

***Hapū Ora:
Wellbeing in the
Early Stages of Life***

Funded by the partnership programme of the Health Research Council of
New Zealand and the Ministry of Health

Artwork courtesy of Helen Moewaka Barnes

ISBN 1-877428-22-1

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2013



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Acknowledgements

This project was funded by the partnership programme of the Health Research Council of New Zealand and the Ministry of Health – he mihi nui ki a koutou katoa.

We would like to acknowledge the following people who contributed to the report:

- Jenny Rankine and Tim McCreanor, who diligently edited and proofread a number of versions of the report
- Victoria Jensen, who managed the online survey and analysed the results
- Zaneta Thayer, who peer reviewed the report and made valuable comments, particularly in relation to epigenetics and fetal programming
- Dr Nancy Krieger, who suggested useful literature.

We would like to thank the following people, who were involved in the consultation phase:

Stephen Allen, Vyletta Arago-Kemp, Kahukore Baker, Tasha Bentley, Belinda Borell, Ngaropi Cameron, Julia Carr, Nikki Coupe, Marama Davidson, Terryanne Dobbs, Amanda D'Souza, Moana Eruera, Denise Ewe, Liz Gordon, Reweti Hapi, Selah Hart, Wendy Henwood, Ruth Herd, Te Kapua Hohepa-Watene, Kathie Irwin, Victoria Jensen, Mariameno Kapa, Cindy Kiro, Beverley Lawton, Rachel McClintock, Rangimarie McDowell, Verna McFelin, Verne McManus, Georgina Martin, Zoe Martin-Hawke, Sally Merry, Alamein Newth, Hohepa Patea, Gene Potae, Nora Puketapu, Steve Randerson, Marnie Reinfelds, Lucy Ripia, Christine Stewart, Ken Taiapa, Harry Tam, Binki Taua, Keri Thompson, Te Pora Thompson-Evans, Andrew Waa, Arianna Waller, Louise Webster, Paul White, Sarah Widmer, Mahia Winder and Tracey Wright-Tawha.

We also acknowledge the work and support of Lisa Morice, Jan Sheeran, Caroline Lowe and Thomas Graydon-Guy of the SHORE & Whāriki Research Centre.

Ngā mihi nui ki a koutou katoa.

Executive summary

Aim and approach

The aim of this project was to identify Māori life course research priorities, with a specific focus on wellbeing at the early stage of life, hapū ora, covering the fetal/gestational and neonatal periods. The project was funded by the partnership programme of the Health Research Council of New Zealand and the Ministry of Health. The research involved four components: scoping and literature review, stakeholder engagement, analysis/synthesis, and identifying knowledge gaps and developing research priorities.

The review brought together life course, epigenetic and social determinants approaches, along with Māori concepts of pregnancy and wellbeing. A framework was developed, outlining four levels of influence:

- national and state systems at the macro level
- community influences at the mezzo level
- mothers and babies at the micro level
- exosystems (health services).

Together these systems, operating within historical, generational and intergenerational contexts, have an impact on the early stage of life, with implications for life course health.

Macro to micro conditions for hapū ora

At a macro level, governance, macro policy, and societal norms and values provide the conditions and the intervention points that shape the structure of society. Although governance arrangements are influenced to some extent by the Treaty of Waitangi, colonisation has had profound impacts, including significant impacts on Māori societies. These macro determinants permeate social environments and play out at all levels, from communities to whānau (extended family) to individuals.

Macro level societal determinants also include issues of resource distribution: there is considerable evidence that societal benefits accrue to the more advantaged members of society and that poor health is distributed as a gradient by socioeconomic position. Within the literature on child health, the impacts of poverty and deprivation are seen as strong drivers of health outcomes throughout the life course.

The ability of whānau to provide environments supportive of hapū ora is constrained by a range of features at the mezzo level. The physical and sociocultural conditions of everyday community environments can have profound impacts on the ability to promote optimal health for whānau, including parents and children. Physical conditions include exposure to insecticides, pesticides, heavy metals, air pollution (indoor and outdoor) and other

toxins, which can have direct effects and interfere with hormones. Community and neighbourhood measures of deprivation – such as poor and overcrowded housing conditions, and features of place such as shops, playgrounds, communal spaces and networks – also have an impact at this level.

Maternal health, wellbeing and behaviours can have considerable effects on babies *in utero* and in the early days after birth, with implications for life course health. Parental infant attachment, including the involvement of hormones, and informal learning may have lasting effects on brain function and maturation. Maternal mental health, diabetes, nutrition and substance use are among the documented areas of concern for Māori at the micro level. This is where most of the literature on epigenetic research¹ is focused, although only one study in this review provided Māori specific analyses.

Maternal mental health emerged as an area of particular concern, with depression, anxiety and stress associated with a range of negative outcomes. The mental health of Māori mothers was also identified as an area where there are considerable knowledge gaps, including the impacts of racism as a particular additional and ongoing stressor.

Maternity care for Maori

Pregnancy is an important period during which health and support services can provide information, care and resources to enable the optimal environment for the fetal stage of life. Māori women have a higher prevalence of maternal risk factors compared to other women, and therefore have greater maternity care needs. However, the review found that Māori women experience inequalities in access to care and report lower levels of satisfaction than other women. There may be some additional issues for Māori women from isolated communities.

Research priorities

Despite some differences in research approaches, the review consistently reinforced the idea that pregnancy and the early days of life are significant times when the life course of the baby can be influenced. There is also considerable unrealised potential for synergies between Māori knowledge and practice, social determinants approaches, and the various fields of research covered in this review.

Working from the knowledge gaps and needs identified in this review, four overarching priority areas were developed, providing a balance between the responsibilities of government, communities and whānau:

1. Ensuring high quality data as a foundation for research, monitoring and evaluation

¹ Epigenetic refers to changes in the expression of genes that are caused by the environment rather than simply the genetic code.

2. Addressing societal conditions such as poverty and deprivation and meeting the needs of vulnerable populations
3. Supporting mother, baby and whānau through services and social support and by better understanding stress and maternal mental health issues
4. Improving services for maternal and newborn care, including maternal mental health care.

