



Report: Comparative study of maternity systems

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What you leave behind is not what is engraved in stone monuments, but what is woven into the lives of others. - Pericles

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This report was compiled by Malatest International Consulting and Advisory Services (Malatest International). Malatest International provides high quality research, programme evaluation and skilled advisory services to public, private, academic and non-profit sectors.

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Though we have completed a range of projects in the health sector, we have no conflicts of interest in producing this report.

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Summary

Purpose

This report provides an overview of maternity systems and maternity outcomes for mothers and babies in New Zealand and across six comparator countries (Australia, Canada, Ireland, the Netherlands, the United Kingdom and the United States), in the context of population demographics and risk factors. The purpose of this study is to provide a resource to help inform future development of policy and maternity services delivery in New Zealand.

Maternity systems

All the countries included in this study, except the Netherlands, have seen shifts in the roles and responsibilities of the different healthcare professionals in their maternity care systems. Many saw responsibility move from midwives to doctors over the 20th century and in latter years calls for more natural childbirth and more community based maternity services have contributed to a trend towards reintroducing or strengthening the roles of midwives.

Workforce challenges have accompanied the often swift transitions in roles and responsibilities. Many countries have experienced shortages in their maternity workforces as in their general medical workforces.

Some challenges are shared across the comparator countries, for example communication between health professionals, referrals and knowledge transfers. The literature shows that regardless of the roles different health professionals play in delivering maternity care, good communication and clear referral guidelines between health care providers underpin effective maternity care. Across all countries, adverse outcomes have been linked to communication challenges between health professionals and to different opinions about when referral from primary to secondary care is indicated. Communication at three key points in maternity care (entry to maternity care, acute referral and exit from maternity care) plays an important role in ensuring that women do not fall through the gaps. Key elements of best practice that apply to all countries include:

- Access to good quality care and culturally appropriate care;
- Screening processes in place identify risk factors and for women who have risk factors clear referral guidelines guide the transfer from primary to secondary care;
- Communication and knowledge transfer between disciplines is effective; and
- Monitoring adverse events and having continuous improvement processes in place enabling systems to develop.

New Zealand established three standards for maternity care in 2011 consistent with these elements of best practice (MOH 2011):

- Maternity services provide safe, high-quality services that are nationally consistent and achieve optimal health outcomes for mothers and babies;
- Maternity services ensure a woman-centred approach that acknowledges pregnancy and childbirth as a normal life stage; and
- All women have access to a nationally consistent, comprehensive range of maternity services that are funded and provided appropriately to ensure there are no financial barriers to access for eligible women.

Changes to funding arrangements can influence the way maternity services are delivered. Different funding packages can impact the roles of different health professional disciplines and influence the way they provide care, for example the rate of interventions.

Maternity outcomes

There are significant differences in maternity systems and models of care across the comparator countries selected for this study. There are also other differences. For example, in the Netherlands the homebirth rate is far higher than in the other comparator countries while the caesarean rate is far lower. Despite these differences, comparator countries share a number of similarities in the outcomes they achieve. Like other developed nations, they have all seen dramatic improvements in maternal and perinatal mortality over the last century. Advances in technology, general healthcare and evolutions in maternity system design have reduced the incidence of maternal and child deaths to a small fraction of those seen in the early 1900s.

Approaches to making further progress in reducing mortality rates include the systematic investigation of all perinatal and maternal deaths and use of this information as part of a continuous improvement process. In the countries studied, perinatal and maternal mortality monitoring systems operate to varying extents. The investigation process in the United Kingdom is regarded as the 'gold standard'. Similarly to the United Kingdom, New Zealand has in place the Perinatal and Maternal Mortality Review Committee which has carried out this function since 2006. In New Zealand the system reviews each death. Caution in comparing mortality rates should be exercised as not all countries have the similar national audit ability and high case ascertainment rates.

Policy makers in the countries studied are moving towards closer examination of morbidity as an indicator for the quality of care. Morbidity indicators become more important as mortality indicators become more variable as a result of small numbers. Analysis of the causes of severe morbidity provides an opportunity to continue to develop understanding of treatment and prevention to further improve outcomes. There are varying degrees of morbidity many of which are related to interventions during childbirth. New Zealand reports a range of morbidity statistics in the New Zealand Maternity Clinical Indicators report.

The leading cause of neonatal mortality and morbidity in developed countries is premature birth, with 60 to 80% of deaths without congenital anomalies related to premature birth.

Measuring satisfaction with care is another way of assessing the maternity care process, describing the consumer's view point and evaluating overall care. All comparator countries measured maternal satisfaction, usually through surveys. New Zealand results demonstrate that most new mothers are satisfied with the maternity care they have received.

The outcomes achieved for the vulnerable populations in a country are a measure of the quality of that country's health care. While many overall outcome indicators are similar, disparities remain between the outcomes achieved for women in vulnerable populations and others. Across comparator countries, poorer women, Indigenous peoples and immigrant populations have on average poorer maternity outcomes than their counterparts. While disparities are less marked in New Zealand than in some other countries, there remains room for improvement.

Risk factors

A large number of factors affect the level of risk pregnant women can face. Some are characteristics of the mother, for example older mothers and teenaged mothers. Other maternal factors in pregnancy can also lead to a higher risk of complications, for example smoking, use of alcohol or other substances. While the incidence of some risk factors, such as smoking in pregnancy, is falling

across comparator countries, others are increasing. More women are obese when they become pregnant, are giving birth at older ages and are giving birth to multiple children.

It is important to note that there are associations between risk factors; mothers with low incomes are more likely to be younger, to have other risk factors (for example substance abuse or smoking) and to face barriers to accessing services. Many risk factors are over-represented in vulnerable populations, underpinning the poorer outcomes for these groups, at least to some extent. New Zealand has high rates of a number of these risk factors, for example high rates of teenage pregnancy and obesity.

Improving maternity outcomes

In all comparator countries, further significant improvements in outcomes will require interventions to reduce the risk factors associated with adverse maternity outcomes. The profiles of women served by the maternity systems in the comparator countries are changing in terms of both demographics and risk factors. Changes in the incidence of factors such as older and younger motherhood, obesity, smoking and substance abuse pose different challenges for maternity systems. Initiatives that reduce the prevalence of risk factors can reduce neonatal and perinatal mortality.

Public health initiatives targeting women before they become pregnant have more of a role to play in reducing the incidence of many of these risks than maternity systems. Although the ability of maternity systems to prevent many of the factors contributing to increased risk of adverse outcomes is limited, carers must respond by identifying risk factors and providing appropriate care and where indicated referral.

Different countries address risk factors in different ways; however there are some common themes. Interventions tend to target multiple risk factors and tend to aim to reduce barriers to accessing services. Specialist or modified maternity care can be provided to minimise the impact of risk factors on maternity outcomes. A range of different approaches, from specialist midwives to integrating maternity care with other social services have had success across the comparator countries. The one-on-one, community-based midwifery model of care used by many New Zealand women provides a foundation to provide interventions to meet these challenges.

Further improvements in national maternity outcomes also require a focus on improving outcomes for mothers in vulnerable groups. A challenge for maternity systems across all comparator countries is to adapt to provide care differently for vulnerable populations to respond to the poorer outcomes these groups often have when compared to other sectors of the population. Disentangling the effects of changing demographics and the incidence of risk factors within and across countries is challenging and requires good monitoring data.

Responding to disparities in maternity outcomes needs to encompass reducing the impact of risk factors, improving access to maternity care and health care in general and improving the quality of care and ensuring that maternity care is culturally competent. Good data must also be available to understand the factors associated with disparities and to monitor and evaluate the progress in reducing disparities.

New Zealand's maternity care system

In comparison with the other countries in this study, New Zealand has similar or better outcomes across a wide range of measures. New Zealand is grappling with the same issues in maternity systems as other countries, such as measuring results, improving the communication at entry, exit and referral in maternity care, improving access and outcomes, particularly for vulnerable groups and addressing changes in the maternity consumer profile. New Zealand's maternity system

compares well with other countries in many areas, but there are opportunities to learn from approaches that have been successful elsewhere.

Strengths of the New Zealand system include:

- Universal access to primary and secondary maternity care through the public health system and established guidelines for referral;
- The maternity service in New Zealand is relatively stable and has a strong midwifery workforce;
- The LMC model provides the foundation for strong community based care and continuity of care as well as public health;
- Strong advocacy for the different professions within the maternity workforce and improved relationships between those groups;
- There are high levels of consumer satisfaction; and
- Established investigation and reporting of all maternal and neonatal deaths through the Perinatal and Maternal Mortality Review Committee.

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Glossary

Term	Definition
Antenatal:	Refers to during pregnancy, or before birth, also known as prenatal.
General practitioner:	A health practitioner who is educated and registered with the appropriate regulatory body to provide primary healthcare to patients of any age or sex. Also known as a family doctor or family physician.
Midwife:	A health practitioner who is educated and registered (with the appropriate regulatory body) as a practitioner of the profession of midwifery. Provides the necessary support, care and advice during pregnancy, labour and birth and the postpartum period and care for the new born.
Obstetrician:	A health practitioner who is educated and registered (with the appropriate regulatory body) in the vocational scope of obstetrics and gynaecology. Obstetricians provide medical care before, during and after childbirth.
Perinatal:	The time immediately before, during and after birth.
Postnatal:	The period of time after birth, usually considered to extend six weeks.
Vulnerable populations:	Vulnerable populations are populations with a higher risk of adverse maternity outcomes arising from their demographic profile, where they live and/or an accumulation of risk factors.

Abbreviation	Definition
AHMC	Australian Health Minister's Conference
AIHW	Australian Institute of Health and Welfare
ART	Assisted reproductive technologies
BCCEWH	British Columbia Centre for Excellence in Women's Health
BMI	Body Mass Index
CDC	Center for Disease Control
CHAI	Commission for Healthcare Audit and Inspection
CMACE	Centre for Maternal and Child Enquiries
DHA	Department of Health and Aging (Australia)
GP	General practitioner or family physician
HC	Health Canada
Hfma	Healthcare Financial Management Association (UK)

HRID	Health Research Information Division (Ireland)
MMPO	Midwifery and Maternity Provider Organisation (MMPO)
NCCWCH	National Collaborating Centre for Women's and Children's health
NCT	National Child Trust (UK)
NHS	National Health Service (UK)
NRT	Nicotine replacement therapy
NZCOM	New Zealand College of Midwives
NZMC	New Zealand Medical Commission
OECD	Organisation for Economic Cooperation and Development
SADH	South Australian Department of Health
PHAC	Public Health Agency of Canada
PMMRC	Perinatal and Maternal Mortality Review Committee
RCSI	Royal College of Surgeons Ireland
SOG	Society of Obstetricians and Gynaecologists (Canada)
TAH	Trust for America's Health
UKCOM	United Kingdom College of Midwives
WHO	World Health Organisation

1. Introduction

1.1 Maternity care systems

Maternity care systems are the services, healthcare professionals, initiatives, policies and infrastructures designed to provide the care pregnant women need to safely give birth to healthy babies. While this goal is achieved for most women, the consequences are tragic and wide reaching when they do not. There are strong and passionate advocates for different approaches to maternity care.

Like the general health systems, maternity care systems have evolved over time. A century ago deaths in childbirth for mother, child or both were not unusual outcomes. In New Zealand, as in other developed countries, improvements to healthcare generally, to maternity systems and technological advances have drastically reduced the incidence of adverse outcomes for both mothers and babies.

Looking to the future, further improvements in maternity outcomes must address the increasing prevalence of maternal risk factors such as women giving birth later in life and obesity. Maternity systems and their workforces must continue to evolve to meet the challenges posed by changing population demographics and risk profiles.

Looking at the ways other developed countries approach maternity care and reflecting on the differences between their systems, innovative approaches they may have tried and the outcomes they achieve is a useful tool supporting continuous reflection on and improvements to New Zealand's maternity system.

1.2 Study purpose and aims

The Ministry of Health contracted Malatest International to complete this comparative study of maternity systems. The quality of maternity systems can be described in terms of:

- **Effectiveness:** Women receive appropriate care throughout their pregnancies, childbirth and the postnatal period.
- **Safety:** The incidence of outcomes such as perinatal and maternal mortality and morbidity.
- **Efficiency:** Care delivered and the systems that support it deliver value for money for the government and the public.

These elements of quality are represented in New Zealand by the New Zealand Maternity Standards (MOH 2011).

The purpose of this study is to provide a resource that describes the key features of New Zealand's maternity context, including maternity systems and maternity outcomes, with that of a selection of other developed countries. This report:

- Describes the maternity outcomes in each country;
- Describes the context the maternity systems of each country operate in including demographic profiles and identifying vulnerable groups;
- Describes the maternity systems in each country, highlighting differences in each country's approach to maternity care; and
- Provides an overview of key themes, trends and emerging issues across all of the countries included in the study.

The Ministry and Malatest International agreed to the following review questions to address these areas.

Review Question	Information Source
Describe maternity systems in comparator countries, including the mix of public and private provision, funding models, the mix of hospital and community based services and the roles of various health professionals in providing services, including multi-disciplinary approaches to care	Grey literature Peer reviewed literature Key informant interviews
Describe the workforce, including their training, professional regulation and on-going professional development	Grey literature Key informant interviews
Describe the key points of entry to/from maternity services and how they are integrated with other health and social services particularly primary health and child health services	Grey literature Key informant interviews
Describe patterns of antenatal care and the length of post-birth support	Grey literature Key informant interviews
Summarise the evidence about maternity outcomes in comparator countries as well as New Zealand to include psycho-social and clinical outcomes	Peer reviewed literature Published statistics
Provide a demographic profile of maternity service users in comparator countries	Grey literature Peer reviewed literature Published statistics
Describe initiatives to address the needs of vulnerable service users and the success of these initiatives in engaging vulnerable clients and reducing outcome disparities.	Grey literature Peer reviewed literature Key informant interviews

Based on the review questions above, the following table clarifies the scope of this project. Many of the issues considered within this report have wider implications than maternity care. This report is not an extensive review of each issue; it is intended to provide an overview of these areas as they relate to maternity care systems.

In scope	Out of scope
Description of maternity systems Description of evidence about maternity outcomes including clinical and others Description of risk factors Description of evidence of successful maternity initiatives for vulnerable populations Reflection of issues identified by key informants	Recommendations for the New Zealand system Analysis of association between national outcomes and maternity systems Detailed review of payments for maternity services Assessment of the appropriateness of different approaches to training or regulation Review of general or child health services Assessment of the appropriateness of different systems Quantification of the contribution of individual or collective risk factors to outcomes Initiatives that have not been proven to be effective

1.3 Methods

1.3.1. Data collection

This report is based on data collected through two methods:

Literature review: A search was conducted of the literature available through the Ministry of Health’s library. This search was supplemented by internet based searches for grey literature and advice from interviewed key informants on relevant resources. The reliability of sources of evidence were assessed and recorded in a table of evidence used to guide the development of the report. Priority was given to evidence from Cochrane reviews and meta-analyses.

Key informant interviews: Malatest International worked with the Ministry of Health to identify key informants with a relationship to the maternity care system in New Zealand. A number of international informants were also identified in the course of studying their maternity systems. Researchers completed semi-structured interviews with key informants discussing the maternity system in their country, its strengths and weaknesses and initiatives showing good results particularly in providing care to vulnerable populations.

See Appendix One for a description of the methods used in this project.

1.3.2. Selection of comparator countries

The selection of countries to be included in the review was made based on an initial scan of the literature with the limitations in the scope and timeframe of the project in mind. The following factors were considered:

- Availability of data and other information;
- Comparability to New Zealand culturally and socially;
- Presence of vulnerable population groups; and
- Maternity outcomes.

The countries that have been selected are: Australia, Canada, Ireland, the Netherlands, the United Kingdom and the United States. These countries are all within the OECD and all have good data and reporting available about their maternity systems, policies and outcomes. Several have a fully or partly publicly funded health care system, and they provide examples of a range of approaches to maternal care.

The table below provides a very brief overview of the comparator countries included in this study to provide context for the discussion of outcomes and risk factors.

Brief Country Overviews	
NZ	In 1990, the introduction of the Nurses Amendment Act, and further changes to funding arrangements led to a rapid shift from doctor-led/hospital based care to midwife-led care for most women.
	Under New Zealand’s public health system, comprehensive maternity care is provided at no cost to the user. A Lead Maternity Carer (LMC) who is selected by the expectant mother coordinates maternity care. A LMC is usually a midwife or in a small number of cases a General Practitioner (GP) or obstetrician. Most babies are born in hospitals or in community birth centres.
	New Zealand’s vulnerable populations include young parents and Māori and Pacific women.
AU	In the late 1940s and 1950s, responsibility shifted to hospitals with more involvement from obstetricians. For many years now almost all births have taken place in public or private hospitals. Concern about the high and rising rate of interventions in labour is contributing to calls for more midwife involvement in maternity care. Changes to funding arrangements have led the way for more midwife involvement, though midwives’ autonomy is limited by conditions requiring collaborative arrangements with obstetricians.
	Maternity care in Australia is public care provided at no cost to women, but many use private care or a combination of public and private care.
	Australia’s vulnerable populations include rural mothers and those in city centres, as well as Indigenous populations.

CA	<p>Most maternity care is delivered by GPs, obstetricians or maternity nurses. In the latter half of the 20th century Canada was the only developed member of the WHO without professional midwives. In the 1990s, the midwifery profession was legally recognised and midwives are now regulated in some provinces and territories. Almost all births take place in hospital with a small proportion in birth centres or at home.</p> <p>Canada's maternity care is public care with some costs for elements of pre- and postnatal care.</p> <p>Canada shares some challenges with Australia. Its vulnerable First Nations populations (First Nations, Inuit and Métis) live in remote communities, some vast distances away from the nearest hospital, and have on average a higher prevalence of risk factors during pregnancy and poorer overall maternity outcomes.</p>
IE	<p>The Irish maternity system has a long history of maternity care delivered in a hospital environment. Dublin boasts the oldest maternity hospital in the world, established in 1745. Almost all Irish women give birth in hospitals. In contrast to the United States and Canada, midwives play a central role in providing care within hospitals and a high proportion of births are attended by midwives. There are only a small number of independent midwives offering support for home births in the community.</p> <p>Maternity care in Ireland is public care provided at no cost to women, but many use private care or a combination of public and private care. Ireland's vulnerable populations are recent immigrants and those with low socioeconomic status and other risk factors.</p>
NL	<p>The Netherlands is notable because of the high percentage of homebirths, compared to the other countries in this study, and the clear boundary between primary and secondary care. The Netherlands actively promotes birth at home under the care of primary caregivers – midwives and GPs. The Dutch state has a history of preserving autonomous midwifery and birth at home through laws and regulations giving preference to midwifery care, state support for midwifery education, and by funding research demonstrating the efficacy of midwife attended home birth. When the modern system of national health insurance was established in the 1940s, midwives were given preference as women's first choice providers of maternity care, an arrangement that remains today.</p> <p>The autonomous role of the midwives in the Netherlands is closest to that of New Zealand midwives.</p> <p>Maternity care is provided under national or private health insurance.</p> <p>The Netherlands' vulnerable populations are new immigrants who are not embedded in the country's wider communities and not used to working within the health system.</p>
UK	<p>Historically GPs played a significant role in maternity care in the United Kingdom. Through the second half of the 20th century, there was a shift from small maternity units in community hospitals, where GPs worked with midwives to provide care, to large maternity units. Today most care is provided by midwives or obstetricians. GPs have a smaller and decreasing role in maternity care, though they are more represented as maternity carers in rural areas.</p> <p>Most women use public care although private care is available.</p> <p>In the 1990s, the focus of maternity care policy shifted towards allowing women choice, continuity of care and control. More recently, health policy has strongly endorsed midwifery-led care, including encouraging women to self-refer to midwives.</p> <p>As in Ireland, the UK's vulnerable populations are recent immigrants and ethnic minorities, particularly those with low socioeconomic status.</p>
US	<p>Childbirth and maternity care became increasingly medicalised throughout the early- to mid-20th century. The use of midwives almost disappeared as obstetricians argued that pregnancy required care from specialist doctors. More recently, there has been some shift towards community and midwife care. However, midwife numbers are still low and most women receive care from their GP or far more commonly an obstetrician, even if they have normal pregnancies.</p> <p>Modern United States healthcare is primarily funded through private health insurance or through the Medicaid system, which provides care for women with low incomes. Today the United States spends more on healthcare per capita than any other country. And yet, outcomes for women giving birth in the United States are poorer than in many other countries. The United States' vulnerable populations are African Americans, Hispanics and low income white Americans.</p>

1.4 Report structure

The report is divided into the following main sections:

Section 2: Maternity outcomes: The section below provides information and discussion of some key outcomes for maternity services.

Section 3: Other measures of maternity outcomes: The tables in this section provide summaries of outcome, demographic and risk factor statistics providing the context for maternity care systems in New Zealand and each of the comparator countries.

Section 4: Risk factors in pregnancy and birth: This section provides information on risk factors affecting the maternity systems in the comparator countries. Each country faces changes over time in each risk factor which can have a strong influence on the population's service requirements.

Section 5: Vulnerable populations: This section describes the provision of maternity care to minority populations within the comparator countries, including information on any disparities in risk factors and outcomes between minority groups and the general populations.

Section 6: Comparison of maternity systems: This section provides descriptions of the maternity care systems delivering the outcomes and grappling with the risk factors described in the preceding sections. More detailed descriptions are included in Appendix Two.

Section 7: Overview of emerging themes: This section provides an overview of the themes emerging from the analysis of the maternity systems and outcomes of comparator countries in the body of the report.

Throughout the report, quick reference boxes provide summaries of evidence of successful initiatives, best practice or relevant evidence reviews relating to the content of the section they are placed in.

2. Maternity outcomes

Historically perinatal and maternal mortality outcomes have been used to compare the health of mothers and babies across different countries.

Mortality outcomes are now relatively rare in developed countries. Different definitions, different ways of collecting data in different countries, and differences in the prevalence of risk factors combine with small numbers of adverse events to make cross-country comparisons difficult. Whilst the definition of maternal mortality has been standardised the collection and analysis of maternal mortality data continues to be inconsistent across countries. Countries such as the United Kingdom and New Zealand with good systems for recording maternal death can appear to have higher rates relative to those countries with poorer data collection (Euro-Peristat 2004). This is due to the high case ascertainment and more complete identification of maternal deaths that may otherwise be missed if using more generalised reporting.

There is now increased interest in measuring other clinical outcomes, such as morbidity (CMACE 2009, Manning 2012), and psychosocial outcomes such satisfaction, as these are seen as increasingly relevant measures of outcomes useful in identifying modifiable factors. The United Kingdom review (CMACE 2009) concludes that:

“The key to achieving further reductions in mortality and morbidity lies in developing guidance to target modifiable obstetric variables in a cost effective way.”

The section below provides information and discussion of some key outcomes for maternity services.

The primary sources for comparative information on maternity outcomes are the OECD and WHO. More up to date information is available for some countries, however we have focused on these two sources as they are compiled for comparative purposes. Reliable New Zealand figures are published by the PMMRC in its yearly reports. The most recent report, published in 2012, includes statistics extending to 2010.

2.1 Maternal mortality

2.1.1. Defining maternal mortality

Maternal mortality generally includes all deaths of women during pregnancy or childbirth and within 42 days of termination of pregnancy. The Perinatal Maternal Mortality Review Committee (PMMRC) in New Zealand adopts the WHO definition of maternal related death:

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

Maternal deaths can be grouped into direct and indirect deaths. Some countries report on both direct and indirect deaths, while others report only direct deaths. The WHO defines them as:

Direct deaths: Those resulting from obstetric complications of the pregnant state (pregnancy, labour and puerperium), from interventions, omissions, incorrect treatment or from a chain of events resulting from any of the above e.g. eclampsia, amniotic fluid embolism, rupture of the uterus, postpartum haemorrhage.

Indirect deaths: Result from pre-existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but which was aggravated by the physiological effects of pregnancy e.g. heart disease, diabetes, renal disease.

Incidental deaths: Result from conditions occurring during pregnancy, where the pregnancy is unlikely to have contributed significantly to the death, although it is sometimes possible to postulate a distant association e.g. road accidents, some malignancies.

For the professionals involved, the family and general public, each maternal death represents the worst possible outcome and each death is a tragedy. Maternal mortality is recognised as an important indicator of maternity care systems despite limitations in ability to analyse the data.

Advances in technology and maternity care have reduced mortality to the point that small variations can cause large fluctuations in national ratios. This is particularly noticeable in New Zealand, where there are a small number of maternal mortalities each year. For example, the PMMRC reported eight maternal deaths in 2010 (PMMRC 2012). Each death has a large effect on the mortality rate for the country.

There are many problems with accurate country to country comparisons of maternal mortality. There are variations in methods of data collection and different definitions of maternal mortality. However, both the OECD and WHO provide data on maternal mortality ratios which are adjusted to account for differences. The two organisations present two different views of maternal mortality as a result of different approaches to standardising data. The OECD statistics are regarded as unreliable and so have not been reported.

In New Zealand, maternal mortality data were collected by the Maternal Mortality Committee from 1969 to 1991. Under the Maternal Mortality Research Act 1968 any maternal death that occurred during pregnancy or within three months of the pregnancy had to be notified to the committee. This collection came to a halt in 1991 and consequently the mortality rate dropped within two years as notification of all maternal mortality reduced.

New Zealand re-established a maternal mortality committee – the Perinatal and Maternal Mortality Review Committee in 2006 with full data collection and reporting in 2007. At this point reliable data for both direct and indirect maternal mortality is available which has resulted in full case ascertainment and an apparent rise in the mortality rate.

The figure below reports the mortality ratios for New Zealand and the comparator countries from 1990 to the most recent data available.

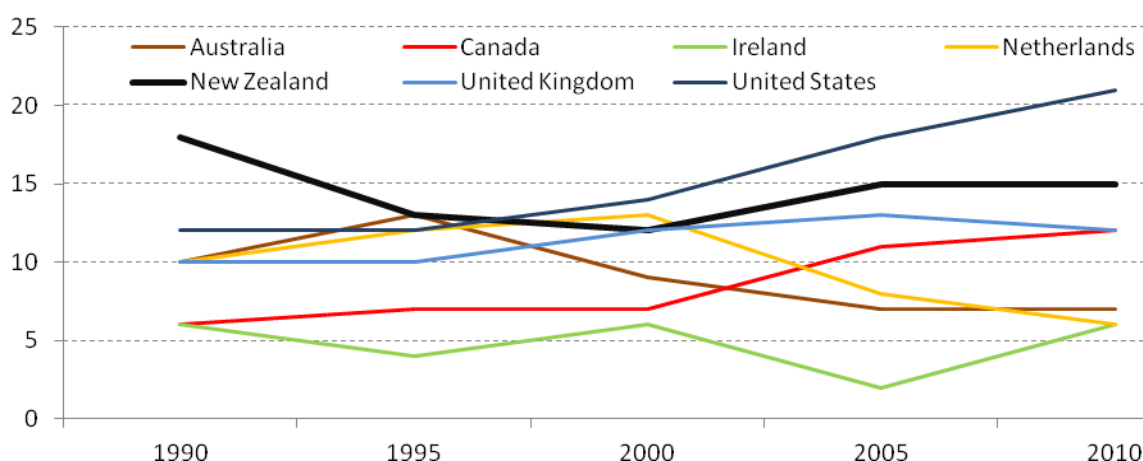


Figure 1. WHO maternal mortality ratio. Figures are deaths per 100,000 live births. Numbers are adjusted based on WHO and related organisations. Note that data are reported with uncertainty ranges and the graph above displays the calculated point estimates. Further detail is available at <http://apps.who.int/ghodata/?vid=250#>

Maternal mortality data are available five-yearly from the WHO, with the most recent data in 2010 (Figure 1). Assessing the data as a ratio allows for trends to be seen more clearly and demonstrates that the mortality ratio is similar and relatively stable for most countries. It also more clearly demonstrates the impact that a national and systematic collection and analysis of data has had on the rates for New Zealand.

The rates for all comparator countries across this time period are far lower than they were in the early 20th century. With advances in technology and treatment, mortality rates have decreased steadily. The differences between rates in developed countries and developing countries highlight the effect of these advances – in 2005, fourteen developing countries still had ratios of over 1,000 deaths per 100,000 live births (WHO 2007).

Using these figures it would appear that Ireland, Australia and the Netherlands have the lowest ratios over the 20 year period covered. However, Australia has acknowledged the need for a nationally agreed method to review and report on maternal deaths. The current Australian Perinatal and Maternal Morbidity Review Committees omit data from the Northern Territories and Australian Capital Territories (AIHW 2011). The United States, New Zealand and Canada have more variable trends although as noted previously New Zealand five-year trends are affected by annual fluctuations resulting from small numbers; one death can have a large effect on the ratio.

The United States has increasing maternal mortality ratios. Like other comparator countries, the maternal mortality rate dramatically declined in the United States through the 20th century; it decreased by more than 99% between 1900 and 1982. However, it has stalled and may be increasing in the 2000s (Main 2010). Main (2010) identifies the following drivers for increases in the United States, though they are not unique to the United States:

- Mothers with underlying medical conditions falling through the cracks of insurance coverage in the American healthcare system;
- Changes in maternal demographics (increases in obesity, older mothers); and
- Increasing rates of intervention which are associated with specific complications (though establishing causal relationships is very difficult).

There are vast differences in the rates for different ethnic groups in the United States. African American women are more than three times more likely to die than white women (Anachebe

2006). Main (2010) cites one study which examined five medical conditions and found similar incidence rates in African American and white women but African American women had a case-mortality ratio two to three times higher. Some of the difference can be attributed to socioeconomic factors, differences in rates of maternal risk factors and differences in access to services. Outside the influence of these factors there may be differences as a result of ethnicity itself (Anachebe 2006). Australia (where 3.8% of the pregnancy population) are indigenous has a similar divide between maternal mortality rates for Indigenous people and other Australians, with rates nearly three-times higher in the former (Sullivan et al. 2008). This difference in mortality rates due to ethnicity can also be seen in the UK with higher rates of mortality for ethnic minorities. In New Zealand, 25% of the maternity population are Māori and a further 11% are Pacific Islander, both ethnicities appear to have higher maternal mortality than New Zealand European women.

Interventions for ethnic minorities and Indigenous groups are discussed in Section 5.

2.1.2. Reducing maternal mortality

In developing countries, strategies to reduce maternal mortality rates focus on improving access to basic care in pregnancy and childbirth (HC 2004). In developed countries, such as those included in this study, most of the gains from these improvements were realised in the 20th century. Further reduction in maternal mortality rates can be achieved through improved surveillance to identify causes of the small numbers of maternal deaths still occurring and to consider how they could have been avoided (Gaskin 2008).

Systematic investigation of all maternal deaths has been adopted in some countries as a strategy for reducing death rates. The investigation process in the United Kingdom is regarded as the 'gold standard' (HC 2004). Each maternal death is reviewed locally and investigated by a national committee, the Confidential Enquiry into Maternal Deaths in the United Kingdom. The Committee was initiated in 1952 for England and Wales and now covers the United Kingdom as a whole. Reports are provided three-yearly and individual cases are reviewed. In contrast, the United States has a surveillance system that records all maternal deaths but does not investigate individual cases (HC 2004). The accuracy of the United States system has been questioned and improving its quality has been discussed as an avenue to addressing rising rates of maternal mortality (Gaskin 2008):

"... we literally have no idea how many U.S. women die from pregnancy- or birth-related causes every year. The CDC's most recent guess is that they could be missing as much as two-thirds of the maternal deaths. How can we prevent those deaths that are preventable when we don't really know why all of these women are dying?"

In New Zealand, each maternal death (both direct and indirect) is investigated by the PMMRC, which is part of the Health Quality and Safety Commission. The following table shows the recommendations of investigations into maternal deaths in New Zealand and the United Kingdom.

	Recommendations (recommendations for management of specific conditions excluded)
New Zealand recommendations for maternal mortality 2006-2010 (PMMRC 2012)	<ul style="list-style-type: none"> - Pre-existing medical disease: Pregnant women who are identified with pre-existing medical conditions should be referred appropriately. - Early booking: All women should commence maternity care before 10 weeks. - Maternal information: Support is required for national reporting of maternal deaths. - Seatbelts during pregnancy: There is a need for greater public awareness of the importance of wearing a seatbelt during pregnancy. - Maternal mental health: Maternal mental health services should be integrated into maternity services. Access should be provided to a mother and baby unit in the North Island. Women with histories of some serious mental health problems should be referred for assessment and management even if well. Note that the most common cause of maternal death in New Zealand is suicide. Clinicians and LMCs should be encouraged to conduct antenatal screening and document any mental health

	<p>history to identify women who are at increased risk of mental illness.</p> <ul style="list-style-type: none"> - Team approach: Women with complex medical conditions require a multidisciplinary approach to care. Pregnant women who are admitted to hospital for medical conditions not related to pregnancy need to have specific pathways for perinatal care. - Emergency obstetric training: All staff involved in the care of pregnant women should undertake regular training in the management of obstetric emergencies.
<p>United Kingdom Saving mothers' lives 2006-2008 top recommendations (CMACE 2011)</p>	<ul style="list-style-type: none"> - Pre-pregnancy counselling: Women of childbearing age with pre-existing illness (including psychiatric conditions) with implications for pregnancy should be informed of this at every opportunity. Pre-pregnancy counselling should be routinely commissioned as an integral part of local maternity services. - Professional interpretation services: Professional interpretation services should be provided for all women who do not speak English. - Communications and referrals: Referrals to specialist services in pregnancy should be prioritised as urgent, must clearly state the woman is pregnant and her progress must be followed up. Trainees should have a low threshold for referral and referrals between specialities should be at a senior level. - Multidisciplinary care for potentially serious conditions: Women with pre-existing conditions likely to complicate pregnancy should immediately be referred. Women who develop potential complications should be immediately referred and followed up. Midwives and GPs should be able to refer directly, but must inform the obstetrician. - Clinical training: Back to basics: all clinical staff must undergo regular training for identification and management of serious/emerging obstetric conditions. - Specialist clinical care: There is an urgent need for routine use of a national modified early obstetric warning score chart in all pregnant or postpartum women who become unwell and require services. Management of women with an acute severe illness requires a team approach. Pregnant women or recently delivered women with unexplained pain severe enough to require opiates require urgent senior assessment. - Serious incident reporting and maternal deaths: All maternal deaths must be subject to high quality local review. - Pathology: The standard of maternal autopsy must be improved.

