHORS

The development and compilation of this report was a collaborative effort involving:

Dr Shanti Daellenbach – Maternity Researcher, Midwifery and Maternity Provider Organisation

Belinda Gardner – IT Team Leader, Midwifery and Maternity Provider Organisation

Dr Lesley Dixon - Midwifery Advisor, New Zealand College of Midwives

Karen Guilliland - Chief Executive, New Zealand College of Midwives

ACKNOWLEDGEMENTS

We would like to acknowledge and thank the staff at MMPO for ensuring that the data is reliable and robust and Malcom Briggs of Solutions Plus software design company, who developed the software for MMPO.

COPYRIGHT

The copyright owners of this publication are the New Zealand College of Midwives (The College) and the Midwifery and Maternity Provider Organisation (MMPO). Permission is given to reproduce material from this publication provided that all the following conditions are met:

- The content is not distorted or changed
- The information is not sold
- The material is not used to promote or endorse any product
- The material is not used in an inappropriate or misleading context with regard to the nature of the material
- Any relevant disclaimers, qualifications, or caveats included in the publication are reproduced
- The Midwifery and Maternity Provider Organisation/New Zealand College of Midwives are acknowledged as the source

DISCLAIMER

The purpose of this publication is to inform discussion and guide midwives and the profession in decision making on issues surrounding the provision of maternity care. The authors have taken great care to ensure the information supplied within the project timeframe is accurate. However, neither the MMPO, the College, nor the contributors involved can accept responsibility for any errors or omissions. All responsibility for action based on any information in this report rests with the reader. The authors accept no liability for any loss of whatever kind, or damage, arising from reliance in whole or part, by any person, corporate or natural, on the contents of this report. The views expressed in this report are those of the authors and do not necessarily represent those of the MMPO or the College.

The College and the MMPO welcome comments and suggestions about this publication.

ISSN 2463-6061 (Print)

ISSN 2230-4118 (Online)



Table of Contents

Table of Contents	1
List of Tables	2
List of Figures	3
Executive Summary	4
Flowchart 1: Gestation at onset of labour and mode of birth: Full cohort	6
Flowchart 2: Gestation at onset of labour and mode of birth: Women having their first baby (Primiparous)	7
Flowchart 3: Gestation at onset of labour and mode of birth: Multiparous women without previous caesarean section (excludes multiple births)	8
1 Introduction	9
1.1 The Midwifery and Maternity Provider Organisation (MMPO)	9
1.2 Purpose of this report	9
1.3 Report structure	9
1.4 Key data sources	10
1.5 Methodology	11
2 Women and pregnancy	12
2.1 Demographic profile	12
2.2 Antenatal history	13
2.3 Duration of pregnancy	15
3 Labour details	16
3.1 Length of labour	16
3.2 Transfers during labour	16
3.3 Labour procedures	16
4 Births	19
4.1 Type of birth	19
4.2 Place of birth – geographic distribution and birth setting	21
4.3 Birth setting and parity	23
4.4 Water birth	24
4.5 Perineal trauma	24
4.6 Third stage of labour outcomes	25
5 Babies	30
5.1 Gestational age at birth	30
5.2 Apgar scores	30
5.3 Birth weight	30
5.4 Birth status	31
5.5 Neonatal transfers from home and primary facilities	31
6 Postnatal Period	33
6.1 Breastfeeding	33
6.2 Postnatal health: Smoke free status	34
6.3 Postnatal care	35
7 References	36
Appendix: “The MMPO Maternity Notes” dataset	37

List of Tables

Table 1.1:	Data contributors, by DHB region	10
Table 1.2:	Years as 'Continuity of Care' midwife	11
Table 2.1:	Domicile of women by DHB region	12
Table 2.2:	Weeks of gestation at registration	12
Table 2.3:	Women's age at registration	12
Table 2.4:	Women's ethnicity at registration	13
Table 2.5:	Women's gravida at registration	13
Table 2.6:	Women's body mass index at registration	13
Table 2.7:	Factors that may influence pregnancy outcome	13
Table 2.8:	Women with pre-existing medical conditions	14
Table 2.9:	Smoke free status at registration	14
Table 2.10:	Weeks of gestation at labour commencement or elective caesarean (all women)	15
Table 2.11:	Frequency of antenatal assessments	15
Table 3.1:	Hours of labour and parity	16
Table 3.2:	Transfers during labour by birth setting	16
Table 3.3:	Transfers from home and primary birth settings during labour	16
Table 3.4:	Labour induction and parity	17
Table 3.5:	Anaesthetic procedures during labour and parity	17
Table 3.6:	Pharmacological pain management during labour and parity	18
Table 3.7:	Pharmacological pain management for women with no anaesthetic procedure and parity	18
Table 3.8:	Other pain management during labour	18
Table 4.1:	Type of birth	19
Table 4.2:	Vaginal birth after caesarean section (VBAC)	19
Table 4.3:	Birth type and parity	19
Table 4.4:	Birth type and maternal age	20
Table 4.5:	Birth type and maternal ethnicity	21
Table 4.6:	Women by DHB domicile and birth setting	22
Table 4.7:	Birth setting and rurality	22
Table 4.8:	Birth setting and parity	23
Table 4.9:	Birth setting and type of birth	24
Table 4.10:	Births to women using water in labour	24
Table 4.11:	Perineal trauma and parity for all vaginal births	24
Table 4.12:	Episiotomy by parity	24

Table 4.13: Episiotomy for women who had a spontaneous normal vaginal birth, by parity	25
Table 4.14: Postpartum blood loss by birth type for all births	25
Table 4.15: Postpartum blood loss by third stage care (excludes all instrumental births and caesarean sections)	26
Table 4.16: Third stage care and parity following all vaginal births	27
Table 4.17: Placental condition and birth type	28
Table 4.18: Placental condition and third stage care following all vaginal births	28
Table 4.19: Birth position	29
Table 4.20: Birth position by birth setting	29
Table 5.1: Gestational age of babies at birth	30
Table 5.2: Apgar score at 5 minutes and birth setting	30
Table 5.3: Birth weight of babies and gestation	30
Table 5.4: Birth status	31
Table 5.5: Perinatal related mortality by status at birth and birth setting	31
Table 5.6: Perinatal related mortality by gestation	32
Table 5.7: Admissions/transfers to NNU/SCBU of babies, by birth setting	32
Table 6.1: Feeding status at 2 weeks by birth setting	33
Table 6.2: Feeding status at discharge by birth setting	34
Table 6.3: Feeding status at 2 weeks by mother's ethnicity	34
Table 6.4: Women's smoke free status postnatally	35
Table 6.5: Postnatal care, setting of assessments	35

List of Figures

Figure 2.1: Percentage of women who reported smoking during pregnancy, by age group	14
Figure 2.2: Percentage of women who reported smoking during pregnancy, by ethnicity	15
Figure 3.1: Induction of labour by age group	17
Figure 4.1: Percentage of births by birth type – vaginal versus caesarean – and ethnicity	21
Figure 4.2: Percentage of women giving birth by birth setting and rurality	23
Figure 4.3: Percentage of births by birth setting and parity	23
Figure 4.4: Postpartum blood loss by induction and augmentation	26
Figure 4.5: Percentage of births, by postpartum blood loss by third stage care for all non-operative births	27
Figure 4.6: Percentage of normal vaginal births and condition of placenta by third stage management	28
Figure 6.1: Percentage of births, by feeding status at 2 weeks and birth setting	33
Figure 6.2: Percentage of births, by feeding status at 2 weeks and ethnicity	34

Executive Summary

All Lead Maternity Carer (LMC) midwife members of the New Zealand College of Midwives (the College) have the opportunity to join the Midwifery and Maternity Providers Organisation (MMPO), which is a nationwide organisation that offers a practice management service for community-based LMC midwives. In return for free membership of the MMPO, the midwives contribute to a national midwifery activities and outcomes database, namely the College of Midwives Clinical Outcomes Research (COMCORD) database. The information obtained by MMPO LMC midwife (henceforth 'MMPO midwife') registrations of expectant mothers is entered into the database, which is supported by an independent software vendor. This report is an objective descriptive summary of the data collation from the 2016 cohort of 30,165 birthing mothers from the MMPO registrations.

In 2016, there were 950 registered MMPO midwives throughout New Zealand who contributed data. The largest proportion of contributors came from the Canterbury region of the South Island, where the MMPO has had a longer establishment base.

Overall, the MMPO midwives have provided a complete episode of care for:

- 30,165 mothers who gave birth between 01 January and 31 December 2016 and were registered into the system
- 30,526 babies who were born to these women

This report summarises the outcomes for mothers and babies who had MMPO midwives providing their LMC care. It provides data on place of birth, type of birth, demographic information such as maternal age and ethnicity, parity, and types of third stage of labour procedures. It also includes information about maternal smoke free status (before and after birth) and the baby's weight, gestation and breastfeeding status.

Highlights

Women and pregnancy

- The majority of women (80.5 percent) registered with an MMPO midwife prior to 15 weeks gestation.
- 29.7 percent of women were pregnant for the first time.
- More than half of the women (59.1 percent) who registered with MMPO midwives were aged between 25 and 34 years old, with 16 percent over the age of 35 years.
- The majority of women identified their ethnicity as NZ European/Pākehā (61.1 percent), followed by Māori (18.7 percent) and Asian (12.0 percent).
- 46.0 percent of women had a healthy body mass index, with a further 26.8 percent classed as overweight and 24.6 percent obese.
- 15.3 percent of pregnant women were current smokers at the time of pregnancy registration with a midwife.

Labour and births

- The majority of babies (67.0 percent) were born to women who had a normal vaginal birth.
- Home births and births in primary facilities had higher normal vaginal birth rates than births in other facilities.
- The combined caesarean section (elective and emergency) rate was 24.2 percent.
- A further 8.4 percent of babies were born via instrumental vaginal births.
- The largest proportion of births (45.5 percent) occurred in secondary facilities.
- 5.1 percent of babies were born at home.
- 26.8 percent of women used water immersion for pain management during labour and 10.2 percent of babies were born in water.
- Babies born to women who identified as Māori were more likely to be born by normal vaginal birth (77.7 percent), whereas babies born to mothers in the 'Asian' and 'Other' ethnic categories had higher rates of caesarean sections (29.1 and 33.5 percent respectively).
- Babies born to younger mothers (under 20 years of age) had the highest normal vaginal birth rates (77 percent), with the rates of caesarean sections increasing as the mother's age increased (peaking at 41 percent at 40+ years of age).
- Women who had a vaginal birth and active management of the third stage of labour experienced greater blood loss (more than 500mls) than those who had a physiological pathway for the third stage (12.6 percent versus 7.6 percent).

Babies

- The majority of babies were born after 37 weeks of pregnancy with 6 percent born prematurely.
- The majority of babies (91.7 percent) weighed between 2.5 and 4.5 kg at birth, with 5.7 percent less than 2.5kg and 2.6 percent more than 4.5kg

Postnatal period

- The majority of babies (75.4 percent) were fully or exclusively breastfed at 2 weeks following birth.
- Babies born at home had higher rates of exclusive or fully breastfeeding at two weeks of age (87.9 percent).
- New Zealand European women had the highest rate per ethnic group of exclusive breastfeeding at 2 weeks (70.2 percent).
- Smoking rates decreased to 13.5 percent during the postnatal period.
- Almost half of the women (46 percent) received between 1 and 2 visits by their MMPO midwife when in a maternity facility and a further 25.7 percent received between 3 and 5 visits.
- The majority of women (71.5 percent) received between 6 and 9 home visits during the postnatal period, with a further 14.1 percent receiving between 10 and 14 visits.

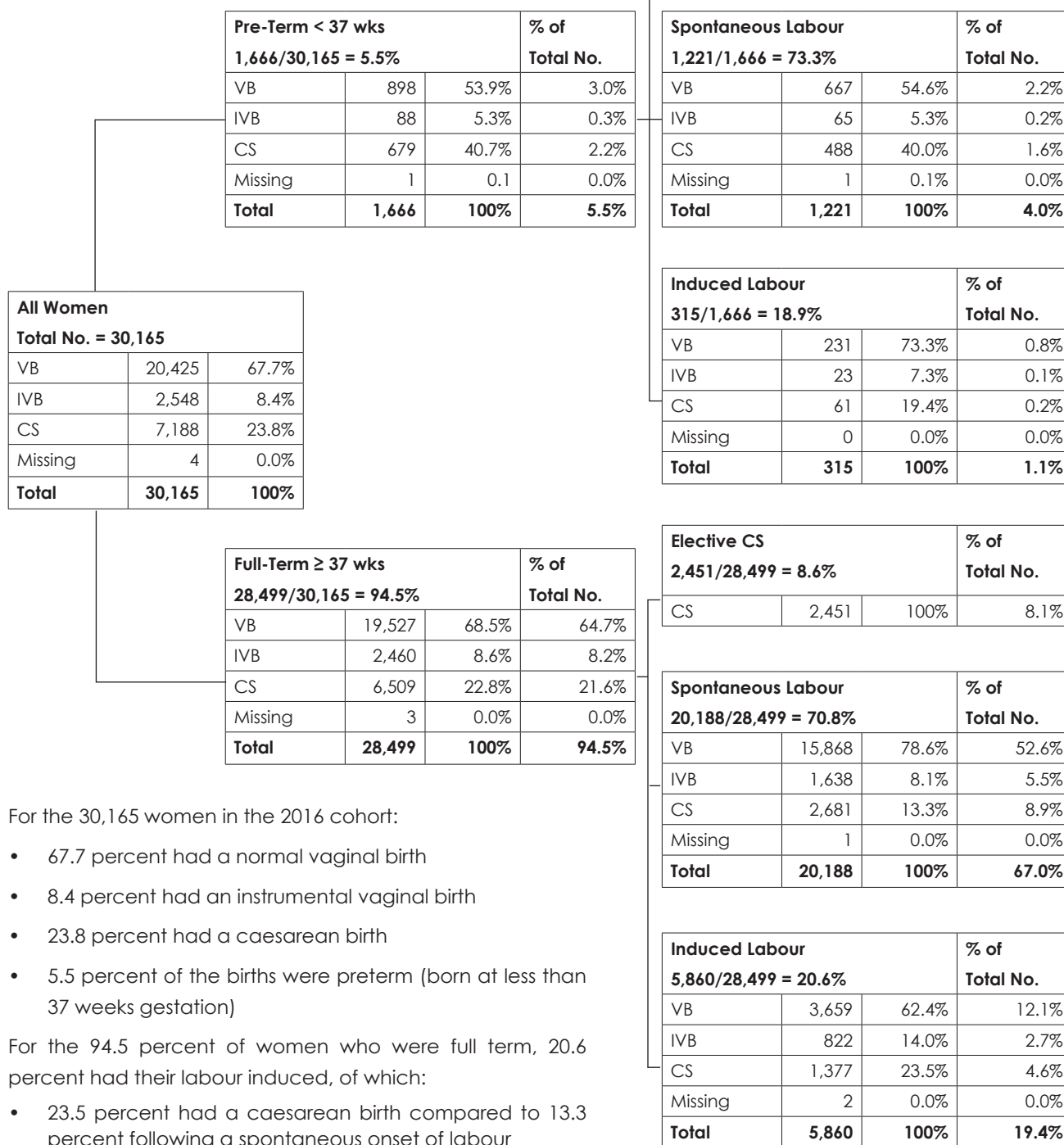
The next section will discuss the gestation and mode of birth for the 2016 cohort by way of flow charts. The first flow chart demonstrates the gestation and mode of birth for the total cohort, followed by gestation and mode of birth for primiparous women. This is followed by a flow chart for the gestation and mode of birth for multiparous women.