Introduction

Purpose

This report is the outcome of a project aimed at informing Māori research priorities in relation to influences on babies *in utero* and during the early days after delivery, with implications for health throughout the life course. Specifically, the research asked:

- What does the literature say about health impacts at the early stage of life: *in utero* and in the days after birth?
- What are Māori relevant approaches and concepts in relation to this stage of life?
- What is the relevance to Māori life course health of epigenetic research focused on this early stage?
- From the literature and stakeholder engagement, what are the knowledge gaps and research priorities in relation to early stage impacts on life course health?

Significance of the review

The concept of life stages is based on the idea that there are distinct phases or stages in life: fetal/gestation, infancy, childhood, pre-pubescence, adolescence, adulthood/young adulthood, and senescence/late life (Ben-Shlomo & Kuh, 2002). Health inequities between Māori and non-Māori, including low birthweight, preterm birth, small for gestational age (SGA), stillbirth and neonatal deaths, are observed early in the life course.

Early physical, social and cognitive development lays a critical foundation for health and wellbeing throughout the life course. Intervention and support at this time has the potential to be immediately effective and to prevent adverse outcomes later in life, contributing to reducing health inequities (CSDH, 2008). A comprehensive approach to the early years of life can contribute to improvements in population health and also fulfil obligations under the UN Convention on the Rights of the Child (CSDH, 2008) and the Treaty of Waitangi. This review seeks to contribute by developing research priorities.

Methods

This project aims to identify Māori life course research priorities, with a specific focus on wellbeing at the early stage of life, covering the fetal/gestational and neonatal periods. The project was funded by the partnership programme of the Health Research Council of New Zealand and the Ministry of Health. The brief was to conduct a literature review and engage with key stakeholders in order to identify knowledge gaps and develop research

priorities.² The Whāriki Research Group (SHORE & Whāriki Research Centre, Massey University) was the lead contractor, in collaboration with the other authors named in this report. The research involved four components: a scoping and literature review, stakeholder engagement, analysis/synthesis, and a research priorities development stage.

The research priorities were developed in an iterative process informed by:

- a comprehensive literature review on key topics related to hapū ora
- key informants, including researchers, policy makers, and people working in clinical, public health and Māori health services
- peer reviewers of the initial draft, which resulted in substantial revision
- further literature review and interviews with stakeholders.

The project used the WHO social determinants framework, aligned with ecosocial theory and te ao Māori concepts, to develop a structured approach that enables the multiple layers of influences to be presented, from structural conditions to a more individual focus.

Literature review

Searches were conducted using (but not limited to) the following electronic databases: Google Scholar, PubMed, Cochrane Library, Scopus and Index New Zealand. General web searches were also conducted with a particular emphasis on subject-related sites. Specific searches were carried out to locate key pieces of literature and the work of key researchers. Advice was sought from experts, particularly in relation to epigenetics research.

Search terms included, but were not limited to, combinations of the following terms: fetal programming, fetal impacts, chronic disease, fetal development, racism, discrimination, mental health, epigenetics, life course, maternal/maternity, antenatal, prenatal, pregnancy, delivery/birth/childbirth/labour/labor, care/services, utilisation/utilization, experience/experiences, Māori, whānau, Indigenous, Native Hawaiian, First Nation/American Indian, Inuit, access/barrier/facilitator, life course/longitudinal/outcome/impact, inequality, inequities, birthweight/SGA/small for gestational age/preterm/premature, anaemia, gestational diabetes, obesity, right to health, maternal stress, anxiety, teen parents, parental attachment, fetal alcohol spectrum disorders, maternal alcohol, drugs, tobacco, cannabis, environmental toxins, maternal depression, postnatal depression, housing, neighbourhood and place, historical trauma, intergenerational trauma, colonisation, social determinants.

Initially, team members took responsibility for writing up specific areas, broadly covering: contextual information; Māori concepts related to pregnancy and birth; impacts and influences on babies *in utero* and in the early days, including epigenetics research; colonisation; racism; stress; maternal mental health and; antenatal care, labour and delivery care. These areas were then worked on collectively to integrate the data, except

² Initially this was conceptualised as a research agenda. In order to provide a more focused approach, a selected number of research priorities were developed.

for the section on health services, which remained largely separate. Literature on specific topics arising from the consultation and analysis phases were added as the project progressed.

Stakeholder engagement

Core outcomes from the initial literature review were used as a platform for interviews with key stakeholders, with the aim of further identifying key research issues. Stakeholder engagement was undertaken with people who were purposively selected for their experience and expertise in the field to ensure the project was covering the area effectively, and to gain wider views on key issues and research directions.

A key aim of the stakeholder engagement was to ensure the research priorities were based not only on identified gaps in the literature but also on identified needs of decision makers and sector practitioners.

Group and individual discussions covered researchers; policy (health, social development, Māori development); health promotion; health services; clinicians; Māori and non-Māori organisations in a range of settings and locations (see Appendix 1). Discussions were conducted face-to-face and by telephone and Skype. Telephone discussions tended to be shorter (approximately 30 minutes), with face-to-face conversations taking up to two hours. The interviews were not taped, but comprehensive notes were taken. In total 26 discussions were held, involving 51 people.

Around 30 people were also invited via email to participate in online feedback. Respondents were selected for geographical spread and to provide general feedback, particularly from health services, on whether the areas that had emerged fully covered their concerns. Fifteen anonymous responses were received from participants working in a number of different health-related organisations. Ten participants identified themselves as Māori, and one participant identified as Māori/Pākehā. The ethnicity question was not added to the feedback questionnaire until after the first responses were received, thus the first four participants did not have an opportunity to disclose their ethnicity.

The online feedback questionnaire was brief and addressed three areas: concerns observed in their work; areas where research is needed and; research ideas emerging from the project. Under each area, participants were asked to look at a list and rank the items in order of importance (1 being not at all important/needed and 10 being very important/needed) (see Appendix 2). Each list also provided a space for participants to add their own categories. If participants ranked an area where they felt research was needed as important to very important, they were asked to provide brief reasons.