2.2 Neonatal and perinatal mortality

Like maternal mortality, perinatal mortality is used as an indicator of maternity care systems because it represents the worst possible outcome from pregnancy. As with maternal mortality, neonatal and perinatal mortality rates have greatly decreased in developed countries since the beginning of the 20th century.

Neonatal mortality and perinatal mortality statistics differ in the way stillbirths and deaths after birth are categorised. Neonatal mortality includes babies who are born alive and die within the first four weeks of life. Perinatal mortality includes babies born alive who die within their first week and stillbirths where the baby has a gestational age or weight above a certain limit. International comparisons are difficult because there are differences in the limits countries apply in defining stillbirths. For example, the PMMRC defines fetal death as the death of a fetus at 20 weeks gestation or beyond or weighing at least 400g if gestation is unknown (PMMRC 2012). This figure includes termination of pregnancy for fetal anomaly. The majority of countries define fetal death as occurring at more than 24 weeks gestation. In the United States Federal guidelines recommend reporting fetal deaths as those over 350g or with 20 weeks gestation.

Joseph et al. (2012) examined data on fetal weight for perinatal deaths across countries. They found large variation in the proportion of fetal deaths reported with very low birth weights (<500g and <1000g). They recalculated country rankings for 2004 excluding all births with weights under 1,000g. This had a substantial effect on rankings – for example the United States and Canada moved from 18th and 22nd to 12th and 11th respectively. This type of sensitivity testing in how deaths are recorded and reported highlights the differences across countries and calls comparisons into question.

These limitations should be kept in mind when interpreting the figures in the following sections.

2.2.1. Neonatal mortality

The table below shows the 2008 (the most recent year with data available for all countries) OECD ranking for each comparator country. None of the comparator countries have exceptionally high rankings for these two statistics. The United States consistently has the highest rates and worst ranking across comparator countries for neonatal mortality.

Country	OECD neonatal mortality (2008) rate per 1,000 live births		OECD perinatal mortality (2008) rate per 1,000 live births	
	Rate	Rank	Rate	Rank
New Zealand	2.9	22	6.3	21
Australia	2.9	21	Not available	
Canada	3.8	27	6.2	19
Ireland	2.7	18	6.1	17
Netherlands	2.8	20	6.3	20
United Kingdom	3.2	25	7.5	27
United States	4.3	30	Not available	

Table 1. OECD rankings for neonatal and perinatal mortality (2008) based on deaths before 28 days. Data available at http://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT#

Figure 2 below shows the OECD data for neonatal mortality since 1990 and illustrates the decreasing rates since 1990 over all comparator countries.

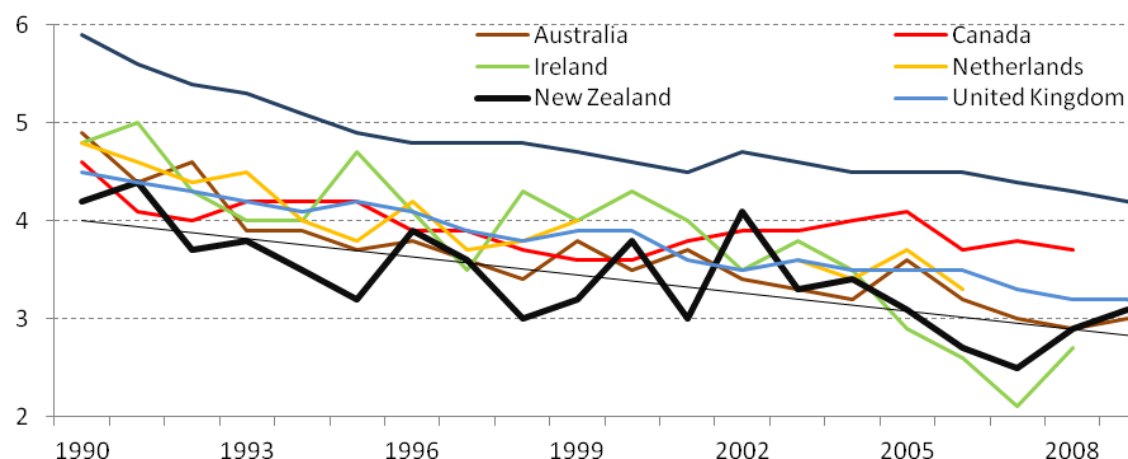


Figure 2. OECD statistics for neonatal mortality (deaths within 27 days per 1000 live births). Data definitions and sources are available at: <http://stats.oecd.org/wbos/fileview2.aspx?IDFile=255bc14f-cf40-4fed-9e00-f09c0faa5d08>

The figure below shows data provided by the WHO (Figure 3.). It is consistent with that provided by the OECD, showing the decreasing trend over time.

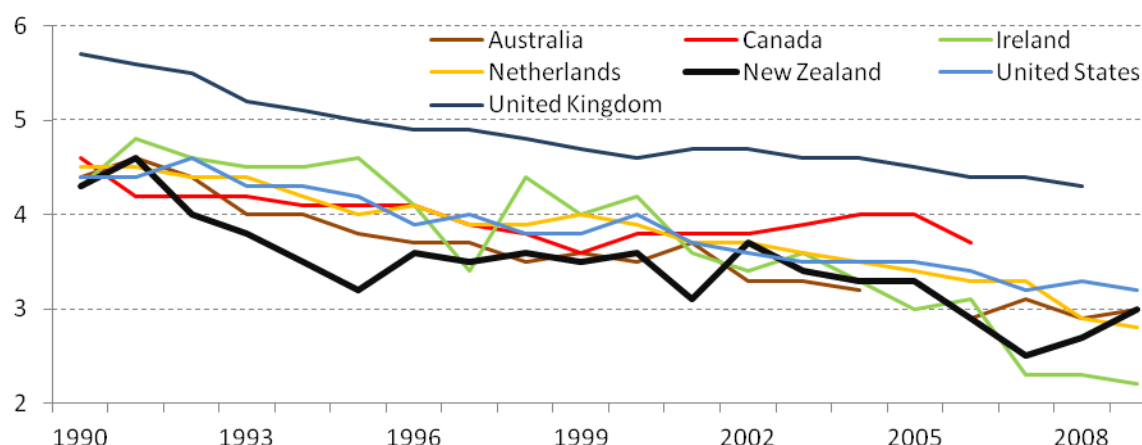


Figure 3. WHO neonatal mortality rates (deaths within 27 days per 1000 live births). Rates are based on estimates from national civil registries and are rescaled by the WHO based on mortality rates for <5 year olds. Data and further information available at: http://www.who.int/healthinfo/statistics/mortality_neonatal/en/

The decreasing trend in neonatal mortality is evident across most countries, though improvements are slower than those at the beginning of this period. Canada stands out in the time period covered with rates remaining relatively stable. Ireland has made improvements in neonatal mortality statistics, with substantial decreases in neonatal mortality rates. The rate in New Zealand is relatively low.

2.2.2. Perinatal mortality

The OECD also provides data on perinatal mortality. Some of these deaths are included in neonatal mortality statistics reported above. Perinatal mortality data has more missing data points for some countries.

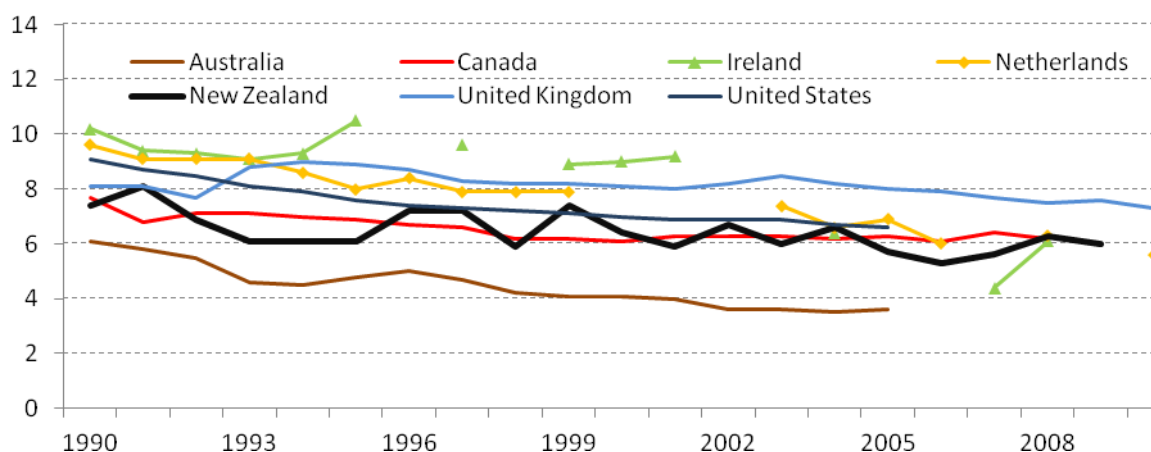


Figure 4. OECD figures for perinatal mortality (ratio of deaths of children within one week of birth (early neonatal deaths) plus fetal deaths of minimum gestation period 28 weeks or minimum weight of 1000g per 1000 births). Deaths are recorded differently in different countries so care should be taken in making cross-country comparisons. Further information available at <http://stats.oecd.org/glossary/detail.asp?ID=2038>

Again, Ireland stands out as a country that has reported a substantial decrease in the perinatal mortality rate although the data are incomplete over this period and the rate was higher than all the comparable countries until 2004. Though different from the OECD data, Ireland's national reporting of perinatal statistics supports the overall assessment stating that the perinatal mortality rate decreased in Ireland by 21% between 2001 and 2010 (HRID 2012). New Zealand's data have

been consistent and robust over this period of time with the neonatal and perinatal mortality data comparing well with all comparable countries. There is room for improvement in the quality of the Australian data (AIHW 2011).

2.2.3. Reducing perinatal and neonatal mortality

The leading cause of neonatal morbidity in developed countries is premature birth, with 60-80% of deaths without congenital anomalies related to premature birth (PHAC 2008). Rates of iatrogenic premature birth and spontaneous premature birth in some settings are increasing due to increasing rates of obesity. Risk factors for premature birth include being single, younger or older maternal age, previous preterm delivery, infection, smoking, low or high pre-pregnancy weight, low or high weight gain, multiple gestation, preeclampsia and ethnicity. Similarly, the major risk factors for stillbirth are low socioeconomic status, advanced maternal age, maternal smoking during pregnancy, primiparity, high pre-pregnancy weight, small for gestational age, intrauterine growth restriction and multiple pregnancies (PHAC 2008).

Initiatives that reduce the prevalence of these risk factors, can reduce neonatal and perinatal mortality. As with maternal mortality, most of the gains from improvements and access to basic care have been realised in developed countries including the comparator countries in this review. However, disparities remain between the general population and vulnerable service users.

Reducing stillbirth (Ota et al. 2012)

In the protocol for an overview of reviews of interventions during the antenatal period for preventing stillbirth, the authors group interventions with evidence supporting their effectiveness into three groups:

- **Dietary interventions:** Ensuring women have adequate nutrition including macronutrients and micronutrient supplements (eg vitamin A, E, folate).
- **Prevention and management of infection:** Infections account for about 15% of stillbirths in developed countries.
- **Prevention, detection and management of other morbidities:** Detection of conditions such as pre/eclampsia and hypertension, other risk factors such as smoking.
- **Screening and management of foetal growth and wellbeing:** Screening to detect problems in pregnancy, especially impaired growth and distress.

Collection of high quality data provides a platform for understanding and addressing the causes of mortality in both individual cases and the maternity system as a whole. In New Zealand, the PMMRC has recommended the development of a Perinatal Database for compiling data on maternity outcomes, including perinatal mortality. The United Kingdom's Centre for Maternal and Child Enquiries has a longer history of reporting on perinatal mortality but still makes a number of recommendations around proper recording of perinatal deaths (CMACE 2009). Likewise, the Australian government's report on improving maternity services recommends that the Australian government work with states and territories to agree and implement a comprehensive system for national data collection, monitoring and review for maternal and perinatal mortality and morbidity.

Self-reflection through review of serious incidences of adverse outcomes are part of the regulation of the professional groups involved in maternity care, enabling improvement in practice over time.

2.3 Morbidity: an alternative to reporting mortality

As efforts to improve maternity services continue, analysis of severe acute maternal morbidity is an important tool in identifying areas where systems can be improved. For every woman who dies, there are a number that face organ failure or other serious conditions which can have long term consequences for their health. These cases are described as 'near misses' and include situations where obstetric intervention may have saved the life of the patient, but the situation could have

been avoided by earlier consultation. The United Kingdom enquiry into maternal deaths states (CMACE 2009):

“Maternal deaths represent the tip of the iceberg of disease; a much larger number of women suffer from near miss morbidity, increasing the power of these studies to investigate risk factors for both the occurrence of disease and progression to death and other severe complications.”

The difficulties in comparing mortality data across countries also apply to morbidity data, perhaps more so. There is no final, easily identifiable outcome as there is with mortality. Standards for diagnoses and processes for reporting differ across countries. Some researchers have included management-based systems and an organ-based definition of morbidity (Manning 2012). The WHO listed a series of conditions in 2009 which describe when severe maternal morbidities should be recorded, which serves as a guide (Pattinson et al. 2009).

In some countries investigation of morbidity is limited to small scale studies or studies of individual institutions, but others have implemented national systems to report and analyse the incidence of severe morbidity. In Ireland, a Maternal Morbidity group was established in 2010. It will make its first report in 2012 based on national collection of severe maternal morbidity notification forms (Manning 2012). In the United Kingdom, the surveillance of specific near miss maternal morbidities has been conducted through the United Kingdom Obstetric Surveillance System since 2005. Clinicians complete a monthly report card indicating whether there have been any cases with one of the conditions included in the study in the previous month (CMACE 2009).

In New Zealand, the PMMRC is promoting the collection of morbidity data (PMMRC 2012). The Committee is working with the well-established Australasian Maternity Outcomes Surveillance Systems on the collection of perinatal and maternal morbidity data. The most recent report includes reporting on neonatal encephalopathy. Development of the processes for identification and review of cases of severe morbidity and near misses is ongoing.

3. Other measures of maternity outcomes

3.1 Satisfaction with maternity services

Measuring satisfaction with care is a way of assessing the maternity care process, describing the consumer's view point and evaluating overall care. It can seem unnecessary to focus on satisfaction when a positive clinical outcome, a healthy baby and mother, is the most important outcome for both women and professionals. But there can be differences in the outcomes that are important to consumers and to healthcare professionals, and it is important that consumers are able to reflect their views on care back to the professionals delivering it (Redshaw 2008). Professional organisations should include satisfaction as a component of continuous improvement of maternity care. Consumer satisfaction is a component of accreditation programmes for some professional organisations and many have already developed ways of obtaining feedback on satisfaction.

Maternity care with women seen as consumers or service users has long been a key focus of measuring satisfaction (Redshaw 2008). Redshaw (2010) gives the following reasons for the importance of collecting information on women's experiences and views of their maternity care:

- Good care meets the needs of people as individuals allowing for choice, information, support and reassurance;
- Women's reactions to care around the time of birth can affect the way they care for themselves and their baby and influence their contact with caregivers; and
- Some aspects of care can be assessed only by asking women.

Satisfaction with care is generally measured through consumer surveys administered in the time following birth. In New Zealand, the New Zealand Maternity Consumer Satisfaction Survey (MOH 2011) asks all women who gave birth over a two month period about their levels of satisfaction with maternity care. Such surveys can provide detail of how maternity systems work in practice (Redshaw 2008).

Hodnett (2002) completed a systematic review of reports on the factors influencing women's evaluations of their childbirth experiences. The review is widely cited and concludes that four factors override all others in whether women evaluate their childbirth experiences positively. They are:

- Personal expectations;
- The amount of support from caregivers;
- The quality of the caregiver-patient relationship; and
- Women's involvement in decision making.

The recent (2011) New Zealand Maternity Consumer Satisfaction Survey found that the way women were cared for during birth and the overall care received from the LMC had the largest impact on women's overall satisfaction (MOH 2012). Similarly, a study of 605 Dutch and Belgian women's experiences of childbirth found that fulfilment of expectations was most beneficial for overall satisfaction, as well as personal control. Women with higher self-efficacy had higher rates of satisfaction with self, midwife and doctor related aspects of care (Christiaens 2007).

Referral from primary to secondary care is a common experience for women in maternity care, but can in itself have an effect on women's satisfaction with care. A study of the satisfaction with care of Dutch women found that satisfaction with care was highest in women who give birth at home,

but women transferred to hospital were less satisfied than those who had planned hospital births (Christiaens 2007).

The table below lists the surveys identified in comparator countries with satisfaction components.

Country	Measuring satisfaction	National survey results where available
New Zealand	New Zealand Maternity Consumer Satisfaction Survey (MOH 2011) – covers all mothers who gave birth over a two month period (3235 women).	High levels of satisfaction across information (85%), quality of care before (87%), during (87%) and after (77%) birth, and overall care (89%). Amongst bereaved mothers, 77% were satisfied/very satisfied with care during/following the loss of their baby.
Australia	No national survey, but surveys run by individual states – for example South Australia (SADH 2007) reporting on a sample of 848 women who had at least one live birth in September 2006.	Satisfaction is scored from 1-100, where 90 is considered the 'gold star' and 70 is unsatisfactory. The overall satisfaction score was 86.1 out of 100 with the highest scores in information and communication and access to hospital. Country hospital patients had higher satisfaction scores.
Canada	Canadian Maternity Experiences survey (PHAC 2009) – comprehensive survey of a random sample of 8,244 Canadian mothers' experiences with the maternity system, including satisfaction with aspects of care.	80% of women reported a positive or very positive overall experience. 78.5% were very satisfied with the respect shown to them, 75.9% with the competence of caregivers, 72.6% with their involvement in decision making and 65.4% with the information given to them throughout pregnancy and birth.
Ireland	Some small scale maternity satisfaction surveys run by individual hospitals, no national survey identified.	
Netherlands	Perinatal factors related to negative or positive recall of birth experience in women three years post-partum in the Netherlands (Rjinders 2008) – all women who gave birth in 2001 (1,309 respondents, 44% response rate).	Three years post-partum, 84% of women looked back positively. Women were more likely to look back negatively if they had a referral during labour, didn't have a choice in pain relief, had an assisted vaginal or unplanned caesarean, did not have a home birth or described the caregivers negatively.
United Kingdom	National survey of women's experience of maternity care (Redshaw 2010) – random sample of 10,000 women.	60% of women felt they were definitely given choices in their care, 75% always had confidence in staff, 68% said staff communicated very well, 97% said they were talked to in a way they could understand, 96% said they were treated with respect most of the time. 63% felt they were involved in their care. Most were satisfied with pregnancy care (88%), labour and birth care (87%) and postnatal care.
United States	Listening to Mothers I (Declercq 2004, 1,583 respondents) and II (Declercq 2006, 1,573 respondents) – combined phone and online survey.	LTMII found high proportions of women felt they generally understood what was happening (94%), felt comfortable answering questions (93%), got the attention they needed (91%) and were as involved as they wanted in making decisions (89%). LTMII focused more on the care received and found that despite the primarily healthy maternity population and the fact that birth is not intrinsically pathological, technology intensive childbirth was the norm. Many women did not have the choices or knowledge they wanted, high levels of intervention resulted in healthy women being vulnerable to surgery and burdened with health concerns following the birth. This survey is more like a snapshot of how maternity care is provided rather than an inquiry into satisfaction with maternity care.

The process and location of care provided to women can have a strong effect on women's sense of control. Personal control and childbirth expectations have been shown to be strongly related to

birth environment (Christiaens 2007). Another example is an observational study comparing the interaction of women and their midwives under hospital team and community caseload midwifery models. In caseload models, midwives were more likely to adopt a less hierarchical partnership model with conversational interaction, suggesting more choice and control for the women (McCourt 2005). Small changes, like allowing women to carry their own notes, can enhance a women's sense of control (Brown 2011) and contribute to an increased sense of satisfaction with her maternity care.

Measurement of satisfaction on its own is not sufficient. If more comprehensive information is collected, it can be used to understand the complex mix of factors that contribute to a positive or negative experience (Redshaw 2008). Redshaw (2008) recommends that women:

“... Have the opportunity to express a range of views about different facets of their experience, both positive and negative, to be critical, and to praise and commend the individuals or service that provided their care.”

Midwives, who are the lead maternity carers for the majority of women giving birth in New Zealand, encourage their women to provide feedback through the New Zealand College of Midwives consumer feedback forms. They allow women to consider the care they have received and provide positive or negative feedback anonymously to their midwife. These forms are used by each individual practitioner to reflect on their care provision, a requirement of their biannual standards review (a component of recertification). More than 20,000 consumer feedback forms are received by the College each year and the majority (99%) provide positive feedback about their maternity care (NZCOM correspondence 2012).

3.2 Cross country comparison of other outcome indicators

The table below provides a summary of indicators that describe some of the broader outcomes that can be used to measure how well the comparator countries' maternity systems provide care for their mothers and babies. The outcomes in this table are closely linked with the demographic profile of women giving birth within each country and provide context for the system descriptions provided throughout this report.

Note that data collection methods and definitions are not consistent across countries. Some data are population level and some are based on large surveys. Where data are sourced from surveys the rate may be higher than that of the actual population, depending on the methods used to collect and process it. Data are therefore indicative only. Where statistics were not able to be identified, the fields are marked with a "-". Each statistic is marked with a super-script letter identifying the sources, or the source is noted in the row description.

Outcome	New Zealand	Australia	Canada	Ireland	Netherlands	United Kingdom	United States
Notes on data Data are taken from different sources and relate to different years. Differences in definition across sources and countries limit comparability and figures should be seen as indicative only.	Source: ^A Ministry of Health Report on Maternity 2010 (2012) ^B PMMRC report 2012 ^C MOH New Zealand Maternity Consumer Satisfaction Survey 2011 ^D National Maternity Collection data extract - 2010	Source: ^A Australia's Mothers and Babies 2009	Source: ^A Canadian Perinatal Health report 2008, Public Health Agency of Canada. ^B Canadian Maternity Experiences Survey. 2009 (95% CI)	Source: ^A Perinatal Statistics Report 2010	Source: ^A 2008 Perinatal Care in the Netherlands	Source: ^A Hospital episode statistics 2010-11 (excludes private hospitals and home births) ^B Delivered with care: a national survey of women's experience of maternity care in 2010 ^C Infant Feeding Survey 2010: Early Results	Source: ^A Births: preliminary data for 2010 ^B CDC National Vital Statistics System (2009 data) ^C Listening to Mothers II survey (2005) ^D CDC Breastfeeding report card 2012 ^E March of Dimes Peristats (2002)
First trimester antenatal appointment Proportion of mothers who attend an antenatal care appointment in the first trimester. Definitions of 'first trimester' vary across countries – from 12-15 weeks. See Section 6.3.	-	71.2% ^A before 14 weeks	95% ^A	63% ^A	-	95% ^B	71% ^A

Outcome	New Zealand	Australia	Canada	Ireland	Netherlands	United Kingdom	United States
Antenatal attendance Proportion of women who attend at least one antenatal care appointment before birth. See Section 6.3.	85.7% of women registered with an LMC pre- or post-natally. The remainder received care through a DHB funded service or received no primary maternity care. ^A	97.3% ^A	100% ^B	99.8% ^A	-	98% ^B	96.4%(2002) ^E 3.6% of women attend late or no antenatal care
Caesarean rate Proportion of births where delivery is by caesarean section. See Section 6.4.3	23.6% ^A	31.5% ^A	25.6% ^A	27% ^A	15.4% ^A	24.8% ^A	32.8% ^A
Home birth rate Proportion of births that occur at home. See Section 6.4.1.	3.2% ^A	0.3% ^A	1.2% ^B	0.2% ^A	20.9% ^A	3% ^B	0.78% ^B
Hospital birth rate Proportion of births that occur in hospital. See Section 6.4.1.	85.4% ^A	96.9% ^A	97.9% ^B	98.8% ^A	67.1% ^A	93% ^B	98.8% ^B
Birth centre birth rate Proportion of births that occur in birth centres (not hospital or home births). See Section 6.4.1.	10.8% ^A	2.2% ^A	0.8% ^B	-	11.5% ^A (includes outpatient)	3% ^B	0.37% ^B
Multiple births Proportion of pregnancies resulting in two or more babies. See Section 4.3.	1.5% ^A	1.6% ^A	3.0% ^A	2% ^A	1.9% ^A	1.5% ^A	3.5% (2009) ^A
Induced labour (total) Proportion of labours physically or chemically induced.	19.8% ^A	25.3% ^A	19.1% ^A	-	10.0% ^A	21.3% ^A	23.2% ^A
Spontaneous vaginal births Proportion of births that are 'normal' – vaginal births without instruments.	65.0% ^A	56.8% ^A	61.1% ^A	58% ^A	74.2% ^A	60.5% ^A	61.9% ^B

Outcome	New Zealand	Australia	Canada	Ireland	Netherlands	United Kingdom	United States
Postnatal length of stay <2 days The proportion of births that result in a postnatal hospital stay of less than two days. Figures relate to a subset of births for some countries (indicated). See Section 6.5.	40.2% ^A Refers to mothers with a postnatal length of stay <2 days	16.7% ^A	25.5% ^A Of vaginal deliveries	55% ^A Singleton births	-	57.1% ^A	80% (2005) ^C
Breastfeeding initiation The proportion of mothers that ever breastfeed their babies. Data from OECD tables of national statistics collected through various methods unless otherwise stated. See Section 6.5.3.	95.3% (2010) Note that MOH ^A 2012 reports that at two weeks 91.9% of babies were breast fed at two weeks	92% (2006)	84.5% (2005)	43.5% (year not recorded)	79% (2005)	81% (2010) ^C	76.9% (2009) ^D
Breastfeeding continuation Proportion babies that are fully or exclusively breastfed at six months of age. Data from OECD tables of national statistics collected through different methods unless otherwise indicated. See Section 6.5.3.	8% (2006/7)	14% (2004)	19% (2003)	-	25% (2005)	-	16.3% (2009) ^D

4. Risk factors in pregnancy and birth

The following section provides information on risk factors affecting the maternity systems in the comparator countries. Each country faces changes over time in each risk factor which can have a strong influence on the population's service requirements. Increasing prevalence of different risk factors can drive increases or decreases in the rates of the maternity outcomes reported in Section 2 and 3.

A large number of factors affect the level of risk of pregnancies. Some are characteristics of the mother, for example older mothers and teenaged mothers. Other maternal factors in pregnancy can also lead to higher risk of complications, for example obesity, smoking, use of alcohol or other substances.

It is important to note that there are associations between risk factors; mothers of low socioeconomic status are more likely to be younger, to have other risk factors (for example substance abuse or smoking) in pregnancy and to face barriers to accessing services. Vulnerable populations, such as those discussed in section 5, have higher incidences of one or more of the risk factors discussed in the following section. The combination of multiple risk factors contributes to the poorer outcomes achieved for both mothers and children in those populations.

Different countries address risk factors in different ways, however there are some common themes. Interventions tend to target multiple risk factors and tend to aim to reduce barriers to service access.

Maternity systems have to have processes and capacity in place to provide the care needed when the presence of risk factors contributes to an acute condition. The identification and monitoring of women who are at risk is a core function of maternity systems. But such acute problems can and do also arise in women who are at low risk and they require an appropriate and timely response.

4.1 Demographic and risk factors summary table

The table below provides data on a range of demographic and other risk factors which affect maternity system care and outcomes. Please note that data collection methods and definitions are not consistent across countries. Some data are population level and some are based on large surveys. Data are therefore indicative only.

Demographic factor	New Zealand	Australia	Canada	Ireland	Netherlands	United Kingdom	United States
Notes on data Data are taken from different sources and relates to different years. Differences in definition across sources and countries limit comparability and figures should be seen as indicative only.	Source: ^A Ministry of Health Report on Maternity 2010 (2012) ^B PMMRC report 2010 ^C Growing up in New Zealand: Before we are born 2010 ^D Statistics New Zealand: Births and Deaths for the year ended June 2012	Source: ^A Australia's Mothers and Babies 2009 ^B Improving maternity services (2009) ^C Overweight and obesity in Australian mothers: epidemic or endemic? (Medical Journal of Australia 2012). ^D Challenges for midwives: pregnant women and illicit drug use. Australian Journal of Advanced Nursing. Note: A state by state comparison for some statistics is provided in section 7.10.	Source: ^A Canadian Perinatal Health report 2008 ^B Hrsdc.gc.ca – national indicators of wellbeing ^C Maternity experiences survey (2009)	Source: ^A Perinatal Statistics Report 2010 ^B Growing up in Ireland: Key findings: infant cohort (2011) ^C Maternal Morbid obesity and obstetric outcomes, European Journal of Obesity (2009)	Source: ^A 2008 Perinatal Care in the Netherlands	Source: ^A Hospital episode statistics 2010-11 (excludes private hospitals and home births) ^B Delivered with care: a national survey of women's experience of maternity care in 2010 ^C Infant Feeding Survey 2010: Early Results ^D Characteristics of mother, England and Wales 2010 ^E Infant Feeding Survey 2005	Source: ^A National vital statistics reports: Births: Preliminary data for 2010 ^B The New Demography of American Motherhood (2010). Pew Social Trends ^C Alcohol use and binge drinking among women of childbearing age – United States 2006-2010 (CDC) ^D Results from the 2006 National Survey on Drug Use and Health, SAMHA
Number of live births per annum	64,485 ^A	294,500 births ^A	377,896 ^B (2008)	75,600 births ^A	174,376 ^A	723,165 ^A	4,000,279 ^A
Fertility rate (WHO) The number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates.	2.2 (2010)	1.9 (2010)	1.7 (2010)	2.1 (2010)	1.8 (2010)	1.9 (2010)	2.1
Teenage births Proportion of births to women aged under 20 years. See Section 4.2.2.	7.1% ^A	4.0% ^A	4.1% (2008) ^B	3% ^A	1.4% ^A	5.6% ^A	9.3% ^A
Teenage fertility (WHO 2007-2008) Births per 100,000 15-19 year olds	33.57 (2008) ^W	17.49 (2008) ^W	14.07 (2007) ^W	17.16 (2008) ^W	5.15 (2008) ^W	25.9 (2005) ^W	40.03 (2008) ^W
Average maternal age Average age of women giving birth. See Section 4.2.1.	29 (median age) ^A	30.0 years ^A	29.3 ^B (2008)	31.5 years ^A	-	29.5 (England and Wales 2010)	25.0 (2006) CDC

Demographic factor	New Zealand	Australia	Canada	Ireland	Netherlands	United Kingdom	United States
Age of first time mothers (OECD 2008) Average age of mothers giving birth for the first time. See Section 4.2.1.	28.9	28.0	27.6	28.38	28.9	30.0	25.0
Births to older mothers Proportion of births to older mothers (35+). See Section 4.2.1.	21.5% ^A	22.9% ^A	13.9% (2008) ^B	27.9% ^A	22.1% ^A	19.9% ^A	14% ^B
Use of assisted reproductive technology Proportion of births that used ART in pregnancy.	-	3.6% of women ^A	-	-	3.2% (33% unknown)	1.7% (2006)	1% ^A
Smoking during pregnancy Proportion of mothers who smoke at all during pregnancy. See Section 4.6.1.	13.9% smoked at LMC registration ^A	14.5% ^A	13.4% ^A	18% ^B	0.3% (Described as 'nicotine abuse') ^A	26% in the 12 months before birth, 12% throughout pregnancy ^C	11.4% (2002) ^A
Alcohol use Proportion of women who use alcohol at all during pregnancy. See Section 4.6.2.	23.4% (planned) to 34.1% (unplanned)	59% at some point during pregnancy ^B	10.5% frequent or infrequent ^C	20% ^B	-	54% (2005) ^D	7.6% of pregnant women surveyed drank in the past 30 days (2005-2010) ^C
Drug use Proportion of women who misuse drugs at all during pregnancy. See Section 4.6.2.	-	6% (estimate) based on surveys ^D	1.0% during pregnancy ^C	0.1% ^B	0.1% ^A	-	4% (2006) ^D
Obesity Proportion of women who are obese based on BMI measurements during pregnancy. See Section 0.	-	12.7% (30+ BMI) in 2009 ^C	13.6% BMI of 30+ (2008) ^A	13% (2007) ^C	-	-	-

Demographic factor	New Zealand	Australia	Canada	Ireland	Netherlands	United Kingdom	United States
Ethnicity Breakdown of the ethnicity of mothers giving birth.	^A Māori 25.4% Pacific 11.7% Asian 10.8% Other 52.2%	2.5% Aboriginal or Torres islander	Total population (Census 2006): South Asian 4.0% Chinese 3.9% Black 2.5% Filipino 1.3% Latin American 1.0% Southeast Asian 0.8%	Total Irish ethnicity: Irish 88.9% UK 2.7% Other EU 4.5% Africa 0.8% Asia 1.1% Other 2%	Ethnicity: ^A Dutch 78.3% Turkey/M.co 7.7% Other Euro 3.5% Creole 2.7%	Country of birth of children in England and Wales: UK 74.9% Europe 7.3% Africa 5.5% Americas/Caribbean 1.6% Middle East 0.9% Asia 8.3% Australasia 0.5%	Non-Hispanic White 54% Hispanic 23.6% Non-Hispanic Black 14.7% Indigenous 1.2% Asian or Pacific Islander 6.2% ^A

4.2 Maternal age

4.2.1. Older mothers

More women in New Zealand are choosing to start their family later in life and to continue having children at older ages. The median age of women giving birth increased from 27.9 in 1990 to a high of 30.4 in 2005, though it has remained steady since (Statistics New Zealand 2011¹). New Zealand is not unique in a trend towards older motherhood over time; among developed countries there has been a trend towards older childbearing over recent decades. Delayed childbearing is now commonplace in developed countries, however it is a complex social phenomenon with complex causes (PHAC 2008).