Flowchart 1: Gestation at onset of labour and mode of birth: Full cohort (excludes multiple births)

VB - Vaginal birth

IVB - Instrumental vaginal birth

CS - Caesarean section



For the 30,165 women in the 2016 cohort:

- 67.7 percent had a normal vaginal birth
- 8.4 percent had an instrumental vaginal birth
- 23.8 percent had a caesarean birth
- 5.5 percent of the births were preterm (born at less than 37 weeks gestation)

For the 94.5 percent of women who were full term, 20.6 percent had their labour induced, of which:

- 23.5 percent had a caesarean birth compared to 13.3 percent following a spontaneous onset of labour
- 14.0 percent had an instrumental vaginal birth compared to 8.1 percent when labour onset was spontaneous.

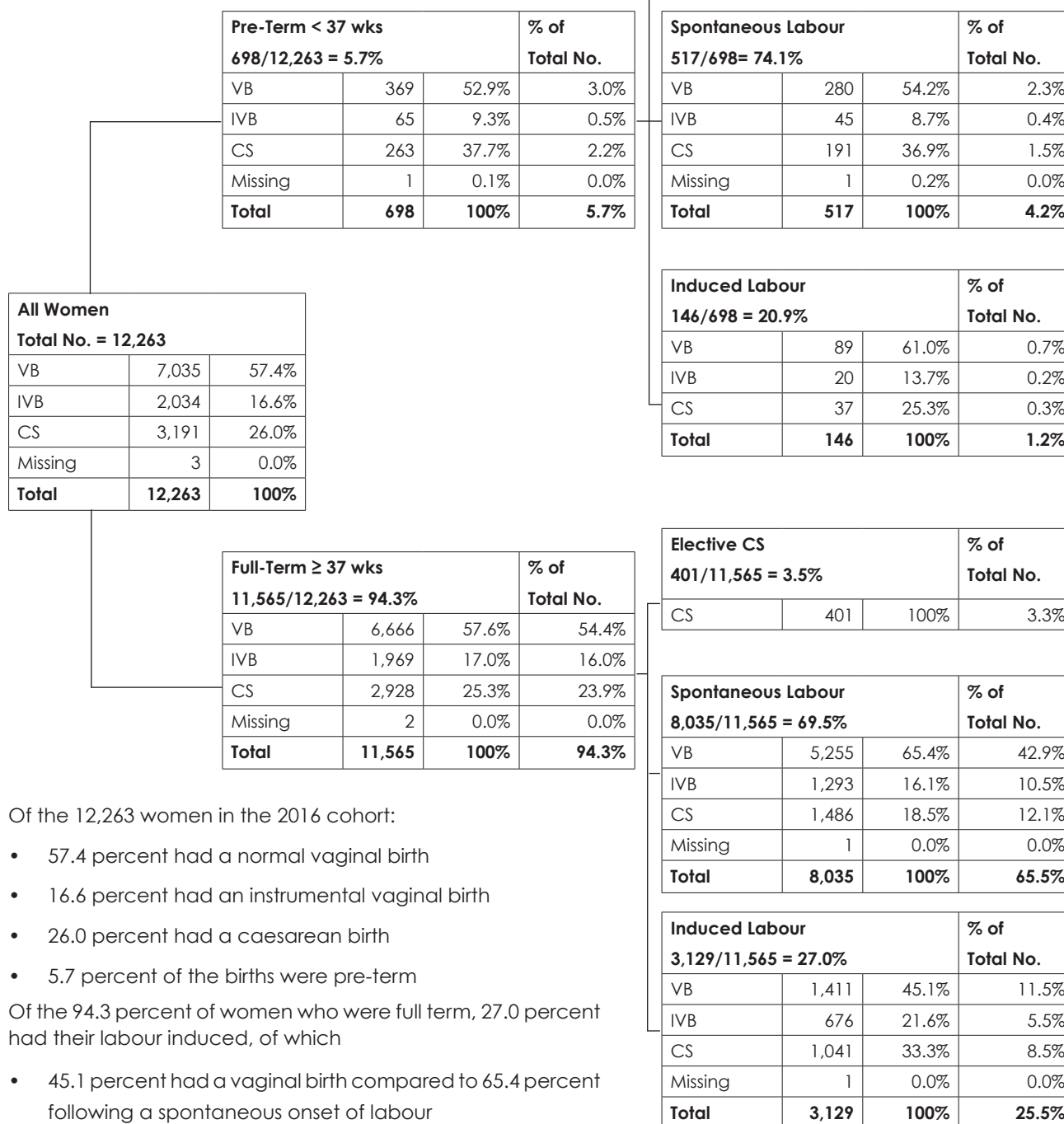
NB This chart provides data on the mother and excludes multiple births.

Flowchart 2: Gestation at onset of labour and mode of birth: Women having their first baby (Primiparous, excludes multiple births)

VB - Vaginal birth

IVB - Instrumental vaginal birth

CS - Caesarean section



Of the 12,263 women in the 2016 cohort:

- 57.4 percent had a normal vaginal birth
- 16.6 percent had an instrumental vaginal birth
- 26.0 percent had a caesarean birth
- 5.7 percent of the births were pre-term

Of the 94.3 percent of women who were full term, 27.0 percent had their labour induced, of which

- 45.1 percent had a vaginal birth compared to 65.4 percent following a spontaneous onset of labour
- 33.3 percent had a caesarean section compared to 18.5 percent when labour onset was spontaneous.

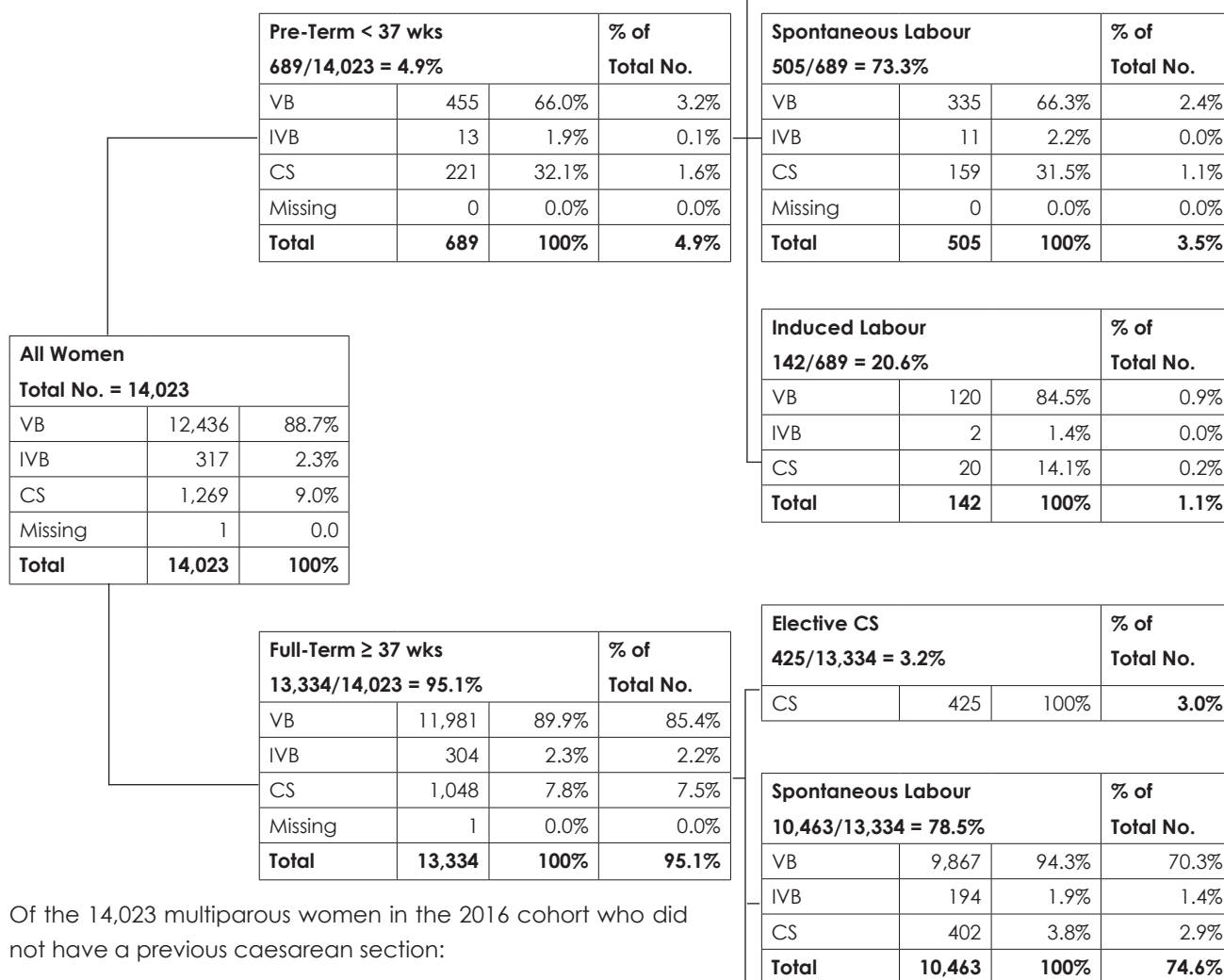
NB This chart provides data on the mother and excludes multiple births.

Flowchart 3: Gestation at onset of labour and mode of birth: Multiparous women without previous caesarean section (excludes multiple births)

VB - Vaginal birth

IVB - Instrumental vaginal birth

CS - Caesarean section



Of the 14,023 multiparous women in the 2016 cohort who did not have a previous caesarean section:

- 88.7 percent had a normal vaginal birth
- 2.3 percent had an instrumental vaginal birth
- 9.0 percent had a caesarean birth
- 4.9 percent of the births were preterm

For the 95.1 percent of women who had a full term labour, 18.3 percent had their labour induced of which

- 9.1 percent had a caesarean section compared with 3.8 percent when labour onset was spontaneous
- 4.5 percent had an instrumental vaginal birth compared with 1.9 percent when labour onset was spontaneous.

NB This chart provides data on the mother and excludes multiple births.

1. Introduction

Continuity of care is a key aspect of maternity care in New Zealand. It is a concept that is written into the philosophy and standards of practice for midwives (New Zealand College of Midwives, 2015) as well as the maternity services specifications for Lead Maternity Carers (LMCs) (Ministry of Health, 2007). The College supports the establishment of a partnership relationship with women which is enhanced by continuity of care from the beginning of pregnancy, through the labour and birth and into the postnatal period. When midwives work with women they provide care in many different settings and remain accountable for that care. In New Zealand the majority of primary maternity care is provided by midwives who work as LMCs and provide care from early pregnancy, labour and birth and for up to six weeks during the postnatal period. The majority of midwife LMCs are self-employed and enter into a contractual arrangement with the Ministry of Health (Section 88) under which they claim payment for services provided to women. All LMC midwives have the opportunity to join the Midwifery and Maternity Provider Organisation (MMPO).

1.1 The Midwifery and Maternity Provider Organisation (MMPO)

The MMPO was established by the New Zealand College of Midwives (the College) in 1997 to provide a practice management system for LMC midwives. The MMPO is co-located with the College's National Office in Christchurch. MMPO personnel include management, and accounting, data entry and claims support staff.

Through the organisation's partnership with the College, a number of initiatives were implemented to enhance the development of LMC services. In 2002, the MMPO (which was previously restricted to the provision of services to South Island midwives) extended membership to midwives throughout the country. MMPO services are free to College members, with operational costs met by the provision of clinical record systems and contracts negotiated to support midwifery practice. Midwives are able to enter their own data and have an electronic interface with the MMPO.

The MMPO provides a practice management service to midwife members, which includes claiming payment for maternity services on the schedule specified in the Primary Maternity Services Notice pursuant to Section 88 of the Public Health and Disability Act 2000 (Ministry of Health, 2007). A 'national midwifery activities and outcomes database' was developed in 2003 to extract relevant midwifery care and outcome data from this process. This data is used to provide individual midwives with personalised care outcome reports and is aggregated into regional and national midwifery outcome reports. This data provides a benchmark for:

- Individual midwife LMCs against which they can measure their own activities and care outcomes
- The midwifery profession to guide education, planning and to improve care outcomes
- Maternity service founders and providers
- Midwifery researchers

The independent software vendor collated the data provided by the midwives following provision of care. The data was then aggregated and analysed for this report.

1.2 Purpose of this report

The MMPO Midwives Care Activities and Outcomes Report provides analysis of the data collected by MMPO midwives about the women to whom they provided care during the year 2016. It is important to note it is not a technical report with statistically significant analysis, but rather, an annual report of the data analysed from the 2016 database. It can be seen as an annual report for 2016 of women who had their maternity care provided by midwives who worked as LMCs and were members of the MMPO and the College.

1.3 Report structure

Chapter 1 - Introduction

This chapter provides the background information about the MMPO along with the demographics of the registered midwives. It describes the data collation and analysis processes.

Chapter 2 – Women and pregnancy

This section provides information about pregnancy as obtained from women by the MMPO midwives in 2016. The information collected provides a description

of maternal age, ethnicity and health status, as well as gestation at the time of registration and at the time of labour onset.

Chapter 3 – Labour details

The third chapter provides information about the women's labour and includes details on the length of labour, labour procedures such as induction, and anaesthetic use and transfers during labour.

Chapter 4 – Births

This chapter provides information about the type of birth, along with the place of birth. Maternal age, ethnicity and parity are described, along with birth outcomes and birth setting. Third stage of labour care and outcomes are also discussed, along with perineal trauma following birth.

Chapter 5 – Babies

This chapter is based on the number of babies born and entered into the MMPO database in 2016. It provides information on gestational age at time of birth, Apgar scores, birth weight and neonatal transfers following birth.

Chapter 6 - Postnatal period

The postnatal period is covered in this chapter which provides information on babies' feeding status at two weeks postpartum, along with maternal postnatal smoke free status.

Appendix

The appendix describes the MMPO Maternity Notes dataset.

1.4 Key data sources

The data for this report were sourced from all pregnant women who registered with MMPO midwives during their pregnancy, were more than 20 weeks' gestation and who gave birth between 01 January and 31 December 2016. Therefore, the information in this report does not include any data relating to pregnancies ending in terminations or miscarriages. The data was generated using a Microsoft Access database as two separate files – with one file providing data related to the mother and the other to the baby. Each of the files has the same date and cohort parameters and are merged so that outcomes can be examined.

Cohort numbers vary between various sections within this report. The reasons for this are firstly, the exclusion of elective caesarean sections for particular aspects such as labour management and secondly, multiple births which increase the cohort of babies in the 'Births' and 'Babies' sections of this report.

1.4.1 Regional profile of data contributors

In 2002, the MMPO opened membership to midwives nationally. Prior to this, membership was restricted by contract with the Ministry of Health to the South Island. This accounts for the disproportionately high numbers of midwife members in the South Island at this time. The following table (Table 1.1) shows the distribution of MMPO midwives throughout the country based on District Health Board (DHB) regions for 2016.