The online feedback was administered and managed using the online survey software tool SNAP. Ratings from each question were added and then divided by the number of participants to generate an average score out of 10. Qualitative data presented by the participants was analysed and summarised. The feedback provided an additional mechanism to identify whether there were issues that had not arisen in the literature or stakeholder discussions. As such, it confirmed that a breadth of issues had been covered. A summary of the feedback is presented in Appendix 2.

Further interviews were conducted after the initial report was drafted and gaps in stakeholder consultation had been identified.

Limitations

The stakeholder discussions should not be considered representative; rather the aim was to gain insights from a broad and diverse group of stakeholders, particularly those in positions to comment broadly on the field and to contribute particular insights.

A small number of responses were received through the online feedback process, however this was an additional checking mechanism and no new issues within the scope of this project arose.

Report structure

Chapter 1: A theoretical approach to hapū ora brings together life course, epigenetic and social determinants and Māori approaches. A framework is presented that outlines four levels of influence: national and state systems at the macro level; community influences at the mezzo level; mothers and babies at the micro level and; exosystems (health services). This provides the structure for the discussion in the subsequent chapters.

Chapter 2: From the macro to the mezzo: Creating the conditions for hapū ora examines broader factors impacting on hapū ora. These include societal level determinants (macro) and influences at the levels of community, environment and whānau (mezzo).

Chapter 3: Mother and baby - micro level factors discusses micro level conditions and exposures affecting babies *in utero* and in the days following birth. These include: maternal stress and mental health; substance exposure; physical health; nutrition and; maternal/baby attachment.

Chapter 4: Maternity care for Māori reviews literature on antenatal, labour and delivery care for Māori, with particular reference to access and knowledge gaps.

Chapter 5: Sector engagement outlines views from the health sector gathered from engagement with individuals and groups.

Chapter 6: Hapū ora research approaches and priorities discusses research approaches and, drawing on the literature review and stakeholder engagement, presents research priorities.

Chapter 1: A theoretical approach to hapū ora

Introduction

In order to develop hapū ora Māori health research priorities, it is important to outline the causes of inequities and the drivers of Māori wellbeing.

During the early and mid-20th century differences in health and other outcomes between individuals and groups were often attributed to the individual's or group's 'genetic make-up'. This thinking sits alongside beliefs that social gradients are inevitable or at least intractable. Such thinking resulted in research that emphasised genetics in isolation from the environment, providing analyses and interventions with a narrow focus on those deemed genetically vulnerable.

Over time, the role of the environment as a key determinant of health outcomes has become increasingly recognised, with much emphasis placed on the role that social and economic determinants play in health outcomes. Researchers now propose that the development of disease and health conditions cannot be simplistically explained by genetics. Wadhwa (2005) summarises the major paradigm shift in relation to the interaction between genes and environment over the last 20 years:

Development is viewed not as a gradual elaboration of an architectural plan pre-configured in the genes, but rather as a dynamic interdependency of genes and environment, characterized by a continuous process of interactions in a place-and time-specific dependent manner. (p. 725)

Within a hapū ora context, these early interplays have an impact on the life course and are encompassed by the intimate relationships that exist between the maternal experience (pregnancy, childbirth, motherhood), the experience of the growing baby (*in utero*, during childbirth, in early infancy), and the environment that surrounds them (whānau and social, economic, emotional, physical, nutritional, etc). Social determinants and other ecosocial approaches attempt to depict some of the complex and multi-layered forces at work that produce and maintain inequities in health, from the macro to the micro level. Within these layers there are key Māori concepts and structures that lay the foundation for wellbeing.

Social determinants and inequities

Health inequities are 'differences which are unnecessary and avoidable, but in addition are considered unfair and unjust' (Whitehead, 1992:431). Thus health equity not only focuses on individuals, but on systems, social resources and rights: 'Health equity has two important strands: improving average health of countries and abolishing avoidable inequalities in health within countries' (CSDH, 2008:29).

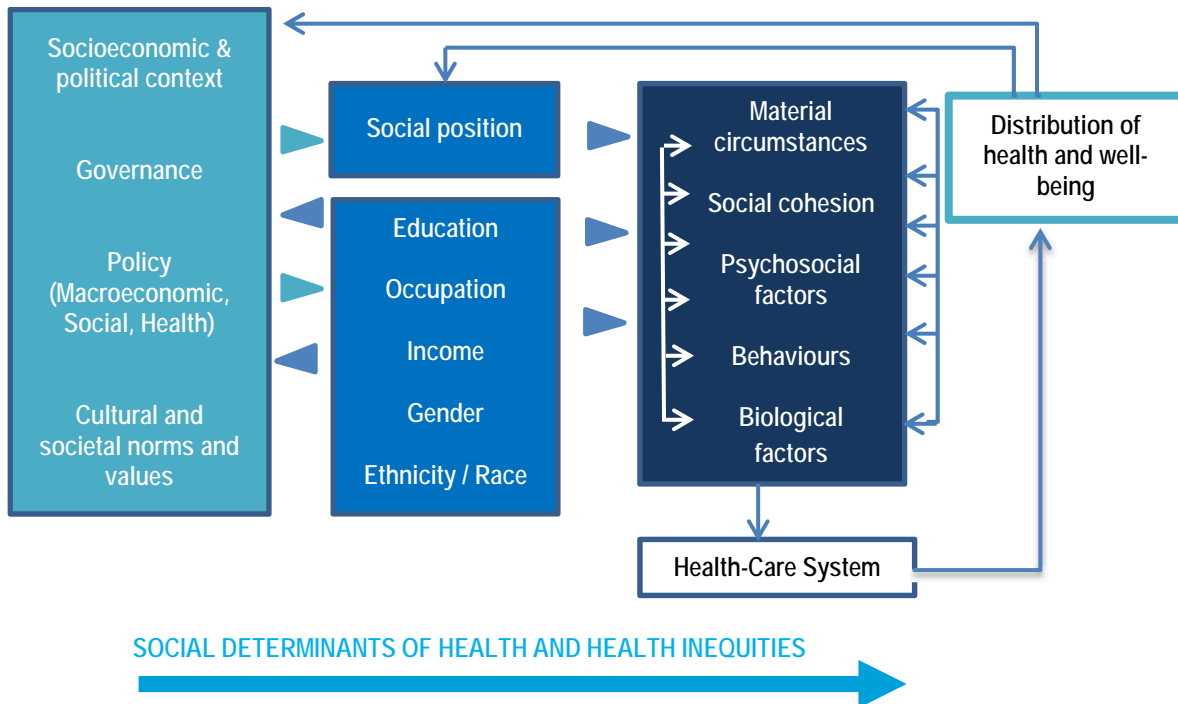
Māori rights to monitor Crown actions on health inequities arise from indigenous rights recognised in the United Nations Declaration on the Rights of Indigenous Peoples (United Nations, 2007) and in the Treaty of Waitangi (Committee on the Elimination of Racial Discrimination, 2007). They also arise from the normalisation of persistent and systematic disparities in health outcomes between Māori and non-Māori. These include greater exposure to the determinants of illness, a lack of responsiveness to these issues by the health system, and low proportions of Māori health workers (Reid & Robson, 2007).