The trend towards increased rates of older childbearing is evident in statistics for all of the comparator countries. For example, in Canada, the proportion of live births to women aged 35 to 39 increased from 7.6% in 1991 to 12.4% in 2000. Similarly, the proportion of births to women aged 40 to 44 years increased from 0.9% to 2.1% over the same period. Birth rates for older women varied across provinces and territories. At the lower end, there were 23.4 births per 1,000 females aged 40 to 44 years in Newfoundland and Labrador while at the upper end the rate was 50.4 in Nunavut (PHAC 2008).

Figure 5 below shows the proportion of births to mothers over 35 in each comparator country. New Zealand, Australia, the Netherlands and the United Kingdom have comparable proportions, with around one in five births to older mothers.

Ireland stands out as having the highest proportion of older mothers: in 2010 4.6% of live births were to women 40 to 44 years old and just under one-quarter (23.3%) were to women 35 to 39 years of age. In contrast, the USA and Canada have lower proportions of births to older mothers. In the United States this is driven by high teenage birth rates in the Hispanic ethnic group. Though the proportion of births to older mothers is lower in the United States, it has increased: the number of births to older mothers increased by 64% between 1990 and 2008 when the total number of births increased by just 2%.

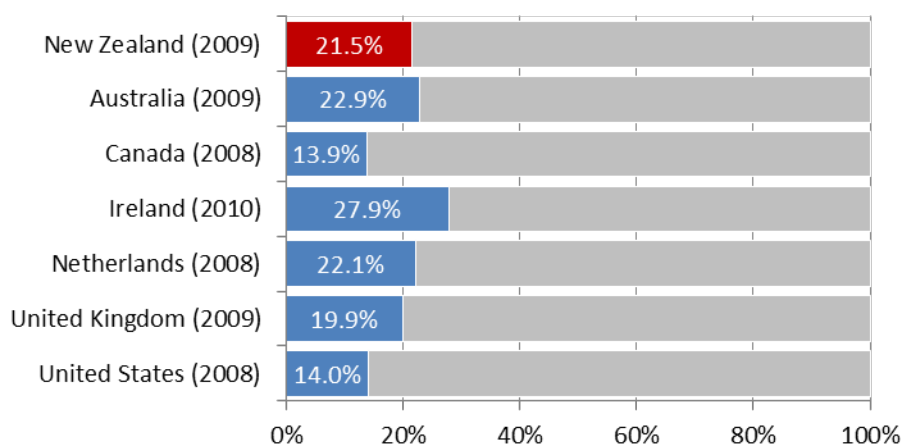


Figure 5. Proportion of all live births that are to mothers of 35 years of age or older. Note: Datapoints are from different years and diverse sources; they should be seen as indicative only. See demographics table for sources.

The increasing age of first-time mothers is an important issue for maternity services. Older mothers are more likely than 25 to 35 year old mothers to experience complications during pregnancy and labour and are more likely to require medical intervention (Joseph et al. 2005). The babies of older women are

¹ http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/demographic-trends-2011/births.aspx

more likely to have congenital abnormalities, to be born prematurely, have fetal growth restriction, perinatal mortality and/or serious neonatal morbidity. Older maternal age is also associated with increased rates of multiple births, which increases the likelihood of complications and intervention in labour.

On the other hand, older mothers are more likely to be educated and exhibit some healthy behaviours such as seeking early antenatal care and not smoking. It is important to note that while older women have higher risk pregnancies, most older mothers have healthy pregnancies and healthy babies (PHAC 2008).

While it is not possible for maternity services to influence the trend towards older mothers other than through providing information to consumers, the increased risk of complications during pregnancy and labour emphasises the importance of strong systems around identifying complications as early as possible and delivering the appropriate care.

4.2.2. Young mothers

Younger mothers (age 19 and under) are at higher risk of poor social outcomes for both themselves and their children than mothers between 25 and 35 years of age (AIHW 2011, CDC 2011). Teenage pregnancy is strongly associated with other risk factors for maternal and perinatal health. For example, in the United Kingdom teenage conception and birth rates are up to six times higher in the poorest areas than the most affluent areas (NCCWCH 2011). In Australia, 37% of young mothers smoked during their pregnancy compared to 14.5% of older mothers (AIHW 2011). In New Zealand teenage women and those under 25 years of age had the highest rates of smoking when compared to all other age ranges. These associations make it difficult to quantify the effect of young parenting in itself (NCCWCH 2011).

In New Zealand, the PMMRC (2011) found that 7.8% of births in New Zealand in the three years 2007–2009 were to mothers under 20 years of age. In this same period a disproportionate 10.6% of perinatal deaths were babies with mothers in this age group.

As in New Zealand, teenage pregnancy and birth is an issue of high concern in a number of comparator countries. Health problems for teenage mothers include poor maternal weight gain and anaemia as well as increased risk of low birth weight babies and premature births, outcomes which are also related to smoking in pregnancy (PHAC 2008). Access to free contraception may be a contributing factor. In the United Kingdom, younger mothers have lower rates of maternal mortality but higher rates of stillbirths, perinatal and neonatal deaths than mothers between 20 and 34 years of age (NCCWCH 2011). In general they are less likely to breastfeed and more likely to have an inadequate diet, experience postnatal depression or other mental health problems in the first three years of the baby's life and experience social isolation and relationship breakdown (DH 2008). The Centre for Disease Control estimates that teen pregnancy and childbirth in the United States costs taxpayers \$9-11 billion per year in increased healthcare and foster care costs, increased incarceration rates for children of teen parents and lost tax revenue from teen mothers who do not complete their educations (CDC 2011).

In contrast to birth rates to older mothers, teenage pregnancy rates and the proportion of live births that are to teenage mothers are remaining steady or declining in comparator countries. For example, in Australia, the most recent perinatal statistics report shows that the proportion of teenage mothers remains steady, declining from 4.2% in 2008 to 4.0% in 2009, compared with 5.0% in 2000. The proportion of teenage women who gave birth in 2009 varied across states from 2.4% in the Australian Capital Territory to 10.5% in Northern Territory. Birth rates for younger women are higher among Aboriginal and Torres Strait Islanders (AIHW 2011). In Canada, birth rates to teenage groups decreased steadily between 1995 and 2004, with higher rates of decreases for younger age groups. Rates of birth to teenage mothers remained higher in provinces and territories that were more rural and had higher populations of First Nations people (PHAC 2008).

Figure 6 below shows the teenage fertility rates of the comparator countries as reported by the OECD. The OECD average teenage fertility rate is 17.1, though 14 of the 39 countries have rates below 10.

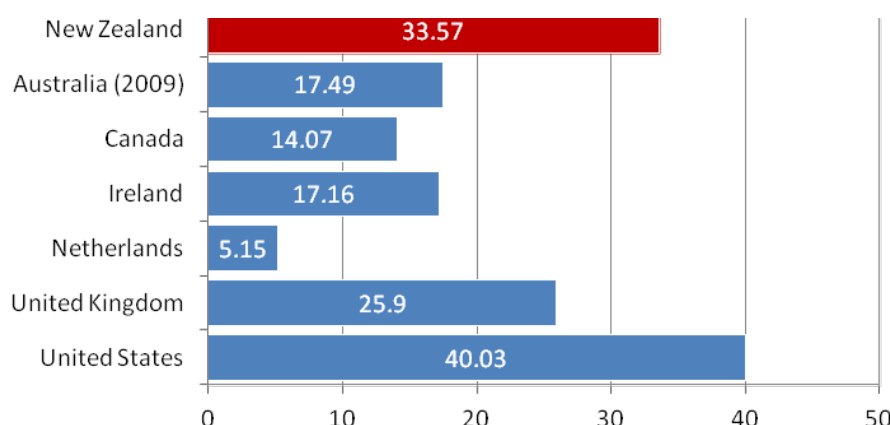


Figure 6. Birth rates (per 100,000 15-19 year olds) for comparator countries for 2008 sourced from the WHO. Australian figures are for 2009.

The United States and New Zealand are considerably above average while the Netherlands is considerably lower. Although lower than the United States and New Zealand, policymakers in the United Kingdom are concerned that it has the highest rates of birth to teenagers in Western Europe (NCCWCH 2011).

There are many initiatives aimed at reducing teen pregnancy rates by preventing teenagers from becoming pregnant and entering maternity services in the first place. Approaches include the provision of sex education in schools, free or subsidised contraceptives and public health campaigns on the risks of unsafe sex. This is a pressing issue for New Zealand, particularly in some areas where there is lack of access to contraception and delays in appointments with family planning. Not all schools have standing orders for contraception and more nurses need to be trained in the insertion of jadelle (RANZCOG correspondence, 2012).

One of the most significant issues in providing maternity services to young parents is antenatal care. Young parents are less likely than their older counterparts to attend antenatal services early in their pregnancies. For example, in the United States in 2008, teenaged mothers were least likely to receive antenatal care with one-third (32.9%) of mothers aged under 13 and about one-half (54.3%) of mothers aged 15 to 19 initiating antenatal care in the first trimester, compared to the national rate of 71% for mothers of all ages (Child Health USA 2011).

Young mothers are a diverse group and face many different barriers to care. The following were listed by an expert group as the most important based on available evidence (NCCWCH 2011):

Service barriers: Treatment by staff, staff attitudes, waiting times, transportation.

Teenage antenatal clinics reducing preterm births (Quinlivan 2004):

A small trial of 731 teenage patients in Australia (selected consecutively) who were approached to participate in a trial of teenage antenatal care clinics. 541 teen parents received care from a specialised multidisciplinary team including obstetric doctors, clinical midwives, midwife nurse educators, social workers and a psychiatrist. At regular intervals, staff from Centrelink (a Government financial support agency), Indigenous Health and Dietician Services attended the clinics to see patients.

Their outcomes were compared to those of 253 teenagers using a general antenatal clinic.

Teenage antenatal clinic patients were significantly less likely to present with threatened preterm labour or deliver preterm. Clinic care had no independent effect on newborn outcomes. There were no significant changes in breastfeeding initiation. However, more teenage clinic mothers were discharged on contraception.

Personal barriers: Embarrassment of unplanned pregnancy, not wanting to recognise the pregnancy, fear of telling parents, having other more important social problems than healthcare, discrepancy in age with other antenatal care attendees.

In New Zealand, much pregnancy care is provided by midwives in a community setting, which may reduce some barriers of access for pregnant teenagers. Data from the New Zealand College of Midwives research database demonstrate that teenagers do access maternity care but are more likely to do so later than recommended. This may be related to a lack of acknowledgement and concealment of their pregnancy rather than issues of access. Additionally some midwifery group practices are known within their communities to be specialists for young mothers and these practices report high levels of early pregnancy engagement and improved outcomes (New Zealand College of Midwives).

The box below reports the recommendations of an expert group in the United Kingdom for the provision of antenatal care to young women. Perhaps the most important point is that maternity services can act as a gateway to other social services (DH 2008). Several of the experts interviewed for this report confirmed the importance of providing wraparound services to teenage parents and preventing recurrent teen pregnancies.

Recommendations for antenatal care of women aged under 20 from NCCWCH 2011:

Access to services can be encouraged by ensuring they:

- Are age appropriate;
- Are aware young women may be dealing with other social problems;
- Offer information about help with transportation to and from appointments; and
- Provide opportunities for partners to be involved in care with the woman's agreement.

The following options for organisation of services should be considered to improve access and maintain contact:

- Antenatal care in peer groups in different settings (for example GP surgeries, children's centres and schools);
- Antenatal education in peer groups integrated with antenatal appointments and access to other services; and
- A named midwife with direct access.

Professionals should have training in working with young people and information should be age appropriate.

4.3 Multiple births

Multiple birth rates varied from 1.5% and 1.6% in the United Kingdom and Australia respectively to 3% and 3.5% in Canada and the United States respectively.

Comparator countries report an increasing proportion of multiple births. For example, in Canada the proportion of all births that were multiple births increased from 2.2% in 1995 to 3.0% in 2004 (PHAC 2008).

The increase in the rate of multiple births is linked to increasing rates of use of assisted reproductive technology (ART) in older women. Regulation of ART in some countries allows multiple embryos to be implanted. The New Zealand policy for public funding allows implantation of one embryo only, though private organisations may still implant multiple embryos (written correspondence, Ministry of Health).

In the Netherlands, 27% of multiple births result from ART, compared to 2.8% of singleton births. In Australia and New Zealand, there were 70,451 ART treatment cycles reported in 2009 resulting in 12,127 live deliveries of 13,114 babies. The number of ART treatments increased by 48% between 2005 and 2009. On average, women receiving ART were 35.8 years old, considerably older than the average maternal ages in both countries. On average, 8.2% of ART treatments resulted in multiple pregnancies, a decrease from 14.1% in 2005. Advances in technology and clinical practice are decreasing the rate of multiple pregnancies (Wang et al. 2010).

Multiple births are more likely to require medical intervention, for example induction of labour and caesarean delivery. Women expecting a multiple birth are a high risk group with increased risk of perinatal mortality and serious neonatal morbidity (PHAC 2008).

4.4 Socioeconomic risk factors

Economic deprivation is closely linked with rates of teen pregnancy and with other risk factors in pregnant women. Low socioeconomic status is linked to higher rates of smoking, alcohol abuse, poor nutrition, low antenatal care attendance and low maternal education. These are all risk factors for poor maternal outcomes.

In the United States, a study of young women giving birth in Missouri between 1997 and 1999 found that socioeconomic factors may largely explain the increased risk of neonatal mortality for younger adolescent mothers (12-17 years old) (Markovitz 2005).

A high quality, large (157,445 participants) population based study of all women giving birth in Nova Scotia, Canada between 1988 and 1995 found that lower family income was associated with increased rates of gestational diabetes, small-for-gestational age, live birth and post-neonatal death despite free public healthcare services being widely available. The authors speculate that the observed poorer outcomes are related to higher rates of obstetric intervention in the lower family income groups than in the highest income groups (Joseph et al. 2007).

In New Zealand, there is a significantly increased rate of stillbirth among mothers in the most deprived socioeconomic quintile compared to all less deprived quintiles (PMMRC 2012). Similarly, in the United Kingdom a report from the Department of Health in 2007 stated that (DH 2007):

“Outcomes of pregnancy for the more vulnerable and disadvantaged are cause for concern: For maternal mortality, the confidential enquiry showed:

- *Women living in families where both partners were unemployed, many of whom had features of social exclusion, were up to 20 times more likely to die than women from the more advantaged groups*
- *Single mothers were three times more likely to die than those in stable relationships*
- *Women living in the most deprived areas of England had a 45% higher death rate compared to women living in more affluent areas.”*

Women with low socioeconomic status encounter barriers to care that other mothers do not. Barriers may be physical, for example lack of service availability, distance to services, lack of transport or lack of choice in services. Making maternity services available in community settings and linking them with other social services can attempt to address this barrier (see the box for examples). Initiatives targeting at-risk groups (for example young parents, parents with substance abuse problems or smoking) tend to use approaches targeting women of low socioeconomic status

Sure Start Children's Centres (United Kingdom)

Sure Start children's centres provide maternity care in community settings linked with other types of care. The centres focus on identifying other social issues for families in addition to maternity care. An example described is the midwifery team in Southampton. The team worked with the Sure Start programme to ensure women from vulnerable groups and their families had access to Sure Start services and easier access to midwifery services in the community. The social model provided by midwives ensures that women have continuity of care throughout pregnancy, birth and afterwards for up to six weeks. One of the primary aims was to reduce the incidence of low birth weight babies. Women cared for by these teams had lower rates of low-birth weight babies and high rates of home or birth centre births (DH 2007).

Family Nurse Partnerships (United Kingdom)

FNP is often delivered through Sure Start Children's Centres. The programme, modelled on the United States version, provides intensive and structured home visiting from specially trained nurses for first-time young parents from the second trimester. Evaluation shows promising outcomes for clients suggesting that those with the highest levels of vulnerability were among the best supported (Barnes et al. 2011)

as these risk factors are more prevalent amongst that group. United Kingdom recommendations for working with women with complex social needs include (NCCWCH 2011):

- Health professionals discussing the need for antenatal care at first contact;
- Considering a broad needs assessment to develop a coordinated care plan;
- Respecting confidentiality and providing one to one consultation;
- Ensuring handheld notes contain a full record of care and results of all tests completed; and
- Providing a telephone number for a health professional that can be used out of hours.

In New Zealand, fragmentation of services may place a burden on LMCs, most often midwives, to link various agencies (RANZCOG correspondence).

4.5 Remoteness

Rural practitioners face challenges with geographical isolation, small populations and long distances to secondary/tertiary maternity facilities. Rural populations are often dependent on a small number of health practitioners working collegially.

In New Zealand there are differences between the maternity services available to people in rural communities and those in urban areas. The New Zealand College of Midwives reported that in 2009 women in rural or semi-rural locations were more likely to give birth in primary facilities than their urban counterparts (NZCOM 2009). Canada and Australia have wide sparsely populated geographic areas. They face challenges with their workforces: obstetricians are disproportionately more likely to be located in urban areas in both countries and there are critical shortages in many areas. Though the issues with remoteness in New Zealand are not as extreme, approaches to improving rural and remote care, often through workforce development, are as applicable in New Zealand as in Canada and Australia.

The prevalence of risk factors for maternity outcomes differs between rural and urban populations, but there are also differences in service availability. Increased rates of negative outcomes in rural areas are associated with higher prevalence of risk factors (for example younger mothers, smoking and substance misuse) and decreased access to maternity services.

In Australia, different states have different proportions of rural populations. In the Northern Territory one-half of all mothers live in remote or very remote areas but in the Australian Capital Territory virtually all mothers live in major cities (AIHW 2011). In 2009, mothers in the Northern Territory were more likely to:

- Be younger (the average age was 27.8 compared to 30.8 nationally and the proportion of teenage births was four times the national proportion);
- Be Aboriginal (38.2% compared to 3.8% nationally);
- Give birth to their fourth or subsequent child (8% compared to 5.7% nationally);
- Give birth prematurely (9.3% compared to 7.4%); and
- Give birth without intervention.

Not all facilities are available in all rural areas and the number of facilities providing maternity services in rural and remote Australia has declined over recent years. GPs and obstetricians are both disproportionately located in major cities rather than regional or remote areas. Births are concentrated in a smaller number of larger facilities (Australian Government 2009). Women may have to travel considerable distances to access care, but Australia also has a number of initiatives to provide maternity care to women in remote

Medical Specialist Outreach Assistance Programme

The Australian Government increases access to multi-disciplinary maternity service teams, through providing funding for travel, meals, accommodation, facility fees and other expenses incurred by practicing in an outreach location.

locations. Examples include the Medical Specialist Outreach Assistance Programme and the Specialist Obstetrician Locum Scheme.

Similarly in Canada, mothers in more rural areas are more likely to be younger and to have maternal risk factors like youth and exposure to smoking (PHAC 2008). There are acute shortages in maternity care providers in rural and remote areas with providers facing long distances to travel to facilities and to access specialised equipment. Primary care is more likely to be provided by nurses in remote areas due to the absence of doctors (PHAC 2009). Initiatives in Canada to provide care to women in remote locations include an increasing use of telemedicine and robotics where specialists located remotely can provide support to on-site nurses through computer assisted technologies.

High proportions of women travel away from their communities to give birth in some Canadian states: more than one-half of women in Nunavut and just under two-thirds of women in the Northwestern Territories. Women are more likely to give birth locally if caesarean capability is available locally (PHAC 2009). Travelling away from their communities for care or to give birth can be difficult for some women (O'Driscoll et al. 2011). It reduces the social support available from partners, friends and family and has a cost impact. The requirement for travel to access care negatively impacts mothers' experiences of birth. A survey of mothers' experiences found that women who travelled more than 100km to give birth were more likely to report a very negative or somewhat negative experience (PHAC 2009).

In New Zealand, there are initiatives in place that aim to strengthen the rural maternity workforce. For example, the Ministry of Health and the College of Midwives established the Rural Recruitment and Retention Service (RMRRS) in 2009. The RMRRS provides support to rural midwifery practitioners through the provision of locum services (for leave and recertification education), a mentor and establishment grants for areas in which there is a shortage of LMC services.

4.6 Other maternal risk factors

4.6.1. Smoking

Maternal smoking is associated with an increased risk of a range of negative outcomes, particularly premature birth and low birth weight. It is causally associated with an overall increased risk of preterm birth, spontaneous abortion, stillbirth and sudden infant death syndrome. It is associated with an increased risk of infant mortality and morbidity (PHAC 2009). Smoking has been described as the single most important modifiable cause of adverse pregnancy outcomes (Lumley et al. 2009).

Smoking rates are interlinked with other risk factors. Women who smoke in pregnancy generally have low income, high parity, are more often without a partner, have low levels of social support, receive publicly funded maternity care, have limited education and are more likely to feel criticised by society (NCCWCH 2011).

The differences in rates of smoking during pregnancy across population groups and across geographic areas within countries can be vast. Across the comparator countries, there are associations between smoking and:

- Age: For example, in Australia, 14.5% of all mothers smoke but 37% of teenaged mothers smoke (Australian Government 2009) and similarly in New Zealand smoking rates are higher amongst women under 25 years of age;
- Low socioeconomic status: For example, in a study of Irish mothers, mothers with low education were more than twice as likely to have smoked at some stage in their pregnancy (40%) than the average across all groups (18%) (Williams et al. 2010);

- Remoteness: For example in 2009 in more urban British Columbia and Ontario, 9% of mothers smoked during pregnancy while 25% and 64% smoked in the Northwest Territories and Nunavut respectively (PHAC 2009);
- Ethnicity: There is a significantly higher prevalence of smoking in pregnancy in several Indigenous and ethnic minority groups, which is consistent with higher levels of socioeconomic deprivation (Lumley et al. 2009). This pattern can be seen in New Zealand, where smoking rates are higher amongst Māori and Pacific mothers; and
- Mental health: smoking is associated with depression and stress – depressed women are up to four times more likely to smoke than non-depressed women (Lumley et al. 2009).

Pregnancy provides an opportunity for women to be influenced to stop smoking. A systematic review of interventions promoting smoking cessation in pregnancy identified the following successful strategies (Lumley et al. 2009):

- Advice and counselling using various tools (written and electronic resources and telephone support) and theoretical basis, such as cognitive behavioural therapy and motivational interviewing;
- Advice and counselling based on assessment of the women's 'stage of change'²;
- Feedback of fetal health status or measurement of by-products of tobacco smoking to the mother;
- Provision of pharmacological agents, such as nicotine replacement therapy and bupropion;
- Social support and encouragement, including the use of rewards for cessation; and
- Other interventions such as hypnosis.

Promoting smoking cessation programmes to providers (Campbell 2006)

In Australia, antenatal care guidelines recommend that women are advised to quit smoking. This 2006 trial compared two methods of promoting antenatal care providers to give advice on smoking cessation.

Clinics were either mailed information on a smoking cessation programme or provided with information including training visits, sample clinic policies, regular contact and computerised clinic feedback on smoking cessation activities from consumers.

Neither groups of clinics found better outcomes, raising questions about the capacity of medium intensity dissemination programmes to contribute to large decreases in the prevalence of smoking in pregnancy. The authors conclude that alternative strategies should be trialled.

The review of these interventions promoting smoking cessation in pregnancy found a great degree of heterogeneity in results. But it concluded that smoking cessation programmes are successful in reducing the proportion of people who continue to smoke into late pregnancy and in reducing the incidence of low birth weight and preterm birth. There has been concern that interventions to promote smoking cessation increase stress and psychological symptoms for women. But a number of studies have now shown that this is not the case (Lumley et al. 2009). One trial in the United Kingdom found intensive advice to stop smoking provided by a midwife did not increase stress in pregnant women who smoked (Aveyard et al. 2005).

In Canada, one-quarter of all women lived with someone who smoked (PHAC 2009). It is thought that partner smoking is a factor that could decrease the likelihood of women quitting. But a cluster-randomised trial comparing the effects of a smoking cessation programme (midwife delivered counselling and self-help manuals) on partner smoking rates for 918 women found no effect on the number of partners who quit smoking (Aveyard 2005). The effect of smoking cessation programmes on women's partners smoking habits is an area requiring further research.

All comparator countries have guidelines from the government or from professional organisations recommending women smoking in pregnancy receive interventions to promote smoking cessation

² Prochaska and Di Clemente stages of change model

(Lumley et al. 2009). If smokers quit before 12 to 15 weeks, risk to the baby can be reduced (McCowan et al., 2009).

New Zealand guidelines recommend that pregnant smokers are offered multi-session behavioural smoking cessation interventions from a specialist/dedicated cessation service. All health practitioners undertake the ABC assessment with pregnant women – this involves Ask about smoking, provide Brief advice (to stop smoking) and refer to a Cessation provider (MOH 2007). The approach has been developed to fit the New Zealand culture and context.

The New Zealand College of Midwives advocates for the strength of the New Zealand approach. It is exemplified by a group practice of midwives that provides all antenatal care in the woman's home environment so that smoking cessation messages can also be provided to others within the woman's social environment (NZCOM correspondence).

In the United Kingdom, the current NICE guidelines for antenatal care recommend that midwives assess exposure through a CO₂ test, provide information to the woman on the risk smoking poses to herself and the baby, refer to smoking cessation services, provide a helpline number and follow up referrals. They have been developed to fit the United Kingdom context, which differs from New Zealand in many ways.

Given how difficult it is for many women to give up smoking in pregnancy, it is important that public health initiatives continue to reduce smoking in the population as a whole to reduce the number of women who are smoking when they become pregnant (Lumley et al. 2009).

4.6.2. Substance misuse

Misuse of alcohol and drugs during pregnancy is associated with poorer maternity outcomes including low birth weight, preterm birth and developmental and behavioural issues during childhood (PHAC 2009). Enquiries into maternal death in the United Kingdom have found an association between maternal substance misuse and an increased risk of maternal and/or infant death in the perinatal period. Nearly one-third of the women who died between 2003 and 2005 in the United Kingdom had problems with substance misuse (CMACE 2009).

Prenatal exposure to alcohol can lead to a range of conditions known as Fetal Alcohol Spectrum Disorder (FASD). Women misusing substances are less likely to access or maintain contact with maternity services and are more likely to experience other social disadvantages (NCCWCH 2011).

Evidence of the mechanism causing poor outcomes from drug use is equivocal because of its high correlation with other risk factors such as smoking, lack of prenatal care and alcohol use. There are higher rates of substance abuse in younger mothers and mothers of low socioeconomic status (PHAC 2009).

Obtaining accurate data around use of drugs is difficult given the social undesirability and illegality of drug use. In New Zealand, there is no national collection or reporting of rates of drug use by pregnant women (RANZCOG correspondence). Surveys in the United States indicate that 6.4% of women of childbearing age use illicit drugs while 2.9% of pregnant women use drugs (PHAC 2009). Large scale surveys of mothers put rates of drug use during pregnancy at 1% in Canada (PHAC 2009) and 0.1% in Ireland (Williams 2011) and the Netherlands (NPR 2008). Only small minorities of women use drugs during pregnancy, though there are many interventions targeting these women, particularly in the United Kingdom and United States.

An expert British group has analysed the evidence about successfully providing antenatal care to women misusing substances. They made the following recommendations for providing care to women who misuse substances to the extent that physical dependence and/or harm to their or their baby's health is a risk (NCCWCH 2011):

- **Barriers to care:** Like other groups of vulnerable service users, women misusing substances face the following important barriers to care and treatment: treatment and attitude of staff; lack of integrated care from different services; and women's feelings of guilt about their misuse of substances and the potential effects on their baby.
- **Provision of a range of services in one location:** The studies the group reviewed suggested being able to access drug treatment and antenatal care in the same location encouraged antenatal attendance.
- **Specialised care:** The group concluded that women should receive care from a named individual who has specialised knowledge of substance abuse issues.
- **Service considerations:** Services should be integrated, ensure attitudes of staff do not prevent women from accessing treatment, address women's fears about the involvement of children's services and potential removal of their child by providing information tailored to their needs, address women's feelings of guilt about their misuse of substances and the potential effects on the baby.

Manchester Specialist Midwifery Service (NICE 2012)

In the United Kingdom, an increasing number of services appoint specialist midwives to coordinate care for women who misuse substances (NCCWCH 2011). The Manchester Specialist Midwifery Service has operated since April 2001 and specialises in providing service to women and their families where drug or alcohol use and mental health problems have been identified. They are based in a community centre with other social services.

The midwives provide antenatal care, but also lead the coordination of care through individual casework and case planning.

Approaches which support continuity of care and a strong relationship between the pregnant woman and the mother may encourage information sharing allowing any drug and alcohol issues to be identified and addressed (NZCOM correspondence).

Two Cochrane reviews of approaches to care for women with substance misuse find a lack of evidence about what contributes to effective service provision.

Home visits during pregnancy and after birth (Turnbull 2012): Home visits are an approach to linking women with the healthcare services they need. The authors reviewed seven trials involving 803 women, predominantly involving postpartum visits. They found evidence that home visits after the birth may increase the engagement of these women in drug treatment services and their use of contraception, but there were insufficient data to say if this improved the health of the baby or mother. Further research is needed, with visits starting during pregnancy.

Educational and psychological interventions to reduce alcohol consumption by pregnant women (Slade 2009): This systematic review found only four trials which were not similar enough to conduct a meta-analysis. The authors conclude there is an urgent need for more research in this area as the individual studies suggest these interventions may encourage women to abstain from or reduce alcohol consumption while pregnant.

4.6.3. Obesity

Obesity is a current and increasing problem in maternity care (Dodd 2010). Worldwide, rates of obesity are increasing in the general population and so too are rates of obesity in pregnant women. There are well documented risks associated with obesity in pregnancy including increased risk of pregnancy complications, need for intervention in labour including induction and caesarean, and stillbirth. Children born to mothers who are obese are more likely to be large for gestational age, require neonatal intensive care, or be diagnosed with a congenital anomaly (Dodd 2010).

Obese women also place a greater demand on services. A United States study found that after controlling for age, race or ethnic group, level of education and parity, obese women had a mean length of stay significantly longer than that of non-obese women. Higher BMI was associated with more prenatal procedures but fewer antenatal visits. Most of the increased length of stay was a result of increased rates of caesarean section and obesity-related high risk conditions (Chu 2008).

New Zealand has increased rates of obesity. This is of particular concern to maternity outcomes for Māori and Pacific mothers, who have higher rates of obesity than the public as a whole. The importance of obesity as a risk factor in pregnancy is recognised by the inclusion of morbid obesity (BMI > 50) in the Australasian Maternal Outcomes Surveillance System. A total of 297 cases were identified in New Zealand in 2010-11 (PMMRC 2012).

Increasing rates of obesity can be seen across all comparator countries, with the United States having the highest overall rates. Obesity in United States women of reproductive age increased from 13% in 1995 to 22% in 2005. In Canada, more than one-third of women giving birth have high pre-pregnancy BMI, with 21% categorised as overweight and another 13.6% as obese (PHAC 2009). Australia too has high and increasing rates of obesity. Though the Netherlands has lower rates of obesity than the comparator countries in the general public, the proportion of the population that is obese has doubled in the two decades to 2011.³

Current guidelines from the American College of Obstetricians and Gynaecologists recommend women be counselled prior to conception and encouraged to reduce their weight prior to pregnancy.

Dodd (2010) conducted a review of available trials of providing antenatal dietary and/or lifestyle interventions for pregnant women who are overweight or obese. They found four studies but saw no statistical differences between intervention and control groups. As with other modifiable risk factors, the focus should be on reducing the incidence of obesity before pregnancy. One approach is including advice on the risks of obesity in pre-pregnancy counselling (TAH 2008). Limiting gestational weight gain and supplementing vitamin D and folic acid can reduce risk (Thangaratinam et al., 2012).

4.7 Maternal mental health and psychosocial risk

Many women develop mental health problems during pregnancy or at childbirth and over the following year. Pregnancy and childbirth are transition points in women's lives and are associated with higher levels of emotion and anxiety (Jomeen 2008). While most adjust well, some experience psychological or psychiatric health problems that mar the experience (Rowan 2007). At the extreme end, mental health problems can contribute to maternal suicide, which was the most common cause of maternal death in New Zealand (PMMRC 2012) and the United Kingdom (CMACE 2011). Similarly, perinatal depression has been identified as a priority by the Australian Government (Australian Government 2009).

Mental health problems can arise both during and after pregnancy. During pregnancy, approximately 12% of women suffer from depression. Depression during pregnancy is related to poor maternal self-care behaviours, which may influence the baby's health. It places a woman at significant risk of developing postpartum depression (Dennis 2008). After birth, there are three major categories of postnatal emotional conditions: the postnatal "blues", postnatal depression and postnatal psychosis.