Table 1.1: Data contributors by DHB region

DHB region	MMPO midwives contributing data	
	n	%
Northland	44	4.6
Waitemata	75	7.9
Auckland	51	5.4
Counties Manukau	37	3.9
Waikato	87	9.2
Bay of Plenty	43	4.5
Lakes	15	1.6
Taranaki	36	3.8
Tairāwhiti	16	1.7
Hawke's Bay	24	2.5
Wairarapa	9	0.9
Whanganui	18	1.9
MidCentral	49	5.2
Hutt	37	3.9
Capital and Coast	74	7.8
Nelson Marlborough	35	3.7
Canterbury	164	17.3
West Coast	8	0.8
South Canterbury	15	1.6
Otago*	60	6.3
Southland*	53	5.6
TOTAL	950	100

*Otago and Southland are now combined as Southern DHB.

The highest proportion of midwives came from the Canterbury region, whereas the West Coast, South Canterbury, Lakes and Wairarapa had low proportions. The majority (64.7 percent) of MMPO midwives were located in the North Island.

1.4.2 Professional profile of data contributors

Table 1.2 summarises the MMPO midwives' professional experience as at 2016, reported as the number of years' experience as a 'Continuity of Care' midwife.

The term 'continuity of care' midwife is used here as opposed to a 'Lead Maternity Carer' (LMC) midwife because the LMC term was not introduced until 1996 and a proportion of MMPO midwives reported having professional experience prior to this date

Table 1.2: Years as 'Continuity of Care' midwife

Years as a 'Continuity of Care' midwife	MMPO contributors		Midwifery Council Workforce data 2016	
	n	%	n	%
Up to 1 year	153	16.1	269	8.9
2-5 years	248	26.1	530	17.5
6-10 years	209	22.0	491	16.2
11-15 years	158	16.6	392	13.0
16-20 years	90	9.5	409	13.5
21-25 years	29	3.1	361	11.9
26-30 years	12	1.3	217	7.2
31-35 years	6	0.6	178	5.9
36-40 years	8	0.8	129	4.3
41+ years	2	0.2	47	1.6
Missing	35	3.7	0	0.0
TOTAL	950	100	3,023	100

Table 1.2 shows the MMPO data and compares to that held by the Midwifery Council in 2016 (Midwifery Council of New Zealand, 2016). For the MMPO data the largest group of midwives were those who had between two and five years professional experience as a 'continuity of care' midwife (26.1 percent) followed by midwives with between six and ten years' experience as a 'continuity of care' midwife (22 percent). There were 6 percent of midwives with twenty years or more of 'continuity of care' midwifery experience.

1.5 Methodology

The purpose and objectives of the report along with a summary of the methodology used to compile the report are available on the College website at www.midwife.org.nz/midwives/publications/midwifery-outcomes/

2 Women and pregnancy

2.1 Demographic profile

This chapter provides demographic information, pregnancy registration, maternal age, maternal ethnicity and antenatal history, along with the gestation at commencement of labour for women in the 2016 MMPO cohort.

2.1.1 Registered births

In 2016 information for 30,165 pregnant women who gave birth to 30,526 babies captured in the MMPO database. At the time of printing the Ministry of Health had not published the annual Report on Maternity for 2016 meaning that comparisons of MMPO data and Ministry of Health data could not be undertaken.

2.1.2 DHB region of births

In the 2016 MMPO cohort, the largest group of women were living in the catchment area for the Canterbury District Health Board (CDHB) (19.3 percent) with 9.0 percent in the Waikato region and 9.4 percent from the Waitemata DHB (Table 2.1).

Table 2.1: Domicile of women by DHB region

DHB region	Women contributing data	
	n	%
Northland	1,740	5.8
Waitemata	2,823	9.4
Auckland	899	3.0
Counties Manukau	1,800	6.0
Waikato	2,718	9.0
Bay of Plenty	1,247	4.1
Lakes	428	1.4
Taranaki	970	3.2
Tairāwhiti	760	2.5
Hawke's Bay	758	2.5
Wairarapa	226	0.7
Whanganui	575	1.9
MidCentral	1,674	5.5
Hutt	1,243	4.1
Capital and Coast	1,608	5.3
Nelson Marlborough	1,321	4.4
Canterbury	5,813	19.3
West Coast	197	0.7
South Canterbury	303	1.0
Otago	1,661	5.5
Southland	1,401	4.6
TOTAL	30,165	100

2.1.3 Gestation at registration

The following table (Table 2.2) indicates the gestation at which women registered with an MMPO midwife. An increasing number of women are registering with a midwife before 10 weeks' gestation with, 49.6 percent in 2016 compared to 47.7 percent in 2015. A further 30.9 percent registered between 10 and 14 weeks, with a total of 80.5 percent of women registering in the first trimester of pregnancy, 13.5 percent of women registered in the second trimester and 5.9 percent in the third trimester of pregnancy.

Table 2.2: Gestation at registration

Gestation	n	%
< 10 weeks	14,961	49.6
10-14 weeks	9,330	30.9
15-20 weeks	2,661	8.8
21-27 weeks	1,427	4.7
28 to term	1,786	5.9
TOTAL	30,165	100

2.1.4 Maternal age

The mean age of pregnant women at registration was 28 years (Standard Deviation [SD] 5.7), with the majority of women (59.1 percent) aged between 25 and 34 years (Table 2.3). There were 6.1 percent under 20 years of age, and 2.7 percent aged 40 years or older.

Table 2.3: Women's age at registration

Maternal age	n	%
<16 years	94	0.3
16-19 years	1,746	5.8
20-24 years	5,668	18.8
25-29 years	9,154	30.3
30-34 years	8,700	28.8
35-39 years	3,998	13.3
40+ years	805	2.7
TOTAL	30,165	100

2.1.5 Maternal ethnicity

The ethnicity data for the women in the 2016 dataset (as recorded at the time of registration) is shown in Table 2.4. This demonstrates that the majority (61.1 percent) identified as NZ European, followed by 18.7 percent who identified as Māori. The third highest ethnic group was recorded as Asian (12 percent) and 6.0 percent identified as Pasifika. The Other category included women from Africa, the Middle East and Latin America.

Table 2.4: Women's ethnicity at registration

Ethnicity	n	%
NZ European	18,440	61.1
Māori	5,634	18.7
Pasifika	1,808	6.0
Asian	3,611	12.0
Other	670	2.2
Missing	2	0.0
TOTAL	30,165	100

2.2 Antenatal history

This section includes data on selected maternal health and other factors that could influence the current pregnancy.

2.2.1 Gravida

Gravida refers to the total number of pregnancies a woman has had including the current one, regardless of whether they were carried to term or not. Multiple pregnancies count as one pregnancy. For example, a woman who had one previous pregnancy and is currently pregnant is designated as 'gravida 2'. Almost thirty percent (29.7) of all women who registered with an MMPO midwife in 2016 were experiencing their first pregnancy (Table 2.5)

Table 2.5: Women's gravida at registration

Gravida		n	%
Primigravida	1	8,953	29.7
Multigravida	2-4	17,347	57.5
	≥5	3,865	12.8
TOTAL		30,165	100

2.2.2 Body Mass Index

A healthy body size is known to be important for health and wellbeing during pregnancy. Body Mass Index (BMI) is a widely used indicator of body weight, with classifications indicating underweight, healthy weight, overweight and obese, and with obesity also categorised into 3 classes (World Health Organization [WHO] <http://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi>)

For pregnant women in 2016 the mean BMI was 26.6 (SD 6.1) and the median was 25.2. The majority of women (46 percent) were within the healthy range BMI, with 26.8 percent overweight, and a further 24.6 percent in the obese category.

Table 2.6: Women's body mass index at registration

BMI	n	%
Underweight (<18.5)	776	2.6
Healthy weight (18.5-24.9)	13,868	46.0
Overweight (25-29.9)	8,090	26.8
Obese class 1 (30-34.9)	4,284	14.2
Obese class 2 (35-39.9)	1,965	6.5
Obese class 3 (>40)	1,182	3.9
TOTAL	30,165	100

2.2.3 Factors that may influence pregnancy

During pregnancy the midwife undertakes a full health and obstetric history. Data from this assessment is used to identify some features of interest that could influence the care provision and outcomes for the existing pregnancy, labour and birth.

Some of these factors are identified in Table 2.7 for the 2016 cohort and include multiple pregnancy (1.2 percent), previous caesarean section (12.9 percent), giving birth for the first time and being over 37 years of age (1.5 percent) and being over 39 years of age when giving birth (0.6 percent).

Table 2.7: Factors that may influence pregnancy outcome

Specific features	n	%
Nulliparous >37 years of age	444	1.5
Nulliparous >39 years of age	193	0.6
Previous caesarean section	3,896	12.9
Multiple pregnancy (≥2 babies)	359	1.2

2.2.4 Existing medical conditions

There were 17,605 (58.4 percent) women in the 2016 cohort who had one or more pre-existing medical condition. The type of medical condition is described in more detail in Table 2.8. This table provides the frequency of the condition identified with some women reporting more than one medical condition.

Table 2.8: Women with pre-existing medical conditions

Condition	n	%
Asthma	3,639	12.1
Psychiatric	2,807	9.3
UTI Renal	2,943	9.8
Sexual transmitted Infection (STI)	1,915	6.3
Hypertension (essential)	512	1.7
Thyroid conditions	612	2.0
Cardiac disease	399	1.3
Diabetes	328	1.1
Rheumatic fever	64	0.2
Epilepsy	160	0.5
Coagulation disorder	198	0.7
Other*	389	1.3

* Autoimmune disorders, TB, bowel problems, cancer therapy.

The most commonly identified condition was asthma (12.1 percent), followed by urinary tract infections or a renal condition (9.8 percent), psychiatric conditions (9.3 percent) and a previous sexually transmitted infection (6.3 percent). Conditions that were less commonly identified were hypertension (1.7 percent), thyroid disease (2.0 percent), cardiac disease (1.3 percent), diabetes (1.1 percent) and epilepsy (0.5 percent).

2.2.5 Smoke free status during pregnancy

Smoke free status is being recorded with more information about smoking history and demonstrates that 15.3 percent of women continued to smoke during pregnancy, while 65.7 percent had never smoked (Table 2.9). A proportion of women (19 percent) reported having a history of smoking but being smoke free at the time of pregnancy registration.

Table 2.9: Smoke free status at registration

Smoke free status history	n	%
Current smoker	4,612	15.3
Ex smoker (<12 months abstinent)	3,032	10.1
Ex smoker (>12 months abstinent)	2,692	8.9
Never smoked tobacco	19,822	65.7
Now smoke free (> 4 wks) - no longer used	6	0.0
Unknown	1	0.0
TOTAL	30,165	100

Age was examined for women who reported smoking (current smoker) or being smoke free during pregnancy (Figure 2.1). The age group with the highest level of smoking was women between 16 and 19 years of age with 32.1 percent smoking, followed by those younger than 16 years old with 26.6 percent smoking during pregnancy.

Ethnicity was examined looking at women who reported being a current smoker or being smoke free (Figure 2.2). The ethnic group with the greatest proportion of women smoking during pregnancy

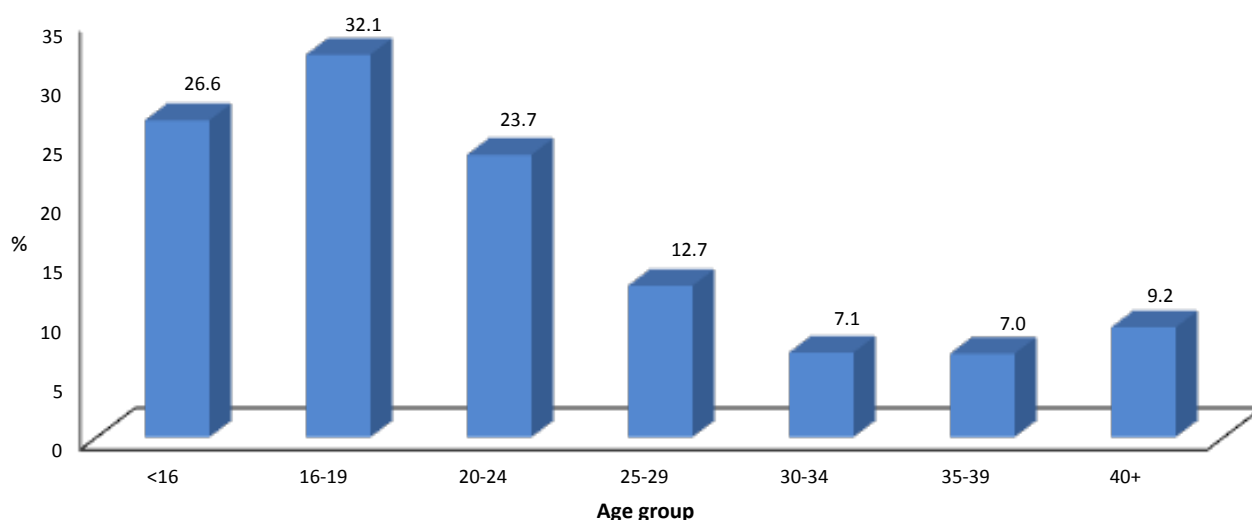


Figure 2.1: Percentage of women who reported smoking during pregnancy, by age group

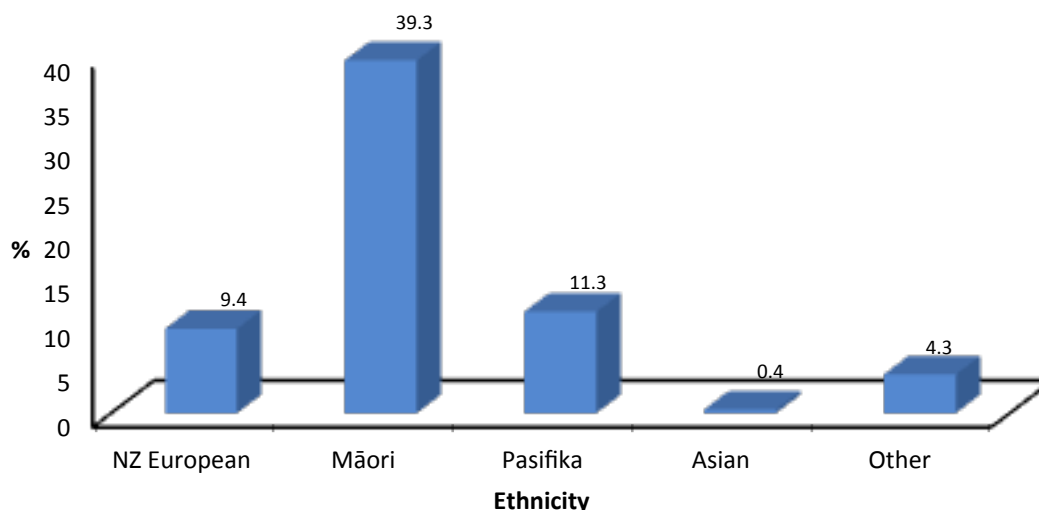


Figure 2.2: Percentage of women who reported smoking during pregnancy, by ethnicity

were women who identified as Māori (39.3 percent) followed by Pasifika (11.3 percent) and NZ European women (9.4 percent).

2.3 Duration of pregnancy

For the majority of women (87.9 percent) the onset of labour was between 37 and 41 weeks gestation (Table 2.10) with only a small number (0.6 percent) with very premature labours (before 27 weeks gestation). For 6.6 percent of the cohort the gestation was at or more than 42 weeks at the onset of labour.