Cunningham (2011) argues that a determinants model is one of at least three models that can be used to explain differential outcomes for Māori; others are a cultural deficit model, which is sometimes included in a determinants model, and a colonisation and/or racism model. Racism, and occasionally colonisation, are included within a number of models and frameworks that have been developed in attempts to conceptualise and demonstrate the myriad ways that inequities are generated and maintained (see, for example CSDH, 2008; Krieger, 2011; Williams & Mohammed, 2009).

Social determinants (CSDH, 2008), ecological and ecosocial (Krieger, 2011) framings generally share the idea that impacts occur at multiple levels of society, and that there are complex interplays with gender, class and race/ethnicity. System levels range from macro to mezzo to micro. Exosystems may also be included; these are sometimes described as external agencies and services, but may also include iwi (tribe, nation) and informal networks (Glass & McAtee, 2006; Ministry of Social Development, 2006). Krieger (2011) also includes temporal considerations of historical context, generations and the life course.

The World Health Organization's Commission on Social Determinants of Health (CSDH) developed a conceptual framework recognising the need to go beyond immediate causes to look at the 'causes of causes', which they describe as 'the fundamental global and national structures of social hierarchy and the socially determined conditions these create in which people grow, live, work and age' (CSDH, 2008:4). The framework situates pathways, causes and actions in relation to determinants of health at multiple levels. These levels include structural and more immediate drivers: socioeconomic context and position, differential exposure, differential access to health care, differential vulnerability, and differential consequences (see CSDH, 2008: Table 9.1 for examples of determinants and interventions at each level).

Figure 1: Commission on Social Determinants of Health conceptual framework



CSDH, 2008 (Amended from Solar & Irwin, 2007)

Figure 1 presents the Commission’s conceptual framework. Implicit in the Commission’s approach is the understanding that social determinants operate at every level of development, both as immediate influences and as influences on health throughout the life course. Concern for the wellbeing of women and their children is apparent in a recommendation to improve the circumstances in which children are born and to address inequities, including gender inequities, in society. Failure to provide the conditions for children to reach their full developmental potential has implications not only for the child but for society. The Commission calls for a comprehensive approach to early life and outlines three principles of action in relation to the social determinants of health: (i) improve the conditions of daily life; (ii) tackle the inequitable distribution of power and; (iii) measure the problem, evaluate action, and increase awareness, knowledge and training in the social determinants of health.

The life course field

Over recent decades, increased emphasis has been placed on life course research approaches when investigating causal mechanisms and pathways relating to a range of health and social outcomes. These approaches are able to consider the complex inter-relationships between life stage, genes, environment and risk exposure, and later health outcomes.

Life course research involves exploring the nature of a series of complex relationships including: relationships between environmental, social and biological factors; the natural history and physiological trajectory of biological and psychological systems and; the relationship between the timing of exposures to risks and their impact on later outcomes. Thus, *biology*, *environment* and *timing* are not separate, but can come together in life course research, providing a platform for investigating the relationship between early experiences and later outcomes.

Life course as an interdisciplinary framework (Kuh, Ben-Shlomo, Lynch, Hallqvist, & Power, 2003) has led to collaborations between fields and to growing explorations within disciplines. Life course epidemiology, for example, is the use of epidemiological design and method to explore the relationship between early exposures and later outcomes – in particular, incorporating the trajectories or pathways to different outcomes.

Life course approaches have an increasing role in informing health and social policy as decision-makers consider the nature and timing of interventions. A taskforce established by the Prime Minister's Science Advisor to look at improving outcomes for young people in their transition from childhood to adulthood argued that prevention and interventions that occur earlier rather than later are more effective and 'reap more economic returns over the life course' (Office of the Prime Minister's Science Advisory Committee, 2011:8).

A life course approach is not incompatible with Māori understandings that experiences throughout the whole of life and intergenerationally are drivers of health. However, some overseas writers have pointed to potential limitations, in particular arguing that interactive linkages across the life course need to be considered, with particular attention paid to the processes that create and maintain inequities (Colen, 2011).

Epigenetics and the life course

Research has highlighted that environmental factors such as nutrition and exposure to stress and toxins can change the expression of our genes and the risk of disease in later life (Gluckman, Hanson, Cooper, & Thornburg, 2008:61). The field of epigenetics explores events that might influence gene expression, and which potentially have an impact throughout an individual's life course, or even across generations (Lenroot & Giedd, 2011).

Within epigenetic research, fetal programming approaches focus on events at the fetal stage, seeking to understand the pathways and mechanisms involved in the relationship between fetal exposure and later outcomes. While some undesired effects may be reversible (Lenroot & Giedd, 2011), the fetal programming hypothesis argues that the fetus can adapt to changes in environments, leading to permanent programming or re-programming with consequences for life course health (Barker, Osmond, Golding, Kuh, & Wadsworth, 1989; Van den Bergh, Mulder, Mennes, & Glover, 2005). Fetal changes in response to environmental factors may not only have an impact on individuals but 'in some instances may be transmitted to offspring via epigenetic inheritance' (Thayer &

Kuzawa, 2011:798) and passed on to several generations (Gluckman, Hanson, & Pinal, 2005).