Impact of obesity on maternity services (Hesslehurst 2007)

The authors conducted survey of healthcare professionals from maternity units in the United Kingdom asking about the impact of obesity on their services. Practitioners described a major impact, particularly in relation to the level of care required, the cost and resource implications, complications and risk to mother and infant. Practitioners reported a lack of awareness among their patients of the risks of obesity in pregnant women.

³ Statistics Netherlands, available at: <http://www.cbs.nl/en-GB/menu/themas/gezondheid-welzijn/publicaties/artikelen/archief/2011/2011-3514-wm.htm>

The postnatal blues occur in up to 80% of women and usually resolve within two weeks. Postpartum depression occurs in the first year after birth in 10% to 20% of women and can last months or even years. Postpartum psychosis is rare, occurring in about 0.2% of women, but requires immediate medical care (PHAC 2009). Some women experience these symptoms for the first time after birth, while others have experienced them previously (Rowan 2007). Untreated postnatal depression carries risks to maternal and child health.

Children of mothers with perinatal depression have been shown to have increased risk of depression and anxiety disorders. Maternal mental illness during pregnancy and the postpartum period has been shown to have a detrimental effect on the emerging mother-infant relationship and other family and whānau relationships (MOH 2012). Evidence strongly indicates that mothers who have good mental health in the perinatal period have positive impacts upon the cognitive, emotional and behavioural consequences of their children (Australian Government 2009).

The strongest predictors of postnatal depression are depression or anxiety during pregnancy, recent stressful life events, poor social support and a history of depression. Additional factors that might contribute to postnatal depression include hormonal changes, birth experiences, lack of experience with babies, marital stress, number of other children and demographic characteristics such as maternal age (PHAC 2009).

There is a need for healthcare professionals to ensure individual postnatal mental health needs are identified and met though the evidence of the most effective ways to achieve this is lacking (Rowan 2007). In New Zealand, the PMMRC recommends that women with a history of serious mental illness should be referred to mental health services for monitoring and support during pregnancy and until three months after birth. These guidelines are supported by the New Zealand Guidelines Group and the NICE guidelines (New Zealand Guidelines Group 2008; National Institute for Health and Clinical Excellence 2007). However, in a survey of 398 LMCs conducted from 2010-2011 found that a significant proportion of New Zealand's LMCs (26%) do not routinely ask about the mother's mental health. Only 60% identified a specific referral pathway if a woman is identified as having an existing mental health problem or being at high risk.

Psychosocial and psychological interventions for preventing postnatal depression (Dennis 2004)

The authors reviewed fifteen randomised controlled trials of interventions to prevent postnatal depression involving 7600 women.

Overall the authors conclude that psychosocial interventions do not prevent the numbers of women who develop postnatal depression.

However, they draw the following conclusions:

- Intensive professionally-based postpartum support may be helpful.
- Interventions that were individually based appear to be more beneficial than those that were group-based.
- There is evidence supporting interventions that are initiated in the postnatal period that do not include an antenatal component.
- Interventions targeting 'at-risk' mothers may be more beneficial than those including a general maternal population.
- Many questions remain unanswered and additional research is needed.

A review by the same authors of non-pharmacological/psychosocial/ psychological interventions to prevent antenatal depression found insufficient evidence to draw any conclusions (Dennis 2008).

Treatment of mental health problems once they are detected is an issue for New Zealand and other countries. Currently, there is a disparity between need and availability of maternal mental health services in many parts of the country. The PMMRC recommended improved coordination of care, screening and referral but also identified inadequate maternal mental health resources and lack of clear referral pathways as a barrier to women accessing mental health assessment and treatment when it is required (PMMRC 2012). The New Zealand 'Healthy Beginnings' report (MOH 2012) describes the continuum of services needed for an effective mental health care system for mothers and infants in New Zealand.

Psychosocial and psychological interventions for treating postnatal depression (Dennis 2007)

The authors identified and reviewed nine trials of interventions for treating postnatal depression involving 956 women. Psychosocial interventions reviewed included peer support and non-directive counselling and were delivered by either trained health visitors/nurses or peer volunteers. Psychological interventions were cognitive behavioural therapy, interpersonal psychotherapy and psychodynamic therapy and all were provided by health professionals.

The authors conclude that psychosocial and psychological interventions are an effective treatment option for women suffering from postpartum depression. They note that although the methodological quality of the majority of trials was generally not strong, the meta-analysis results suggest that psychosocial and psychological interventions are an effective treatment option for women suffering from postnatal depression. The long-term effectiveness remains unclear and the evidence is not strong enough to reach definite conclusions about the relative effectiveness of different strategies.

Women's experience of pregnancy and birth and the care they receive has been thought to be related to women's psychological wellbeing (Jomeen 2008). Emphasising choice and control in the care women receive is promoted as a means to improve psychological outcomes. However, findings of a longitudinal study of choice and psychological outcomes of 165 women in the United Kingdom suggest that choice of care as a single independent variable does not result in the expected or indeed predicted psychological benefits. The physical and psychological challenges are similar regardless of the choices made in care. The authors conclude that the choice of model may be less important than the quality of care and the way care is delivered within those models for perinatal psychological outcomes (Jomeen 2008).

Postnatal stays in hospital are reducing in the comparator countries in this review as they are in general. There has been concern about the effect of early discharge on maternal mental health. A Cochrane review of ten trials of early discharge from hospital for healthy women found that early discharge does not appear to increase the incidence of maternal depression when accompanied by a policy of offering at least one nurse or midwife home visit after hospital discharge. However, the evidence is not strong enough to draw definitive conclusions (Brown et al. 2009).

In the United Kingdom, the National Institute for Clinical Excellence makes ante- and postnatal recommendations for the mental health of pregnant women.⁴ They include:

Prediction and detection: At first contact both pre- and post-natally, healthcare professionals should ask about the mental health history of the woman and her family, including the following questions about depression:

- During the past month, have you often been bothered by feeling down, depressed or hopeless?
- During the past month, have you often been bothered by having little interest or pleasure in doing things?

If the woman answers yes, a third question should be considered:

- Is this something you feel you need or want help with?

Psychological treatments: Women requiring psychological treatment should be seen for treatment normally within one month of initial assessment, and no longer than three months afterwards. This is because of the lower threshold for access to psychological therapies during pregnancy and the postnatal period arising from the changing risk–benefit ratio for psychotropic medication at this time.

⁴ Available in full at: <http://publications.nice.org.uk/antenatal-and-postnatal-mental-health-cg45/key-priorities-for-implementation>

Explaining risks: Before treatment decisions are made, healthcare professionals should discuss with the woman the absolute and relative risks associated with treating and not treating the mental disorder during pregnancy and the postnatal period.

Management of depression: When choosing an antidepressant for pregnant or breastfeeding women, prescribers should take into account the different risk profiles for the pregnant woman and the fetus.⁵

Organisation of care: Clinical networks should be established for perinatal mental health services, with multi-disciplinary management groups. These networks should provide a specialist multi-disciplinary perinatal service in each location, to expert advice on psychotropic medication during pregnancy and breastfeeding, clear referral and management protocols, and pathways of care for service users.

⁵ It should be noted that caution should be exercised in stopping antidepressants in pregnancy especially in women with severe mental health histories.

5. Vulnerable populations

Vulnerable populations are populations with a higher risk of adverse maternity outcomes arising from their demographic profile, where they live and/or an accumulation of risk factors. As populations, they have higher rates of the risk factors discussed in section 4 than other population groups. Vulnerable populations are discussed in further detail in this section as improving outcomes for these populations may require different approaches to providing care.

Disparities in maternity outcomes between Indigenous populations and immigrant populations, when compared to the general population highlight the vulnerability of these groups. A report comparing the health outcomes of Indigenous children across the United States, Canada, Australia and New Zealand concludes that “striking Indigenous/non-Indigenous health disparities were identified in all four countries” (Smylie 2009). Similar disparities exist for other vulnerable groups, such as immigrants, across comparator countries.

Indigenous groups and other ethnic minorities have a different demographic and risk profile than other population groups, which can contribute to poorer outcomes. But they also face issues around access to care and availability of culturally competent services.

In New Zealand, there are disparities between the outcomes for Māori and Pacific Island mothers and the country as a whole. Māori and Pacific mothers face many of the issues common to vulnerable groups across comparator countries: slower engagement with antenatal care, higher prevalence of risk factors, an increased incidence of prematurity and poorer mortality outcomes. While New Zealand is actively addressing health disparities, it is clear that there is still room for improvement.

This section describes the disparities in outcomes for vulnerable populations within the comparator countries, including information on disparities in risk factors, and provides an overview of initiatives to improve outcomes for vulnerable populations.

5.1 Disparities in outcomes for Indigenous peoples

Discussions of maternity outcomes for indigenous peoples draws on comparisons between New Zealand and Australia, Canada and the United States. New Zealand differs from the comparator countries in that the proportion of New Zealand’s population who identify as Māori is substantially higher than: the proportion of First Nations peoples in Canada; Aboriginal and Torres Strait Islanders in Australia; and Native Americans in the United States. In New Zealand, 23% of births in 2010 were to Māori mothers (PMMRC 2012). In Australia, about 3.8% of women who gave birth during 2009 identified as Aboriginal or Torres Strait Islander (AIHW 2009). In the 2006 census of Canada, 3.8% of people identified as First Nations. In the 2010 United States census, 0.9% of the population identified as Native American.

Disparities in maternity outcomes are evident in Indigenous populations in New Zealand and in comparator countries. Despite major improvements in infant mortality rates for all ethnicities over the years, disparities persist. Some reports say New Zealand and Canada have had more success in closing the gaps between Indigenous groups and the rest of the country than Australia (Kildea 2010). However, differences between the general population and First Nations people in Canada are still described as “striking” (Smylie 2010).

In New Zealand, Māori have an increased risk of stillbirth and neonatal death compared to New Zealand European maternities (PMMRC 2012) and Māori neonates are far more likely than New Zealand Europeans to die at 20-23 weeks gestation (PMMRC 2012). With regards to birth outcomes however, Māori women were more likely to give birth at home or in a primary unit and more likely to have a

normal birth (MOH 2012). In the first year following birth the Sudden Unexplained infant death (SUDI) rate for Māori was 90.1% higher than that of the non-Māori/non-Pacific population in 2006 (MOH 2010).

In Canada, First Nations peoples are likely to have true fetal and infant mortality rates more than two-fold higher than those of the rest of the population. Though the gap has closed in recent times, rates are still higher and yet are believed to underestimate actual rates because of under-registration of births (PHAC 2009). Similarly, in Australia the 2009 fetal death rate was 12.9 per 100,000 Aboriginal or Torres Strait Islander births compared to 7.8 per 100,000 births for non-Indigenous people (AIHW 2011).

5.2 Disparities in outcomes for immigrant populations

Similar disparities exist for immigrant populations and the barriers to service access can be similar. In New Zealand, 12% of births in 2010 were to Pacific mothers (PMMRC 2012). As is the case for Māori, Pacific have an increased risk of stillbirth and neonatal death compared to NZ European maternities (PMMRC 2012). Pacific neonates are far more likely than NZ Europeans to die at 20-23 weeks gestation (PMMRC 2012). In 2006, the Pacific infant death rate was 67.8% higher than the non-Māori, non-Pacific ethnic group (MOH 2010) and is one of the most important determinants of stillbirth in Pacific (RANZCOG correspondence).

In the United States, African-American infants are more than twice as likely to die as white infants in the first year of life. In one area of New York City, the infant mortality rate in minority populations is seven times higher than that of a nearby high-income predominantly white neighbourhood. United States studies suggest that higher rates of premature birth in African-American women contribute to the difference in outcomes. Spong et al. (2011) list the contributory factors, as:

- Social and economic factors: low income, low educational level, exposure to violence, unsafe housing, lack of child safety equipment;
- Differential prevalence of premature birth and factors associated with premature birth;
- Lack of access to highly resourced or high-quality maternal and neonatal care;
- Congenital abnormalities: poor nutrition, lack of supplementation, toxic environmental exposures, differential access to expert genetic and developmental services;
- Young maternal age; and
- Parental smoking, alcohol and drug use.

In the United Kingdom, women born outside the United Kingdom may be at higher risk of accessing antenatal care too late to receive information about the full range of screening and tests available in pregnancy. This may be a result of practical difficulties accessing healthcare and negative attitudes to male healthcare professionals (Rowe et al. 2008).

In the Netherlands, there is a disparity between outcomes for native Dutch people and immigrant groups; immigrants have a three times elevated risk of mortality compared to native people. A study examining the incidence of severe acute maternal morbidity found a number of factors contributed to increased risk, including language barriers, lack of social support, low socioeconomic status and inexperience with the obstetric system of the Netherlands (Zwart et al. 2010).

A study of views of immigrant women in Australia and the care they received during labour and birth found that immigrant women had lower levels of satisfaction with the care they received than the state-wide results. Immigrant women wanted the same things from their care that other Australians wanted – care that was safe, kind, supportive and respectful (Small et al. 2002).

5.3 Factors contributing to disparities in outcomes

Vulnerable populations in Australia, New Zealand, Canada and the United States share many of the following characteristics that contribute to disparities in maternity outcomes.

5.3.1. Lower socioeconomic status

On average Indigenous and immigrant populations have lower incomes and lower levels of educational attainment which contribute to lower socioeconomic status. In New Zealand, a higher proportion of Māori and Pacific women who give birth live in low socioeconomic areas (PMMRC 2012). Approximately one-third of First Nations children in Canada live in low-income families and poor housing and living conditions disproportionately affect First Nations families in Canada (Smylie 2009) and Pacific families in New Zealand (Ministry of Social Development 2010).

In New Zealand, Australia, Canada and the United States, differences in socioeconomic status are persistent and the income gap between Indigenous and immigrant populations and the population as a whole may be increasing. In the United Kingdom, the most recent enquiry into maternal deaths found that for the first time there has been a reduction in the inequalities gap, with a significant decrease in maternal mortality rates among those living in the most deprived areas and those in the lowest socioeconomic group (CMACE 2011).

5.3.2. Higher prevalence of risk factors

On average, women from Indigenous and new immigrant populations have a higher prevalence of risk factors. Many of the risk factors contributing to poor overall health outcomes, such as smoking, substance misuse and poor nutrition and obesity also increase the risk of poor maternity outcomes. Obesity is rising in prevalence across the general population and particularly in vulnerable populations. In New Zealand, it is one of the most important determinants for still birth in Pacific women (RANZCOG correspondence 2012).

Many of these risk factors are also associated with economic deprivation and the effects are interlinked. Individually, each of these risk factors has the potential to increase the incidence of adverse maternity outcomes. But Indigenous populations experience higher rates of most risk factors, with many mothers having a combination. The cumulative effect can be seen in the disparities between outcomes for the comparator countries' populations as a whole and those of their Indigenous groups.

The pattern can be seen across comparator countries. For example, in New Zealand, Māori and Pacific mothers are far more likely to be young (under 20 years of age) than mothers from other ethnic groups, and are more likely to smoke during pregnancy (PMMRC 2012). First Nations populations in Canada have higher rates of alcohol and tobacco use during pregnancy (PHAC 2009). In Australia, Indigenous mothers are younger than non-Indigenous mothers; their average age was 25.3 years, compared with 30.2 years for non-Indigenous mothers. Smoking during pregnancy was reported by one-half (50%) of Indigenous mothers (AIHW 2011).

5.3.3. More barriers to accessing maternity care

Indigenous peoples face barriers to accessing services not faced by other population groups. The PMMRC speculates that differences in perinatal outcomes between Māori and women from other ethnic groups may be a result of barriers to accessing and engaging with antenatal care. Bartholomew (2010) using the Growing up in New Zealand data found that only 4.6% of Māori women did not have an LMC for their maternity care compared to 5.2% for Pacific Island women. The Ministry of Health (2012) reported that in 2010, 34% of Pacific women were not registered with an LMC compared to 14% of all women and 16% of Māori women. They may have received antenatal care through the DHB services,

but may not have received any care. New Zealand College of Midwives research shows that Māori and Pacific are slower to engage in LMC midwifery care. More research and evidence is required to explore and understand what the barriers are to early engagement in maternity care for these ethnic groups. Barriers to accessing services were a disproportionately common contributory factor for Māori and Pacific perinatal deaths (PMMRC 2012). Strategies to encourage the importance of early antenatal care booking, for example public health education, are the key to improving outcomes for vulnerable women (RANZCOG correspondence, 2012).

In Australia, Aboriginal or Torres Strait Islander mothers have lower rates of access to antenatal care. They attend fewer antenatal visits than non-Indigenous mothers: of Indigenous mothers who gave birth at 32 weeks or more, 77% attended five or more visits, compared with 93% of non-Indigenous mothers (AIHW 2011).

African-American and Hispanic women in the United States have perinatal outcomes far worse than their white counterparts and limited service accessibility is recognised as a contributing factor. A report from consumer advocates called for improved access to services by advocating for the implementation of proven approaches to high quality and culturally appropriate maternity care (Childbirth Connection 2010).

Rural and remote locations also contribute to barriers to accessing care for Indigenous populations. The lack of maternity care services available to expectant mothers in rural and remote areas in Canada is remarkable. For some First Nations women, childbirth is more stressful because they know they may be airlifted to a distant hospital to give birth, away from family and support networks (PHAC 2009).

Barriers to care can also be cultural. Maternity care that is not culturally safe risks alienating the consumer and discouraging access to needed care. Cultural safe care is important in maximising the gains from a health intervention where the parties are from different cultures. Culturally safe care is providing care in a way that acknowledges and takes into account the consumer's cultural identity to reduce stress and maintain well-being and social connectedness. It is more than just awareness and sensitivity to other cultures (Midwifery Council of New Zealand).

5.4 Responses to poor outcomes for vulnerable populations

Maternity systems have to adapt to provide care differently for vulnerable populations to respond to the poorer outcomes these groups often have when compared to other sectors of the population. Responses need to encompass reducing the impact of risk factors, improving access to maternity and general health care as well as improving the quality of care. In particular, maternity care should be culturally competent because birth is a life event with great cultural significance. Efforts to reduce disparities must be supported by data to understand the factors associated with disparities and to monitor and evaluate the progress in reducing disparities.

The close associations between risk factors and the fact that many have general health implications beyond maternity care suggest that broad, integrated approaches are required to addressing them. One way to approach this issue is the formation of multidisciplinary groups that include government and leaders from within Indigenous communities. Such initiatives include representation from the targeted vulnerable population recognising the value of partnership and the importance of community ownership. In a report on Indigenous health, Smylie (2009) identifies six best practice and promising practice initiatives for improving the health of First Nations people in Canada. All six are governed or led by First Nations groups alone or in partnership with others. For example:

- **The First Nations Health Plan, British Columbia:** A health plan signed by the First Nations Leadership Council, the First Nations Summit and the Union of British Columbia Chiefs and the Government of British Columbia. The plan is a ten year commitment to improving the health

and wellbeing of First Nations targeting: governance, relationships and accountability; health promotion and disease and injury prevention; health services; and performance tracking.

- **The First Nations EpiCentre of Alberta:** The EpiCentre brings together specialists in public health in partnership with First Nations to improve the quality and use of information required to take action on health, health programmes and health determinants while respecting treaty rights to health and cultural diversity.
- **Kahnawake School Diabetes Prevention Project, Quebec:** This initiative formed a partnership between academics and a small First Nations population with high rates of type 2 diabetes. Healthy eating, physical activity and positive attitudes are promoted to primary school children and to mothers.

5.4.1. Targeting risk factors

The interventions targeting the incidence of risk factors for vulnerable populations are similar to those described in section 4. However, there are differences in the way the interventions are delivered. Vulnerable populations face barriers to accessing services which must be addressed and overcome for an intervention to be successful. An expert United Kingdom group analysed the evidence around barriers to care and the effectiveness of a range of interventions to improve access to antenatal care in particular. Their findings are summarised in the box below.

NCCWCH 2010

Barriers to accessing care for recent immigrants: Language, lack of interpreters, discrimination, lack of continuity of care, refusing GP registration, difficulty accessing services, lack of cultural sensitivity/knowledge, no referring agencies, refusing to register with a GP.

Personal barriers: Not understanding the system, lack of social network, misunderstanding dates and times of appointments, depression/fear/anxiety/other personal, financial, lack of childcare, fear of immigration consequences.

Healthcare professionals can encourage access by using a variety of means to communicate with women, telling women about antenatal care services and how to use them and undertaking training in the specific needs of women in these groups including religious, social, cultural and health needs.

To allow sufficient time for interpretation, commissioners and those responsible for organising local antenatal services should offer flexibility in the number and length of antenatal appointments when interpreters are used, over and above the appointments outlined in national guidance. Those responsible for the organisation of local antenatal services should provide information about pregnancy and antenatal services, including how to find and use antenatal services, in a variety of settings, formats and languages.

A range of different types of initiatives can be used to target Indigenous populations. Some of the more common models are specialist midwifery services, clinics with a strong cultural focus, and community-based initiatives.

Cultural appropriateness is an important factor in making maternity care accessible and effective for Indigenous populations (Smylie 2009). New Zealand is recognised internationally as a leader in providing culturally appropriate care. Cultural competence has been an integral part of the education of medical professionals in New Zealand for many years. At the practice level, it is essential for midwives working in partnership with women of other cultures. The New Zealand Midwifery Council states that the midwives apply cultural safety to their practice in order to:

- Understand her own cultures and power as a health professional;
- Recognise and respect each woman's culture, aware that different elements of culture exist side by side and therefore, at any one time, one aspect may be more important than another for the woman;
- Understand how cultures influence the way that people behave and that the traditions and practices from a woman's cultures will have an influence and an impact on her childbirth experience;

- Understand the woman's culture and incorporate these into her practice according to the woman's wishes;
- Recognise the potential danger of making assumptions about cultural needs;
- Acknowledge the potential power imbalances in midwife/woman relationships and work to mediate these;
- Promote individualized care to try to meet the needs of individual women; and
- Acknowledge that it is the woman who decides if care is safe and appropriate for her.

The importance of culturally competence is acknowledged by the Australian National Maternity Services Plan (2011), which includes as one of its priorities: "Develop and expand culturally competent maternity care for Aboriginal and Torres Strait Islander people." The steps towards meeting this goal are:

- Identify the characteristics of culturally competent maternity care;
- Undertake a stocktake of access to culturally competent maternity care;
- Expand programs providing culturally competent maternity care;
- Identify mechanisms for evaluating cultural competence in all maternity care settings;
- Evaluate culturally competent maternity care; and
- Evaluate cultural competence in all maternity care settings.

At a higher level, initiatives should include strong representation in their governance or leadership arrangements from the vulnerable population targeted. Smylie (2009) discusses the importance of "OCAP" – ownership, control, access and possession of information.

The following table provides examples of initiatives that are promising or have proven successful in improving maternity or general health services for vulnerable populations.

Initiative type	Initiative name, description and location	Evidence of outcomes
Specialist midwives	Integration of community workers with midwives in primary care for new immigrants (Hesselink 2011) An initiative in the Netherlands placed culturally sensitive Community Health Workers (CHWs) in primary care clinics with midwives. The CHWs delivered programmes with six components related to maternal/infant health, including advice on smoking, infant care and using Dutch maternity services.	A mixed method evaluation concluded that culturally sensitive perinatal programmes are able to gain access to hard-to-reach groups. Improvements were seen in knowledge and self-confidence.
	St Mary's Hospital, Manchester (NCCWCH 2010) St Mary's Hospital, Manchester, employs a midwife (known as the 'refugee midwife') for asylum seekers and refugees with specific funding from the primary care trust. The post was set up in 2005 to meet needs arising from the extent of service use by asylum seekers and the findings of the 2002 Confidential Enquiry into Maternal and Child Health. The refugee midwife coordinates with other services and spends time developing and maintaining networks. A monthly list of antenatal refugees is circulated to all clinical areas in maternity services. In addition to cultural groups, the midwife works with Refugee Action, Manchester Asylum Induction Team and charities which provide support to destitute asylum seekers.	No evaluation evidence identified, however the programme is described as demonstrating the features of a programme that addresses barriers to care.
Funding of services	Healthy for Life - Australia (Urbis 2009) This initiative was introduced in 2005-6 with funding of \$102.4 million aiming to improve the health of Australia's Indigenous people. Many of the goals are maternity focused- for example,	Though the programme has not been evaluated with a randomised trial, review of aggregated reporting data have shown improvements in areas including early antenatal care attendance for Aboriginal

	<p>increasing antenatal attendance in the first semester, increasing mean birth weights and decreasing the incidence of low birth weights and risky behaviours in pregnancy.</p> <p>The approach is based on providing population health approaches in a primary health care context using continuous quality improvement processes.</p> <p>Providers are funded to deliver a programme that will contribute to the initiative's overall outcomes but are free to do so in a way that best suits their community. They establish baseline data and progress against a set of eleven core indicators is assessed to allow continuous improvement.</p>	and Torres Strait Islanders.
Specialist clinics Clinics	<p>Congress Alukura – Australia (Herceg 2005)</p> <p>Congress Alukura is a women's health and maternal and child health care centre developed in the 1980s to address the concerns of Aboriginal women in Central Australia.</p> <p>Services include the provision of culturally appropriate antenatal, birthing, postnatal and women's health care through a Maternity Service and Women's Health Clinic.</p> <p>It provides sexual health education to young women aged 12 to 20 through group sessions in schools, youth organisations, town camps, remote communities and at Alukura. It includes the Australian Nurse Family Partnership Program, which provides intensive home visitations. The program supports mothers and their babies until the child is aged two years.</p> <p>Services provided include antenatal and postnatal care, visiting specialist obstetricians, home visits, transport, specialist/hospital liaison and some mobile bush service.</p>	Results showed an increase in mean birth weights in babies born to urban Aboriginal mothers between 1986 and 1995, as well as satisfaction with care and perception of benefit for clients.
	<p>Inuit birth centres in remote locations (Kildea 2010):</p> <p>Many Inuit live in remote areas. A primary maternity service was opened in Purvirnituk, six to eight hours drive from the nearest surgical service in a regional centre. Since then a number of other primary health services have been implemented to provide on-site birthing and training of midwives.</p>	Evaluation of data from these three communities shows improved trends in all maternity health outcomes.
	<p>Townsville Aboriginal and Islander Health Service (TAIHS) Mums and Babies Program – Australia (Herceg 2005)</p> <p>The service provides a dedicated clinic with dedicated workers delivering antenatal care, postnatal care and child health services.</p>	Evaluation found that compared to a historical control group and hospital births, mothers had increased service usage, improved antenatal attendance and care, reduction in preterm births (17% in 1998-99 to 9% in 2000-3; 14% in the contemporary control group), increase in mean birth weight.
Community initiatives	<p>Kahnawake School Diabetes Prevention Project – Canada (Smylie 2009)</p> <p>This initiative formed a partnership between academics and a small First Nations population with high rates of type 2 diabetes. Healthy eating, physical activity and positive attitudes are promoted to primary school children and to mothers.</p>	Evaluation shows mixed outcome results but the project demonstrates that community based interventions can be implemented using Native culture and local expertise.
	<p>Djuli Galban programme – Australia (DHA 2005)</p> <p>The Djuli Galban program, Djuli meaning child and Galban meaning women in the local Dunghutti language, provides</p>	Comparisons between the local population and the state as a whole show some indications of positive results. For example,

	accessible community based, culturally sensitive outreach services to Aboriginal women and their infants, focusing on the health needs of the family during pregnancy and the infant period.	in 2004-05, 88% of Aboriginal women in the Macleay area presented for antenatal care before 20 weeks gestation, which is higher than the overall rates for Aboriginal women in NSW (71%), as reported in the 2003 NSW Midwives Data Collection. The rate is also higher than for non-Indigenous women in NSW (87%).
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5.4.2. Monitoring and evaluating progress

Responses to poorer outcomes for Indigenous people can be hampered by incomplete or inaccurate data. The major survey of the maternity experiences of mothers in Canada excludes women living on First Nations reserves (PHAC 2009). In Canada, the most recent perinatal statistics report (PHAC 2009) concludes that:

“It is clear that better quality information on First Nations, Inuit and Métis and other vulnerable subpopulations is necessary in order to identify and target disparities in perinatal health.”

In the United States, Spong et al. (2011) note that there is need for improved data collection of health statistics to understand the relationships between ethnicity, risk factors and birth outcomes.

Initiative type	Initiative name, description and location	Evidence of outcomes
Improving information availability	The First Nations Regional Longitudinal Health Survey – Canada (Smylie 2009) This survey aims to address the lack of health information available for First Nations people in Canada. The First Nations survey is the only First Nations governed survey in Canada and the only survey data for First Nation on-reserve populations.	The survey is the only national survey that collects data for the First Nation on-reserve populations.
	Infant mortality working group – Canada A joint working group with membership from all First Nations communities was formed in 2005 in response to problems with the accuracy of publically released infant mortality data. The group’s goal is to improve the coverage and accuracy of data through consultation with vital registrars and joint governance and data management arrangements.	Key achievements to date include a review of First Nations, Inuit, and Métis infant mortality data practices in all provinces and territories and the preparation of a national statement on First Nations, Inuit, and Métis Infant Mortality Rates.
	The Western Australian Mortality Database, Infants, Children and Young People - Australia This database includes comprehensive information describing the death and the context in which the death has occurred for every child born in Western Australia between 1980 and 2006. The data from this database have been rigorously analysed, and the patterns and trends of mortality among Western Australian born infants, children and young people that have occurred in the last quarter of a century have been widely reported. The following information describes the structure and content of this database. Particular focus has been on describing the change in the disparities existing among the Indigenous population when compared with the non-Indigenous population.	These data have informed evidence-based policy, practice and health information and education initiatives, particularly the prevention of SIDS and the change in legislation to allow the fortification of flour with folate to assist in the prevention of Neural Tube Defects.

6. Comparison of Maternity systems

This section provides descriptions of the maternity care systems delivering the outcomes and grappling with the risk factors described in the preceding sections. Each country's system reflects its historical and cultural attitudes towards maternity care as well as the social and public health context it operates in.

Discussion of some key features using comparator country examples are followed by summary tables providing a more description for each country. Detailed country profiles are provided in Appendix One.

6.1 Quick overview tables

The tables below provide a comparison of different aspects of the maternity systems of comparator countries. Appendix One provides country by country summaries alongside some historical context for each country. More detail is provided in the following section.

Maternity system characteristics			
Maternity System level	Public/Private maternity care Availability of public or private maternity care and user costs	Funding model Funding of maternity care systems and providers	Hospital or community based services Locations for delivery of services
New Zealand	Public care at no cost, though there may be some charges for scans, private care available	Payment of a set amount for each module of care provided to providers with some variation for different care to cover increased expenses (eg home birth)	Antenatal care in the woman's local community but most births in hospital, few home and birth centre births
Australia	Public care at no cost, many use private care (private health insurance) or combined public and private	Mixture of central, state and private, funding for services. Homebirths not funded	Primarily hospital based, with some antenatal and midwife care in communities, almost all births in hospitals
Canada	Public care, some cost for some elements of pre- and postnatal care	Blend of funding mechanisms, payment for care and salary	Most primary care in the community, with births in hospital
Ireland	Public care at no cost, many use private care or combined public and private	GPs paid by government, grants to women available for community midwives, hospital providers salaried	Some care community based (GP or clinic) but primarily hospital services and almost all births in hospitals
Netherlands	Healthcare provided under national or private health insurance	Care funded through private and public health insurance	Primary care in the community and often at home, births either at home or hospital
United Kingdom	Public care at no cost, private care available	Providers paid per pregnancy with a single fee based on risk	Much care takes place in the community (GP surgeries or community clinics), most births in hospital few home and birth centre births
United States	Public care for low-income, otherwise private, insurance or user pays.	Pay for services through insurance, Medicaid or user pays	Most care in hospitals, very few home and birth centre births.