Table 2.10: Gestation at labour commencement or elective caesarean (all women)

Gestation at labour commencement*	Weeks	n	%
Extremely pre term	20–23	93	0.3
	24–27	93	0.3
Very pre term	28–31	165	0.5
Moderate to late pre term	32–36	1,312	4.3
Term	37	1,370	4.5
	38	3,431	11.4
	39	7,526	24.9
	40	8,291	27.5
	41	5,883	19.5
	42	1,839	6.1
Post term	>42	159	0.5
Missing		3	0.0
TOTAL		30,165	100

*WHO definition of prematurity <http://www.who.int/news-room/fact-sheets/detail/preterm-birth>

2.3.1 Frequency of antenatal assessments

The average number of antenatal visits for women was 10.0 (SD 3.8). Nearly half of all women (47.2 percent) received between 11 and 15 visits, with a further 37.0 percent receiving between 6 and 10 visits (Table 2.11).

Table 2.11: Frequency of antenatal assessments

Antenatal visits	n	%
None	773	2.6
1–5 visits	2,488	8.2
6–10 visits	11,162	37.0
11–15 visits	14,247	47.2
16–20 visits	1,367	4.5
>20 visits	128	0.4
TOTAL	30,165	100

3 Labour details

This chapter is based upon the data obtained from the 30,165 women registered with MMPO midwives who laboured and gave birth in 2016. It describes length of labour, transfers during labour and specific labour procedures such as induction of labour.

3.1 Length of labour

MMPO midwives report separately on both the onset of contractions and established labour in the clinical notes for women. The midwife discusses with the woman when contractions started and when labour was thought to be established. This helps to clarify the length of the labour for both the woman and the midwife. The data for length of labour for this report has been taken from the time that established labour is reported.

Overall, the majority of women (77.8 percent) had a labour length recorded as eight hours or less, with 4.3 percent of women having a labour of more than 15 hours. Primiparous women had longer labours, with 33.6 percent of first-time mothers reported as having labours more than eight hours compared with 7.5 percent of multiparous women.

Table 3.1: Hours of labour and parity

Hours of labour	Primiparous		Multiparous		Total	
	n	%	n	%	n	%
<1	111	0.9	713	4.5	824	3.0
1-2	1,266	10.7	5,774	36.6	7,040	25.5
3-4	2,140	18.1	4,465	28.3	6,605	23.9
5-6	2,164	18.3	2,146	13.6	4,310	15.6
7-8	1,733	14.7	973	6.2	2,706	9.8
9-10	1,336	11.3	495	3.1	1,831	6.6
11-15	1,706	14.4	445	2.8	2,151	7.8
>15	934	7.9	258	1.6	1,192	4.3
Not stated	437	3.7	488	3.1	925	3.4
TOTAL	11,827	100	15,757	100	27,584*	100

* Excludes women who had an elective caesarean (n=2,581).

3.2 Transfers during labour

The majority of women (95 percent) gave birth in the facility in which they had planned to give birth (Table 3.2). For women who plan to give birth in a primary facility or at home there is sometimes a need to transfer during labour to the regional secondary or tertiary facility. The reasons for transfer vary but may be due to a requirement for obstetric input or additional analgesia. For the overall 2016 cohort, 5 percent of women were transferred to another facility

during labour, 1.7 percent from a planned home birth and 3.2 percent from a planned primary facility birth..

Table 3.2: Transfers during labour by birth setting

Intrapartum transfers	n	%
Home	462	1.7
Primary facility	879	3.2
Secondary facility*	32	0.1
Tertiary facility*	6	0.0
Total transferred	1,379	5.0
Total not transferred	26,205	95.0
TOTAL	27,584**	100

* Transfers from secondary and tertiary facilities may be due to unavailability of a neonatal service in the planned place of birth.

** Excludes women who had an elective caesarean (n=2,581).

The number of women planning to give birth in a primary facility or at home and the number who transferred are summarised in Table 3.3. This demonstrates that of the cohort of women who planned to give birth at home, 23 percent transferred to a facility during labour. This means, for example, while 2,010 women had planned to give birth at home, 462 (23 percent) were transferred to a maternity facility during labour and therefore, 1,548 women actually gave birth at home. Of those who planned to give birth in a primary facility, 20.3 percent were transferred in labour.

Table 3.3: Transfers from home and primary facilities during labour

Planned place of birth	Total n	Transfers	
		n	%
Home	2,010	462	23.0
Primary facility	4,333	879	20.3
TOTAL	6,343	1,341	21.1

NOTE: Excludes women who had an elective caesarean (n=2,581) because the place of birth was pre-arranged at the time of the caesarean booking.

3.3 Labour procedures

3.3.1 Induction of labour

The majority of women (77.6 percent) commenced labour spontaneously in 2016. Labour was induced for 22.4 percent of the women in the MMPO cohort (Table 3.4). Primiparous women were more likely to be induced (27.7 percent) than multiparous women (18.4 percent).

Overall, as women's age increased, the incidence of induction also increased, with 38.7 percent of women 40 years of age or over induced compared to 20.7 percent of women under 16 years of age (Figure 3.1).

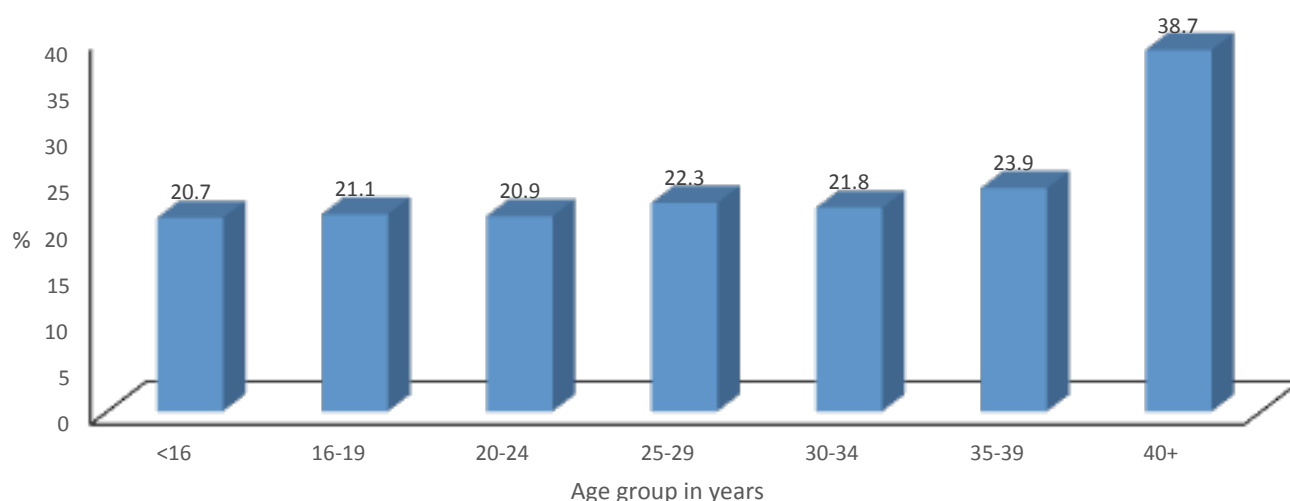


Figure 3.1: Induction of labour by age group

Table 3.4: Women by labour induction and parity

Induction	Primiparous		Multiparous		Total	
	n	%	n	%	n	%
No	8,552	72.3	12,857	81.6	21,409	77.6
Yes	3,275	27.7	2,900	18.4	6,175	22.4
TOTAL	11,827	100	15,757	100	27,584*	100

* Excludes women who had an elective caesarean (n=2,581).

3.3.2 Anaesthesia during labour

Overall, the majority of women (64.4 percent) did not have any anaesthetic procedures during labour, but of those who did, epidurals were the most common (Table 3.5). Anaesthetic use was higher for primiparous women for all anaesthetic procedures. The rate of epidurals and spinals (including combined epidural/spinal and general/spinal/epidural) for primiparous women was 43.3 percent, compared with 18.4 percent for multiparous women.

3.3.3 Other pharmaceutical pain management

The different types of pharmaceutical pain management are reported in Table 3.6 and demonstrate that women may use more than one type of pharmaceutical pain management during labour.

For the 2016 cohort of women 41.8 percent used Entonox alone, with a further 1.6 percent using Entonox with pethidine. Pethidine alone was used by 0.7 percent of women and 0.2 percent used fentanyl patient-controlled analgesia (PCA) alone.

Table 3.5: Anaesthetic procedures during labour and parity

Anaesthesia type	Primiparous		Multiparous		Total	
	n	%	n	%	n	%
Epidural	3,629	30.7	1,518	9.6	5,147	18.7
Epidural and spinal	127	1.1	73	0.5	200	0.7
Spinal	1,315	11.1	1,280	8.1	2,595	9.4
General anaesthetic	190	1.6	171	1.1	361	1.3
Pudendal	201	1.7	58	0.4	259	0.9
General/Spinal/epidural	50	0.4	26	0.2	76	0.3
Other	386	3.3	614	3.9	1,000	3.6
Nil used	5,850	49.5	11,908	75.6	17,758	64.4
Not stated	79	0.7	109	0.7	188	0.7
TOTAL	11,827	100	15,757	100	27,584*	100

* Excludes women who had an elective caesarean (n=2,581).

Table 3.6: Pharmacological pain management during labour and parity

Medication type	Primiparous		Multiparous		Total	
	n	%	n	%	n	%
Entonox	5,724	48.4	5,809	36.9	11,533	41.8
Entonox, Pethidine	324	2.7	122	0.8	446	1.6
Entonox, Fentanyl PCA	64	0.5	33	0.2	97	0.4
Entonox, other	346	2.9	166	1.1	512	1.9
Pethidine	140	1.2	64	0.4	204	0.7
Fentanyl PCA	36	0.3	30	0.2	66	0.2
Other	155	1.3	86	0.5	241	0.9
Not known	9	0.1	7	0.0	16	0.1
Nil used	5,029	42.5	9,440	59.9	14,469	52.5
TOTAL	11,827	100	15,757	100.0	27,584*	100

* Excludes women who had an elective caesarean section (n=2,581).

Table 3.7: Pharmacological pain management for women with no anaesthetic procedure and parity

Medication type	Primiparous		Multiparous		Total	
	n	%	n	%	n	%
Entonox	2,609	44.6	4,104	34.5	6,713	37.8
Entonox®, Pethidine	133	2.3	80	0.7	213	1.2
Entonox®, Fentanyl PCA	28	0.5	17	0.1	45	0.3
Entonox®, Fentanyl PCA Pethidine	92	1.6	78	0.7	170	1.0
Pethidine	62	1.1	35	0.3	97	0.5
Fentanyl PCA	9	0.2	15	0.1	24	0.1
Other	69	1.2	48	0.4	117	0.7
Not known	3	0.1	2	0.0	5	0.0
Nil used	2,845	48.6	7,529	63.2	10,374	58.4
TOTAL	5,850	100	11,908	100	17,758	100

Just over half of the women in the 2016 cohort (52.5 percent) did not use any pharmacological pain relief methods.

In order to identify how many women did not use either anaesthetic methods or pharmacological pain relief we reviewed the data for the 64.4 percent (17,758) of women who did not have an anaesthetic procedure (no epidural/spinal etc.). Table 3.7 demonstrates that 48.6 percent of primiparous women and 63.2 percent of multiparous women used neither anaesthetic methods nor pharmacological pain relief methods.

3.3.4 Water and complementary forms of pain management

This section reports those women who have used any of the identified non-pharmaceutical types of pain management. Women may have used any or all of these plus pharmaceutical pain management. Therefore, Table 3.8 reflects the number and percentage of each form of pain management and is not a count of women.

In 2016 the most common forms of pain management used were positional techniques (changes in position) (36.2 percent), use of water (26.8 percent), massage (22.5 percent) and heat packs (15.5 percent). Less commonly used were TENS (transcutaneous electronic nerve stimulation), acupressure, acupuncture and homeopathy

Table 3.8: Other pain management during labour

Other pain management	n	%
Positional techniques	9,996	36.2
Water	7,399	26.8
Massage	6,208	22.5
Heat Packs	4,279	15.5
Acupressure	1,389	5.0
Homeopathy	823	3.0
TENS	656	2.4
Acupuncture	302	1.1

4 Births

Information presented in this chapter relates to the type of birth, maternal age and ethnicity, as well as birth setting and geographical areas.

4.1 Type of birth

The information presented in Table 4.1 relates to the birth of the baby and includes 361 more babies than mothers due to multiple births (357 sets of twins and 2 sets of triplets; 1.2 percent of births). For these multiple births it is possible for a woman to have more than one type of birth. The denominator for this group is therefore 30,526 births.

Table 4.1: Type of birth

Birth type	MMPO 2016	
	n	%
Spontaneous vaginal birth	20,544	67.3
Normal vaginal	20,452	67.0
Vaginal breech	92	0.3
Assisted birth	2,568	8.4
Ventouse	1,485	4.9
Forceps	1,031	3.4
Other Instrumental *	42	0.1
Instrumental breech	10	0.0
Caesarean section	7,399	24.2
Elective caesarean	2,681	8.8
Emergency caesarean	4,718	15.4
Unknown	15	0.1
TOTAL	30,526	100

*e.g. Kiwi cup

The majority of babies born in 2016 were born vaginally, with 67.3 percent having a spontaneous vaginal birth and 8.4 percent an instrumental birth (Table 4.1). The caesarean section rate was 24.2 percent, of which 8.8 percent were elective caesareans and 15.4 percent were emergency caesareans.

4.1.1 Vaginal birth after caesarean section (VBAC)

There were 3,895 women who had a history of previous caesarean section in the 2016 dataset. Of these 43.1 percent (n=1,681) had an elective caesarean section. Of the remaining 2,214 women who attempted a vaginal birth after caesarean section 47.6 percent had an emergency caesarean section and 52.4 percent achieved a vaginal birth (Table 4.2).

Table 4.2: Vaginal birth after caesarean section (VBAC)

Birth type	TOTAL	
	n	%
Spontaneous vaginal birth	960	43.3
Normal vaginal	956	43.2
Vaginal breech	4	0.1
Assisted birth	201	9.1
Ventouse	122	5.5
Forceps	75	3.4
Other Instrumental *	4	0.2
Caesarean section	1,054	47.6
Emergency caesarean	1,054	47.6
TOTAL	2,215	100

*e.g. Kiwi cup

4.1.2 Birth type and parity

The mother's parity and type of birth are compared and presented in Table 4.3 for the 30,165 women who gave birth. More multiparous women (77.7 percent) had a vaginal birth when compared to primiparous women (74.0 percent). More primiparous women (26.0 percent) than multiparous (22.3 percent) had a caesarean section.

Fewer primiparous women (3.6 percent) had an elective caesarean when compared to multiparous women (12.0 percent), with more primiparous women having an emergency caesarean (22.5 percent) when compared to multiparous women (10.3 percent).