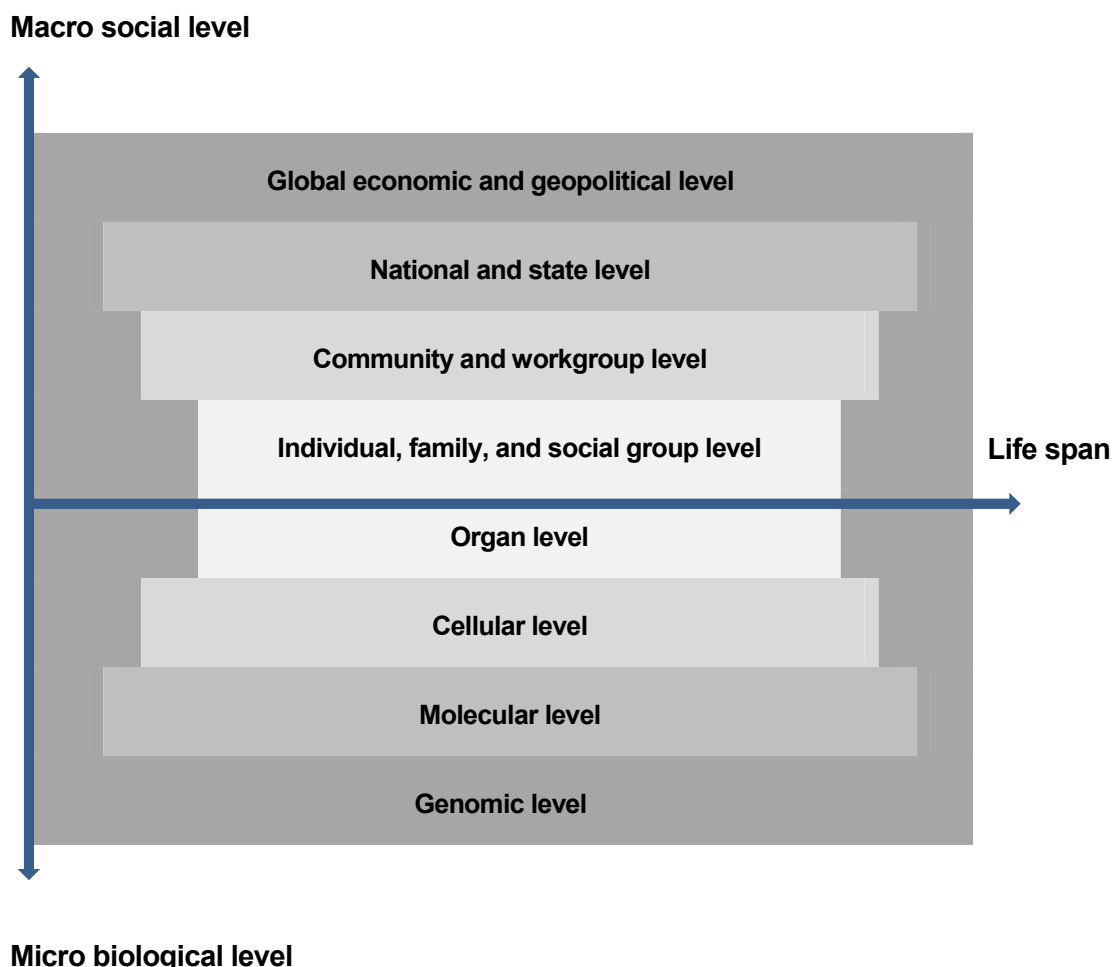
Fetal programming theory has more recently been developed to include the broader concept of 'developmental plasticity', meaning that the developing child is malleable and subject to various influences that 'can under some circumstances be maladaptive and lead to greater risk of disease' (Gluckman & Hanson, 2007:461). Gluckman and Hanson (2007) argue that the term 'programming' needs to be resisted because it 'implies a deterministic process and set of mechanisms akin to the genetic "programme" of development' (p. 461). They believe that this thinking can adversely influence the approach of researchers. Nevertheless, the term programming continues to be widely used.

It is clear that the antenatal time is one of vulnerability. Bodily systems are established at different times in development *in utero*, and so environmental exposures at various stages of development are likely to have different effects. It is generally accepted that there are key stages of fetal development that, with critical timing and exposures, may have long-lasting effects (Davis & Sandman, 2010). Ben-Shlomo and Kuh (2002) define a critical period as 'a limited time window in which an exposure can have adverse or protective effects on development and subsequent disease outcome' (p. 288). They hypothesise that the accumulation of adverse social and psychological conditions leads to changes in what were previously normally functioning biological processes. It is this mechanism that contributes to short and long term effects on the child.

However, there is debate about which developmental stage of the fetus is the most crucial, with studies indicating that sensitive periods may vary depending on the type of environmental stress a fetus is exposed to (e.g. psychosocial as opposed to nutritional). Debate continues as to how these various influences interact *in utero*, and cautions are given about simplistic interpretations of cause and outcome. For example, the very many possible other confounding and associated exposures and relationships need to be taken into account, including other maternal heritability associations and the impact of the postnatal environment.

Research into areas such as experiences of adversity and stress in pregnancy and their impact on the developing fetus, infant and child provides important ways to explore inequity and potentially point the way for interventions. The field can contribute to our understanding of how the *in utero* environment during pregnancy may influence outcomes for offspring throughout the life course and also how it might play a role in persistent disparities across generations. While much research in this field focuses on more individual level concerns, placing it in an ecosocial framework (Figure 2) connects social and physical environments and biological phenomena across the life course with sensitive periods; such frameworks can be used to generate theory and organise research (Glass & McAtee, 2006).

Figure 2: Health as a continuum between biological, behavioural and social factors across the life span



(Office of Behavioral and Social Sciences Research, 2007)

While the social determinants and ecosocial framings described here are useful, for Māori there is also a need to elaborate the roles of racism and colonisation. Colonisation affects health and wellbeing by alienating the economic base and denigrating and/or destroying the systems and values of the societies it disrupts. While we are pursuing equity and seeking to close the health gap within a generation (CSDH, 2008:1), we need to provide a space for the restoration and integrity of indigenous social systems, spirituality and concepts that enable Māori to realise their positive potential (Te Puni Kōkiri, 2008).