Maternity workforce and different professional roles

	Maternity workforce issues Issues faced by each country's maternity workforce	Roles of midwives Roles in maternity care for midwives	Role of obstetricians and GPs Roles in maternity care for GPs and obstetricians	Training Training available for midwives	Workforce relationships Collaboration and relationships between workforce groups
New Zealand	Midwifery workforce growing though shortages remain in some areas	Autonomous, most common lead carer in primary care can work in either primary or hospital	Decreasing GP involvement, obstetricians generally limited to private or secondary/tertiary care	Midwifery degree only – specific requirements for degree entry, recognition of prior learning for nurse	Improving, referral criteria updated collaboratively
Australia	Shortages, rural workforce shortages	Since 2012 able to lead care as long as collaborative arrangements in place with obstetricians or doctors	GPs decreasing involvement, obstetricians lead hospital care	Midwifery training direct entry and postgraduate for nurses	Collaboration an area for improvement
Canada	Few midwives and looming shortages as obstetricians retire, rural workforce shortages	Can lead care, but not common due to limited numbers and limited regulatory systems	GP involvement decreasing, obstetricians play a major role	Direct entry training available, regulation not available in some provinces/territories	Further development of interdisciplinary teams needed
Ireland	Midwife shortages	Midwives primary caregivers for normal births, usually in hospital.	GPs involved in ante- and postnatal care. Obstetricians lead hospital care	Direct entry and nursing diploma available	Most births occur in hospital with teams available
Netherlands	Shortages resolved	Autonomous, lead role in primary care and growing role in secondary	GPs involved in primary care, obstetricians lead secondary care	Direct entry midwife training	Established, very strict and enforced referral criteria for secondary care
United Kingdom	Chronic shortages in England, aging profession throughout United Kingdom	Lead role in care for women with normal pregnancies, deliver antenatal and postnatal care	GPs declining involvement, obstetricians lead secondary care	Midwifery degree programmes and nursing diplomas for midwifery	Area for improvement, particularly referral processes
United States	Declining capacity, rural workforce shortages	Few midwives, with three levels of training, some can lead care	Obstetricians lead carers in majority of births, with GP role more limited	Three different midwifery training programmes, direct entry only recognised in some states	Relationships improved, collaborative practice improving

Maternity care available

Maternity care available	Antenatal Care provided in the antenatal period	Intrapartum care Care provided during labour and birth	Postnatal support Care provided after birth
New Zealand	Antenatal care through LMC, usually midwife, women can self-refer or enter through GPs, referral to obstetrician if required	Women can choose where to give birth, in discussion with LMC, hospital, home and birth centres available, uncomplicated births attended by midwives	Provided by midwives with daily visits in hospital and regular home visits till six weeks post-partum
Australia	Majority of antenatal care provided privately by obstetricians or GPs, but community midwifery service available in some areas	Few GPs deliver intrapartum care. Most births in hospital, with a small proportion in birth centres and few at home. Midwifery care provided in hospital.	Universal home visiting implemented in most states, with centre based care in some areas.
Canada	Most care provided by obstetricians or GPs. Often in a primary setting	The majority of births occurred in hospitals or clinics attended by obstetricians, even low-risk births	Hospital stays decreasing, postpartum service models vary with nurses, midwives, GPs all potentially involved
Ireland	Combined care with GP and hospital most common though some women are seen only by obstetricians	Most Irish mothers give birth in hospital under the care of obstetrician, with a midwife providing midwifery care. Some midwifery led units and home births with independent midwives available	The majority of postnatal care for women is given by the midwives on duty in the hospital though some women in private care are seen by obstetricians, GPs do health checks in the weeks after birth
Netherlands	GPs and midwives are the first points of contact and refer women to secondary care if risks are identified	Women with low risk pregnancies can freely choose where to give birth, at home or in a hospital or birth centre. If complications are found women give birth in secondary care under the care of obstetricians	Postnatal care is provided by midwives or occasionally GPs and maternity care assistants unless the women and/or baby are hospitalised, kraamzorgs provide postnatal care in the home
United Kingdom	Most antenatal appointments take place with a midwife, with many women only seeing a midwife during their pregnancy, entry through GPs	Women can give birth at home, in a free-standing midwifery unit, an alongside midwifery unit or in a unit with obstetricians. The majority have midwife-led care in hospital and one-third have consultant-led care	On average women stay in hospital for less than two days and receive just under four visits from midwives, with most women attending GP health checks at six weeks
United States	A substantial majority of women receive antenatal care from a doctor, most often an obstetrician	Almost all births occur in hospital led by doctors, freestanding birth centres are available in some areas	Almost all women have at least one office visit with their maternity caregiver between 3 and 8 weeks after the birth of their child

6.2 Roles of midwives, obstetricians and GPs

6.2.1. Roles in primary maternity care

The roles of the different professional groups are closely linked to each country's model of care. This is most evident in the approach to the care of women with uncomplicated or low-risk pregnancies.

The philosophical approach to primary care in comparator countries is shown in the table below:

Midwife primary care (Hatem et al. 2008) New Zealand, Netherlands, United Kingdom, Ireland	Obstetrician primary care Canada, United States, Australia
Pregnancy and childbirth are normal life events and care is woman-centred. The midwife-led model of care focuses on a holistic approach to wellbeing, individualised care, minimising technological intervention and education and continuity of care.	Focuses more on the prevention and treatment of problems and complications, often through the use of interventions to control labour and delivery. The relationship between woman and carer is often different to midwife-led care.

Two countries in the study, the United States and Canada, predominantly use an obstetrician-led model for all aspects of maternity care. In both countries, the mainstream model of maternity care moved from midwife-led to obstetrician-led in the first half of the 20th century. Now almost all births occur in hospital and most are under the supervision of obstetricians. In the United States, obstetricians were the lead caregivers for 79% of women in 2005 (Declercq 2006) and in 2006-7 in Canada 70% of women gave birth with an obstetrician in attendance (PHAC 2009). Both Canada and the United States have low rates of homebirth. Increases in midwifery can be seen even in the United States and Canada though numbers are still low. In Ireland, most women give birth in hospital and midwives play an instrumental role in providing care, though it is obstetrician led.

Midwife-led care compared to other models (Hatem et al. 2008):

This Cochrane study reviewed randomised controlled trials of midwifery-led models of care to other models of care. The review found that Midwife-led care was associated with several benefits for mothers and babies, and had no identified adverse effects.

The main benefits were reduced use of regional analgesia with fewer episiotomies or instrumental births. Midwife-led care also increased the chance of being cared for in labour by a midwife she had got to know, the chance of feeling in control, having a spontaneous vaginal birth and initiating breastfeeding. However, there was no difference in caesarean birth rates.

Women who were randomised to receive midwife-led care were less likely to lose their baby before 24 weeks' gestation, although there were no differences in the risk of losing the baby after 24 weeks, or overall. In addition, babies were more likely to have a shorter length of hospital stay.

In other countries, obstetrician involvement is limited to women in secondary care and women who are prepared to engage private obstetricians. For example, in the Netherlands, women must have a referral from a midwife or doctor to access secondary care from an obstetrician. Homebirth rates are still far lower than hospital birth rates in these countries, with the exception of the Netherlands.

General practitioners (or family doctors/physicians as they are known in other countries) have historically had a role in providing antenatal care in most of the comparator countries. In some countries they have also had a role in intrapartum care. The role of GPs in primary maternity care has decreased markedly in New Zealand since 1990 and like New Zealand, Australia, Canada and the United Kingdom have all seen decreasing GP involvement in maternity care. Reasons for the decrease are varied and include: the funding arrangements, difficult working hours, disruption of office hours, interference with lifestyle, fear of litigation, costs of insurance and fewer opportunities to maintain competency. GPs often have a stronger role in providing care in rural communities (Wiegers 2003). The decreasing GP

involvement in maternity care for many countries has been accompanied by increasing involvement of midwives.

Although GPs play a reduced role in delivering care directly, they often have an important part to play in referring to other maternity care providers and sharing information. For women with health conditions, their GPs may be the health professionals most familiar with their medical history.

In New Zealand, midwives are autonomous and are most commonly the Lead Maternity Carers. They provide care for women from antenatal to intrapartum to postnatal care. There is variation in the role of the midwife in the other comparator countries with midwife-led care. All use the same philosophy in the service they provide to women, however there are differences in the way care is delivered. Different midwife-led models used in comparator countries include:

Community midwives: All countries have at least some community midwives. Community midwives provide primary care to women outside hospital settings, for example in the home or in community based clinics. Some community midwives are independent from the public health system and some operate within it.

Most commonly (in the comparator countries) the Community midwives provide postnatal care in the community to women who have given birth in hospital under the care of hospital midwives. Sometimes they provide antenatal and postnatal care and in some cases they may also provide continuity of care in a case loading model.

In New Zealand many midwife LMCs are community midwives. In contrast, Ireland has only a very small number of midwives who are independent from the public system and therefore able to provide all maternity care including home births in the community. But under new community midwifery schemes, a small number of hospitals employ midwives to provide care for women in the community (mostly antenatal and postnatal care). Australia too is moving towards more community based midwifery care with midwives in some areas able to take a case load and provide continuity of care.

As in New Zealand, midwives in the Netherlands act autonomously to provide care to women and often do so in women's own homes. Community midwives generally provide very good continuity for coordinating and delivering care. Some operate as individuals, offering high levels of continuity of care. Other midwives adopt a team approach, where women meet and become familiar with all members of the team and are attended by at least one member of the team when giving birth. Working in teams minimises the risks of midwives being unavailable when needed.

Midwives in birth centres or midwife-led units: Birth centres or maternity units (standalone) which are separate from maternity hospitals, are available in all comparator countries though to varying degrees. In this context midwives provide care to women who are considered to be low-risk. The environment is generally midway between a community or home setting and a hospital setting. Midwives are able to quickly call on specialist onsite teams or transfer women if complications arise.

Hospital midwives: Most countries have midwives who are employed by hospitals to provide antenatal care and particularly intrapartum and postpartum care. Generally they work in teams where women are seen by the midwife on duty, who is not necessarily someone they have met or consulted with earlier in their antenatal care. Hospital midwives attend births and are responsible for involving obstetricians if complications arise.

For example, in Ireland and the United Kingdom, most hospital births are attended by a midwife in a hospital. The Netherlands has the strongest culture of independent midwifery amongst the comparator countries but 20% of midwives work in hospitals, assisting in care for high-risk women. They do so under the supervision of obstetricians (Wiegers 2007).

In New Zealand midwives can work either as an LMC or as a maternity facility midwife – 48% of midwives work in either a primary, secondary or tertiary facility. These midwives are employed by the facility to provide midwifery care. They support the LMC midwife during uncomplicated births and provide midwifery care for women with complex conditions in the facility. They work with the obstetric team.

6.2.2. Roles in secondary and tertiary maternity care

Secondary maternity care is specialist care provided to women who are at risk of complications. Generally, the education and training of midwives is intended to provide them with the skills to manage low-risk or normal pregnancies. Obstetricians are trained to intervene in pregnancy and labour when complications arise that put the expectant mother or her child at risk. They are therefore considered best placed to provide secondary maternity care.

Obstetricians lead secondary care for women in all countries, but there is variation in the extent of their involvement in primary care. At one end of the spectrum, obstetricians in the United States provide much of the routine care for women without complications, essentially filling a primary care role. The situation is similar in Canada and much of Australia.

In the other comparator countries, obstetricians lead care for women who experience complications or who are at higher risk. For example, in the Netherlands, women only see an obstetrician if they are referred for secondary care by their primary care provider (Wiegers 2007). Women in countries where maternity care is midwifery-led are able to access private care from obstetricians if they are prepared to pay. For example, in Australia, many women make use of obstetrician-led care throughout their pregnancy but they pay to do so privately. In New Zealand, midwives acting as LMCs generally remain involved coordinating the care of women who require referral to secondary care though there is some handover of complex cases to hospital midwifery teams.

6.2.3. Specialist maternity support workers

In some countries, other healthcare professionals play a central role in maternity care. Such support workers can alleviate demand for obstetricians and midwives, where there are shortages, or in some cases provide care in their place.

For example, Canada has 13,801 nurses primarily responsible for maternal-new born care, far more than the number of registered midwives (700). They are the largest group of maternity care providers in Canada, providing care for women during labour and for both mother and baby after birth (SOG 2008). In Ireland and the United Kingdom support workers (Health Care Assistants and Maternity Support Workers respectively) work with women and their children under the supervision of midwives. In the United Kingdom, this role was introduced to reduce the time midwives spent on administrative work and basic clinical work. It has resulted in increases in the amount of time midwives spend with women in labour and in overall savings to NHS trusts (NHS Employers 2007). In most countries the need for support workers has been driven by shortages in the maternity workforces, often shortages of midwives.

6.2.4. Coordination and collaboration

Enhancing the coordination of maternity care and collaboration between different health professional groups can improve outcomes for consumers (NHMRC 2010). It is a theme common to the literature for all comparator countries. Clear communication and defined referral pathways are common elements in effective collaborative care models (Australian Government 2009). For example, in countries such as the United Kingdom or New Zealand where primary care is delivered by midwives or GPs in the community,

it is critical that women are able to be swiftly referred to specialist services for assessment and care from when indicated. Referrals happen throughout maternity care.

Discussion of referrals in the literature focuses on three areas:

Identification of risk factors: Identification of risk factors requiring transfer for additional care.

Effective referral: Ensuring referrals result in engagement between the mother and the referral destination within an appropriate timeframe.

Transfer of information: Ensuring referral destinations are able to access all relevant information (for example patient histories).

Transfer of patients and urgent referrals in acute cases requires effective communication between healthcare professionals. Timing can be critical and breakdowns in communication can lead to avoidable deaths. When women rapidly develop either pregnancy conditions such as pre-eclampsia, or medical conditions deteriorate because of pregnancy, established communication pathways that work well are essential. Post-partum haemorrhage is still the biggest obstetric emergency most midwives have to cope with in all these countries as it happens quickly and communication to get prompt help is difficult. Geography is a factor; in some parts of New Zealand and particularly Canada and Australia, emergency assistance can be distant.

Interview participants identified transition from primary to secondary care as one of the more problematic areas of maternity care. While there is general agreement on some conditions requiring referral, there are a number of grey areas that have led to disagreement between health professionals at an individual or profession-wide level about the level of risk that should trigger a referral. In New Zealand, reviews by the PMMRC have also identified a need to improve communication between primary and secondary services. The PMMRC found problems with communication, failure to seek help or supervision and delays in emergency response have contributed to deaths in New Zealand.

Recommendations for improvement focus on strategies to improve the transfer of information between primary and secondary services, such as woman-held patient notes, integrated notes systems and electronic transfers of information (PMMRC 2010).

Tools such as section 88 in New Zealand can aid communication by providing a framework for healthcare professionals to follow. Improving coordination between health professionals has underpinned the development and implementation of professional guidelines for when referral is required. In the amendment to section 88, New Zealand has implemented a set of conditions which, when identified, result in referrals to secondary maternity care though there is allowance for discretion.

The United Kingdom system highlights good practice in this area. However, one of the top ten recommendations of the review of maternal deaths from 2006-2008 (CMACE 2011) was to improve communication and referrals. A number of women died before seeing the specialists they were referred to. The review notes that referrals in pregnancy should be prioritised as urgent and recommend that referrals should be at a senior level and when urgency is required, the senior doctor should use the telephone. A United Kingdom interview participant discussed the implementation of multi-disciplinary teams in larger United Kingdom hospitals that focus on certain conditions, like hypertension, in pregnant women. Such teams work well to bring professional groups together around individual cases.

Patient held notes (Brown 2011):

A system using patient held notes is one where women are given their own case notes to carry with them throughout their pregnancies.

A Cochrane library review of three small randomised controlled trials of patient held notes concluded that potential benefits include increased likelihood of women feeling in control of and satisfied with their antenatal care. However, the review identified a potential risk of higher rates of operative delivery. There is insufficient evidence of the differences in availability of case notes to carers and rates of other risk factors (for example, smoking) during pregnancy.

Similarly, the Netherlands has implemented guidelines outlining when referral to secondary maternity care is required.

The Canadian maternity workforce has identified the importance of developing inter-professional models of care as part of addressing workforce shortages (PHAC 2009). Similarly, further development of collaborative care models has been identified as a goal for the Australian system (NHMRC, 2010).

Summary table: Roles in maternity care

NZ	<p>Midwives Midwives are the most common choice for LMC (90% of women now select a midwife (MOH draft report for 2010)). In New Zealand midwives are autonomous and provide and coordinated and integrated care from the antenatal to the postnatal period, referring as required if complications arise. Women can go to midwives for care directly, without referral from a GP. Midwives care for women and babies from early in pregnancy, ordering and receiving tests as needed. They attend births at home or in birth centres without a doctor present, and they can admit women for hospital births. Midwives are trained to deal with many complications during pregnancy and birth. After birth, midwives care for women and babies, assisting with breastfeeding, early days of parenting, and watching over the postpartum healing.</p> <p>GPs and obstetricians GPs and obstetricians act as LMCs for a decreasing proportion of pregnancies. Where GPs are LMCs, they act in a similar role to midwives but midwives still play a key role in providing intrapartum and postnatal care. They provide primary care and refer on to obstetricians if complications arise. Publicly-funded obstetricians deliver secondary care, and are available in private care.</p> <p>All secondary and tertiary facilities also employ midwives. Hospital (or 'core') midwives do not act as LMCs and work shifts in hospitals, so women who do not have a midwife LMC are attended by the midwife on duty. They provide support for community midwives especially for more complex cases.</p> <p>Support workers The family and friends are welcome to attend with women during maternity care and generally provide support services for the mother and childbirth educators deliver antenatal education classes.</p>
AU	<p>Midwives Expansion of midwifery models of care was limited by both education and workforce shortages as well as funding relationships (Schmied et al. 2008). Midwives are able to provide care from antenatal services to birth (in hospital, at home or in a birth centre) to postnatal care and some do this privately. To be able to provide government funded services, eligible midwives must have a collaborative arrangement with an obstetrician or a medical practitioner who provides obstetric services (i.e. GP obstetrician) and deliver intrapartum care in a hospital or birth centre. Though the obstetrician does not have to be present, an arrangement must be in place for transfer if complications arise. Women in midwife-led care attend a number of appointments with doctors as part of their antenatal care.</p> <p>Since 2010, professional indemnity insurance for births has been available through the Australian Government however it does not cover births in the home.</p> <p>GPs and obstetricians GPs care for women before pregnancy (eg advice) and during pregnancy. However, few GPs are sole carers for pregnant women or undertake intrapartum care due to lifestyle choices and cost of insurance (Schmied et al. 2008). GPs play a critical role in delivering care in rural communities where they often deliver care that would typically be provided by specialists in urban areas (Australian Government 2009).</p> <p>Obstetrician led care, or combined care with GPs are among the most common models of care in Australia. Forty percent of antenatal care is delivered by private obstetricians and 15% by GPs (2006 data, Australian Government 2009). Obstetricians supervise births in public hospitals and have collaborative arrangements with midwives who lead care in birth centres or hospitals.</p> <p>Support workers Childbirth educators are commonly used for antenatal education and a small proportion of women use doulas as support in childbirth and postnatal care.</p>
CA	<p>Midwives Midwives are required to register to practice legally, but regulatory systems are in place in only seven provinces and</p>

territories. The 700 total Canadian midwives are effectively not able to practice legally in those where regulatory systems are not in place. There is support for the midwife role from other professional groups; the Society of Obstetricians and Gynaecologists of Canada developed a strategy for maternity care calling for regulated, publically funded midwifery and more inter-professional models of care (SOG 2008).

Where midwives are available they are primary caregivers. Women can go to midwives for care directly, without referral. Midwives care for women and babies from early in pregnancy, ordering and receiving tests as needed. They attend births at home or in birth centres without a doctor present, and they can admit women for hospital births. Midwives are trained to deal with many complications during pregnancy and birth. After birth, midwives care for women and babies for up to six weeks, assisting with breastfeeding, early days of parenting, and watching over the postpartum healing.

GPs and obstetricians

Some GPs provide care during pregnancy and again after birth, but fewer give care during labour. The number involved in maternity care is decreasing due to lifestyle issues, concern about liability, insufficient number of cases per year and inadequate compensation (Wiegers 2003). Activity levels for those individual GPs still doing intrapartum care increased significantly between 1992 and 2001 and GPs play a greater role in maternity care in rural areas (Wiegers 2003).

Most women in Canada give birth with an obstetrician in attendance, as fewer GPs attend labour and birth and midwives are not yet widely available.

Support workers

Childbirth educators and breastfeeding counsellors provide specialised instruction and help before and after birth, respectively. Childbirth educators may be employed by hospitals or in public health; others work independently in community agencies. Breastfeeding counsellors or lactation consultants may be employed as part of the medical system, but usually only in cities, so women may not know where else to find breastfeeding support.

Registered nurses provide care in community and hospital settings including: prenatal, intrapartum, post-partum and/or neonatal care for expectant families. Nurses care for women and attend almost every birth in Canada and can be the only health care provider present when midwives/doctors are not available. Nurses provide essential services during all phases of perinatal care and can play key roles in new models of inter-professional collaborative care.

Midwives

The role of the midwife as primary carer for women and infants experiencing normal pregnancy and childbirth has remained essentially unchanged for many years (RCSI 2009). In more mainstream obstetric care midwives can provide antenatal care and care during labour and birth. Women are attended by the midwife on duty, however care is obstetrician led (Hatem et al. 2008).

Some hospitals have Midwives' Clinics which offer continuity of antenatal care where possible. Under the Domino/Community Midwives Scheme, midwives are able to provide antenatal care and deliver babies for women at low risk. Not all hospitals participate in this scheme. There are a small number of self-employed community midwives who can offer homebirth services.

GPs and obstetricians

Obstetricians or GPs can play a lead role in maternity care in Ireland. Though most births are in hospital settings, low-risk women may have no obstetrician involvement. Obstetricians are the lead carers in pregnancies with complications or risk factors. Obstetricians have overall clinical responsibility, however most care is delivered by midwives (Hatem et al. 2008). Many women use a combined care model where GPs play a lead role in antenatal care.

Support workers

Healthcare support workers are supervised by midwives and provide some basic aspects of maternity care (RCSI 2009).

Midwives

Midwives are autonomous in the Netherlands. They are involved in both the primary and secondary care systems, working alongside GPs in the former and alongside obstetricians in the latter (Wiegers 2009). A healthy woman with an uncomplicated pregnancy has no need to see another care provider than her midwife. Midwives are responsible for assessing risk and referring women to secondary care as needed. Most midwives work in primary care (80%), though some deliver care in hospital with obstetricians (Wiegers 2007).

Most primary care midwives work in group practices and are jointly responsible for their clients.

GPs and obstetricians

GPs are involved in primary care, for low risk women, and obstetricians in secondary care for higher risk women (Wiegers 2009). Whenever a risk of complications arises, obstetricians become involved and become the lead carer

	<p>(Wiegers 2010).</p> <p>Support workers Kraamzorg is a service delivered by maternity nurses or kraamverzorgsters who provide postnatal care to new mothers and their babies in the eight to ten days immediately after the birth in their homes (Wiegers 2010). Mothers begin interacting with them in the late stages of the pregnancy. Maternity care support workers also provide support for women while freeing up midwives to undertake essential midwifery duties (RCSI 2009).</p>
UK	<p>Midwives Midwives play a major role in the United Kingdom maternity system. Midwives are generally the lead carers for women having normal births. They deliver care in communities and in hospitals. Most hospitals assign a midwife to each pregnant woman, though only two-thirds have midwives carrying caseloads; in other hospitals women see the midwife on duty.</p> <p>Community midwives work from children's centres, GP surgeries or other locations to be the lead care provider for normal or low risk pregnancies (Smith et al. 2010). Midwives attend the booking appointment in antenatal care where they assess the mother's level of need and screen mothers (HFMA et al. 2012). Almost all women (94%) see a midwife during their pregnancies (Redshaw 2010).</p> <p>GPs and obstetricians Obstetricians lead the care of high-risk women. Obstetricians are the lead care providers in pregnancies with complications and are involved in antenatal care for just under one-third (30%) of women (Redshaw 2010).</p> <p>The involvement of GPs in maternity care has dramatically declined and they now have a very limited role in the care of pregnant women, though there is more GP involvement in remote rural areas (Smith et al. 2010). Just over one-fifth (21%) of women see a GP during their pregnancy (Redshaw 2010).</p> <p>Support workers Maternity support workers provide administrative support and some basic clinical care under the supervision of midwives. They were introduced in 2005-6 (NHS employers 2007) and have recently been accepted into the Royal College of Midwives.</p>
US	<p>Midwives Midwives are the lead caregivers for a small proportion of births in the United States, just 8-9% of mothers during pregnancy and childbirth (Sakala 2008), though the proportion is increasing over time.</p> <p>Three differently qualified midwives are available and have different roles. Certified Nurse Midwives typically attend births in hospitals. Certified professional midwives provide care in out of hospital settings and usually do not practice in hospital. Certified midwives are similar to nurse midwives but were initially trained in other healthcare roles. All three models provide care from antenatal to postnatal.</p> <p>GPs and obstetricians Obstetricians are the lead caregivers for most women during both pregnancy and labour (79% in 2005). Doctors attend around 90% of births in the United States (Childcare Connection).</p> <p>Many GPs deliver maternity care – about 28% provide some maternity care and 20% of GPs attend at least some births in hospitals. GPs are the lead care providers for 8% of births (Sakala 2008).</p> <p>Support workers Most care is provided in hospitals by obstetricians or family practitioners supported by maternity nurses. In some states private Doula's can provide support in the absence of midwives and family</p>

6.3 Antenatal care

There is a strong relationship between regular antenatal care and positive child health outcomes. Women who receive antenatal care at least four times, as recommended by the World Health Organisation, have increased likelihood of receiving effective maternal health interventions during antenatal visits (WHO 2011). Late entrance to antenatal care is associated with a range of other risk factors, including younger age, low socioeconomic status, lack of health insurance, smoking, alcohol use, unmarried status and unplanned pregnancy (Chote et al. 2010).

Modern systems of antenatal care in developed countries are broadly based on the basic structure defined in 1929 in the United Kingdom. Since then, the responsibility for delivering antenatal care has

shifted between the different groups in the maternity workforces of countries around the world. There has been little evaluation of different packages of antenatal care with the result that (Dowswell et al. 2010):

“Antenatal care has perhaps been rather more ritualistic than rational.”

Women’s entry into antenatal care is the point of entry to maternity care as a whole. In New Zealand, 60% of women first approach a GP when they believe they are pregnant, 32% approach midwives directly and 5% approach obstetricians. Women pregnant for the first time are more likely to approach a GP than a midwife whereas women who have had a midwife LMC with a previous pregnancy are more likely to contact the midwife directly. Women then select and register with a LMC, who is responsible for coordinating and delivering maternity care, including antenatal care.

Antenatal care involves a varying number of visits (agreed between to the LMC and woman). It is generally recommended that care begin in the first trimester to allow for identification of risk factors as early as possible (Low et al. 2005). The United Kingdom NICE guidelines recommend booking for antenatal care before ten weeks.

Women’s GPs serve as the entry point to maternity care for women in most countries. Entry to the maternity care system is one of the key points where communication is required amongst healthcare professionals and women. Women must be helped to understand the care they have access to and require, who delivers it and how they can access it. Healthcare professionals must share information on the needs of the patient, for example between the GP and the woman’s LMC. In New Zealand, this entry point has communication problems. GPs may not communicate directly with midwives, leaving the woman to organise this. But some women, particularly in disadvantaged areas, do not always know about the different models of care available. Women may not see their LMC for several weeks after initial consultation with primary care and therefore may miss the tests which have to be done early in pregnancy. Test duplication and gaps are common.

In New Zealand, as noted above, the majority of women approach a GP first even though most receive antenatal care from midwives. In the United Kingdom, most antenatal care is delivered by midwives and women are able to approach midwives directly but women have to be registered with a GP to access maternity care and they are the first point of contact for most (77%) women (Redshaw 2010). The situation is similar in Ireland. In the Netherlands women are able to see either a GP or midwife first when they become pregnant. In the United States and Canada, a large proportion of women see a GP first, though most women see an obstetrician.

An interview participant highlighted the success of antenatal day clinics in the United Kingdom. The clinics treat higher risk women who would normally be hospitalised as outpatients, reducing the need for them to be hospitalised during antenatal care. The clinics have freed up hospital resources and were reported as a strength of the United Kingdom maternity system.

Figure 7 below shows the proportion of women who attended at least one antenatal appointment across the comparator countries. New Zealand, the United Kingdom and Canada all report very high rates of attendance while Ireland, the United States and Australia have lower rates.

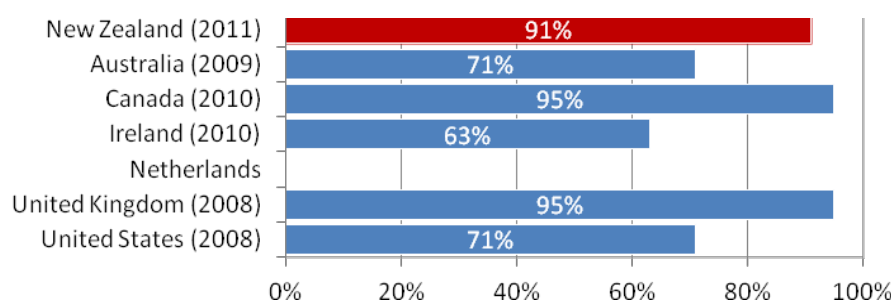


Figure 7. Antenatal care attendance - proportion of women who attend at least one antenatal care appointment in the first trimester. Note: The data are from different sources and have not been standardised; figures for some countries refer to first trimester, while others use a definition of 12 or 14 weeks gestation.

It is important to note that in many cases there are disparities between attendance rates for the countries as a whole and their vulnerable groups. For example, in Australia Aboriginal and Torres Strait Islanders have far lower rates of antenatal care attendance than the population as a whole.

Analysis of antenatal care programmes with a reduced number of goal oriented visits showed increases in perinatal mortality in low- and middle-income settings (Dowswell et al. 2010).

Number of antenatal care visits (Dowswell et al. 2010)

The authors reviewed trials where antenatal care packages with a reduced number of visits were compared to standard packages. Seven trials were identified – four in high income countries (where visits were reduced to around eight) and three in low-middle income countries (reduced to around five visits).

In high income countries, there was no difference in perinatal mortality, inductions and caesarean sections across groups. However, trials in low-middle income countries showed borderline significant increases in perinatal mortality.

Women in all settings were less satisfied with the reduced schedule of visits; for some reason the gap between antenatal visits was perceived as too long. There was some evidence that a reduced schedule of visits may be associated with lower costs.

6.3.1. Responsibility for delivering antenatal care

There is variation in responsibility for antenatal care amongst countries. Perhaps the first method of providing antenatal care is the provision of public information on how to access antenatal care. Most countries have government owned or sponsored or privately run websites providing guidance to pregnant women on the available antenatal care.⁶ Many women first visit their GPs to confirm their pregnancy and to gather information, though in many countries with midwife-led primary maternity care, women are able to approach midwives directly (for example, the United Kingdom, Netherlands and New Zealand).

In countries with midwife-led models of primary maternity care, antenatal care from obstetricians only is available only in the private system unless risk factors justifying specialist care have been identified in primary care. In Australia, a number of different models of care exist. Though public antenatal care is available, most women access private care through obstetricians or GPs. Similarly in Canada, obstetricians and GPs provide most antenatal care. In the United States, most antenatal care is provided by obstetricians, with a small proportion of women receiving care from midwives or GPs.

⁶ For example, see <http://www.nct.org.uk/pregnancy>, http://www.hse.ie/eng/services/Find_a_Service/maternity/, <http://www.patient.co.uk/doctor/Antenatal-Care.htm>

6.3.2. Screening for risk factors

The development of technology has led to the introduction of many different screening tests to identify women who are at high-risk. Such screening for medical conditions for mothers and their unborn babies is a significant part of modern antenatal care. Women with additional risk factors or complications require timely consultation and planned management which may involve specialist care. Screening and assessment processes in antenatal care are designed to identify these women. Refinement of the criteria to determine which women should be referred and which conditions require referral is an ongoing process in all countries. Improvements in the referral processes GPs, midwives and trainee doctors use for pregnant women were one of the top-ten recommendations from the United Kingdom review of maternal deaths 2006-8 (CMACE 2011) and of the New Zealand PMMRC.

New Zealand introduced revised referral guidelines in 2011. The Guidelines for Consultation with Obstetric and Related Medical Services (Referral Guidelines) provide a list of criteria and conditions for LMCs to refer their patients on to secondary maternity care. They have been updated after a collaborative process involving all key stakeholder groups. Key informants interviewed for this project thought the process was effective and demonstrated the improvements in the relationships amongst the Ministry of Health and the professional groups involved in maternity care.

Similar guidelines can be seen in all countries. In some cases they are provided by the professional regulatory bodies (for example the American College of Obstetricians and Gynaecologists) and in others by government agencies (for example the National Institute for Health and Clinical Excellence in the United Kingdom).