Table 4.3: Birth type and parity

Birth type	Primiparous		Multiparous		Total	
	n	%	n	%	n	%
Normal vaginal	6,999	57.1	13,351	74.6	20,350	67.5
Vaginal breech	42	0.3	42	0.2	84	0.3
Ventouse	1,156	9.4	317	1.8	1,473	4.9
Forceps	843	6.9	181	1.0	1,024	3.4
Other Instrumental *	29	0.2	13	0.1	42	0.1
Total vaginal	9,069	74.0	13,904	77.7	22,973	76.1
Elective caesarean	436	3.6	2,145	12.0	2,581	8.6
Emergency caesarean	2,755	22.5	1,852	10.3	4,607	15.3
Total caesarean	3,191	26.0	3,997	22.3	7,188	23.8
Unknown	3	0.0	1	0.0	4	0.0
TOTAL	12,263	100	17,902	100	30,165	100

* e.g. Kiwi cup

4.1.3 Birth type and maternal age

The influence of age and birth type is explored in Table 4.4 for the 2016 cohort. Women under 20 years of age were only a small proportion of the overall cohort of births (6.1 percent) but they had the highest incidence of normal vaginal births (76.9 percent). For babies born to women 40 years of age or older (2.7 percent of cohort) the incidence of normal vaginal births was the lowest (51.3 percent). Overall the normal vaginal birth rate reduced as the woman's age increased.

The highest incidence of instrumental births was in the under 16 years age group (12.8 percent) and the 25-29 age group (9.4 percent), whereas the age group with the highest incidence of elective and emergency caesarean sections were women who were 40 years and older (41 percent).

4.1.4 Birth type and maternal ethnicity

Table 4.5 and Figure 4.1 refer to the numbers of births by birth type and maternal ethnicity. Women who identified as Māori or Pasifika had the highest rate of normal vaginal births at 77.7 percent and 76.2 percent respectively and the lowest caesarean rates (18.0 and 19.6 percent, respectively). Conversely, the women who identified as Asian or Other had the lowest rate of normal vaginal births, at 58.2 percent and 58.1 percent respectively.

Table 4.4: Number of births by type and maternal age

Birth type	Maternal age (years)							Total
	<16	16-19	20-24	25-29	30-34	35-39	40+	
	n							
Normal vaginal	66	1,350	4,226	6,252	5,642	2,401	413	20,350
Vaginal breech	0	5	12	31	18	15	3	84
Ventouse	8	71	256	486	432	186	34	1,473
Forceps	4	57	185	353	297	105	23	1,024
Other Instrumental*	0	4	7	17	9	3	2	42
Total vaginal	78	1,487	4,686	7,139	6,398	2,710	475	22,973
Elective caesarean	2	33	257	665	893	578	153	2,581
Emergency caesarean	14	226	725	1,348	1,409	708	177	4,607
Total caesarean	16	259	982	2,013	2,302	1,286	330	7,188
Missing	0	0	0	2	0	2	0	4
TOTAL	94	1,746	5,668	9,154	8,700	3,998	805	30,165
	%							
Normal vaginal	70.2	77.3	74.6	68.3	64.9	60.1	51.3	67.5
Vaginal breech	0.0	0.3	0.2	0.3	0.2	0.4	0.4	0.3
Ventouse	8.5	4.1	4.5	5.3	5.0	4.7	4.2	4.9
Forceps	4.3	3.3	3.3	3.9	3.4	2.6	2.9	3.4
Other Instrumental*	0.0	0.2	0.1	0.2	0.1	0.1	0.2	0.1
Total vaginal	83.0	85.2	82.7	78.0	73.5	67.8	59.0	76.1
Elective caesarean	2.1	1.9	4.5	7.3	10.3	14.5	19.0	8.6
Emergency caesarean	14.9	12.9	12.8	14.7	16.2	17.7	22.0	15.3
Total caesarean	17.0	14.8	17.3	22.0	26.5	32.2	41.0	23.9
TOTAL	100	100	100	100	100	100	100	100

*e.g. Kiwi cup

Table 4.5: Births by birth type and maternal ethnicity

Birth type	NZ European		Māori		Pasifika		Asian		Other		Not Stated		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Normal vaginal	12,105	65.6	4,375	77.7	1,378	76.2	2,101	58.2	389	58.1	2	100	20,350	67.5
Vaginal breech	53	0.3	13	0.2	4	0.2	12	0.3	2	0.3	0	0.0	84	0.3
Ventouse	969	5.3	151	2.7	46	2.5	276	7.6	31	4.6	0	0.0	1,473	4.9
Forceps	726	3.9	81	1.4	24	1.3	171	4.7	22	3.3	0	0.0	1,024	3.4
Other Instrumental*	36	0.2	2	0.0	2	0.1	1	0.0	1	0.1	0	0.0	42	0.1
Total vaginal	13,889	75.3	4,622	82.0	1,454	80.4	2,561	70.9	445	66.5	2	100.0	22,973	76.2
Elective caesarean	1,783	9.7	323	5.7	97	5.4	292	8.1	86	12.8	0	0.0	2,581	8.6
Emergency caesarean	2,764	15.0	689	12.2	257	14.2	758	21.0	139	20.7	0	0.0	4,607	15.3
Total caesarean	4,547	24.7	1,012	18.0	354	19.6	1,050	29.1	225	33.5	0	0.0	7,188	23.8
Missing	4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
TOTAL	18,440	100	5,634	100	1,808	100	3,611	100	670	100	2	100	30,165	100

*e.g. Kiwi cup

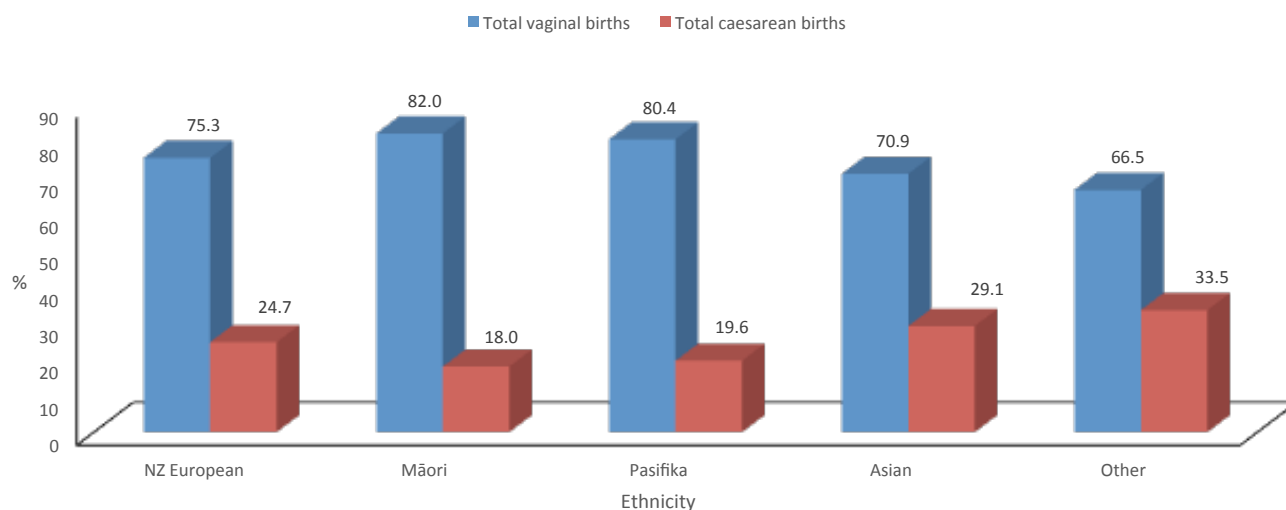


Figure 4.1: Births by birth type – vaginal versus caesarean – and ethnicity

4.2 Place of birth – geographic distribution and birth setting

This section examines the place of birth by the domicile DHB region of the woman giving birth. It also explores the rurality of the women registered with an MMPO midwife in 2016.

The biggest proportion of the births occurred in secondary facilities (45.5 percent), while 37.9 percent birthed in one of the six tertiary facilities in the country (Table 4.6). There were 5,002 women (16.6 percent) registered with an MMPO midwife who gave birth either at a primary facility or at home.

The region with the highest percentage of home births was the West Coast (16.8 percent), followed by Northland (9.4 percent) and Hawke's Bay (8.2 percent). Waikato was the region with the highest percentage of primary unit births (28.0 percent) followed by Counties Manukau (20.8 percent) and Northland (16.7 percent).

Table 4.6: Women by birth place type and district health board domicile

DHB region	Home		Primary facility		Secondary facility		Tertiary facility		Total	
	n	%	n	%	n	%	n	%	n	%
Northland	164	9.4	291	16.7	1,263	72.6	22	1.3	1,740	100
Waitemata	126	4.5	96	3.4	2,486	88.1	115	4.1	2,823	100
Auckland	56	6.2	77	8.6	199	22.1	567	63.1	899	100
Counties Manukau	45	2.5	375	20.8	7	0.4	1,373	76.3	1,800	100
Waikato	141	5.2	760	28.0	36	1.3	1,781	65.5	2,718	100
Bay of Plenty	52	4.2	154	12.3	1,031	82.7	10	0.8	1,247	100
Lakes	12	2.8	52	12.1	356	83.2	8	1.9	428	100
Taranaki	44	4.5	31	3.2	886	91.3	9	0.9	970	100
Tairāwhiti	33	4.3	39	5.1	681	89.6	7	0.9	760	100
Hawke's Bay	62	8.2	16	2.1	674	88.9	6	0.8	758	100
Wairarapa	18	8.0	1	0.4	202	89.4	5	2.2	226	100
Whanganui	27	4.7	29	5.0	513	89.2	6	1.0	575	100
MidCentral	81	4.8	69	4.1	1,511	90.3	13	0.8	1,674	100
Hutt	34	2.7	0	0.0	1,183	95.2	26	2.1	1,243	100
Capital and Coast	87	5.4	229	14.2	39	2.4	1,253	77.9	1,608	100
Nelson Marlborough	101	7.6	35	2.6	1,168	88.4	17	1.3	1,321	100
Canterbury	309	5.3	800	13.8	47	0.8	4,657	80.1	5,813	100
West Coast	33	16.8	27	13.7	118	59.9	19	9.6	197	100
South Canterbury	20	6.6	0	0.0	267	88.1	16	5.3	303	100
Otago	63	3.8	188	11.3	58	3.5	1,352	81.4	1,661	100
Southland	40	2.9	185	13.2	1,012	72.2	164	11.7	1,401	100
TOTAL	1,548	5.1	3,454	11.5	13,737	45.5	11,426	37.9	30,165	100

4.2.1 Births in rural areas

The Section 88 Maternity Notice 2007 (Ministry of Health, 2007) defines the domicile of the mother according to the rurality of the place of residence. This is defined as not rural (urban), semi-rural, rural and remote rural. The data obtained from the 2016 MMPO cohort is presented in Table 4.7 and Figure 4.2.

Overall, 64.1 percent of the babies born to women registered with MMPO midwives were from urban (not rural) domiciles and of these, 87.5 percent gave birth in either a tertiary or secondary setting. A greater proportion of women living in rural areas (20.2 percent rural and 26.5 percent remote rural) gave birth in primary units (Figure 4.2). More remote rural women gave birth at home (8.2 percent) than urban women (4.7 percent).

Table 4.7: Women giving birth by birth setting and rurality

Rurality	Home	Primary facility	Secondary facility	Tertiary facility	Total
			n		
Urban	901	1,518	8,591	8,333	19,343
Semi-rural	168	212	1,729	721	2,830
Rural	335	1,258	2,748	1,890	6,231
Remote rural	144	466	669	482	1,761
TOTAL	1,548	3,454	13,737	11,426	30,165

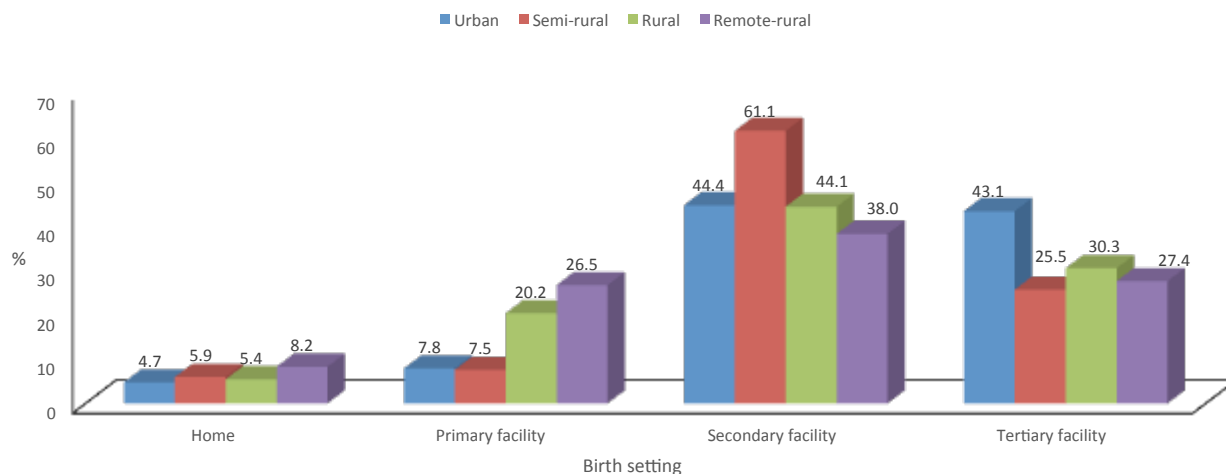


Figure 4.2: Percentage of birth by birth setting and rurality

4.3 Birth setting and parity

Birth setting and maternal parity are examined in Table 4.8 and Figure 4.3. For primiparous women, the majority (88.7 percent) gave birth in either a secondary or tertiary facility compared to 79.8 percent of multiparous women. Primiparous women were less likely to give birth at home (2.8 percent) or in a primary unit (8.5 percent) than multiparous women.

Table 4.8: Birth by birth setting and parity (excludes multiple births)

Birth setting	Primiparous		Multiparous		Total	
	n	%	n	%	n	%
Home	339	2.8	1,209	6.8	1,548	5.1
Primary facility	1,040	8.5	2,414	13.5	3,454	11.5
Secondary facility	5,629	45.9	8,108	45.3	13,737	45.5
Tertiary facility	5,255	42.9	6,171	34.5	11,426	37.9
TOTAL	12,263	100	17,902	100	30,165	100

4.3.1 Birth setting and type of birth

For the 30,165 women giving birth in 2016, 67.5 percent had a normal vaginal birth, of which 44.2 percent occurred in a secondary facility and 31.2 percent in a tertiary facility (Table 4.9). Secondary facilities had a lower rate of elective caesareans than tertiary facilities (9.2 percent versus 11.6 percent, respectively). Tertiary facilities had the highest rates of ventouse births and forceps births and of emergency caesarean births.