It is interesting to note that the concepts underpinning epigenetic research may not be incompatible with Māori understanding at this critical stage of development. Walters (cited in Rimene, Hassan, & Broughton, 1998:28) states that 'All the Māori things are absorbed from the outside to the inside where their wairua (spirit) and the wairua of their child is growing.' Although this is said in relation to culture and identity, it echoes the concept inherent in epigenetic research that the developing child is strongly affected by external influences throughout pregnancy. The following section further outlines Māori understandings and structures in relation to whānau and children.

Te ao Māori concepts and hapū ora

Whakapapa

Whakapapa involves, among other things, the inter-relationships between generations, emphasises the relational and collective nature of Māori societal structures (Henare, 1988; Ministry of Justice, 2001; Pere, 1988) and is central to Māori world views and understanding (Pohatu, 1996; Taki, 1996). Whakapapa establishes sets of roles, obligations and accountabilities within whānau, hapū and iwi (Pere, 1988) and connects Māori culturally, socially and spiritually to the wider environment. Whakapapa is also cyclical, bringing to the fore the relationships between past and present generations, and highlighting the fact that birth, life and death are interconnected (Ministry of Justice, 2001; Norman, 1992; Pihama, 2001).

There are multiple examples of the rendition of whakapapa that commence with the many phases of Te Pō (the darkness) and the conception of all living things that now exist within Te Ao Mārama, the world of light (Buck (Te Rangihiroa), 1949). Cleve Barlow (1991) depicts whakapapa as providing genealogical descent from the 'gods' to the present day. Both Ngata (1972) and Barlow (1991) describe whakapapa as a process of layering, stemming from complex Māori cosmologies.

Conceptualising whakapapa in such a way enables us to understand the complexities of the relationships that exist within te ao Māori, whereby layers are linked to and across each other. These interconnections align with the earlier discussion of life course approaches and the multiple levels within which determinants have an impact. However, Māori concepts also provide a circular dimension and another way of viewing intergenerational relationships and influences.

Whānau, hapū and iwi

Within contemporary society Māori are diverse, both in their experiences and in their aspirations (Irwin, 1992; Smith, 1992). However, there are key structures within te ao Māori that are enabling and set a foundation for wellbeing. These key structures are whānau, hapū and iwi.

Significant to these structures are the dual meanings of 'hapū' (pregnancy or conception in the womb/sub tribe) and 'iwi' (people/bone). Māori have a complex and comprehensive cosmology connecting people to their origins and to their environments over time. 'Whenua' means both land and placenta, the source of sustenance in the womb and in te ao mārama; 'whānau' or 'whakawhānau' refers to family and to giving birth, bringing new family into the world. The whenua (placenta) of the newborn baby is taken and placed into the whenua (earth). This links the child to the land and establishes their tūrangawaewae (place to stand) and preserves the mauri (life force) and mana (prestige, integrity, honour) of a child (Rimene et al., 1998). These meanings highlight the relationship between Māori societal institutions, such as hapū and iwi, to processes of reproduction and birth.

Whānau is the societal unit that underpins Māori society (Durie, 2001; Pere, 1988) and provides the basis on which broader structures of hapū and iwi are dependent. Whānau has been defined as three to four generations living together as an extended family unit (Henare, 1988; Pere, 1988; Walker, 1990) with, in pre-European time, a common ancestor (Morehu, 2005). Through whānau, Māori societal concepts and practices were both socialised and reinforced, providing the basis for learning about and imparting knowledge, values and beliefs essential to both the individual and the wider hapū and iwi. The cultural practice of whanaungatanga (relationships) is pivotal in sustaining all generations within the extended whānau.

A further meaning of whānau is 'birth', which embeds the concept of birthing future generations within the maintenance of whakapapa and Māori societal structures. Te reo (language) and tikanga (correct practices or processes) clearly illustrate the importance of birth in maintaining whakapapa based structures.

Hapū and iwi structures are built on the basis of whānau and whanaungatanga. Hapū are constituted through groups of whānau, with iwi being developed through the growth and joining of hapū and through a process of having particular ancestors break away from hapū to form their own collective groupings (Barlow, 1991). Iwi are constituted through the joining of a number of hapū, and they are the largest social and political grouping for Māori.

Roles in whānau and Māori society

Gender roles are conceptualised as upholding the mana of men and women and are characterised by reciprocity (Rimene et al., 1998) and balance, with complementary and equally valued roles, including leadership (Irwin, 1992; Mikaere, 1995; Moewaka Barnes, 2010; Smith, 1992; Te Awekotuku, 1991). Moewaka Barnes (2010) describes how women, as keepers of te whare tangata (house of humanity, womb) and nurturers of new life, are aligned with the Moon and Earth. They are strong, but 'it only takes a little mokomoko (a caterpillar) to get to the heart of the tree. This is likened to our children' (Glavish, cited in Moewaka Barnes, 2010:34).

The place of Māori children as taonga within whānau and the lifeblood of generations is particularly important (Rokx, Woodham, & Joe, 1999:2). From the time of birth the connection between the land and the child is made. The return of the whenua to the land signifies a cyclical view of the world that involves an ongoing link between the past and the present. As Māori we come from Papatūānuku and return to Papatūānuku; life and death are a continuum, and so the preservation of the mauri and the mana of the child is crucial to the preservation of future generations (Norman, 1992).

The context of whānau enables those closest to the child to provide the input and oversight that are essential to the wellbeing of the child, and hence the whānau more generally. An analogy that is often drawn in relation to such social organisation is that of the pā harakeke, the flax bush. The pā harakeke is a metaphor for the inter-relationship between, and dependence of, each generation and the next (Metge, 1995).