Antenatal care summary	
NZ	<p>Antenatal care is provided by the LMC chosen by the woman, usually a midwife but in some cases a GP or obstetrician.</p> <p>Around two-thirds of women approach a GP first when they become pregnant (60%) and around one-third approach a midwife (32%) (Ministry of Health 2012). Most women (91%) have their first contact with a health care provider within the first trimester (MOH 2012).</p> <p>Just under three-quarters (73%) of women having their first child attend antenatal classes while just 5% of women having a subsequent pregnancy attended classes (MOH 2012).</p>
AU	<p>Antenatal care is available in public hospitals or in community based services from midwives, obstetricians or GPs (Schmied et al. 2008). The majority of antenatal care is provided in the private sector including obstetricians and GPs even if the mother has chosen to give birth in the public maternity service (AHMAC 2008). 55% of antenatal care is delivered in public hospitals, with 40% delivered by private obstetricians and 15% by GPs (2006 data, Australian Government 2009).</p> <p>97% of women attend at least one antenatal visit and 92% attend five or more. The majority of women (71%) attend at least one antenatal care visit in the first trimester (AIHW 2011).</p>
CA	<p>Most women (95%) initiated prenatal care in the first trimester of pregnancy. Women attend 12.9 antenatal care visits on average with only 1% of women having four or fewer prenatal care visits (PHAC 2009). Overall, about one-third (33%) of women attend prenatal classes.</p> <p>Most women receive their prenatal care from an obstetrician/gynaecologist (58%) or GPs (34%) and most care is provided in a primary care setting. An additional 6% and 0.6% of women received prenatal care from a midwife or nurse/nurse practitioner, respectively. There is a large degree of variation across provinces and territories, with some having very high proportions of care provided by obstetricians (for example 89% on Prince Edward Island) and others having very low proportions (for example 6% in Nunavut). More women use GPs or nurses for antenatal care in those provinces and territories with lower rates of obstetrician use (PHAC 2009). The type of prenatal health care provider was associated with province or territory of residence and level of education. As would be expected, midwives were more commonly reported as a primary prenatal care provider in regions where midwifery is legislated and publicly funded.</p>
IE	<p>Under the public health system, Irish mothers are able to use combined antenatal care (visits to both GP and hospitals),</p>

	<p>or hospital only antenatal care (hospital/obstetrician care only). Private (private obstetrician only) and semi-private care (combined public funded GP care with private hospital care) are also available.</p> <p>Most (78%) mothers use combined public care, with care in hospital clinics (7%) or by private obstetricians (12%) the other popular choices (Williams 2010). Under the public Maternal and Infant Care Scheme, GPs can provide initial examinations, if possible at 12 weeks, and a further six examinations over the course of the pregnancy which are alternated with visits to the maternity unit or hospital.</p> <p>Just under two-thirds of mothers (63%) attend their first antenatal care appointment in the first trimester of their pregnancies (HRID 2012).</p>
NL	<p>GPs and midwives are the first points of contact when women become pregnant and make an assessment of the level of risk of the pregnancy. GPs refer women to midwives in the case of low risk pregnancies, while both midwives and GPs refer women to obstetricians in higher risk pregnancies. Antenatal care is universally available under the public health system. Midwives most often provide antenatal care, though around one-third of women have regular antenatal appointments with obstetricians.</p> <p>Approximately 10% of Dutch natives attend antenatal care late, with higher proportions of other ethnic groups attending late, particularly among recent immigrants (Chote et al. 2011).</p>
UK	<p>Almost all women have contact with healthcare by the twelfth week of their pregnancy. Though most women (77%) first make contact with their GP, most antenatal appointments take place with a midwife or obstetrician in GP surgeries or hospital clinics (Redshaw 2010). Women are increasingly having contact with a midwife first (CQC 2010). Almost all (95%) of women have contact with a health professional in the first trimester (Redshaw 2010).</p> <p>GPs share information on mothers' medical histories with antenatal care providers, particularly midwives (Smith et al. 2010). Mothers are assessed by midwives and antenatal screening takes place in hospital. Women have access to an NHS information booklet and website, and antenatal education classes (Redshaw et al 2010). Just over two-thirds of women attend antenatal classes, though fewer multiparous women attend.</p>
US	<p>A substantial majority of women receive antenatal and intrapartum care from a physician (Wiegers 2009). Under three-quarters (71%) of women accessed antenatal care in the first trimester in 2008 (CH 2011).</p> <p>A national survey of mothers' experiences of birth provides good information on their experience of antenatal care: On average mothers had their first antenatal care visit in their ninth week of pregnancy. Family doctors provided antenatal care in 8% of cases, midwives for 9% and obstetricians for 79%. Just under three-quarters received antenatal continuity of carer. One in four women take childbirth education classes with a higher proportion of new mothers taking classes (Declercq et al. 2006).</p>

6.4 Intrapartum care

6.4.1. Birth location

In all of the countries compared, the majority of births occur in hospital in conventional labour ward settings, though the proportions of births in other locations vary. In some countries (the United States, Canada, Australia, Ireland) virtually all births take place in hospital. The United Kingdom has also has a high proportion of births in hospital (93%) while 85% of women in New Zealand mothers birth in a maternity unit of a general hospital and a further 11% gave birth in a small (midwife-led standalone) maternity facility (MOH 2012). The Netherlands stands out because it has a relatively low two-thirds of births taking place in hospital (Wiegers 2009).

Like New Zealand, all countries had some availability of freestanding birth centres offering delivery in a primary care environment. In some cases these were midwife-led. For example, Ireland has a small number of midwife-led birthing units where women can give birth in a less medicalised environment though they have only recently been implemented: Irelands first birth centres opened in 2011. The United Kingdom has a mixture of different styles of birth centres operated by the NHS – some are freestanding midwife-led, while others are attached to hospitals.

There are many claims regarding the safety and benefits of planned homebirth for low-risk women, with passionate advocates across the comparator countries arguing for the choice to have publically funded homebirth. There are equally passionate groups advocating for hospital births. What appears to be of importance is that women are able to choose place of birth and who is in attendance.

Home births make up a small proportion of births in all comparator countries except the Netherlands, where nearly one-third of births occur at home. Ireland has the lowest rate of home births. In New Zealand in 2010, 3.2% of women gave birth at home (MOH unpublished, 2012).

Safety of planned homebirth compared to planned hospital birth for low risk women

A Cochrane review, updated in 2009, reviewed randomised controlled trials of planned home and hospital births. It found only one small trial suitable for inclusion. The authors conclude that there is no strong evidence to favour either planned home birth or hospital birth for low-risk pregnant women (Olsen 2009).

A large prospective study of 65,000 women in England compared results in a composite main outcome (composed of perinatal morbidities and mortality) for women by planned place of birth at the start of labour. Overall, there were no significant differences between the obstetric and non-obstetric groups. Women planning birth in a midwifery unit and multiparous women planning birth at home experience fewer interventions than those planning birth in an obstetric unit with no impact on perinatal outcomes.

The authors conclude that the results support a policy of offering healthy women with low-risk pregnancies a choice of birth setting.

A review of nine randomised controlled trials comparing traditional and alternative birth settings (freestanding or specially designed within hospitals) found those who gave birth in alternative birth settings were less likely to have medical interventions during labour and more likely to have higher levels of satisfaction (Hodnett et al. 2010).

6.4.2. Birth attendants

The roles of the various professional groups in attending births vary between countries. In the United States and Canada with doctor-led systems, most births are attended by obstetricians and nursing staff. There is overall little midwife involvement. In countries with strong midwife-led models of care (New Zealand, the Netherlands and the United Kingdom), midwives support women with uncomplicated pregnancies to give birth. In Ireland, even though almost all births take place in hospital, most births are attended by midwives under the direction of the obstetrician.

Roles of the professional groups are discussed earlier in section 6.2.

6.4.3. Caesarean section rates

In 1985 the WHO recommended caesarean rates of 10 to 15% though these targets may now be out of date and have been criticised as arbitrary. The WHO is working to update them (RANZCOG correspondence, 2012). Since then rates of caesarean section have increased in developed countries. Increases in both public and private settings have been attributed to funding incentives, convenience, defensive medical practice, increases in numbers of older mothers and patient preference (Hodnett et al. 2010). High rates of intervention in pregnancy have motivated many campaigns promoting the benefits of natural birth and promoting choice in maternity care (see for example New Zealand, Australia, the United Kingdom and Ireland).

The comparator countries included in this study (with the exception of the Netherlands) have high rates of caesarean section (see Figure 8 below) that have risen steadily for many years. For example, in the United Kingdom, rates have increased from 2% of births in 1953 to 25% in 2009. Similarly, in the United States nearly one-third of women now give birth by caesarean. In Australia, 32% of women gave birth by caesarean in 2009, with the rate varying from 28% in ACT to 33% in Queensland (Australian Government 2011). While the New Zealand rate has increased to 23.6%, increases have been slower than countries such as the United States and Australia, whose rates have continued to increase markedly each year.

The Netherlands stands out, with a caesarean rate of 15.4% in 2008, much lower than the other comparator countries. However, the rate in the Netherlands is increasing (14% in 2005) just as it is in the other comparator countries. Figure 8 below reports the most recent identified caesarean section rates for the countries included in this study.

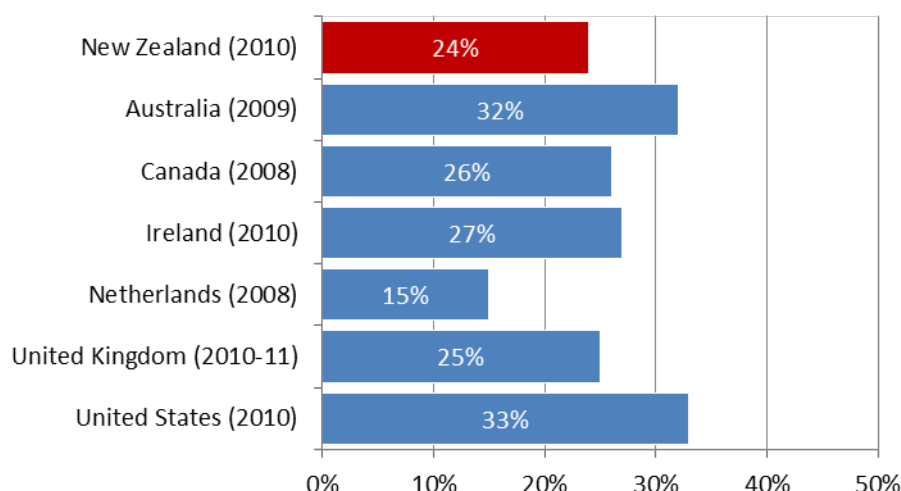


Figure 8. Caesarean section rates in comparator countries. Note that data are from different sources and years and that comparison is therefore indicative only.

It is important to note that while caesarean sections are life-saving interventions, caesarean section itself carries risk and in some situations the risk of complications from the operation outweighs the risk of pregnancy complications it is carried out to avoid (Khunpradit et al. 2011). Some caesarean sections are carried out at maternal request. A Cochrane review of non-clinical interventions to reduce unnecessary caesarean sections (Khunpradit et al. 2011) concludes that:

Interventions targeting pregnant women: There is limited evidence of the effectiveness of interventions that target pregnant women with the aim of reducing caesarean rates (for example birth preparation classes and antenatal group therapy).

Interventions targeting professionals: The introduction of clinical practice guidelines requiring mandatory second opinions or that are supported by local opinion leaders and peer reviewed by individual departments may lead to reduction in caesarean rates. However, evidence is weak and the costs and benefits of introducing these interventions should be considered.

Summary of intrapartum care

NZ

Most births are attended by midwives with obstetricians providing care in the event of complications during labour. Women are able to choose to give birth in hospitals, at home or in birthing centres. If complications arise during labour or birth, women are transferred to hospital to receive secondary care. In 2010, 85% of women gave birth in the maternity units of general hospitals, 3% gave birth at home and 11% gave birth in small maternity hospitals (MOH unpublished 2012). 23.6% of women delivered by caesarean section in 2010 (MOH unpublished 2012). There are five facilities in New Zealand which provide tertiary neonatal intensive care.

AU

Only a small and decreasing number of Australian GPs provide intrapartum care (Schmied et al. 2008). Almost all births occur in a conventional hospital setting (97.9%) though some women give birth in birth centres. Only a very small proportion of women give birth at home (Australian Government 2009). There is little government support for homebirths and midwives delivering babies at home must have collaborative arrangements for transfer in place with an obstetrician.

Australia has a comparatively high rate of interventions in birth, such as caesarean sections (32% in 2009). There is some variation across states on the use of different interventions (Australian Government 2009).

CA	<p>A 2009 survey of mothers who recently gave birth found that (97.9%) of births occurred in hospitals or clinics. Just over 1% of births took place in a private home and 0.8% took place in a birthing centre (PHAC 2009). Several provinces have voiced their support for women's right to choose the place of birth but home birth remains a controversial issue in Canada. It is common for women in more remote territories to have to travel considerable distances to give birth (40% of mothers who gave birth in the Northwest Territory travelled more than 100km) (PHAC 2009).</p> <p>Similarities exist between free-standing birth centres, births at home, and small hospitals that provide services for those mothers and babies without identifiable risk associated with their pregnancy or birth. The primary birth attendant for more than two-thirds of births were obstetricians (69.6%), family physicians attended 14.7%, nurses 4.7% and midwives 4.3%. There is a great deal of variation between provinces: obstetricians attended 91% of births in Prince Edward Island but only 21% in the more remote Northwest Territories where family physicians more commonly attended (PHAC 2009).</p> <p>In 2004-5, 25.6% of babies were delivered by caesarean (PHAC 2010).</p>
IE	<p>Almost all Irish mothers give birth in hospital (98.8%). Women with low-risk pregnancies give birth in hospital under the care of a midwife though higher risk women give birth with an obstetrician in attendance. Caesarean sections are becoming increasingly common, with 26% of births in 2010 carried out by caesarean (HRID 2012). Birth centres have just been introduced in 2011, with the first birth centre, Alukura House, opening in Dublin.</p> <p>Home birthing is possible with independent community midwives, though there are only a small number available. Only a very small proportion of women deliver at home; a total of 0.2% of births were homebirths in 2010 (HRID 2010).</p>
NL	<p>Women with low risk pregnancies can freely choose where to give birth, at home or in a hospital or birth centre (Wiegers 2009). 35% of births in 2007 occurred in primary care – the home or birth centres – with the remainder giving birth in hospital.</p> <p>If there is any risk of complications, an obstetrician attends and the woman moves into secondary care. Around one-half of births occur in secondary care, with just under one-third of women beginning labour in secondary care and a further one-fifth being referred to secondary care during labour. First time mothers are more likely to require secondary care and to want to give birth in hospital (Wiegers 2007). Hospital midwives attend an increasing proportion of births in secondary care, 26% in 2007 (Wiegers 2010).</p> <p>In 2007, midwives attended 70% of births and obstetricians 30% (Borquez 2006). Women in the Netherlands have low levels of intervention in delivery, including low caesarean rates (15.4% in 2008).</p>
UK	<p>Women have four choices for birth location: at home, in a free-standing midwifery unit, an alongside midwifery unit or in a unit with obstetricians (Redshaw 2010). Just under two-thirds of women have midwife-led care in hospital and one-third have consultant-led care. A small proportion give birth in midwife-led units or birth centres separate from hospitals (3%) or home-births (3%). In 2010, one-quarter of women giving birth had a caesarean section (CQC 2010).</p>
US	<p>Almost all births occur in hospital (98.2% where recorded in 2008 – CDC vital statistics online) led by doctors (91%) – just 0.72% of births in 2009 took place at home – though this proportion is increasing (MacDorman et al. 2012). The state with the highest homebirth rate, Montana, had 2.6% of births at home. Most home births are attended by midwives.</p> <p>Freestanding birth centres, often staffed by midwives, are available in some areas for women who want more personal care than hospitals but do not want to give birth at home. Some hospitals also provide birth centres, though some provide care more closely resembling normal hospital care in an aesthetically modified environment.</p> <p>Although most childbearing women and new-borns in the United States are healthy and low risk, national surveys reveal that essentially all women who give birth in United States hospitals experience high rates of interventions with risks of adverse effects. Caesarean section is the most common operating room procedure in the United States and was the second most common procedure billed to Medicaid in 2005 (Sakala 2008). The caesarean rate increased by 50% from 1996 to 2006 and now one-third of births in the United States are by caesarean (32.6%).</p>

6.5 Postnatal care

6.5.1. Postnatal stay in hospital

The length of stay in hospital after birth has been declining across western countries, including those in this study. Most women have short stays, two to three days on average, after a normal birth. In some places the stay is much shorter; some states in the United States discharge women after 12 to 24 hours

(Brown et al. 2009). In New Zealand women are entitled to 48 hours stay (or longer if clinically indicated) in hospital postnatally and then have home visits from their LMC midwife.

In Ireland a new initiative called the Early Transfer Home scheme, offered in some regions, provides for women to leave hospital 12 hours post-delivery with home visits from a midwife daily for five days.

An international review of randomised trials of early transfers home found inadequate data to detect increases in rare outcomes, but found no adverse effects on breastfeeding or maternal depression when accompanied by at least one nurse or midwife home visit (Brown et al. 2009).

6.5.2. Support after hospital discharge

Responsibility for postnatal care provision generally mirrors that for antenatal care. In countries where midwives play a central role in antenatal care, they also provide postnatal care. This is the case in New Zealand, the United Kingdom and Ireland. The most comprehensive post-birth support is provided in the Netherlands where the system features a service called the Kraamzorg under the National Health Service. The Kraamzorg service employs maternity nurses who provide women with support in their homes after birth. Mothers meet their kraamverzorgsters late in their pregnancies. They then work with mothers in their homes after birth to provide support including monitoring the health of baby and mother, help with breastfeeding, care for the new born and even support with housework and care for other children.

In New Zealand the Maternity Consumer satisfaction survey 2011, found that 97% of women were visited at home by their LMC. Of these 75% of women received between 5 and 12 or more home visits after birth. Women with a first baby, young mothers and women who had given birth at home were more likely to have received 12 or more home visits following the birth.

In the United Kingdom a survey of mothers asking about the care they received during and after pregnancy and birth found that 98% were visited by a midwife in their own homes. But GPs are also involved in providing postnatal health checks; a smaller proportion, but still the vast majority (85%) of women had completed a postnatal health check with their GPs (Redshaw 2010).

In Canada and the United States, where midwives play a much smaller role in maternity care, other professionals are responsible for postnatal care. In the United States, postnatal care is generally delivered in hospitals by nurses and obstetricians. The American College of Obstetricians and Gynaecologists and the American Association of Paediatricians recommend women attend a postnatal check between four and six weeks after birth. Similarly, in Canada responsibility for postnatal care falls to hospitals or the women's normal primary care provider.

The transition from the maternity care system into primary care for mother and child is a key point where communication amongst the woman and health professionals is important. The LMC's responsibility for providing care ends, but the woman and child require care such as access to WellChild checks and immunisations. Communication can fail at this point. In New Zealand, referral to WellChild and/or primary care is at times poor or delayed, affecting immunisation rates, breastfeeding rates and timely detection of maternal mental health issues such as postnatal depression.

6.5.3. Breastfeeding

Breastfeeding is internationally recognised as the optimal method of infant feeding with health benefits for babies and mothers (AHMC 2009):

Babies: Breastfed babies are less likely to suffer from a range of serious illnesses and conditions and form better attachment with their mothers. Benefits may extend later in life, with reduced risk of obesity and chronic disease.

Mothers: Breastfeeding promotes faster maternal recovery from childbirth and women who have breastfed have reduced risks of breast and ovarian cancers in later life.

Many factors influence why mothers do not continue to breastfeed exclusively for the first six months, for example health and risk status of mothers and infants, socioeconomic status, education level, knowledge, attitudes and skills, social and cultural factors and support from hospital and health services (Australian Government 2009).

Each of the comparator countries has breastfeeding guidelines with recommendations consistent with the WHO and United Nations Children's Fund guidelines of exclusive breastfeeding until six months. However, these guidelines are aspirational – none of the countries included have breastfeeding rates close to meeting that target. At six months, exclusive breastfeeding rates are far lower – for example, in the United States the rate is 16% (CDC 2012), 14% in Australia (Australian Government 2009) and 16% in Canada (PHAC 2009).

Maternity systems have an important role to play in promoting breastfeeding in mothers after the birth of their child. This can be done through provision of information during pregnancy and in the immediate postpartum period, or through breastfeeding support after the birth. The important role of maternity services in promoting breastfeeding is demonstrated by the international Baby-Friendly Hospital Initiative, a joint initiative of the WHO and UNICEF that aims to ensure all maternity services become centres of breastfeeding support. In New Zealand all maternity services are required to achieve and maintain Baby Friendly Hospital accreditation. In New Zealand this has been applied through guidance that requires health workers to:

- Protect, promote and support breastfeeding;
- Encourage pregnant mothers to breastfeed;
- Give caregivers of formula-fed infants one-on-one accurate, objective and non-judgemental advice;
- Know where clients can access additional help/information about infant feeding;
- Comply with the policies and procedures of health workplaces, including baby friendly hospital and baby friendly community initiatives and the Well Child framework;
- Not accept formula samples from formula companies or promote their use;
- Not accept other gifts from formula companies; and
- Understand that cow's milk is not recommended until the child is at least 12 months old.

Two reviews of the evidence available for strategies to encourage women to breastfeed and support them to continue breastfeeding show that investment in both areas can be effective in increasing breastfeeding rates.

Antenatal interventions (Lumbiganon et al. 2011): The authors reviewed 17 studies including a total of 7,131 women. Some studies compared different forms and combinations of breastfeeding to routine care or to other forms or combinations. The authors conclude that peer counselling, lactation consultation and formal breastfeeding education during pregnancy appear to increase breastfeeding duration. They add that peer counselling appears to be better than routine care for initiating breastfeeding. However, the effects were quite small and the studies mostly of poor quality.

Supporting healthy breastfeeding mothers with healthy term babies (Renfrew et al. 2012): The authors analysed 52 studies including a total of 56,451 women. Supports offered to help women continue breastfeeding included interventions delivered by lay people or by professionals. Intervention characteristics more likely to be effective in supporting breastfeeding include: face-to-face support, support offered proactively (for example not just when women ask for support), support offered through ongoing visits on scheduled basis.

Summary of postnatal care	
NZ	<p>The 2011 New Zealand Maternity Consumer Satisfaction Survey for NZ found that just under half (48%) of women stay in hospital for less than 48 hours following birth (MOH 2012). Most (81%) women feel ready to leave hospital when they are discharged (MOH 2012).</p> <p>Postnatal care is provided by midwives, regardless of the woman's choice for LMC, though the LMC still plays a role in coordinating care. The LMC is responsible for ensuring that women receive a daily visit while the woman is an inpatient and between five and ten home visits by a midwife including one visit within 24 hours of discharge from a maternity facility (a minimum of seven visits in total) (MOH 2007).</p>
AU	<p>Postnatal care has changed significantly over the past 40 years. Women no longer 'lie-in' in hospital for long periods after birth (Coffey 2011). The average length of stay is 3 days- 2 days in public care and 4 days in private (Australian Government 2011). For women who give birth in hospital, the expectation is of a short hospital stay with GP follow-up. Private care usually offers longer stays and women generally report higher levels of satisfaction, despite higher rates of obstetric intervention and care by non-midwives.</p> <p>A common postnatal experience for women in public hospital care is that of a short stay with an expectation of follow up with their general practitioner. Women in this setting may be cared for by a number of midwives and even non-midwives. Their contact with medical officers may be infrequent and limited to very junior staff. Access to community and home-based postnatal services is highly varied across Australia (Coffey 2011).</p> <p>Most State and Territory governments in Australia have initiated universal health home visiting after the birth of a baby and some have made a commitment to establishing midwifery continuity of care models. Child and family health services aim to visit the parent within two weeks after the baby's birth. Centre based services are offered in some areas where access to care is reduced (for example, rural clinics) (Schmied et al. 2008).</p>
CA	<p>In Canada, postnatal hospital stays for mothers and their babies have decreased steadily over the last 15 years. One-third of women now report postnatal lengths of stay of less than two days following vaginal births. Just over one-half of women with a caesarean birth report short stays (less than four days) (PHAC 2009).</p> <p>Postnatal services are provided by hospitals, health centres, public health nurses and primary care providers. A variety of models are used, including phone calls, telephone triage services, clinic visits (drop-in and appointment) and home visits.</p>
IE	<p>The majority of postnatal care for women is given by the midwives on duty. Women in private or semi-private care may see a doctor before discharge. Stays for first time mothers generally vary from one to four days, or three to five days after caesarean, and are shorter for multiparous women.</p> <p>Two postnatal GP visits are funded at two and six weeks for both mother and baby. A public health nurse does a home visit with the mother and baby in the first six weeks after the birth.</p> <p>Under the Early Transfer Home scheme, introduced in some hospitals, mothers receive individualised care from a hospital midwife after leaving hospital (about six hours after birth). The midwife then visits the mother in their home every day up to and including day five.</p>
NL	<p>Postnatal care is provided by midwives or occasionally GPs and maternity care assistants unless the women and/or baby are hospitalised, in which case obstetricians are responsible. Standard postnatal care consists of five postnatal visits to the mother at home with a final consultation at six weeks post-partum (Wiegers 2007).</p> <p>In addition to standard postnatal care, the Netherlands has a service called the Kraamzorg which is delivered by maternity nurses or kraamverzorgsters who provide postnatal care to new mothers and their babies in the eight to ten days immediately after the birth in their homes (Wiegers 2010). Mothers begin interacting with them in the late stages of the pregnancy.</p>
UK	<p>Based on a survey of mothers in 2010, on average new mothers stayed in hospital for less than two days and received just under four visits from midwives and some additional visits from healthcare assistants. Almost all mothers (98%) were visited by midwives in their own homes (Redshaw 2010). GPs have a role to play in post-natal care, monitoring the mental health of the mother, providing advice and ideally performing the six-week postnatal check (Smith et al. 2010). 85% of women in a 2010 survey reported a postnatal check with their GP (Redshaw 2010).</p>
US	<p>Four out of five mothers with a vaginal birth reported staying in hospital for two days or less. Mothers who had a</p>

caesarean generally reported staying in the hospital longer, for three to five days (Declercq et al. 2006).

Traditional postpartum care in the United States consists of daily hospital visits for two to four days after birth and a follow up postpartum care visit within 4 to 6 weeks of birth (Groff 2011). Almost all women have at least one office visit with their maternity caregiver between 3 and 8 weeks after the birth of their child (Declercq et al. 2008).

6.6 Maternity workforce

6.6.1. Workforce levels

Shortages in health workforces are an issue in many countries (OECD 2008). New Zealand faced a chronic shortage of midwives, particularly in rural areas, in the mid-2000s. A number of strategies have been implemented to address midwife shortages and concern about increasing midwife age, and to include changes to education, return to practice programmes, competency programmes for overseas midwives, the Midwifery First Year of Practice programme and the recertification programme (NZMC 2010). The number of midwives practicing is now growing, though the number of places in training programmes has reached its likely limit (NZCOM 2010). Shortages remain in some areas, for example in Counties Manukau where there are shortages of both hospital based and independent midwives (RANZCOG correspondence 2012).

The Netherlands midwifery workforce faced severe shortages around the turn of the century which culminated in a demonstration before parliament and a strike. Initiatives were introduced to reduce workload, increase pay and increase training capacity. The number of hospital and community midwives has grown substantially and continues to grow.

Many of the other comparator countries face shortages in their maternity workforces, particularly midwives. In the United Kingdom, a College of Midwives report in 2011 declared that England faces chronic midwife shortages and while the other parts of the United Kingdom appear to have sufficient workforces, aging may lead to shortages in the future.

The United States, Australia and Canada face challenges around the geographic distribution of their maternity workforces. Women in Canada often have to travel considerable distances to give birth, spending time removed from the support of their families and communities. This is a particular issue for First Nations people who live in more remote areas. In Australia, Indigenous people are less likely than other mothers to access antenatal care early in their pregnancy. Distance from services and difficulty with transport to services are significant barriers to access (Australian Government 2009).

Specialist maternity personnel are more likely to be available in urban areas. In the United States there is an oversupply in some urban areas while rural areas face shortages

6.6.2. Workforce relationships

A strong collaborative relationship between the professional groups involved in maternity care can strengthen the system as a whole. Professionals have to be able to work together at an individual level to provide care to mothers. At professional level, a strong relationship between the professional bodies allows the development of joint guidance for practitioners.

In New Zealand, there has at times been friction between the professional groups involved in maternity care. Though all aim to achieve the same ultimate outcomes, healthy mothers and healthy babies, there is scope for different philosophical approaches. The individuals interviewed as part of this project spoke of improvements in the relationships in recent years. The results of more positive relationships can be seen in the effective process of consultation in updating the Section 88 referral guidelines and the maternity quality and safety initiative.

In the United Kingdom, the two core professional groups involved in maternity, the Royal College of Obstetrics and Gynaecology and the Royal College of Midwives work together to develop joint policy, guidelines and statements. One interviewee described this as a strength of the United Kingdom maternity system.

Maternity workforce issues summary

NZ	<p>The Lead Maternity Carer role is most often occupied by midwives (about 78%), though there are some GP (1.6%) and obstetrician (5.8%) LMCs (14.4% were not registered with a LMC) (MOH 2010). In the early to mid-2000s there was a chronic shortage of midwives with rural areas critically affected (Hendry 2009). In 2009 and 2010, the midwifery workforce was growing with increases in the number of midwives in training by about 4.7% per year. It is uncertain whether this trend will continue (NZCOM 2010). There were 2,767 midwives practicing in New Zealand in 2010.</p>
AU	<p>The Australian maternity workforce, as with the overall health workforce, is faced with existing and worsening shortages (Australian Government 2009).</p> <p>The number of specialists spending most of their time as obstetrics and gynaecology clinicians in Australia has remained constant, despite population growth, with a total of 1,168 specialists working in 2005. The number of GPs providing obstetric services fell from 706 to 599 between 2002 and 2007. There were 18,297 midwives employed in Australia in 2005 (Australian Government 2009).</p> <p>While midwives are well distributed across rural and metropolitan areas, GPs and obstetricians are disproportionately common in large cities. Initiatives to address this include extra scholarships for GPs and midwives to expand the maternity workforce, particularly in rural and remote Australia.</p>
CA	<p>Canada is experiencing a shortage and mal-distribution of maternity care providers. Fewer obstetricians and family doctors are engaging in maternity care, particularly intrapartum care. In 2008, more than one-third of obstetricians and gynaecologists planned to retire within the next five years. The Society of Obstetricians and Gynaecologists of Canada has been forecasting a shortage of doctors practicing obstetrics for over a decade. It has called for increases in the midwifery workforce, currently made up of 700 midwives, to compensate however the growth has not been strong enough to do so. Shortages are particularly acute in rural and remote areas (PHAC 2009).</p> <p>There have been calls for a national strategy to address workforce shortages (SOG 2008).</p>
IE	<p>The shortage of midwives, coupled with midwifery role expansion, reduction in junior Doctor's hours, has according to Lindsay (2004) caused stress and strain within maternity services. A review of the Irish maternity workforce in 2009 recommended the expansion of the Health Care Assistant role to take on the duties of midwives which do not require a qualified midwife to complete (RCSI 2009).</p>
NL	<p>In 2000, a shortage of midwives culminated in a strike and demonstration before parliament (Wiegers 2007). Initiatives including increased pay, increased training capacity and decreased workload has led to an increase in the number of midwives from 1,042 to 1,871 between 1995 and 2010. The number of clinical midwives working in hospitals has tripled in the same time period. (Wiegers 2010).</p>
UK	<p>The midwifery workforce is facing chronic shortages in England. It appears sufficient but aging in the rest of the United Kingdom (UKCOM 2011). There was concern about the small number of training doctors entering obstetrics as a speciality however the number is now increasing and is meeting demand. The number of maternity support workers is also increasing (HM Government 2011).</p>
US	<p>Maternity care is primarily provided by obstetricians. Challenges to the United States maternity workforce include oversupply in some urban centres and shortages in rural areas, inefficient coordination of care and declining trends in workforce capacity (Sakala 2008). There are shortages in obstetricians in some states as a result of an aging workforce, the high stress of an obstetrics practice, decreasing interest from students in the specialty and fear of liability and insurance.</p>

6.7 Professional organisation for maternity workforces

6.7.1. Professional organisations

All countries have professional organisations responsible for GPs, midwives and obstetricians. As with doctors in other specialties, GPs and obstetricians are required to meet education and professional standards to practice. Professional bodies govern the training, registration or certification and discipline of people working in their field.

For example, in the United States, the American Board of Obstetrics and Gynaecology certifies Obstetricians and Gynaecologists. They are certified after four years of training and passing examinations. Other countries have similar processes in place for entering the specialty.

Though all countries have regulation of midwifery and professional bodies for midwives, there is variation. In New Zealand, all midwives are registered with the Midwifery Council under the Health Practitioners Competency Assurance Act 2003. Most midwives belong to the New Zealand College of Midwives – a professional organisation. The College of Midwives represents 90% of midwives in New Zealand and describes itself as the ‘voice’ for midwives and has a strong role in advocacy for midwives and development of maternity health policy. It sets practice standards for its members. The Council was appointed in 2003 and assumed responsibility for regulating midwives from the Nursing Council of New Zealand in 2004.

In some countries midwives are regulated by the same organisation as nurses. In Australia, midwives are represented by both the Australian College of Midwives and the Royal College of Nursing. Registration is both a federal and state responsibility with involvement from the Australian Nursing and Midwifery Council and since 2010 the Nursing and Midwifery Board of Australia.

In Canada, regulation of midwives differs across provinces and territories. Midwives must register with provincial and territorial authorities to practice. But only seven provinces and territories have regulatory systems with which to manage the registration and professional organisation of midwives. Effectively midwives are unable to practice in the rest of Canada.

6.7.2. Training

Training for obstetricians is consistent across countries. In the United States, doctors are required to complete a four year residency and pass a written test, oral examination and demonstration of experience to become Board certified. The American College of Obstetricians and Gynaecologists provides advocacy and training. In New Zealand, the Royal Australian and New Zealand College of Obstetrics and Gynaecology offers training to any medical graduate. Training for membership involves six years of postgraduate hospital based training and assessment including four years of rotation through three different hospitals, including tertiary and rural hospitals, and a two year elective programme.

In New Zealand, GPs can complete postgraduate training in Obstetrics through a diploma course to become General Practice Obstetricians. In some countries, GPs are required to complete this postgraduate training to deliver intrapartum care to women, while it is optional in others. In Australia for example, GPs can practice obstetrics without postgraduate obstetric training, though most have formal training (Wiegers 2003). Generally GPs without obstetric qualifications can provide care in the first trimester of pregnancy.

Midwifery training can be direct entry or postgraduate, though some countries have both options available. Midwifery was sometimes seen as a specialty of nursing, with nurses able to complete a diploma in midwifery following the completion of their nursing degree. All countries have midwifery education available as postgraduate training for nurses. But direct entry courses are now available in

most countries. Direct entry courses are open to people without previous nursing or health professional training and are generally four years long and bachelor degree level.

As with training, the regulation of obstetricians and GPs is consistent across the comparator countries. Comparator countries' approaches to the regulation of midwives can be put into two groups: those who regulate nationally and those who regulate on a state/province/territory basis. New Zealand, Ireland, the United Kingdom and the Netherlands all regulate on a national level. In 2010 Australia transitioned from state/territory based regulation to national regulation under the Australian Nursing and Midwifery Council and Board. Canada and the United States still regulate on a provincial/state/territorial level.

Summary of training and registration

Training and regulation for obstetricians is broadly consistent across all comparator countries. It involves a number of years of postgraduate training (six years in New Zealand) incorporating experience in delivering obstetric and gynaecological care to women in a range of settings and continuous assessment.