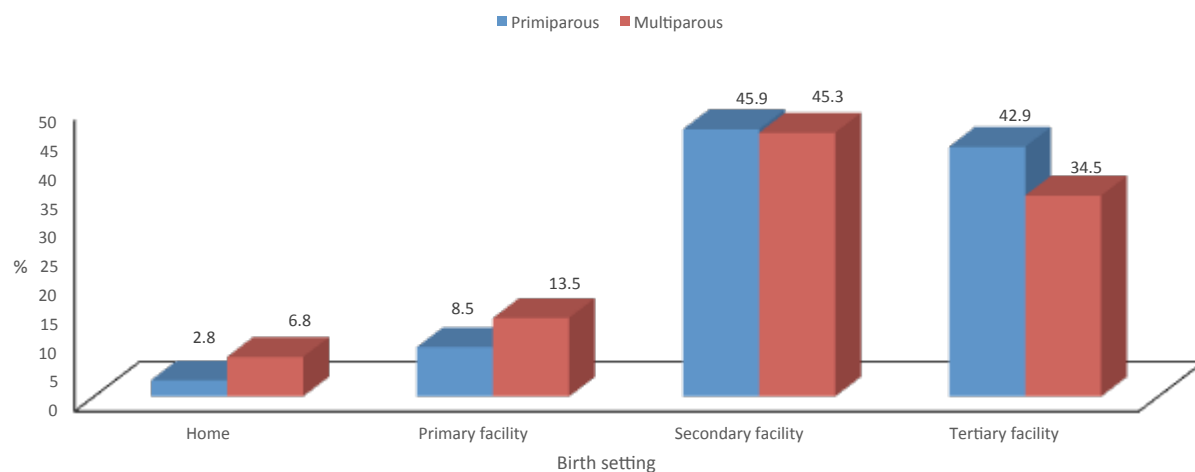


Figure 4.3: Percentage of births by birth setting and parity

Table 4.9: Birth setting and type of birth (excludes multiple births)

Birth type	Home		Primary facility		Secondary facility		Tertiary facility		Total	
	n	%	n	%	n	%	n	%	n	%
Spontaneous vaginal birth										
Normal vaginal	1,543	99.7	3,445	99.8	9,022	65.7	6,340	55.5	20,350	67.5
Vaginal breech	5	0.3	7	0.2	22	0.2	42	0.4	75	0.2
Total	1,548	100	3,452	100	9,044	65.9	6,382	55.9	20,425	67.7
Assisted birth										
Ventouse	0	0.0	2	0.0	659	4.8	813	7.1	1,473	4.9
Forceps	0	0.0	0	0.0	365	2.7	659	5.8	1,024	3.4
Other Instrumental *	0	0.0	0	0.0	6	0.0	36	0.3	42	0.1
Operative breech	0	0.0	0	0.0	2	0.0	6	0.1	9	0.0
Total	0	0.0	2	0.0	1,032	7.5	1,514	13.3	2,548	8.4
Caesarean section										
Elective caesarean	0	0.0	0	0.0	1,258	9.2	1,323	11.6	2,581	8.6
Emergency caesarean	0	0.0	0	0.0	2,402	17.5	2,205	19.3	4,607	15.3
Total	0	0.0	0	0.0	3,660	26.6	3,528	30.9	7,188	23.9
Unknown	0	0.0	0	0.0	1	0.0	2	0.0	4	0.0
TOTAL	1,548	100	3,454	100	13,737	100	11,426	100	30,165	100

*e.g. Kiwi cup

4.4 Water birth

Immersion in water during labour is known to reduce the need for epidural analgesia and increase maternal satisfaction with labour. The percentage of babies born into water remains low at 10.2 percent of all births (Table 4.10), although 26.8 percent of women report using water during labour (see Table 3.8). Women who gave birth at home or at a primary facility had a higher proportion of water births (27.9 percent and 34.8 percent, respectively) than those birthing in secondary or tertiary facilities (7.0 percent and 2.9 percent, respectively).

Table 4.10: Births to women using water in labour

Use of water	Water births		Non water births		Not stated		Total	
	n	%	n	%	n	%	n	%
Home	432	27.9	1,114	72.0	2	0.1	1,548	100
Primary facility	1,201	34.8	2,243	64.9	10	0.3	3,454	100
Sec-ondary facility	877	7.0	8,149	65.3	3,453	27.7	12,479	100
Tertiary facility	296	2.9	6,135	60.7	3,672	36.3	10,103	100
TOTAL	2,806	10.2	17,641	64.0	7,137	25.9	27,584*	100

*Excludes women who had an elective caesarean section (n=2,581)

4.5 Perineal trauma

4.5.1 Vaginal tears

The majority of women (68.5 percent) in the 2016 cohort had either an intact perineum or a first degree tear (Table 4.11) and 29.1 percent had a second

degree tear. The rates of third and fourth degree tears were low (2.2 and 0.1 percent respectively). The majority of multiparous women had an intact perineum (64.9 percent).

Table 4.11: Perineal trauma and parity for all vaginal births

Perineal trauma	Primiparous		Multiparous		All women	
	n	%	n	%	n	%
Intact/ Graze	5,625	47.6	10,219	64.9	15,844	57.4
1st degree	966	8.2	2,084	13.2	3,050	11.1
2nd degree	4,759	40.2	3,272	20.8	8,031	29.1
3rd degree	448	3.8	170	1.1	618	2.2
4th degree	29	0.2	12	0.1	41	0.1
TOTAL	11,827	100	15,757	100	27,584*	100

*Excludes women who had an elective caesarean section (n=2,581)

4.5.2 Episiotomy

For the 2016 cohort the episiotomy rate was 10.6 percent, with 3.6 percent of multiparous women receiving an episiotomy compared to 19.9 percent of primiparous women.

Table 4.12: Episiotomy by parity

Episiotomy	Primiparous		Multiparous		All women	
	n	%	n	%	n	%
Yes	2,357	19.9	573	3.6	2,930	10.6
No	9,470	80.1	15,184	96.4	24,654	89.4
TOTAL	11,827	100	15,757	100	27,584*	100

*Excludes women who had an elective caesarean section (n=2,581)

NB: Caution should be used when comparing to previous reports as the 2011 data reported episiotomies as a proportion of all births and did not exclude elective caesarean sections.

For women who had a vaginal birth only (assisted and all caesareans removed), overall 8.9 percent had an episiotomy of which 12.5 percent were primiparous and 2.3 percent were multiparous women (Table 4.13).

Table 4.13: Episiotomy for women who had a spontaneous vaginal birth, by parity

Episiotomy	Primiparous		Multiparous		Total	
	n	%	n	%	n	%
Yes	878	12.5	312	2.3	1,190	5.8
No	6,157	87.5	13,078	97.7	19,235	94.2
TOTAL	7,035	100	13,390	100	20,425	100

4.6 Third stage of labour outcomes

The third stage of labour is defined as 'the period from the birth of the baby until the complete birth of the placenta and membranes' (New Zealand College of Midwives, 2013). The next section reports on the blood loss volumes, along with the third stage management used by the midwives. The placental condition following birth is also described.

4.6.1 Blood loss volumes

The blood loss data is reported as less than 500mls, 501 to 749mls, 750 to 1,000mls, 1,001 to 1,499mls and 1,500mls or more. The blood loss volumes were examined for the total cohort for type of birth and volume of blood loss (Table 4.14). Women who had a normal vaginal birth had the lowest blood loss volumes, with 87.3 percent reported as having a blood loss of 500mls or less. Women who had a caesarean section had higher reported levels of blood loss, with 34.7

percent reported to have a blood loss of more than 500mls. Women who had an instrumental vaginal birth also had an increased blood loss volume, with 19.5 percent having a blood loss of more than 500mls.

For women who had a normal vaginal birth, 2.2 percent had a blood loss of 1500mls or more compared to 4.0 percent for instrumental vaginal birth and 3.4 percent for women following caesarean section (Table 4.14).

Women who had their labour induced or augmented had a higher blood loss than women who had a spontaneous onset and progression of labour (no syntocinon administered). Figure 4.4 identifies the number and proportion of women who had a severe postpartum haemorrhage (>1,000mls) and the birth type along with whether labour was spontaneous, induced or augmented.

Women who had a spontaneous onset and progression to birth (no induction and no syntocinon infusion for augmentation) had a lower level of severe blood loss regardless of the type of birth. There were 2.4 percent of women who had a spontaneous labour and an instrumental birth having a blood loss of 1,500mls or more, compared to 4.8 percent of women who had labour induced. For the women who had labour augmented with syntocinon, 3.9 percent who had an instrumental birth had a blood loss of 1,500mls or more.

Table 4.14: Postpartum blood loss by birth type for all births

Postpartum blood loss (mls)	Birth type									
	Normal vaginal birth		Instrumental vaginal birth		Caesarean section		Birth type missing		Total	
	n	%	n	%	n	%	n	%	n	%
0-500	17,833	87.3	1,942	76.2	4,217	58.7	4	100	23,996	79.5
501-749	793	3.9	162	6.4	1,211	16.8	0	0.0	2,166	7.2
750-1,000	661	3.2	177	6.9	862	12.0	0	0.0	1,700	5.6
1,001-1,499	296	1.4	56	2.2	176	2.4	0	0.0	528	1.8
≥1,500	459	2.2	103	4.0	247	3.4	0	0.0	809	2.7
Not Stated	383	1.9	108	4.2	475	6.6	0	0.0	966	3.2
TOTAL	20,425	100	2,548	100	7,188	100	4	100	30,165	100

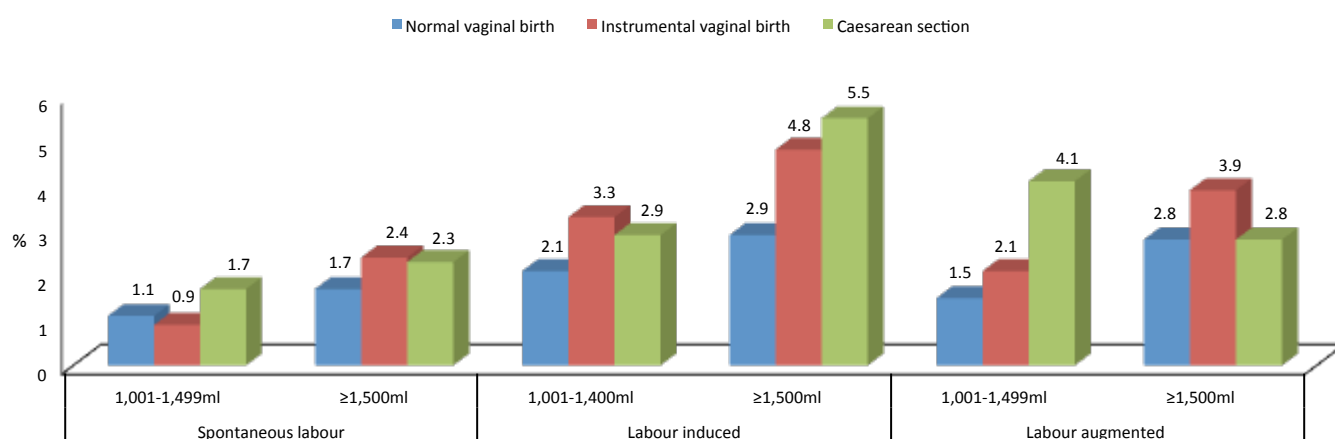


Figure 4.4: Postpartum blood loss by induction and augmentation

4.6.2 Third stage management

MMPO midwives report on four categories for management of the third stage of labour (placental delivery) these are:

1. **Active management of the third stage** involves the administration of a uterotonic during the third stage, cord clamping and cutting, and controlled cord traction to facilitate the birth of the placenta.
2. **Active management and treatment** includes women who have active management but then require further uterotonic administration during the third stage of labour.
3. **Physiological management** involves an approach that facilitates the physiology of the woman's body. It is a "hands off" approach to the third stage in which there is minimal intervention during the third stage and the woman expels the placenta herself using maternal effort and without the use of a uterotonic.
4. **Physiological and treatment** refers to women who initially have physiological management but then require treatment with a uterotonic.

The New Zealand College of Midwives consensus statement for the third stage recognises that women can expect a physiological third stage when preceded by a physiological labour and birth (New Zealand College of Midwives, 2013).

The data in the following tables provides third stage information for all vaginal births. Instrumental births and caesarean births have been excluded to ensure the data describes the normal vaginal birth third stage outcomes only.

4.6.3 Third stage management, treatment and blood loss

The third stage management style was described as either active (and treatment) or physiological (and treatment). More babies were born to women who had active management (63.6 percent) than physiological care (36.1 percent) (Table 4.15).

More women who had active management (and treatment) of the third stage had a blood loss greater than 500mls (12.6 percent) than those receiving physiological (and treatment) care (7.6 percent). More women actively managed also had a blood loss greater than 1,000mls (4.6 percent)

Table 4.15: Postpartum blood loss by third stage care (excludes all instrumental births and caesareans)

Postpartum blood loss (mls)	Active		Active & treatment		Physiological		Physiological & treatment		Not stated		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
0-500	10,494	91.5	629	40.9	5,695	96.3	998	68.2	17	47.2	17,833	87.3
501-749	321	2.8	230	14.9	70	1.2	172	11.7	0	0.0	793	3.9
750-1,000	226	2.0	270	17.6	34	0.6	130	8.9	1	2.8	661	3.2
1,001-1,499	81	0.7	141	9.2	5	0.1	69	4.7	0	0.0	296	1.5
≥1,500	132	1.1	242	15.7	10	0.2	75	5.1	0	0.0	459	2.2
Not Stated	218	1.9	26	1.7	101	1.6	20	1.4	18	50.0	383	1.9
TOTAL	11,472	100	1,538	100	5,915	100	1,464	100	36	100	20,425	100

compared with those in the physiological group (2.2 percent).

For the women who required treatment during the third stage, 40.9 percent of the active and treatment group had a blood loss of less than 500mls compared to 68.2 percent of the physiological and treatment group. There were 24.9 percent of women who had a blood loss of more than 1,000mls in the active and treatment group compared to 9.8 percent in the physiological and treatment group (Figure 4.5).

4.6.5 The condition of the placenta and membranes

When discussing the third stage of labour, it is useful to know the state of the placenta and membranes and if the placenta was retained, requiring a manual removal or examination under anaesthetic (EUA). The midwives record whether the placenta appears complete or incomplete, whether the membranes are ragged and whether a manual removal of placenta or examination under anaesthetic is required (Table 4.17). The results for the total cohort are reported

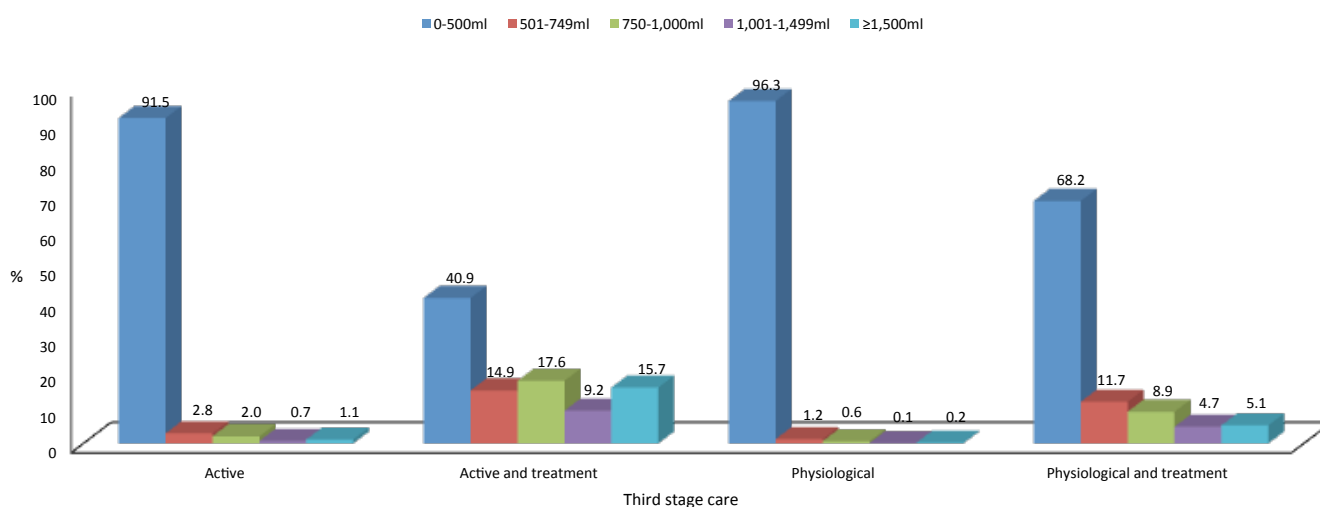


Figure 4.5: Percentage of postpartum blood loss by third stage care (vaginal births)

4.6.4 Third stage management and parity

When examining parity and the type of third stage care provided (Table 4.16), more multiparous women had a physiological third stage (38.3 percent) than primiparous women (32.1 percent).