The whānau traditionally provided the first point of learning and socialisation for tamariki (children) (Buck (Te Rangihiroa), 1949; Pere, 1988; Walker, 1990). Kuia and koroua, as grandparents and great-grandparents, supported the socialisation and education of tamariki and were instrumental in imparting a wealth of knowledge and skills. Māori children were collectively nurtured, raised and educated in this manner, with contributions from both males and females (Salmond, 1997).

Synthesising the approaches

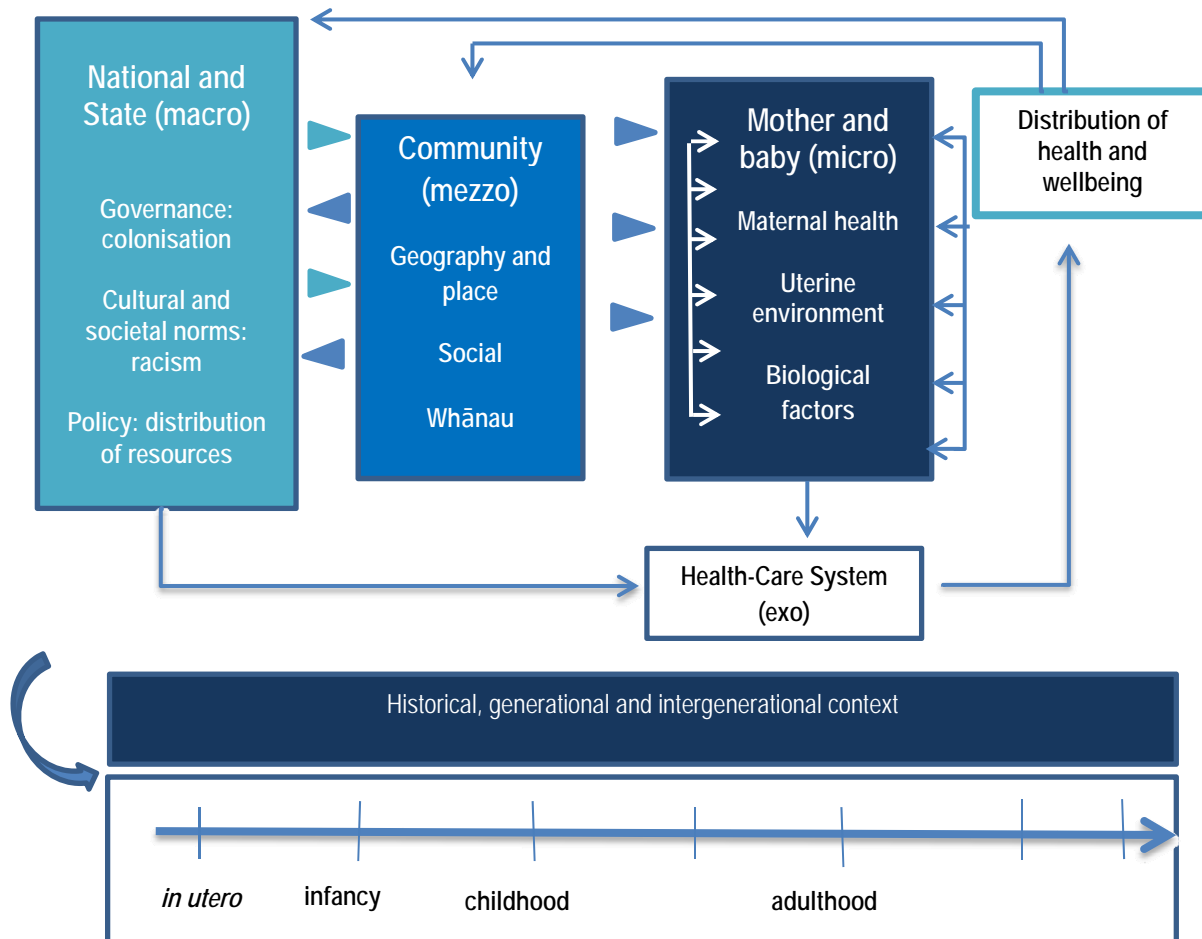
There are considerable synergies in life course and epigenetic approaches, both recognising that there are key times when various influences have an impact on health and wellbeing. Life course approaches focus on stages of life; particularly what issues arise at various times and how interventions might address these. Epigenetics focuses on environmental events and influences that affect people's genetic make-up. Fetal programming/plasticity and related research focuses specifically on influences on the fetal stage of the life course, particularly looking at implications for longer-term health and wellbeing. Examining these specific foci within a broad range of factors such as colonisation, social determinants and te ao Māori, has the potential to provide understandings that can contribute to Māori health gains.

The conceptual framework on social determinants of health put forward by the World Health Organization (CSDH, 2008) provides a useful way of looking at levels of impact; however, although a life course understanding is implicit in the Commission's approach, it is not visible in their framework. Glass and McAtee (2006) explicitly combine life span with levels of impact. The framework presented below builds on these concepts and also borrows from Krieger (2011). Krieger places life course alongside her ecosocial framework and includes 'historical context and generation'. Colonisation is added here as a focus under governance at the macro social level (Kearns, Moewaka Barnes, & McCreanor, 2009), and racism is a focus within cultural and societal norms. The term racism refers here to a system that categorises population groups into 'races' with societal goods, resources and opportunities preferentially allocated to groups regarded as superior (Bonilla-Silva, 1997). Racism can operate at a number of levels: societal; institutional; personally mediated and; internalised. Racism may affect early life, including intra-uterine exposures that have an impact on health over the life course (Lu & Halfon, 2003). Consistent with Māori concepts, key environments placed at the community level include whānau, which are more usually conceptualised as belonging to the micro or individual level.

There are many exosystems (external services and agencies) related to hapū ora; for example, infant mortality is closely related to the mother's education (CSDH, 2008), but education, particularly for young mothers, can be disrupted, which has impacts across childhood and into later life. These multiple accountabilities and impacts are evident throughout the levels of determinants described in this report. In this model, our exosystem focus is on health services in relation to pregnancy and birth, which complements our analysis at the macro, mezzo and micro levels. Together these systems,

within specific historical, generational and intergenerational contexts, have an impact on the early stage of life, with implications for life course health.