NZ	<p>The New Zealand College of Midwives is the professional organisation for midwives it provides ongoing education, professional development and review process. The Midwifery Council runs a recertification programme, sets standards of practice and manages complaints and disciplinary action. All practicing midwives must register with the Council. Midwifery education leads to a bachelor level degree in midwifery, it has been available since 1992. .</p> <p>The obstetrics qualification for GPs is called the Diploma of Obstetrics and Medical Gynaecology which is one year long and involves placement with a maternity unit in a hospital. Alternatively, GPs can obtain a certificate of women's health which does not include intrapartum care. The course is done over a semester.</p>
AU	<p>The majority of midwives are nurses with post-graduate midwifery training. Direct entry undergraduate midwifery programmes were first introduced in 2002 (Australian Government 2009). There are a large number of midwifery training programmes approved by the Nursing and Midwifery Board of Australia including both direct entry (three year bachelor degree level) and postgraduate (for example, diploma of Midwifery, graduate diploma, masters of science (midwifery)). Midwives were registered with states/territories until 2010 but are now registered nationally.</p> <p>GPs complete a DRANZCOG, an obstetrics diploma, over a six or twelve (advanced) month training placement in a hospital.</p>
CA	<p>Midwifery education in Canada leads to a bachelor level degree in midwifery and has only been available since 1993. It is currently offered at six universities (three in Ontario, and one in each of in Quebec, British Columbia and Manitoba). The practice of midwifery in Canada is regulated by provincial and territorial authorities. Midwives can only legally practice their profession if they are registered with these authorities, but only seven provinces and territories have regulatory systems in place. Nurses can train in perinatal nursing or high risk obstetrics to provide perinatal care.</p> <p>Competence in maternity and newborn care is a prerequisite for a certificate in Family Medicine in Canada. Training involves residencies where residents provide care to six or more pregnant women through pregnancy, birth and postnatal care. This is challenged by the decline in the number of faculty role models providing intrapartum care.</p>
IE	<p>Irish midwives are organised under the Irish Nurses and Midwives Organisation. Midwives can train as nurses and take a higher diploma in midwifery over eighteen months or qualify in direct entry training over four years.</p> <p>GPs wishing to practice in obstetrics can complete a Diploma in Obstetrics and Women's Health.</p>
NL	<p>Midwives are strong in professional training, organisation, recruitment standards and organisational power (Benoit et al. 2005) under the Dutch Association of Midwives (KNOV). Midwives are trained in a four year bachelor level course (Wiegers 2010).</p>
UK	<p>Direct entry degree level training and diplomas for nursing graduates are both available for midwife training.</p> <p>GPs complete examinations to gain a Diploma of the Royal College of Obstetricians and Gynaecologists if they wish to provide obstetrics as part of their service.</p>
US	<p>There are three midwifery credentials within the United States:</p> <p>Certified Nurse Midwives: Nurse Midwives are trained in one- or two-year courses after qualifying as nurses. They are able to practice in all states and are well established.</p>

Certified Midwives: Do not need nursing credentials and are trained in direct entry courses. They practice in home or birth centre settings and qualify through direct entry courses, which are recognised in 29 states, able to be licenced in 17 states and be funded by Medicaid in six states.

Certified Professional Midwives: Are educated to provide pregnancy, birth and postnatal care and practice out of hospital in birth centres or at home (Sakala 2008). The North American Registry of Midwives offers national examination and registration.

GPs can be certified under Family Medicine Obstetrics after passing examinations following a twelve month fellowship or five years of clinical experience.

6.8 Funding models

6.8.1. Public or private care

Women are able to access public maternity care in all comparator countries, with the exception of the United States. Funding models and the proportion of women who use private care vary across countries.

In New Zealand, Ireland, Australia, the Netherlands and the United Kingdom maternity care is available publically with little or no cost to the woman. For example, while core maternity care is free in New Zealand, women may be required to pay for some antenatal education and some ultrasound scans. In Ireland and Australia, it is common for mothers to use combined public and private care. These models generally involve combining private antenatal care with the family GP or a private obstetrician with public hospital intrapartum care.

Australia, the Netherlands and the United States all use insurance based models. In the Netherlands, all people are compulsorily included in health insurance (with some exceptions for religious requirements). Health services, including maternity services, are funded through the insurance contributions. The insurance companies and hospitals are often privately owned but not for profit. In the United States, approximately half of maternity care is paid for by private health insurance, with the other half primarily paid for by Medicaid or in some cases by the consumer. Medicaid is available to uninsured, low income people. In Australia, public health services are funded by Medicare, which is funded through an income tax levy. There is a partial rebate available for people who choose to adopt private health insurance.

6.8.2. Funding care providers

It is widely believed that the method through which healthcare providers are paid has the potential to influence their clinical and professional behaviour (Gosden et al. 2000). Healthcare providers can be funded using fixed or variable payments. A spectrum of approaches to funding exists between these two points, combining aspects of the most common funding methods (Wranik 2009) (Figure 9).



Figure 9. Common provider funding models by degree of variability.

Different methods of payment create different incentives, which may influence the care providers deliver to their consumers. The three main methods of payment and their associated incentives are described in the table below (Gosden et al. 2000).

Funding model	Potential incentives (Gosden et al. 2000)
Salary: A lump sum is paid to the care provider for a set number of working hours or sessions per week.	May encourage cost containment, for example through more referrals and prescriptions. Can encourage recruitment in areas with variable demand, as it provides stable income. Retention can be an issue and often there is little control over workload.
Capitation: Where a payment is made to the provider for every consumer to whom they provide care.	Capitation payment may encourage providers to see more patients to increase their income which may result in higher workloads and shorter consultations. But providers may try to attract patients by creating reputations for a higher quality of, or access to, care.
Fee for service: Payment is made to a provider for each item of service or unit of care they provide.	There is an incentive to deliver more care as performing additional services generates additional income. Such incentives may lead to supplier induced demand.

A Cochrane review of studies comparing different funding models for primary healthcare providers identified few studies that used robust trial methods, with variable quality amongst those that did. The authors concluded that payment systems do influence provider behaviour, though the evidence was not robust enough to be used and applied in every context. Providers paid by fee for service provided a higher quantity of primary care services compared with providers paid by capitation or salary.

In the context of maternity services, unneeded interventions can be as damaging to patient outcomes, as can not performing needed interventions. For example, some authors speculate on the link between fee for service payment systems and high intervention rates, for example in the United States (Sakala 2008).

Countries included in this study each use a combination of payment methods. In New Zealand, carers are paid using a variety of models, for example those working in hospitals are often salaried but LMCs are paid per module of care they provide, with care divided into antenatal, birth and postnatal modules. Gosden et al. (2000) report that in 1992, 23% of health plans paid their primary care providers by salary, 35% by capitation and 36% by fee for service in the United States. In the Netherlands, payment is a combination of capitation and fee for service.

In Canada, all provinces and territories have implemented at least some non-fee for service payment methods, such as salaries and blended payments. The majority of economic models focus on the issues relevant to health care systems where physicians compete for consumers, such as care quantity, supplier induced demand, and consumer acceptance. But the Canadian health care system is plagued with a shortage of providers, which is particularly pronounced in rural and remote areas. While the majority of Canadian GPs receive fee for service payments (roughly 80% of payments in 2004-5 were fee for service), the method has come under scrutiny for the creation of perverse incentives and for its incompatibility with health care goals such as effectiveness and quality (Wranik et al. 2009).

Payment by results – the UK method for funding maternity care

The United Kingdom used to use a system based on fee for service. It used an episodic payment system where the system paid providers for each inpatient spell, scan or hospital visit (HFMA 2012). This system did not work well for maternity care, with problems in the way antenatal and postnatal non-delivery care were recorded by providers. It encouraged more clinical interventions, while hospitals providing more proactive, community based care were worse off financially.

Under the new system, providers are paid for each segment of the maternity care they provide with amounts based on the woman's level of risk. They are not funded for each intervention that is completed, but rather receive a payment set at an amount calculated based on the average cost of the each segment of maternity care to women of each risk level. Providers are responsible for how care is delivered to women. The system is intended to incentivise the best possible care without promoting unneeded interventions or unneeded hospital-based care.

Summary of funding models	
NZ	<p>Under the public health system, maternity care is free. This includes maternity care provided by GPs or midwives and referral to obstetricians within the public sector. There may be charges for antenatal classes or childbirth education classes (MOH website) and some tests. Women are able to choose private care if they are able to pay the fees themselves or have insurance which covers it (this is rare in New Zealand). Private obstetricians are funded to access hospital services and receive funding as LMCs, so private care is effectively partly publically funded.</p> <p>All LMCs are paid the same amount for each module of care they deliver – midwives and GPs cannot charge fees on top of the funding they receive from the government. Facilities are funded for all women who use them and receive additional money for primary, secondary and tertiary services they provide for some women.</p>
AU	<p>Pregnant women and children are entitled to healthcare without charge under the public health system (Schmied et al. 2008). Funding for maternity care is a mix of Commonwealth, state and private funding. States and territories play a major role through public hospitals. Currently, a significant proportion of Commonwealth funding is through the Medicare Benefits Schedule (MBS). The MBS is focused almost entirely on medical professional services, with a significant proportion channelled through the Extended Medicare Safety Net (EMSN). As a result, the range of maternity care options available outside the public system is limited.</p> <p>In 1999, private maternity care was used by 31.8% of women, followed by combined maternity care (24%), public hospital clinic care (22%) and shared maternity care (14%) (Australian Government 2009).</p> <p>Medicare rebates are available for obstetricians and midwife antenatal care, postnatal care and births (as long as they happen in hospital or in a birth centre) (DHA 2010). Mothers may be charged additional fees and rebates are not available for homebirths.</p>
CA	<p>In some provinces and regions health reform has increased maternity care costs. Medical and nursing care are still provided for free but other important elements of pre- and postnatal care such as childbirth classes, midwives, and breastfeeding counselling and other support services may only be available to those who can afford them, depending on where they live in Canada (WHCR 2007). Midwives in some provinces are publically funded and payment structures vary – in some provinces they are fee for service and in others midwives are salaried (Canadian Midwifery Regulatory Consortium).</p> <p>Canada is a leader in experimenting with alternative, non-fee for service provider remuneration methods; all jurisdictions have implemented salaries and payment models that blend fee for service with salary or capitation components.</p>
IE	<p>Free public healthcare is available to all mothers and infants ordinarily resident in Ireland through the Maternity and Infant Care Scheme (HSE.IE). Private care and combined private-public care (eg private antenatal care and public delivery) are available and are commonly used. Doctors claim funding for the care they provide.</p> <p>The government provides funding to GPs and obstetricians for a schedule of maternity care from antenatal to postnatal care. All care under the mainstream model is freely available.</p>
NL	<p>The Netherlands has a system of national health insurance with a mixture of collective health insurance organisations and commercial health insurers (Benoit et al. 2005). Maternity care is available free under this system with no cost to mothers.</p> <p>Payment for midwifery care is by fee-for-service. The midwife can either charge the unit price for complete client care or she can charge for partial (prenatal, natal and/or postnatal) care, depending on the referral status of the woman and the time of referral (before, during or after the birth) (Wiegers 2007).</p>
UK	<p>Maternity care is publically available under the National Health System (NHS). Private care options are available, including independent midwifery and private maternity hospitals.</p> <p>The United Kingdom has now moved away from the old payment by results system for maternity care. Under the new pathway payment system (still in many ways a payment by results system), health providers are now paid on a per pregnancy basis, with a single payment for each stage of the pregnancy paid to a single provider per woman per pregnancy. Payment levels are determined by an assessment of the level of care required (Hfma et al. 2012).</p>
US	<p>Care is available through private health insurance/user pays or through Medicaid. In 2008, private insurers paid for 52% of hospital stays for childbirth and Medicaid paid for 41%, with variation across states (Sakala 2008). In 2005, 4% of births were uninsured. Hospitals charge the cost of care back to private insurance or Medicaid, with amounts varying</p>

across hospitals and states.

The government through Medicaid pays maternity providers a fixed global fee for a bundle of services. The fee schedule code and size of payment are based on the services provided and the type of birth. For example, on average providers pay more for caesarean deliveries than vaginal. It is argued that this, along with the predictable scheduling and shorter times of caesarean sections, create strong disincentives for normal deliveries (Sakala 2008).

7. Overview of emerging themes in maternity care

This final section of the report provides an overview of the key themes and challenges identified across comparator countries. In considering the information on outcomes, it is important to keep in mind that comparisons are limited by differences in definitions as discussed in the body of the report.

7.1 Reducing mortality

Analysis of the data for the sentinel outcomes, maternal mortality and perinatal mortality, across all the countries included in the study showed a decline over time. As in other developed countries, rates have fallen greatly over the past century and continue to decrease. However, improvements have slowed as the proportion of births where these tragic events occur has decreased to very low levels.

Approaches to achieving further improvements include the systematic investigation of all maternal deaths and use of this information as part of a continuous improvement process. In the countries studied, perinatal mortality monitoring systems operate to varying extents. The investigation process in the United Kingdom is regarded as the 'gold standard' (HC 2004). Each maternal death is reviewed locally and investigated by a national committee, the Confidential Enquiry into Maternal Deaths in the United Kingdom. The Committee was initiated in 1952 for England and Wales and now covers the United Kingdom as a whole. The New Zealand PMMRC is modelled on this approach.

In Ireland, a group has been created to review maternal deaths and the first report is due at the end of 2012. In the United States, reviews are carried out on a state by state basis and the standard of data collected varies, making analysis difficult. The large population also makes investigation of individual deaths difficult.

In New Zealand the number of deaths is small and the system can investigate and respond to every death. Similar to the United Kingdom, New Zealand now has in place the PMMRC to carry out this function. In the six years it has been in operation, the committee has made a number of recommendations which aim to improve the New Zealand maternity system and so reduce the incidence of maternal and perinatal death.

7.2 Reducing morbidity

Policy makers are moving towards closer examination of morbidity as an indicator for the quality of care. Morbidity indicators become more important as mortality indicators become more sensitive to small variations. Analysis of the cause of severe morbidity provides an opportunity to continue to develop understanding of treatment and prevention to further improve outcomes. New Zealand participates in the Australasian Maternity Outcomes Surveillance System which collects data on the incidence of rare conditions.

The leading cause of neonatal morbidity in developed countries is premature birth, with 60 to 80% of deaths without congenital anomalies related to premature birth (PHAC 2008). Risk factors include single motherhood, younger or older maternal age, previous preterm delivery, infection, low pre-pregnancy weight, low or high weight gain, ethnicity, low socioeconomic status, maternal smoking during pregnancy, primi- or high parity, small for gestational age, intrauterine growth restriction and multiple pregnancies (PHAC 2008). Ethnicity and low socioeconomic status are also associated with increased morbidity, attributable at least in part to other risk factors.

7.3 Other measures of maternity outcomes

As the incidence of adverse outcomes has decreased, the focus on satisfaction as a measure of the quality of care has increased. Satisfaction with care reflects the consumer's experience of care as a whole. While satisfaction is often linked to clinical outcomes, it is possible to be satisfied with care where the result is an adverse clinical outcome. Conversely, it is possible to be dissatisfied with care that results in a positive outcome. Measuring satisfaction with care is a way of assessing the maternity care process, describing the consumer's view point and evaluating overall care against the expectations of the woman.

- Good care meets the needs of people as individuals allowing for choice, information, support and reassurance;
- Women's reactions to care around the time of birth can affect the way they care for themselves and their baby and influence their contact with caregivers; and
- Some aspects of care can be assessed only by asking women.

7.4 Vulnerable populations

The health outcomes of vulnerable populations serve as another indicator of the quality of healthcare systems. While improvements in maternity outcomes have been seen as a result of improved access to basic maternity care, vulnerable population groups such as Indigenous peoples and immigrant populations show far poorer outcomes than their counterparts. This pattern can be seen across the comparator countries.

Maternity systems have to adapt to provide care differently for vulnerable populations to respond to the poorer outcomes these groups often have when compared to other sectors of the population. Responses to disparities in maternity outcomes need to address the impact of risk factors, access to maternity care and the quality of health care in general. The cultural appropriateness of care delivered is an important consideration. Good data on outcomes and processes must also be available to understand the factors associated with disparities and to monitor and evaluate progress in reducing disparities.

7.5 Risk factors

In all comparator countries, significant improvements in outcomes will require interventions to reduce the risk factors associated with adverse outcomes. Interventions that are introduced should be evaluated to assess their effectiveness. A large number of factors affect the level of risk of pregnancies. Some are characteristics of the mother, for example older mothers and teenaged mothers. Other maternal factors in pregnancy can also lead to a higher risk of complications, for example smoking, use of alcohol or other substances. While the incidence of some risk factors, such as smoking in pregnancy, is falling across comparator countries, others are increasing. More women are obese when they become pregnant, are giving birth at older ages and are giving birth to multiple children.

It is important to note that there are associations between risk factors; mothers with low incomes are more likely to be younger, to have other risk factors (for example substance abuse or smoking) and to face barriers to accessing services. Many risk factors are over-represented in vulnerable populations, underpinning the poorer outcomes for these groups, at least to some extent.

Initiatives that reduce the prevalence of these risk factors can reduce neonatal and perinatal mortality. Public health initiatives targeting women before they become pregnant have a role to play in reducing the incidence of many of these risks than maternity systems. However, maternity systems must respond to the demand for care generated by the presence of factors increasing risk. Different countries

approach this in different ways, however there are some common themes. Interventions tend to target multiple risk factors and tend to aim to reduce barriers to accessing services.

For some risk factors, such as smoking in pregnancy, there is robust evidence that interventions are effective and that cessation in early pregnancy prevents spontaneous preterm birth and small for gestational age infants due to smoking. Smoking has been described as the single most important modifiable cause of adverse pregnancy outcomes. For other risk factors, such as obesity, successful evidence-based interventions have yet to be identified. While there is cost associated with implementing interventions, the additional demand for health services generated by adverse outcomes for both mothers and babies also generate significant costs. They can be seen in increased length of stay, complications, admissions to neonatal ICU and the cost of supporting children with permanent disabilities.

7.6 Maternity systems

All the countries included in this study, except the Netherlands, have seen shifts in the roles and responsibilities different health professional groups had in their maternity care systems. In many responsibility moved from midwives to doctors over the 20th century. More recently, calls for more natural childbirth and for increases in community maternity services have seen countries responding by reintroducing or strengthening the roles of midwives. New Zealand's introduction of the Nurses Amendment Act in the 1990s has put the country at the forefront of the modern shift to midwifery-led care with almost all women now using a midwife as their LMC. Australia, Ireland and the United Kingdom have also seen expansion in the number and scope of midwives, though to a lesser extent. Some of the comparator countries (Canada and the United States most notably) have restricted numbers of midwives or have restricted their role in care. In the obstetrician-led systems there are similar calls for fewer interventions and increased community care. The Netherlands stands out because it has had stability of roles with a midwifery-led system supported by legislation.

Workforce challenges have accompanied the often swift transitions in roles and responsibilities. Countries have responded by increasing training places, changing requirements (e.g. introducing direct entry midwifery) and introducing support roles such as community nurses and kraamzorgsters.

All countries are grappling with challenges such as communication between health professionals, referrals and knowledge transfers and the implications of different funding packages. Communication at three key points in maternity care (entry to maternity care, acute referral and exit from maternity care) plays an important role in ensuring that women do not fall through the gaps. Refinement of the frameworks and processes that guide the way professionals communicate at these points and throughout maternity care is a continuing process that must respond to other changes within the maternity system.

Changing intervention rates are connected with a wider discussion in maternity on how care providers approach and manage risk. Countries with strong primary maternity care have systems where there is clear guidance around what levels of risk are acceptable for women before they must move to secondary care. For example, New Zealand and the Netherlands both have clear guidelines around which conditions should result in a referral to secondary care. Referral criteria change in response to research and must be continually revisited. Reliable and robust collection of maternity data is essential to informing this discussion.

There is a strong relationship between regular antenatal care and positive child health outcomes. Women who receive antenatal care at least four times, as recommended by the World Health Organisation, have increased likelihood of receiving effective maternal health interventions during antenatal visits (WHO 2011). Late entrance to antenatal care is associated with a range of other risk

factors, including younger age, low socioeconomic status, lack of health insurance, smoking, alcohol use, unmarried status and unplanned pregnancy (Chote et al. 2010).

There has been little evaluation of different packages of antenatal care. A Cochrane study reviewed randomised controlled trials of midwifery-led models of care compared to other models of care. The review found that women in midwifery-led care experienced a range of improved outcomes with no adverse effects when compared to women receiving other models of care. Reductions were seen in the use of regional analgesia, fewer episiotomies or instrumental births, enhanced continuity of care and sense of control, increases in spontaneous vaginal births and breastfeeding initiation.


Regardless of the maternity system, the literature identified some key elements of best practice that apply to all countries:

- Good quality care is accessible and culturally appropriate care;
- Screening processes must be in place to identify risk factors and for women who have risk factors clear referral guidelines must guide the transfer from primary to secondary care;
- Communication and knowledge transfer between disciplines must be effective; and
- Countries must monitor adverse events and have continuous improvement processes in place enabling continuous improvement of systems.

The countries in this study had similar mortality outcomes. They all face challenges in dealing with their vulnerable populations and in responding to an increased prevalence of risk factors.

7.7 Maternity systems making a difference

Maternity systems have limited ability to prevent the incidence of many of the factors contributing to increased risk of adverse outcomes.

Low	High
Degree of influence for maternity services 	
Prevention of: <ul style="list-style-type: none"> • Obesity • Substance misuse • Economic disadvantage • Younger/older motherhood • Mental health problems 	Quality of service Service that identifies and responds to risk factors Access to service Appropriate and timely referral Communication between service providers Investigation and response to adverse outcomes Culturally appropriate care Availability of services Choice in care

However they can be designed to provide a range of services that promote the best possible outcomes for vulnerable populations and those with risk factors. The table below identifies the populations vulnerable to adverse outcomes, the risk factors associated with those populations, the maternity system factors of increased importance for those populations and types of interventions that are effective.

Vulnerable populations	Risks	Maternity system factors	Effective interventions
Older mothers	<ul style="list-style-type: none"> Increased likelihood of multiple births Increases in ART More likely to experience complications and require interventions 	<ul style="list-style-type: none"> Screening and referral processes Referral guidelines and communication between disciplines 	<ul style="list-style-type: none"> Pre-pregnancy counselling on the risks of late childbearing from primary health providers Early identification and treatment of complications
Young mothers	<ul style="list-style-type: none"> More likely to be economically disadvantaged, and have other risk factors such as smoking Higher risk of poor social outcomes for both themselves and their children Associated with other risk factors 	<ul style="list-style-type: none"> Barriers to access Age-appropriate information Specialist services 	<ul style="list-style-type: none"> Prevention through sexual and reproductive education, provision timely, affordable and ideally long lasting contraceptives Specialist clinics providing antenatal/perinatal/postnatal care for teenaged mothers Specialist midwives Age appropriate care and information integration with other social services
Indigenous populations (including Māori)	<ul style="list-style-type: none"> More likely to be economically disadvantaged, live in remote communities and have other risk factors such as smoking 	<ul style="list-style-type: none"> Culturally appropriate service availability Barriers to access 	<ul style="list-style-type: none"> Reducing barriers to accessing services (information, culturally appropriate care) Increasing general health status Integration with other social services
Economically disadvantaged	<ul style="list-style-type: none"> Strongly associated with other risk factors (young motherhood, smoking, alcohol use, etc) 	<ul style="list-style-type: none"> Barriers to access Integration of services 	<ul style="list-style-type: none"> Reducing barriers to accessing services, including maternity care, dietary interventions, general health care Integration with other social services
Rural and remote communities	<ul style="list-style-type: none"> Difficult to access maternity care especially specialist care. Higher prevalence of risk factors 	<ul style="list-style-type: none"> Availability and capacity of services 	<ul style="list-style-type: none"> Improve access to quality maternity care through improving the availability of local services or improving ability to access and quality of remote services
Other risk factors	<ul style="list-style-type: none"> Obesity, smoking, alcohol use, drug use linked to increased risk of pregnancy complications, need for intervention in labour including induction and caesarean, and stillbirth. Large babies more likely to require intensive care 	<ul style="list-style-type: none"> Availability of specialist treatment Barriers to access 	<ul style="list-style-type: none"> Public health interventions targeting the at risk behaviours Pre-pregnancy counselling Referral to pregnancy-specific support services, for example smoking cessation for pregnant women Specialist clinics and midwives Reducing barriers to accessing services Nutritional advice aimed at limiting gestational weight gain
Mental health status	<ul style="list-style-type: none"> Increased risk of postpartum depression, maternal suicide. Depressed women are more likely to smoke 	<ul style="list-style-type: none"> Identification and referral processes 	<ul style="list-style-type: none"> Referral for mothers with a history of mental health problems Psychosocial treatment for those who develop postnatal depression Reducing barriers to accessing mental health services

7.8 Considerations for New Zealand

In comparison with the other countries in this study, New Zealand has similar or better outcomes and intervention rates across a wide range of measures. The following table highlights some questions raised by interview participants and our analysis of the literature for the New Zealand maternity system which may suggest further research. While these issues have been listed with the New Zealand maternity system in mind, they are relevant to the other countries included in this study.

Common themes	Considerations for maternity services
Maternity care systems	What constraints in the system limit choice in care for women? How could the referral pathways and processes between primary and secondary care be strengthened?
Communication between care providers	How could the transfer of information between care providers be made as effective as possible? Are the processes and tools for transferring information between providers consistent/appropriate/timely? Are the processes/frameworks in place for communication between healthcare providers at the three key communication points (entry to maternity care, acute referral and exit from maternity care) sufficient?
Rural workforce	What strategies could improve the availability of services in rural areas? Do maternity providers in rural settings have access to the training and other support they require?
Access to maternity care	What are the barriers for women, especially vulnerable groups, to accessing maternity care? What strategies could improve the connection between maternity services and other social services?
Increasing rates of some risk factors	How should the public health system respond to the increasing prevalence of some risk factors (for example obesity, and older motherhood)? What are the implications for maternity services?
Poorer outcomes for vulnerable populations	What are the drivers for poorer outcomes for vulnerable populations?
Increasing rates of interventions	How appropriate is the intervention rate?
Availability of data	Are the data available on maternity care sufficient to enable the identification of problems in maternity care? Are there processes in place to ensure that identified problems form part of continuous improvement?

Appendix One:
Method description

Literature review

Search strategy

This study is predominantly informed by information from:

- Papers published in peer reviewed journals;
- Published statistics;
- Books describing maternity care systems; as well as
- Published and unpublished reports and reviews.

Literature searches were carried out through the Ministry of Health library and were framed by the comparator countries used in the study and were generally limited to 2005 and onwards.

Search terms used were (note that the "OR" ensured all combinations listed below were included in the search):

- Perinatal outcome or maternal outcome or maternal mortality or perinatal mortality or infant mortality or maternity statistics or perinatal statistics;
- Maternal mortality rate, infant mortality rate, perinatal mortality rate;
- Maternity service or maternity system or maternity care or antenatal care or perinatal care or maternity workforce;
- Maternity or antenatal or intrapartum or postnatal and psychosocial or satisfaction or control; and
- Maternity and integration or referral.

Evaluation of evidence

The quality of evidence, particularly when reporting on initiatives with demonstrated effectiveness, was evaluated using the following hierarchy.

Quality Level	Study Type
Highest quality	Systematic review
	Randomised controlled trials (not applicable to this study)
	Meta-analysis of cohort or case control studies
	Cohort with comparison group
	Case control
	Cohort/comparison with national dataset
	Cross-sectional studies
	All other studies
Lowest quality	Qualitative studies

Key Informant Interviews and Reference Group

The study was informed by interviews with representatives from the maternity sector within New Zealand and abroad.⁷ Interviews were between 30 minutes and 2.5 hours in length and were semi-structured.

Information from key informant interviews was used to supplement information found in the literature. In particular they helped to provide an understanding of the systems of maternity care provision in the comparator countries. Several key informants also provided unpublished or grey literature which was reviewed as part of this study.

In addition to participating in a key informant interview, a “virtual” external sector reference group was formed and given the opportunity to review and comment on the draft version of the report.

Key informants from the following organisations contributed to this study.⁸ Organisations that were also part of the sector reference group are noted with an asterisk:

Organisation
Action to improve maternity services
American College of Obstetricians and Gynaecologists (United States)
Dutch society of Obstetrics and Gynaecology (Netherlands)
Ministry of Health
NZ College of Midwives*
Otago University Wellington *
Perinatal and Maternal Mortality Review Committee*
Royal Australian and New Zealand College of Obstetricians and Gynaecologists*
Royal College of Obstetricians and Gynaecologists (United Kingdom)
Royal New Zealand College of General Practitioners
Vicki Culling Associates*

All members of the sector reference group reviewed a draft version of the report and provided feedback which was incorporated into the final report.

⁷ Communication, particularly with overseas contacts also took place via email.

⁸ At the time of this draft some international interviews are still being completed.

Appendix Two:

Country maternity system summaries

7.9 New Zealand

New Zealand's maternity care system has seen considerable change since the 1900s. In the early 1900's, midwives primarily provided maternity care in New Zealand. Over the course of the 20th century, maternity care became more hospital based. However, in 1990 with the introduction of the Nurses Amendment Act midwives were again legally allowed to deliver babies alone in both hospital and home-birth settings. Further changes to funding arrangements led to a rapid shift to midwife-led care for most women, though this process and its effects on outcomes and interventions has not been formally evaluated.

Under New Zealand's public health system, the care needed during pregnancy and childbirth is free, and covers everything from confirming the pregnancy to pre- and post-natal care for mother and baby. If specialist care is needed, this is available free of charge through the public health system. Most babies are born in hospitals or in community birth centres. Although giving birth at home is equally acceptable, only a small number of mothers opt to do so. A Lead Maternity Carer (LMC) who is selected by the expectant woman provides maternity care. A LMC is usually a midwife or in a small number of cases a GP or obstetrician who provides maternity care. The number of women who use a GP as their LMC is small and is decreasing. Women who choose an obstetrician to be their LMC, pay for their care.

New Zealand faces challenges delivering care to vulnerable populations, including young parents and Māori and Pacific women. Māori and Pacific women, on average, have the highest birth rates, are more likely to give birth young, smoke, have lower socioeconomic status and access antenatal care later in pregnancy.

Advocates of the New Zealand system of maternity care argue that it supports all of these concepts in its service provision. Women can choose a Lead Maternity Carers (LMC) from within their communities and receive antenatal care in a community setting. The LMC system is designed to ensure continuity of care from one health professional responsible for co-ordinating care and referral to appropriate specialists or services as required.

7.9.1. Models of care

Pregnant women are required to choose a LMC who coordinates their maternity care. Most women and their families choose a midwife as their LMC, though the LMC can also be a GP, obstetrician or a team made up of a combination. The LMC delivers care through the antenatal, birth and postnatal periods.

The New Zealand system is divided into three models of care:

Primary care: Delivered by the pregnant woman's LMC, most often a midwife but sometimes a GP or obstetrician. If the LMC is a midwife, women are referred to an obstetrician if complications arise.

Secondary care: Secondary care is provided in hospitals under obstetricians and includes interventions such as caesarean sections. Women are referred to secondary care in the presence of risk factors laid out in guidelines from the Ministry of Health.

Tertiary care: Tertiary maternity services includes additional maternity care provided to women and their babies with highly complex needs who require consultation with and/or transfer of care to a multidisciplinary specialist team.

Women may be referred between levels of care, for example from their LMC midwife to an obstetrician for secondary care. However, responsibility for coordination of care remains with the LMC. Effective coordination of care and information sharing is essential, particularly in the transition from primary to secondary care.

Maternity care is quite distinct from normal primary healthcare in that it is generally delivered by midwives and not family doctors. Mothers and their babies transition from postnatal care back in to primary health care.

Some women engage private obstetricians as their LMCs through insurance or through their own funds. Even this private care is partly publically funded as hospital facilities are funded by the government and the obstetricians are able to claim LMC payments.

7.9.2. Antenatal care

Antenatal care is provided by the LMC chosen by the woman, usually a midwife but in some cases a GP or obstetrician. Around two-thirds of women approach a GP first when they become pregnant (60%) and around one-third approach a midwife (32%) (Ministry of Health 2012). Most women (91%) have their first contact with a health care provider within the first trimester (MOH 2012). The Lead Maternity Carer role is most often occupied by midwives (about 78%), though there are some GP (1.6%) and obstetrician (5.8%) LMCs (MOH 2010). Just under three-quarters (73%) of women having their first child attend antenatal classes while just 5% of women having a subsequent pregnancy attended classes (MOH 2012).

7.9.3. Intrapartum care

Most births are attended by midwives with obstetricians providing care in the event of complications during labour. Women are able to choose to give birth in hospitals, at home or in birthing centres. If complications arise during labour or delivery, women are transferred to hospital to receive secondary care. In New Zealand in 2010, 85% of women gave birth in the maternity units of general hospitals, 3% gave birth at home and 11% gave birth in small maternity hospitals (MOH 2012), 23.6% of women delivered by caesarean section in 2010 (MOH 2012 unpublished).

7.9.4. Postnatal care

The 2011 New Zealand Maternity Consumer Satisfaction Survey for NZ found that just under one-half (48%) of women stay in hospital for less than 48 hours following birth (MOH 2012). Most (81%) women feel ready to leave hospital when they are discharged (MOH 2012).

Postnatal care is provided by midwives, regardless of the woman's choice for LMC, though the LMC still plays a role in coordinating care. The LMC is responsible for ensuring that women receive a daily visit while the woman is an inpatient and between five and ten home visits by a midwife including one visit within 24 hours of discharge from a maternity facility (a minimum of seven visits in total) (MOH 2007).