Table 4.16: Third stage care and parity following all vaginal births

Uterotonic procedures	Primiparous		Multiparous		Total	
	n	%	n	%	n	%
Active	4,185	59.5	7,287	54.4	11,472	56.2
Active & treatment	579	8.2	959	7.2	1,538	7.5
Physiological	1,698	24.1	4,217	31.5	5,915	29.0
Physiological & treatment	560	8.0	904	6.8	1,464	7.2
Not stated	13	0.2	23	0.2	36	0.2
TOTAL	7,035	100	13,390	100	20,425	100

along with the type of birth so that the impact of type of birth on placental outcomes can be examined. In the 2016 cohort 2.1 percent of the overall cohort required a manual removal or examination under anaesthetic.

While the majority of placentae (89.3 percent) for vaginal births were delivered complete, those with their third stage reported as having 'physiological management' or 'physiological & treatment' had the lowest manual removals and EUA rates when compared to their respective 'active' and 'active & treatment' groups (Table 4.18).

For normal vaginal births the rate of ragged membranes (Figure 4.6) was higher for those in the physiological only and physiological and treatment group (8.3 percent and 13.4 percent, respectively) than those in the active only or active and treatment group (6.3 percent and 11.4 percent, respectively).

Table 4.17: Births by placenta condition and birth type (all births)

Placenta condition	Birth type							
	Normal vaginal birth		Instrumental vaginal birth		Caesarean section		Total	
	n	%	n	%	n	%	n	%
Complete	18,240	89.3	2,366	92.9	6,446	89.7	27,052	89.7
Ragged Membranes	1,589	7.8	101	4.0	215	3.0	1,905	6.3
EUA/manual removal	220	1.1	38	1.5	387	5.4	645	2.1
Incomplete	155	0.8	25	1.0	57	0.8	237	0.8
Other*	192	0.9	15	0.6	58	0.8	265	0.9
Not Stated	29	0.1	3	0.1	25	0.3	57	0.2
TOTAL	20,425	100	2,548	100	7,188	100	30,161**	100

* Includes cases where midwife noted the placental condition as ragged membranes only, gritty, oedematous or with calcifications.

** Excludes 4 women with missing birth type data

Table 4.18: Placental condition and third stage care for all vaginal births

Placenta condition	Active	Active & treatment	Physiological	Physiological & treatment	Not stated	Total	
	n	n	n	n	n	n	%
Complete	10,484	1,192	5,360	1,193	11	18,240	89.3
Ragged membranes	726	175	492	196	0	1,589	7.8
EUA/Manual removal	78	111	2	29	0	220	1.1
Incomplete	75	41	20	19	0	155	0.8
Other*	106	18	41	27	0	192	0.9
Not Stated	3	1	0	0	25	29	0.1
TOTAL	11,472	1,538	5,915	1,464	36	20,425	100

* Includes cases where midwife noted the placental condition as ragged membranes only, gritty, oedematous or with calcifications.

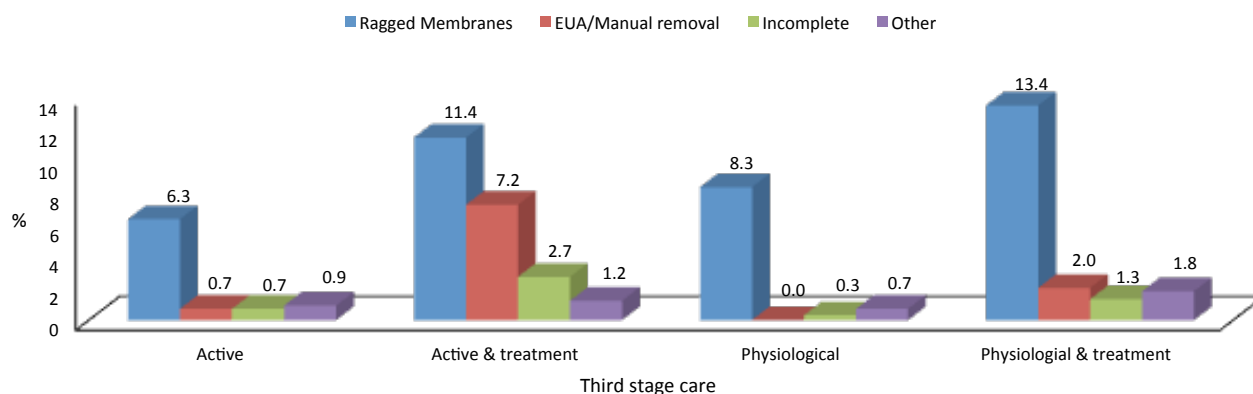


Figure 4.6: Percentage of vaginal births and condition of placenta by third stage care

Excludes data where the placenta was delivered "complete"

4.6.6 Birth position

The following table (Table 4.19) shows that women registered with an MMPO midwife in 2016 used a wide variety of positions to give birth. The majority of women used a semi-reclined position (43.7 percent), followed by lithotomy (13.4 percent), kneeling (11.9 percent) and hands and knees (9.5 percent).

Table 4.19: Birth position

Birth position	n	%
Birthing stool	77	0.3
Dorsal	261	1.1
Hands and knees	2,187	9.5
Kneeling	2,738	11.9
Lateral	1,165	5.1
Lithotomy	3,086	13.4
McRoberts	561	2.4
Semi-reclined	10,038	43.7
Sitting	960	4.2
Squatting	554	2.4
Standing	845	3.7
Other	235	1.0
Unknown	271	1.2
TOTAL	22,978*	100

* Excludes all elective and emergency caesarean births (n=7,187)

Of women who gave birth at home or in a primary facility, a higher proportion were kneeling or on hands and knees for birth (49.7 percent and 36.1 percent, respectively) (Table 4.20). Squatting and standing positions were also more frequently used in home or primary facilities. In secondary and tertiary facilities, a higher proportion of women used semi-reclined (49.5 percent and 43 percent, respectively) and lithotomy positions (12.7 percent and 22.4 percent, respectively).

Table 4.20: Birth position by birth setting

Birth Position	Home		Primary facility		Secondary facility		Tertiary facility		Total	
	n	%	n	%	n	%	n	%	n	%
Birthing stool	4	0.3	13	0.4	45	0.4	15	0.2	77	0.3
Dorsal	13	0.8	12	0.3	122	1.2	114	1.4	261	1.1
Hands and knees	259	16.7	517	15.0	877	8.7	534	6.8	2,187	9.5
Kneeling	511	33.0	728	21.1	898	8.9	601	7.6	2,738	11.9
Lateral	72	4.7	148	4.3	572	5.7	373	4.7	1,165	5.1
Lithotomy	3	0.2	35	1.0	1,280	12.7	1,768	22.4	3,086	13.4
McRoberts	19	1.2	53	1.5	262	2.6	227	2.9	561	2.4
Semi-reclined	349	22.5	1,302	37.7	4,989	49.5	3,398	43.0	10,038	43.7
Sitting	73	4.7	206	6.0	326	3.2	355	4.5	960	4.2
Squatting	81	5.2	171	5.0	202	2.0	100	1.3	554	2.4
Standing	140	9.0	206	6.0	318	3.2	181	2.3	845	3.7
Other	18	1.2	31	0.9	89	0.9	97	1.2	235	1.0
Unknown	6	0.4	32	0.8	97	1.0	136	1.7	271	1.2
TOTAL	1,548	100	3,454	100	10,077	100	7,899	100	22,978*	100

* Excludes all elective and emergency caesarean births (n=7,187)

5 Babies

Information on the 30,526 babies in this report includes multiple births (357 sets of twins and 2 sets of triplets) and relates to neonatal outcomes with a particular focus upon gestational age at birth, Apgar score, and birth weight, followed by status at birth.

5.1 Gestational age at birth

The majority of babies (87.4 percent) were born between 37 and 41 weeks' gestation, with 6.0 percent born before 36 weeks 6 days and therefore considered premature (Table 5.1). There were 6.5 percent born after 42 weeks gestation.

5.2 Apgar scores

At one, five and ten minutes after birth, a set of observations is made of newborns and their responses

to certain stimuli, which are rated as an Apgar score. The results for the five minute Apgar score of the 2016 MMPO birth cohort are presented in Table 5.2, along with the birth setting.

Over 97.2 percent of babies born in the 2016 MMPO cohort had an Apgar score of more than 7 at five minutes. There were 2.3 percent of babies born in secondary facilities, and 3.1 percent born in tertiary facilities, with a low Apgar score.

5.3 Birth weight

Table 5.3 shows the birth weight of the babies born in the 2016 MMPO cohort. The majority of babies weighed between 2.5 and 4.5 kg (91.7 percent), with 5.7 percent weighing less than 2.5 kg and 2.6 percent weighing more than 4.5kg.

The majority of babies weighing less than 2.5 kg were also born before 36 weeks' gestation, with 2.3 percent born with a low birth weight (less than 2.5kg) at term. Of the babies with a high birth weight (more than 4.5kg) 6.7 percent were more than 42 weeks' gestation.

Table 5.1: Gestational age of babies at birth

Gestational age (weeks)	n	%
20-23	96	0.3
24-27	99	0.3
28-31	181	0.6
32-36	1,479	4.8
37-41	26,670	87.4
42+	1,998	6.5
Missing	3	0.0
TOTAL	30,526	100

Table 5.2: Apgar score at 5 minutes and birth setting

Apgar score	Home		Primary facility		Secondary facility		Tertiary facility		Total	
	n	%	n	%	n	%	n	%	n	%
1-7	11	0.7	41	1.2	318	2.3	356	3.1	726	2.4
8-10	1,535	99.2	3,434	98.8	13,543	97.3	11,156	96.3	29,668	97.2
Missing	2	0.1	0	0.0	61	0.4	69	0.6	132	0.4
TOTAL	1,548	100	3,475	100	13,922	100	11,581	100	30,526	100

Table 5.3: Birth weight of babies and gestation

Weeks' gestation	<2.5 kg		2.5-4.5 kg		>4.5 kg		Total	
	n	%	n	%	n	%	n	%
20-23	96	100	0	0.0	0	0.0	96	100
24-27	96	97	3	3.0	0	0.0	99	100
28-31	175	96.7	6	3.3	0	0.0	181	100
32-36	773	52.3	700	47.3	6	0.4	1,479	100
37-41	590	2.2	25,429	95.3	651	2.4	26,670	100
42+	2	0.1	1,862	93.2	134	6.7	1,998	100
TOTAL	1,732	5.7	28,000	91.7	791	2.6	30,523*	100

* Excludes 3 babies with missing weight or gestation data

5.4 Birth status

Birth status identifies whether the baby was alive at birth, stillborn or died following birth. In the 2016 MMPO cohort 99.4 percent (n=30,342) were born alive, 0.6 percent (n=184) were stillborn, and 0.2 percent (n=67) died within 27 days of birth (Table 5.4). Reasons for mortality vary and may relate to prematurity, abnormality or may be unexplained and the data in this report does not provide information on the reasons for mortality.

Table 5.4: Birth status

Birth status		n
Stillbirths	Antenatal	160
	Intrapartum	24
Neonatal deaths	Early <7 days	54
	Late 7-27 days	13

Table 5.5: Perinatal related mortality by status at birth and birth setting

Birth setting	Home	Primary facility	Secondary facility	Tertiary facility	Total
n					
Live births (a)	1,545	3,475	13,842	11,480	30,342
Stillbirths (b)	3	0	80	101	184
Total births	1,548	3,475	13,922	11,581	30,526
Neonatal deaths (c)	0	5	22	40	67
Perinatal deaths (d)	3	4	96	135	238
Perinatal related deaths (e)	3	5	102	141	251
Rate per 1,000 births					
Stillbirth rate (f)	0	0	5.7	8.7	6.0
Neonatal mortality rate (g)	0	1.4	1.6	3.4	2.2
Perinatal mortality rate (h)	1.9	1.1	6.9	11.7	7.8
Perinatal related death rate (i)	1.9	1.4	7.3	12.2	8.2

(a) Includes neonatal deaths

(b) Death after 20 weeks gestation or more than 400gms (includes terminations for fetal abnormality)

(c) Neonatal death up to and including 27 days

(d) Stillbirth and early neonatal death <7 days

(e) Stillbirths and neonatal deaths up to and including 27 days

(f) Rate of stillbirths per 1,000 total births

(g) Rate of Neonatal deaths per 1,000 total births

(h) Rate of Perinatal deaths per 1,000 total births

(i) Rate of Perinatal related deaths per 1,000 total births

Of the 184 babies who were stillborn, the majority occurred at a secondary and tertiary facilities (Table 5.5). When a baby has died during pregnancy the midwife refers to an obstetrician so as to make a plan for the birth. Therefore, the majority of women who had a fetal death will have been referred to a secondary or tertiary facility to give birth.

The vast majority of mortality occurred prior to term (Table 5.6), with 37.1 percent of mortality occurring between 20 and 23 weeks' gestation, a further 26.3 percent between 24 and 31 weeks' gestation and 24.3 percent at term.

5.5 Neonatal transfers from home and primary facilities

Babies can be transferred after birth to either a neonatal unit (NNU) or a special care baby unit (SCBU) for neonatal care. The transfers that occurred in the 2016 MMPO baby cohort are shown in Table 5.7. Seventeen home birth babies (1.1 percent) and 54 primary facility babies (1.6 percent) were transferred to a NNU/SCBU. There were 638 (4.6 percent) and 692 (6.0 percent) babies transferred/referred to a NICU from a secondary or tertiary facility.

Table 5.6: Perinatal related mortality by gestation

Weeks' gestation	Stillborn/IUD antepartum		Stillborn/IUD intrapartum		Neonatal death		Total	
	n	%	n	%	n	%	n	%
20-23 weeks	58	36.3	13	54.2	22	32.8	93	37.1
24-31 weeks	45	28.1	3	12.5	18	26.9	66	26.3
32-36 weeks	20	12.5	1	4.2	10	14.9	31	12.3
37+ weeks	37	23.1	7	29.1	17	25.4	61	24.3
TOTAL	160	100	24	100	67	100	251	100

Table 5.7: Admissions/transfers to NNU/SCBU of babies, by birth setting

Birth setting	Home		Primary facility		Secondary facility		Tertiary facility		Total	
	n	%	n	%	n	%	n	%	n	%
Referred/Transferred to NNU/SCBU	17	1.1	54	1.6	638	4.6	692	6.0	1,401	4.6
TOTAL	1,548		3,475		13,922		11,581		30,526	

6 Postnatal period

This chapter provides information on the postnatal period and is based on the number of babies who were born in 2016, although some of the information relates to the mothers. The first part of this section examines data regarding breastfeeding with the second part looking at maternal smoke free status and postnatal visits.

6.1 Breastfeeding

All babies born with MMPO midwives have the type of feeding recorded at the initial feed, at 48 hours and two weeks after birth, and on discharge (between 4 and 6 weeks of age).

The following tables present the feeding data for 2 weeks postpartum and at postpartum discharge from maternity care. This data has been collated according to birth setting and maternal ethnicity. More than three quarters of 2016 MMPO babies were exclusively or fully breastfed at two weeks of age. Babies born at home had the highest rate

of breastfeeding, at 88.2 percent (Table 6.1 and Figure 6.1).

The highest level of exclusive breastfeeding rates occurred for women who gave birth at home or in a primary facility. The secondary and tertiary facilities had higher rates of babies that were fully breastfed. Secondary facilities had a higher rate of artificial feeding (bottle feeding) at 7.7 percent, followed by tertiary and primary facilities

6.1.1 Breastfeeding and postnatal discharge

Type of feeding was documented by the midwife at postnatal discharge from maternity care; the timing of discharge is variable and occurs between 4 and 6 weeks following the birth. At this time 70.3 percent of women breastfed exclusively or fully, a reduction of 5.1 percent over the postnatal period (Table 6.2). Women who gave birth at home continued to have higher levels of exclusive or full breastfeeding, with 83.9 percent compared to 76.0 percent for primary facility births, 70.0 percent for secondary facility births and 67.1 percent for women who gave birth in tertiary facilities.

Table 6.1: Feeding status at 2 weeks and birth setting

Feeding status at 2 weeks	Home		Primary facility		Secondary facility		Tertiary facility		Total	
	n	%	n	%	n	%	n	%	n	%
Exclusive	1,317	85.1	2,652	76.3	9,304	66.9	7,187	62.1	20,460	67.0
Fully	49	3.1	170	4.9	1,240	8.9	1,107	9.6	2,566	8.4
Subtotal	1,366	88.2	2,822	81.2	10,544	75.8	8,294	71.7	23,026	75.4
Partial	104	6.7	320	9.2	1,858	13.3	1,961	16.9	4,243	13.9
Artificial	55	3.6	217	6.2	1,075	7.7	816	7.0	2,163	7.1
Not stated	23	1.5	116	3.3	445	3.2	510	4.4	1,094	3.6
TOTAL	1,548	100	3,475	100	13,922	100	11,581	100	30,526	100

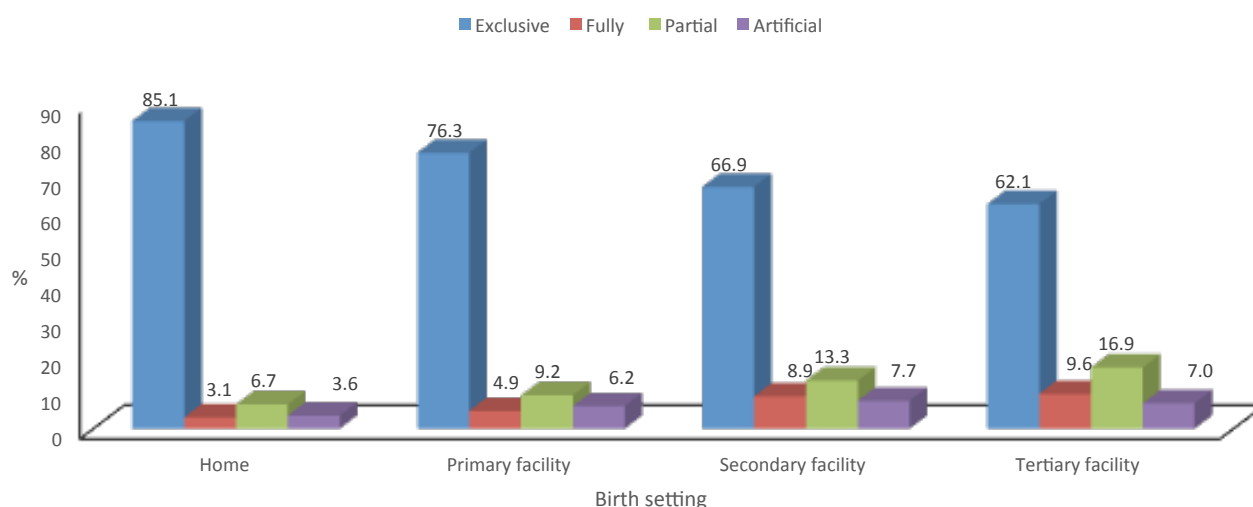


Figure 6.1: Percentage of births, by feeding status at 2 weeks and birth setting

Table 6.2: Feeding status at discharge by birth setting

Feeding status at discharge	Home		Primary facility		Secondary facility		Tertiary facility		Total	
	n	%	n	%	n	%	n	%	n	%
Exclusive	1,234	79.7	2,404	69.2	8,308	59.7	6,497	56.1	18,443	60.4
Fully	65	4.2	238	6.8	1,434	10.3	1,280	11.0	3,017	9.9
Subtotal	1,299	83.9	2,642	76.0	9,742	70.0	7,777	67.1	21,460	70.3
Partial	128	8.3	350	10.1	1,927	13.8	1,871	16.2	4,276	14.0
Artificial	98	6.3	365	10.5	1,803	13.0	1,422	12.3	3,688	12.1
Not stated	23	1.5	118	3.4	450	3.2	511	4.4	1,102	3.6
TOTAL	1,548	100	3,475	100	13,922	100	11,581	100	30,526	100

Table 6.3: Feeding status at 2 weeks and mother's ethnicity

Feeding status at 2 weeks	NZ European		Māori		Pasifika		Asian		Other		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Exclusive	12,953	70.2	3,670	65.1	1,096	60.6	2,164	59.9	463	69.1	20,346	67.5
Fully	1,407	7.6	393	7.0	157	8.7	473	13.1	67	10.0	2,497	8.3
Subtotal	14,360	77.8	4,063	72.1	1,253	69.3	2,637	73	530	79.1	22,843	75.8
Partial	2,208	12.0	747	13.3	289	16.0	765	21.2	102	15.2	4,111	13.6
Artificial	1,281	6.9	591	10.5	163	9.0	80	2.2	16	2.4	2,131	7.1
Not stated	591	3.2	233	4.1	103	5.7	129	3.6	22	3.3	1,078	3.6
TOTAL	18,440	100	5,634	100	1,808	100	3,611	100	670	100	30,163*	100

* Excludes 2 women with missing ethnicity data

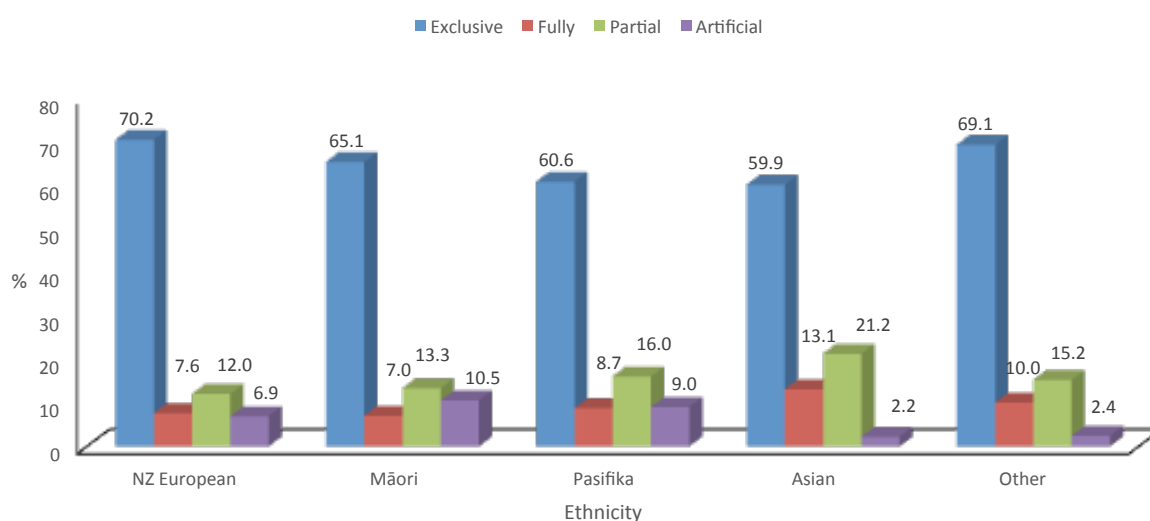


Figure 6.2: Feeding status at 2 weeks and mother's ethnicity

The breastfeeding data at 2 weeks based on maternal ethnicity is presented in Table 6.3. NZ Europeans had the highest rate per ethnic group of babies exclusively and fully breastfed at 77.8 percent. Women of Asian ethnicity had the lowest exclusive breastfeeding rate in 2016 (59.9 percent) and Māori had the highest rate of artificial breastfeeding (10.5 percent).

6.2 Postnatal health: Smoke free status

Smoke free status is also recorded by MMPO midwives

during the postnatal period. Overall, the data indicates a general decrease in smoking rates when recorded at this point.

During pregnancy 15.3 percent of women reported smoking (refer to Table 2.9 in Chapter 2). This rate dropped by 1.8 percent to 13.5 percent by the postnatal period (Table 6.4), with 83.7 percent of women reporting they were smoke free and 2.7 percent not stated.

Table 6.4: Women's smoke free status postnatally

Smoke free status	n	%
Current smoker	4,070	13.5
Ex smoker (<12 months abstinent)	3,302	10.9
Ex smoker (>12 months abstinent)	2,571	8.5
Never smoked tobacco	19,390	64.3
Now smoke free (> 4 wks) - no longer used	6	0.0
Not stated	826	2.7
TOTAL	30,165	100

6.3 Postnatal care

Following the birth the woman has a choice to have up to 48 hours of postnatal care within a maternity facility before going home. The midwife will visit the woman in the facility and at home for up to six weeks following birth.

Table 6.5: Postnatal care, setting of assessments


Postnatal care	Assessment at a maternity facility		Assessment at home	
	n	%	n	%
No visits	6,502	21.6	345	1.1
1-2 visits	13,877	46.0	236	0.8
3-5 visits	7,766	25.7	2,805	9.3
6-9 visits	846	2.8	21,575	71.5
10-14 visits	120	0.4	4,246	14.1
15+ visits	7	0.0	101	0.3
Missing	1,047	3.5	857	2.8
TOTAL	30,165	100	30,165	100

In 2016, 46.0 per cent of women received 1-2 hospital visits and a further 25.7 per cent received between 3 and 5 hospital visits. Once home, 71.5 percent of women received 6-9 home visits, with a further 14.1 percent receiving between 10 and 14 visits.

7 References

- Midwifery Council of New Zealand. (2016). 2016 *Midwifery Workforce Survey*. Retrieved from [https://www.midwiferycouncil.health.nz/sites/default/files/site-downloads/Workforce% 20Survey%202016.pdf](https://www.midwiferycouncil.health.nz/sites/default/files/site-downloads/Workforce%20Survey%202016.pdf)
- Ministry of Health. (2007). *Maternity Services: Notice pursuant to Secion 88 of the New Zealand Public Health and Disability Act 2000*. Wellington: The Crown. Retrieved from <http://www.moh.govt.nz/moh.nsf/indexmh/section88-maternity-notice-2007-feb07?Open>.
- New Zealand College of Midwives. (2013). Consensus statement: Facilitating the birth of the placenta.
- New Zealand College of Midwives. (2015). *Midwives Handbook for Practice* (5th ed.). Christchurch: New Zealand College of Midwives.

Appendix: “The MMPO Maternity Notes” dataset




Client Profile Summary

Maternity Notes number:

Registration Type: ☐ New Registration ☐ Change in GMC GMC number:

Name (Print capital letters)
 Surname or family name:
 First Name:
 Previous Surname(s):
 Date of Birth:
 Address (Print capital letters)
 Street and No:
 Suburb:
 City or Town:
 Phone: Home:
 Email address:
 Partner: ☐ Yes ☐ No Partner:
 Name of Partner (Print capital letters):
 Name:
 Address:
 Email address:
 Phone: Home:
 District Health Board Region:
 Women's Occupation:
 Eligibility for Section 86: ☐ Yes ☐ No
 Women's ethnic group(s):
☐ NZ Maori ☐ Samoan
☐ NZ European ☐ Cook M.I.
☐ Other European ☐ Tongan
☐ African ☐ Other/Other
 First Language:
 LMP Date:
 EDD Date:
 Menstrual Cycle: ☐ Regular ☐ Irregular
 Contraception:
 Family Doctor/General Practitioner (GP):
 Practice Name:
 Women referred by: ☐ Self ☐ Another M.D.



Labour and Birth Summary

Maternity Notes number:

Planned place of birth at onset of labour: ☐ Home ☐ Birth facility (unit)
 Actual place of birth: ☐ Home ☐ Birth facility (unit)
☐ Other facility
 Perinatal transfer planned, for:
 Induction of Labour: ☐ Yes ☐ No weeks gestation:
 Date: Day of week: Time:
 Method of induction: ☐ Prostaglandins ☐ ARM ☐ Oxytocin ☐ Other
 Reason: ☐ Pregnancy > 42 weeks ☐ Fetal distress ☐ Social/maternal request
☐ Pre-eclampsia ☐ RCT ☐ infection
☐ Prolonged rupture of membranes ☐ Maternal illness/complication
☐ Large for gestational age ☐ Other
 Onset of Labour: Day of week: Time: Gestation: weeks
 Transferred during LAB from planned place of birth: ☐ Yes ☐ No
 Transfer initiated: Day of week: Time:
 Transferred from: ☐ Home ☐ Primary Hospital ☐ Secondary Hospital ☐ Tertiary Hospital
 Mode of transfer: ☐ Ambulance ☐ Car (family's) ☐ Car (hired/self) ☐ Air Transport
 Women accompanied by: ☐ Midwife ☐ Other
 LMC risk transferred: ☐ Yes ☐ No Date:
 Maternity care provided by:
 Labour and birth
 Admitted to hospital: Date: Time:
 Midwife in attendance: Date: Time:
 Rupture of membranes: Date: Time:
 Onset contractions (labour established): Date: Time:
 Fully dilated: Date: Time:
 Effective pushing commenced: Date: Time:
 Time of birth: Date: Time:
 Time of birth (hours):
 Placental/umbilical: Date: Time:
 Completion of care: Date: Time:
 LMC present at birth: ☐ Yes ☐ No Back up present at birth: ☐ Yes ☐ No
 Clavering birth: ☐ Yes ☐ No or
 Clavering labour and birth exceptional circumstances: ☐ Yes ☐ No
 Length of labour: 1st Stage: hrs mins 2nd Stage: hrs mins 3rd Stage: hrs mins
 Total length of labour: hrs mins
 Aids during labour: ☐ Yes ☐ No if yes (specify)
 Augmented with Oxytocin: ☐ Yes ☐ No W/ Fluids for hydration: ☐ Yes ☐ No

New Zealand College of Midwives
PO Box 21 106
Christchurch 8143
New Zealand
+64 3 377 2732
nzcom@nzcom.org.nz
www.midwife.org.nz

Midwifery and Maternity Providers Organisation
PO Box 21 106
Christchurch 8143
New Zealand
+64 3 377 2485
mmpo@mmpo.org.nz
www.mmpo.org.nz

ISSN 2463-6061 (Print)
ISSN 2230-4118 (Online)
Published December 2018