7.9.5. Maternity workforce

New Zealand midwives work in a partnership model of care with women. In this model each woman and her midwife are partners, working together to ensure that the woman has care that best meets her individual needs. Midwives are available both publically and privately. In New Zealand midwives can work either as an LMC or as a maternity facility midwife – 48% of midwives work in either a primary, secondary or tertiary facility (NZCOM 2011). These midwives are employed by the facility to provide midwifery care. They support the LMC midwife during uncomplicated births and provide midwifery care for women with complex conditions alongside the obstetric (medical) team.

Many midwives are self-employed and work in the community, but all secondary and tertiary facilities employ midwives. Hospital (or 'core') midwives do not act as LMCs and work shifts in hospitals, so women are attended by the midwife on duty. Women with prolonged labour may see a few different midwives, however continuity of care is not sacrificed. Midwives provide postnatal care to most women, even if their LMC was a GP or obstetrician.

In the early to mid-2000s there was a chronic shortage of midwives with rural areas critically affected (Hendry 2009). In 2009 and 2010, the midwifery workforce was growing with increases in the number of midwives in training by about 4.7% per year. It is uncertain whether this trend will continue (NZCOM 2010). There remain major shortages some areas, for example Counties Manukau. There were 2,767 midwives practicing in New Zealand in 2010 and 232 fellows of the College of Obstetrics and Gynaecology in 2011.

7.10 Australia

In the early part of the 19th century, maternity care in Australia was mostly provided in homes by family doctors and births were attended by midwives. In the late 1940s and 1950s, responsibility shifted to hospitals with more involvement from obstetricians. For many years now almost all births have taken place in public or private hospitals. Today, a small proportion of women choose to give birth in birthing centres and far fewer give birth at home. There has been little support for homebirth in the public healthcare system though recent changes reflect some demand for more choice.

Concern about the high and rising rate of interventions in labour is contributing to calls for more midwife involvement in maternity care. Changes to funding arrangements have led the way for more midwife involvement, though midwives' autonomy is limited by funding conditions requiring collaborative arrangements with obstetricians. Women generally see a doctor or obstetrician at least once during their pregnancy.

Australia faces challenges in improving maternity outcomes for vulnerable populations. There are large disparities in maternity outcomes for rural mothers and those in city centres, as well as between Indigenous populations and the country as a whole. This is evident in the difference in outcomes for mothers across different Australian states, as shown in the table below.

Demographic factor	New Zealand	Australia	NSW	VIC	Queensland	WA	SA	Tas	ACT	NT
Notes on data Data are taken from different sources and relates to different years. Differences in definition across sources and countries limit comparability and figures should be seen as indicative only.	Source: ^A Ministry of Health Report on Maternity 2010 (2012) ^B PMMRC report 2010 ^C Growing up in New Zealand: Before we are born 2010 ^D Statistics New Zealand: Births and Deaths for the year ended June 2012									
Number of live births per annum	64,485 ^A	294,500 births ^A	95,038	72,245	61,021	30,760	19,601	6,280	5,736	3,859
Teenage births Proportion of births to women aged under 20 years. See Section 4.2.2.	7.1% ^A	4.0% ^A	3.5%	2.6%	5.5%	4.8%	4.1%	7.1%	2.4%	10.5%
Births to older mothers Proportion of births to older mothers. See Section 4.2.1.	21.5% ^A	22.9% ^A	13.8%	25.9%	19.9%	20.8%	21.2%	18.1%	25.2%	16.1%
Smoking during pregnancy Proportion of mothers who smoke at all during pregnancy. See Section 4.6.1.	13.9% smoked at LMC registration ^A	14.5% ^A	12.0%	11.7%	18.7%	14.5%	19.6%	24.5%	10.9%	23.2%
Ethnicity Percentage of births to Aboriginal or Torres Strait Islanders	^A Māori 25.4% Pacific 11.7% Asian 10.8% Other 52.2%	3.8%	3.1%	1.2%	5.5%	5.7%	3.1%	4.5%	1.9%	38.2%

Demographic factor	New Zealand	Australia	NSW	VIC	Queensland	WA	SA	Tas	ACT	NT
Remoteness Remoteness of area of usual residence – remote or very remote.	-	2.9%	0.6%	0.1%	3.9%	8.1%	4.0%	2.1%	0.0%	48.1%
Caesarean rate Proportion of births where delivery is by caesarean section. See Section 6.4.3	23.6% ^A	31.5% ^A	30.2%	31.3%	33.3%	33.3%	32.4%	28.8%	27.9%	28.6%
Home birth rate Proportion of births that occur at home. See Section 6.4.1.	3.2% ^A	0.3% ^A	0.2%	0.0%	-	0.8%	0.7%	1.4%	0.2%	1.0%
Hospital birth rate Proportion of births that occur in hospital. See Section 6.4.1.	85.4% ^A	96.9% ^A	96.3%	97.6%	98.2%	97.7%	93.0%	98.0%	93.3%	94.0%
Birth centre birth rate Proportion of births that occur in birth centres (not hospital or home births). See Section 6.4.1.	10.8% ^B	2.2% ^A	2.8%	1.5%	1.0%	1.1%	5.9%	0.7%	6.2%	3.1%
Induced labour (total) Proportion of labours physically or chemically induced.	-	25.3% ^A	25.8%	25.3%	22.4%	28.0%	29.4%	27.2%	22.2%	21.0%
Spontaneous vaginal births Proportion of births that are 'normal' – vaginal births without instruments.	65% ^A	56.8% ^A	58.6%	54.8%	57.5%	52.6%	55.7%	64.5%	59.5%	63.4%

Demographic factor	New Zealand	Australia	NSW	VIC	Queensland	WA	SA	Tas	ACT	NT
Postnatal length of stay <2 days The proportion of births that result in a postnatal hospital stay of less than two days. Figures relate to a subset of births for some countries (indicated). See Section 6.5.	40.2% ^B Refers to mothers with a delivery length of stay <2 days	16.7% ^A	15.6%	-	20.8%	15.1%	11.9%	15.2%	17.1%	16.7%

7.10.1. Models of care

Universal public healthcare for pregnant women and babies is available in Australia. The majority of women give birth in public hospitals, though a significant number use private hospitals.

A number of different models of care are available to pregnant women in Australia. The different combinations have varying levels of public and private care and involvement from midwives and obstetricians or GPs. However, almost all use one of the following four combinations (Australian Government 2009):

- **Private maternity care – 32%:** Private patients of an obstetrician or GP obstetrician; attend private rooms for care in pregnancy and attended by the same obstetrician/GP for labour and postnatal care.
- **Combined maternity care – 24%:** Formal arrangements between a public hospital and local practitioner (GP, obstetrician, midwife); the majority of pregnancy care is provided by a local practitioner with public hospital intrapartum care.
- **Public hospital clinic care – 22%:** Antenatal care in a public hospital outpatient clinic; attend the same hospital for labour and postnatal care; pregnancy and intrapartum care provided under the supervision of medical staff, uncomplicated births usually attended by midwives.
- **Shared maternity care – 14%:** Formal arrangements between a public hospital and local practitioner (GP, obstetrician, midwife); the majority of pregnancy care is provided by a local practitioner, with visits to the hospital at the beginning and latter part of pregnancy; public hospital intrapartum care.

There is demand for alternative models of care, such as delivery in birthing centres (midwife managed freestanding childbirth units) or homebirth, however it exceeds availability. Midwife based models are available in the public sector, but are limited in the private sector (Australian Government 2009). There is also increasing demand for midwife-led continuity of care models (AHMC 2011). Women's choice of care is often a function of income, locality and/or private health insurance status rather than clinical need (van Gool, 2009).

The health system conceptualises these models in three tiers (NHMRC 2010):

- **Primary:** Primary maternity care is healthcare provided for women not experiencing complications. It covers pregnancy, labour and birth, and the postnatal period.
- **Secondary:** In secondary maternity care, responsibility for medical care rests with a general practitioner (GP) obstetrician, specialist obstetrician, or the medical staff on duty in the referral hospital, working in collaboration with a midwife or midwives who continue to provide midwifery care.
- **Tertiary:** Women and babies with more complex or rare needs may be managed in tertiary maternity care, where responsibility for care rests with a multidisciplinary team of providers in a specialised hospital. The team may include an obstetrician, neonatologist, midwife or other specialised services.

7.10.2. Antenatal care

Antenatal care is funded both publicly and privately. In 2005/6, just under half (45%) of antenatal care was delivered privately. Private care was subsidised by the government and can be delivered by GPs, obstetricians or midwives, though funding for midwives was limited to certain services provided on behalf of and under the supervision of a medical practitioner (Australian Government, 2008). The remainder (55%) of antenatal care was delivered in public hospitals.

7.10.3. Intrapartum care

Almost all (96.9%) Australian mothers give birth in a conventional labour ward setting (HRID 2011), with a small proportion giving birth in birth centres (2.2%), at home (0.3%) or in other locations (0.6%) (AIHW 2011).

In the 15 years to 2006, the proportion of births involving a caesarean section increased from around 17% to 31% (van Gool, 2009). Intervention rates are higher in private hospitals where care is predominantly obstetrician led (Australian Government 2009). Some argue that high intervention rates are responsible for Australia's comparatively good maternal and perinatal mortality statistics; however others note intervention carries its own risk (Australian Government 2009).

7.10.4. Postnatal care

In 2009, the median postnatal stay in hospital for mothers was three days. Universal postnatal care is available to all mothers, including at least one home visit or visit in a place of the mother's choosing. Child and family health service aim to visit the parent within two weeks after the baby's birth (Schmied et al. 2008). The goal of the Australian healthcare system is to provide a robust system of early referral and information transfer in the post-natal period. Initiatives are needed to increase the availability of midwifery postnatal care in the weeks after birth (AHMC 2011).

7.10.5. Maternity workforce

The roles of midwives and obstetricians in maternity care has seen tension (van Gool, 2009). There has been a widespread and persistent call for greater choice through expansion of the midwife's role over the past two decades (van Gool 2009).

Until very recently, the Australian funding model drove the dominance of obstetrician-led and hospital-based maternity care. Services provided by obstetricians were funded by the Australian medicare programme but midwife services were not (Australian Government 2009). Some have argued that this funding model is responsible for Australia's high intervention rate.

The recent Maternity Services Plan (2011) expanded the role of midwives through extending some funding structures previously restricted to obstetricians and GPs to some midwives. Eligible midwives now have access to subsidies for antenatal, intrapartum (excluding homebirth) and post-natal care, as well as prescribing rights for some drugs (AHMC 2011).

The Australian maternity workforce, like the health workforce as a whole, faces shortages. There are particular shortages in obstetrician GPs and obstetricians in rural areas. The Australian government is introducing initiatives to increase the number of junior doctors moving into those careers. Midwives are well distributed, direct entry midwifery training has been introduced in many Australian jurisdictions (AHMC 2011).

Workforce shortages are reflected in data on the distribution of hospitals and birth centres by annual number of births. Between 1992 and 2007, the number of centres responsible for between 1 and 100 births decreased by more than half with corresponding increases in the number of centres responsible for 2001+ births (AHMC 2011).

7.10.6. Integration of maternity services

Australian government policy recognises the benefit of collaborative models of care and acknowledges this as an area for improvement (AHMC 2011). This is of particular importance for women who are referred from primary services to secondary or tertiary services.

7.11 Canada

Until the 20th century, women in Canada gave birth at home. But advances in technology and cultural changes led to a move away from midwife-led home births towards births in hospital under the care of the medical profession. By 1900, midwifery had almost disappeared in Canada though it persisted in some small and remote areas. In the latter half of the 20th century attitudes began to change with rising demand for less medicalised care; Canada was the only developed member of the WHO without professional midwives. In 1990, midwives were legalised and midwives are now regulated in some provinces. Most maternity care is still delivered by GPs, obstetricians or maternity nurses. Though a decreasing number of GPs also provide maternity care, GP care is more common in rural areas. Almost all births take place in hospital with a small proportion in birth centres or at home.

Canada shares some challenges with Australia. It has many remote communities, some vast distances away from the nearest hospital. Many remote communities are made up of First Nations people. These groups have higher prevalence of risk factors during pregnancy and have poorer overall maternity outcomes.

The challenges of access and equity, have been compounded by inconsistent maternity policies both across and within some provinces and territories. The Public Health Agency of Canada periodically publishes guidelines on family-centred maternity and new born care that provide the basis for the national, provincial, regional, or local organising of services for the care of mothers and babies.

7.11.1. Models of care

The delivery of maternity care services in Canada is affected by its vast geography. The “full service” family physician (GP) is often the maternity care provider for a rural or remote community. However, across the whole of the country the number of GPs attending births is declining. Midwives play a small role overall, attending 5% of births in provinces where midwifery is regulated and 2% nationwide (BCCEWH 2004).

Primary Care: Most preconception, antenatal, and postpartum services are provided in primary care settings, including office-based individual or group practices, community health centres or health department clinics, and the home. Offered are basic preventive and health promotion services.

Community-based Care: Many services are provided through community-based organisations, either non-governmental or governmental agencies. Programs include childbirth education, breastfeeding support, maternal and newborn bereavement, parent support, community-based nursing, child care, home care, family and social services, and infant development programs. As well, services are offered via health units, parent resource centres and maternity homes.

Secondary care: Most women give birth in secondary care with an obstetrician in attendance. Few family physicians provide intrapartum care, and though demand is high for midwives, they are limited in availability (BCCEWH 2004).

Registered nurses are the largest group of Canadian maternity care providers, delivering care in both community and hospital settings. These nurses may provide one or all of the following: prenatal, intrapartum, postpartum and/or neonatal care for expectant families. Nurses care for women and attend almost every birth in Canada, except those attended by two midwives. Occasionally nurses are the only health care provider present, when there is no physician or midwife available. Nurses provide essential services during all phases of perinatal care and can play key roles in new models of inter-professional collaborative care to better meet needs of families

7.11.2. Antenatal care

A large scale survey of Canadian mothers found most women received their antenatal care from an obstetrician (58%) or family physician (34%). An additional 6% and 0.6% of women received antenatal care from a midwife or nurse/nurse practitioner, respectively. Most women (95%) initiated antenatal care in the first trimester of pregnancy and on average attended 12.9 visits. Only 1% of women had four or fewer prenatal care visits. The proportion of women who indicated that they did not get prenatal care as early as they wanted varied considerably among provinces and territories. The two most common reasons for not getting prenatal care as early as wanted were: “doctor/health care provider unavailable” and “doctor/ health care provider would not start care earlier” (PHAC 2009).

7.11.3. Intrapartum care

Some women choose to have their babies at home but home birth remains a controversial issue in Canada. The vast majority of births take place in hospital that range in size from small units in rural or isolated communities, with fewer than 100 planned births per year, to large tertiary centres, with over 7,000 births per year. A few free-standing birth centres have emerged. Birthing centres are community-based centres where women can go to receive primary midwifery care during pregnancy, labour, birth and the postpartum period. They are distinct from the home and hospital although some providers may refer to maternity units within hospitals as birthing centres.

Most women in Canada give birth with an obstetrician in attendance, as fewer family doctors attend labour and birth and midwives are not yet widely available.

7.11.4. Postnatal care

In Canada, postpartum hospital stays for mothers and their babies have decreased steadily over the last 15 years. In 1991–1992, an estimated 3.7% of women with a vaginal birth had a total stay in hospital of less than two days, compared with 25.5% in 2004–2005. In 1991–1992, an estimated 2.7% of women with a caesarean birth had a total stay in hospital of less than four days, compared with 52.5% in 2004–2005 (PHAC 2009).

Postpartum services in Canada are provided by hospitals, health centres, public health nurses and primary care providers. A variety of models are used, including phone calls, telephone triage services, clinic visits (drop-in and appointment) and home visits. Satisfaction with postnatal care is an important indicator of maternal experiences.

7.11.5. Maternity workforce

In 2008, there were 1,650 obstetricians and gynaecologists in Canada, and about 600 of them planned to retire within the next five years. Obstetricians in Canada provide routine and emergency obstetrical care in 330 hospitals, 24 hours a day, 7 days a week, 52 weeks per year. The Society of Obstetricians and Gynaecologists of Canada has been forecasting a shortage of doctors practicing obstetrics for over a decade.

There are currently 700 registered midwives practicing in five provinces and one territory where midwives are regulated.

7.12 Ireland

The Irish maternity system has a long history of maternity care delivered in a hospital environment. Dublin boasts the oldest maternity hospital in the world, established in 1745. While the system is now beginning to reincorporate midwife-led community models of care, almost all Irish women give birth in hospitals. In contrast to the United States and Canada, midwives play a central role in providing care

within hospitals and a high proportion of births are attended by midwives. There are only a small number of independent midwives offering support for home births in the community.

There is increasing pressure from advocacy groups for a move away from 'medicalised' childbirth towards midwife-led and community based maternity care. Like many developed nations, Ireland has high intervention rates. In recent times, some midwifery clinics and birth centres have been implemented to provide midwife-led care to women in less medical environments.

7.12.1. Models of care

The Irish maternity system has three main models of care:

Combined care: The combined care model is available to public and private consumers. Antenatal care is delivered by GPs and the cost is covered by the Maternity and Infant Care Scheme. Mothers then give birth in hospital under the public system, or under the supervision of a private obstetrician. This is the most common model for antenatal care, accounting for 81% of patients in 2010 (HRID 2012).

Community midwife/midwifery clinic care: Midwife-led care is available under the public system, though this choice is limited in size and by geography - Ireland has just two Midwifery-Led Units. They are available to women with low-risk pregnancies. A team of experienced midwives provides antenatal to postnatal care. If a problem is detected at any point in the pregnancy, contact is made with obstetric teams. There are a small number of independent community midwives available, whose costs may be covered by grants from the public health system.

There are also two new initiatives operating – the Community and DOMINO Midwives Schemes. They are designed for women with low-risk pregnancies and offer care from community based teams of midwives who deliver antenatal care in community settings, health centres or in mothers' homes. Mothers are able to opt for a home or hospital births under the Community scheme. Under the DOMINO scheme, the focus is on a fast transfer home after birth, usually within 12 to 24 hours.

Hospital-based care: Hospital based care is most common under the public health system. Antenatal care is offered through hospitals or hospital clinics based in a community setting. Midwives supervise delivery in uncomplicated pregnancies, with obstetricians involved in cases with additional risk factors. Mothers are assigned to the doctors and midwives on duty so there is unlikely to be continuity of care from antenatal to intrapartum.

Private or semi-private care: A high proportion of the Irish population has private health insurance. People who choose to access private care receive antenatal care in hospitals with a private obstetrician or in their obstetrician's private rooms. There is good continuity of care as the consultant will be present throughout antenatal care and the delivery. Postnatal care is generally in a private ward.

There are different models of semi-private care operating at different hospitals. Generally, mothers see a single private obstetrician for their antenatal care but give birth with whoever is on duty. In some cases, antenatal care is delivered by a team with at least one of the team present for the birth of the baby.

7.12.2. Antenatal care

Antenatal care can be delivered by midwives, GPs, obstetricians or hospitals or a combination. Most often (81% of mothers in 2010, HRID 2012), Irish mothers adopt a combined model with some antenatal care delivered by their GP and some by a midwife or obstetrician through a public hospital. Hospital antenatal care is delivered in hospital itself or in some cases through community-based clinics.

7.12.3. Intrapartum care

Most women give birth in hospital. Only a small proportion of births (0.2%) of births occur in the home and under the supervision of an independent midwife (HRID 2012). Births occur in hospitals under the supervision of hospital midwives, though obstetricians led care.

Like many countries, the rate of interventions and particularly the rate of caesarean sections increased markedly in recent years. Caesarean rates increased beyond WHO recommended levels in the mid-1990s in Ireland and increased by more than one-quarter between 1999 and 2006, an increase not explained by increases in the frequency of risk factors such as older maternal age (Brick and Layte 2009).

7.12.4. Postnatal care

The majority of postnatal care for women is given by the midwives on duty in hospitals. Women in private or semi-private care may see a doctor before discharge. Stays for first time mothers generally vary from one to four days, or three to five days after caesarean, and are shorter for multiparous women.

Two postnatal GP visits are funded at two and six weeks for both mother and baby. A public health nurse does a home visit with the mother and baby in the first six weeks after the birth.

Under the Early Transfer Home scheme operated by some hospitals, mothers receive individualised care from a hospital midwife after leaving hospital (about six hours after birth). The midwife then visits the mother in her home every day up to and including day five.

7.12.5. Maternity workforce

Hospital midwives, GPs and obstetricians all play a major role in the Irish maternity system. The role of the midwife as primary carer for women and infants experiencing normal pregnancy and childbirth has remained essentially unchanged for many years (RCSI 2009). There are few independent midwives working, the number limited by access to indemnity insurance. Like many countries, the workforce is suffering shortages. The shortage of midwives, coupled with midwifery role expansion, reduction in junior Doctor's hours, has according to Lindsay (2004) caused stress and strain within maternity services (RCSI 2009). Direct entry midwifery training programmes were introduced in 2000 in part to combat shortages.

7.13 Netherlands

The Netherlands notable internationally because of the high percentage of homebirths, compared to the other countries in this study, and the clear boundary between primary and secondary care. The Netherlands actively promotes birth at home under the care of primary caregivers – midwives and GPs. The Dutch state has a history of preserving autonomous midwifery and birth at home through laws and regulations giving preference to midwifery care, state support for midwifery education, and by funding research demonstrating the efficacy of midwife attended home birth. The autonomous role of the midwives in the Netherlands is closest to that of New Zealand midwives.

When the modern system of national health insurance was established in the 1940s, midwives were given preference as women's first choice providers of maternity care, an arrangement that remains today.

The Netherlands faces challenges providing care to new immigrants who are not embedded in country's wider communities and not used to working within the health system.

7.13.1. Models of care

The Netherlands maternity system is divided into two clearly defined models of care (Wiegers 2009, 2010):

Primary care: For low risk women, primary care is delivered by GPs and midwives working together. In 2002, 41% of all births took place in primary care – 29% at home and 11% in a hospital or birth centre.

Secondary care: For higher risk women, secondary care is delivered by midwives and obstetricians. Patients need a referral from primary care to access secondary care. In 2002, 60% of births took place in hospital under the supervision of a gynaecologist.

Women begin in primary care. If at any point risk of complications arises, they will be referred to secondary care. Referrals occur freely between primary and secondary care as needed. Around one in four women are referred to secondary care at some point in their pregnancy (Wiegers 2009).

In 1965 around two-thirds of births in Netherlands occurred in the home but it has declined to around one-third.

7.13.2. Antenatal care

Most women see a midwife for antenatal care, though almost half of all women see an obstetrician at some point in their pregnancy. Around one-third have more than one appointment (Wiegers 2009). Antenatal care is provided by midwives in a community setting, often in women's own homes.

7.13.3. Intrapartum care

Women with low risk pregnancies in primary care freely choose where to give birth, at home or in a hospital or birth centre. Wherever they choose to give birth, they are attended by their own midwife or a member of her midwifery team (Wiegers 2009). Birth centres are becoming increasingly popular as women's first choice for place of delivery (NPR 2008).

If a women experiences complications and is receiving secondary care she will give birth in hospital attended by a midwife and obstetrician. First time mothers are more likely to require secondary care and to want to give birth in hospital (Wiegers 2009).

Women in the Netherlands have low levels of intervention in delivery, including lower rates of induction of labour and pain medication (Wiegers 2009).

7.13.4. Postnatal care

Postnatal care is provided by midwives or occasionally GPs and maternity care assistants (kraamverzorgster or kraamzorg) unless the women and/or baby are hospitalised, in which case consultants are responsible. Kraamzorgs provide postnatal care to new mothers and their babies in the eight to ten days immediately after the birth (Wiegers 2010).

7.13.5. Maternity workforce

Midwives are involved in all pregnancies, both low and high risk. Midwives are very autonomous. Most primary care midwives work in group practices and are jointly responsible for their clients.

GPs are the primary care providers in the Dutch healthcare system. They act as the gatekeepers between primary care and secondary care. Midwives are the primary carers for women who become pregnant and receive referrals from GPs (Benoit et al. 2005). Midwives provide antenatal and postnatal care in the community and attend home births and short-stay hospital deliveries.

The Dutch government closely monitors the conditions of midwifery practice to keep an adequate supply of midwives. For example, in the mid-2000s, the Minister of Health opened a new midwifery school, increased the number of students from 120 in the 1990s to 220 in 2003-6 and improved the income of working midwives. The number of post-partum caregivers available to support midwives with postnatal care has also been increased. (Benoit et al. 2005). The number of midwives increased from 1,042 to 1,871 between 1995 and 2010. The number of clinical midwives working in hospitals has tripled in the same time period. (Wiegers 2010).

Throughout the 20th century, midwives in the Netherlands increased in their professionalism, qualifications, recruitment standards and training, and collective organisational power (Benoit et al. 2005).

7.14 United Kingdom

7.14.1. Historical context

Historically GPs played a significant role in maternity care, from antenatal to postnatal including intrapartum care, at home or in community hospitals. The start of the 20th century saw a rise in rates of hospital delivery. At this time GPs provided intrapartum care including home deliveries. The introduction of the National Health Service in the 1948 gave women access to free maternity care for the first time and strengthened obstetrician-led maternity care in hospitals. Through the second half of the 20th century, there was a shift from small maternity units in community hospitals, where GPs worked with midwives to provide care, to large maternity units. Today GPs have a smaller and decreasing role in maternity care, though they are more represented as maternity carers in rural areas. Most care is provided by midwives or obstetricians. Around one-third of women are cared for by midwives alone from antenatal care to postnatal care, including delivery. A similar proportion is cared for by obstetricians because they require intervention and the remainder have combined care from both.

In the 1990s, the focus of maternity care policy shifted towards allowing women choice, continuity of care and control. More recently, health policy has strongly endorsed midwifery-led care, including encouraging women to self-refer to midwives.

7.14.2. Maternity workforce

Midwives play a core role in the United Kingdom maternity system. In normal pregnancies, midwives are the lead care providers and GPs have a very limited role, though there is more GP involvement in rural and remote areas (Smith et al. 2010). Midwives work within the NHS as hospital midwives or community midwives. There are also a number of independent midwives who deliver services privately.

The midwife workforce is in different states across the different parts of the United Kingdom. The United Kingdom College of Midwives reports (2011) that there is a chronic shortage of midwives in England. While the number of midwives and midwifery students is increasing, the rate of growth in birth numbers far outstrips increases in the midwife workforce. In Scotland, Northern Ireland and Wales the midwifery workforce is sufficient but aging (UKCOM 2011).

In the public system, obstetricians see women when there are complications or additional risk factors. Around one-third of women see an obstetrician during antenatal care (NCT 2010). They become involved in intrapartum care when an intervention is necessary or complications arise.

7.14.3. Models of care

The government has made commitments to guarantee women choice in type of care and place of delivery (Smith et al. 2010), though research has shown choice is still limited by the availability of different models of care.

There are two main models of care in the United Kingdom (Smith et al. 2010):

Midwife-led care: The midwife-led care model is available for low risk women. Midwife-led care is often delivered from children's centres rather than GP surgeries (Smith et al. 2010). Caseload midwifery and team midwifery staffing models have been introduced in some NHS trusts to improve continuity of care (CHAI 2008).

Obstetrician-led care: The obstetrician led care model is available for women who have complications or risk factors or who pay for private care. Care takes place in obstetric units within hospitals. Around two-thirds of women see an obstetrician at some point in their pregnancy (CHAI 2008).

7.14.4. Antenatal care

Women are encouraged by government policy to make contact with a midwife first when they become pregnant, however in the majority of cases, GPs are the first health professional women go to see after they discover they are pregnant (Smith et al. 2010). Midwives attend the booking appointment in which they assess the mother's level of need and plan the care the mother will receive (hfma et al. 2012). GPs share information on mothers' medical histories with antenatal care providers, particularly midwives (Smith et al. 2010). If risk factors are identified, the midwife involves an obstetrician.

Antenatal education classes are available through the NHS and just under two-thirds of women use them (NCT 2010).

7.14.5. Intrapartum care

GPs no longer provide intrapartum care. This area of care is considered too risky and subject to litigation to be carried out by non-specialists (Smith et al. 2010). Women have four choices for birth location: at home, in a free-standing midwifery unit, an alongside midwifery unit or in a unit with obstetricians (Redshaw 2010). The vast majority of women give birth in obstetric units (90% in 2010 (NCT 2010)) despite many having low risk pregnancies and deliveries.

In these units most care is provided by midwives with obstetricians attending if any complications arise (NCRT 2010). Just under two-thirds of women have midwife-led care in hospital and one-third have consultant-led care. Only a small proportion give birth in midwife-led units or birth centres separate from hospitals (3%) or home-births (3%). In home births, community midwives provide most of the care required though some women use independent midwives outside the NHS (NCT 2010).

A high proportion of women (81%) reported not having previously met any of the midwives caring for them during labour and birth (Redshaw 2010).

7.14.6. Postnatal care

Postnatally, on average women stay in hospital for less than two days and receive just under four visits from midwives (Redshaw 2010). GPs play a role in advising about physical issues such as incontinence or back pain, assessing mental health and contraception. Generally, it is a GP who performs the six-week postnatal check, and this would be an opportunity to discuss a variety of issues, including contraception, back pain, incontinence, dyspareunia, mental health and preparation for any subsequent pregnancies (Smith et al. 2010).

7.14.7. Funding

The United Kingdom is currently moving away from an episodic funding scheme, where providers were paid for each episode of care. Under this system providers were incentivised to carry out as many clinical interventions as possible. The new system uses a single payment for all the care related to each stage of the pregnancy to a single provider. If the woman moves to a new provider, it is the responsibility of the first provider to pay the second. The goal of the new system is to remove incentives to provide clinical interventions for any reason other than to provide the best possible care. It gives providers the freedom to deliver their services in the way they deem best (Hfma et al. 2012).

Changes to funding in 2004 made providing out of hours care for pregnant women uneconomic for GPs so many opt not to do so (Smith et al. 2010).

7.15 United States

Historically, midwives attended almost all births in America, practicing in homes and communities and passing on their skills informally. Laws around the practice of midwifery varied across states and could not be well enforced and many women, particularly poorer women, gave birth without access to qualified doctors.

Delivery and maternity care became increasingly medicalised. The use of midwives almost disappeared as obstetricians argued that midwives were untrained and incompetent and that pregnancy required care from specialist doctors. More recently, there has been some shift towards community and midwife care. In 2001, the American Public Health Association adopted a formal position paper stating that birth is a natural process and advocating increased out of hospital maternity care. However, midwife numbers are still low and most women receive care from their GP or far more commonly an obstetrician, even if they have normal pregnancies.

Modern United States healthcare is primarily funded through private health insurance or through the Medicaid system, which provides care for women with low incomes. Today the United States spends more on healthcare per capita than any other country. A large proportion of this spending is on maternity care, as childbirth is the leading reason for hospitalisation in the United States. And yet, outcomes for women giving birth in the United States are poorer than in many other countries. There are vast disparities in the United States between ethnic groups, particularly between maternity and general health outcomes for African Americans, Hispanics and white Americans.

7.15.1. Models of care

Though there is a variation in detail across states, there are two main models of maternity care in the United States:

Medical model: For most women in the United States, maternity care from antenatal care to delivery and postnatal care is provided by an obstetrician in a hospital. Care focuses on preventing, diagnosing and treating complications that occur during pregnancy, labour and birth (Brooks 2006). A 2006 survey of mothers (Declercq et al. 2006) found that around four out of five women giving birth had prenatal care from an obstetrician and were attended by an obstetrician.

Midwifery model: A small number of women elect to have midwife-led care. Antenatal care and delivery take place in birth centres (free standing or in some cases attached to a hospital) or in the woman's home with a focus on individualisation of care.

7.15.2. Antenatal care

A substantial majority of women receive antenatal and natal care from an obstetrician though some receive care from a GP (Wiegers 2009).

A survey of mothers' experience of birth provides good information on their experience of antenatal care: On average mothers had their first antenatal care visit in their ninth week of pregnancy. Family doctors provided antenatal care in 8% of cases, midwives for 9% and obstetricians for 79%. Just under three-quarters had continuity of care antenatally. One in four women take childbirth education classes with a higher proportion of new mothers taking classes (Declercq et al. 2006).

7.15.3. Intrapartum care

Most births occur in hospital led by doctors. Freestanding birth centres are available in some areas for women who want more personal care than hospitals but do not want to give birth at home. Care is often provided by midwives. Some hospitals also provide birth centres, though some provide care more closely resembling normal hospital care than midwife-led care. The fact that births take place disproportionately during non-holiday weekday hours is often used as support for the argument that delivery is over-medicalised in the United States.

Although most childbearing women and newborns in the United States are healthy and at low risk of complications, national surveys reveal that essentially all women who give birth in United States hospitals experience high rates of interventions with risks of adverse effects. The caesarean rate increased by 50% from 1996 to 2006 and set a new record in 2007 and 2008 (Sakala 2008).

7.15.4. Postnatal care

Almost all women have at least one office visit with their maternity caregiver between three and eight weeks after the birth of their child (Declercq et al. 2008).

Four out of five mothers with a vaginal birth reported staying in hospital for two days or less. Mothers who had a caesarean generally reported staying in the hospital longer, for between three and five days (Declercq et al. 2006).

7.15.5. Maternity workforce

Maternity care is primarily provided by obstetricians. Challenges to the United States maternity workforce include oversupply in some urban centres and shortages in rural areas, inefficient coordination of care and declining trends in workforce capacity.

The number and role of midwives in maternity care is small in comparison to some countries, but the proportion of births and maternity care provided by midwives is increasing.

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