Figure 3: Hapū ora conceptual framework



Moewaka Barnes, amended from Solar & Irwin, 2007 in CSDH, 2008; Krieger, 2011.

The remainder of the report uses the framework given in Figure 3 as a way of ordering our conceptual approach to the literature, the engagement data and the research priorities.

Chapter 2: From the macro to the mezzo: Creating the conditions for hapū ora

This chapter provides an overview of literature associated with broader factors impacting on hapū ora. These include societal level determinants (macro) and influences at the levels of community, environment and whānau (mezzo).

Macro level determinants

At a macro level, governance, policy and societal norms and values provide the conditions that shape the structure of society. These macro determinants permeate social environments and impact at all levels, from societal to communities, to whānau and individuals. Arguably the most widely discussed macro societal level determinants of health are associated with the distribution of resources. Other macro level determinants include colonisation and racial discrimination. This section provides a review of macro level determinants of particular relevance to hapū ora and Māori health across the life course. Important gaps in knowledge are highlighted.

Distribution of resources

The ways in which societal benefits accrue to the more advantaged in society and the distribution of poor health as a gradient by socioeconomic position is widely recognised. Analyses of ethnic health inequalities are often presented within this context of unequal distribution of resources and experience of deprivation (Blakely, 2002). Low socioeconomic position affects social wellbeing and health in multiple ways, contributing to 'poor education, lack of amenities, unemployment and job security, poor working conditions, and unsafe neighbourhoods, with their consequent impact on family life' (CSDH, 2008:31).

Māori health and wellbeing are markedly affected by socio-economic determinants; Māori experience lower living standards (Jensen, Krishnan, Hodgson, Sathiyandra, & Templeton, 2006; Perry, 2009), have greater unemployment (Statistics New Zealand, 2011) and are more likely to live in severe hardship compared with all New Zealanders (Robson et al., 2011). Socioeconomic position has an impact on housing and Māori are more likely to live in crowded conditions (Flynn, Carne, & Soa-Lafoa'i, 2010). Overcrowded and inadequate housing (damp, uninsulated) are associated with an increased risk for infectious diseases including rheumatic fever, meningitis and respiratory illness. These illnesses in turn may have a broader impact on mental health, education and possibly lead to detrimental health outcomes in later life (Craig et al., 2012; Howden-Chapman, 2004; Robson & Harris, 2007).

Poverty and deprivation are strong drivers of health outcomes in infancy, childhood and youth (Craig et al., 2012) and deprivation is related to low family cohesion (Ministry of

Health, 2008b). Child poverty and its transmission through generations are considered 'major obstacles to improving population health and reducing health inequity' (CSDH, 2008:7). Children living in sole-parent households are almost three times more likely to live in hardship than those living with two parents and a significant proportion of these children are Māori (Perry, 2010). Sudden unexpected death in infancy (SUDI) among Māori infants has a strong association with deprivation 'with the risk increasing by 19% per successive decile' (Robson & Purdie, 2007:43).

New Zealand children's rates of preventable illness are high and the pattern of preventable child disease, injury and hospital admission closely parallels rates of child poverty (St John & Wynd, 2008) and deprivation (Robson & Harris, 2007). Recent analyses highlight a picture of increasing hospitalisations for conditions associated with a marked social gradient among Māori and Pacific children (Craig et al., 2012).

For some, disadvantage is compounded by other factors, such as: mental and physical health (including substance use); employment stigmas (particularly sex work); gender; sexuality and; age and family structure (e.g. 'teen mum' and 'solo mum'). Situations such as homelessness and incarceration also add to disadvantage, including exclusion from, or lack of, appropriate societal structures and resources, conditions of discrimination and stigma, negative judgements, and the withdrawal of approval (McIntosh & Radojkovic, 2012). In addition, it is argued that Māori can be at the margins of Māori society (McIntosh, 2006).

Privilege

Poverty is not just about income; it is also about the unequal distribution of resources and the valuing of some interests over others – often those of 'a rich and powerful minority over the interests of a disempowered majority' (CSDH, 2008:31). Just as structural conditions perpetuate disadvantage, so too they can serve to perpetuate advantage. Gregory (2002) argues that 'research should not ignore the power of elite groups' (p. 6) and suggests that there is an elite group of people with power and wealth who are decision-makers. Studies on societal privilege argue that Whiteness and colour are relational and need to be studied as a system (Fine, Weis, Powell Pruitt, & Burns, 2004). In this context *privilege* refers to those who benefit from these decisions through societal norms, structures and access to resources that are designed to meet their needs.

As with structural disadvantage, social, economic and political advantages play out at each level of society. In this way, structural conditions set the scene for conditions at the mezzo level of communities and whānau discussed later in this chapter. There remains little research within an Aotearoa/New Zealand context that explores concepts of privilege and its relationship to Māori outcomes or wellbeing.

Colonisation

Colonisation affects the systems and structures of society, resonating throughout the macro, mezzo, micro and exo levels. At a structural level colonisation involves the establishment of layers 'of new systems to be established to determine how resources will

be obtained and how they will be distributed and to whom. These systems, therefore, construct who will benefit and who will be privileged' (Reid & Robson, 2007:5).

Colonising forces have targeted the values, relationships and resources that were the basis of whānau wellbeing (Ministry of Justice, 2001). This included the gendering of roles and responsibilities within the whānau, and the imposition of heterosexual roles that destabilised whānau and societal structures (Pihama, 1998). The Mission and Native schools developments actively sought the individualisation of Māori through colonial schooling practices (Simon & Smith, 2001). Linda Tuhiwai Smith (1986) describes a 'trojan horse' approach, whereby Mission and Native schools were placed in the centre of Māori communities and Pākehā teachers modelled particular types of family roles and relationships. Colonial ideologies and law located women as chattels, the property of men (Moewaka Barnes, 2010) and subjugated and inferior to them. Mikaere (1995) argues that the colonial reworking of Māori cosmogony led to the rise and internalisation of patriarchal values and societal practices that reflected those of the colonisers. The potency of female sexuality and reproductive functions, so clearly evident in the earlier creation stories, was negated. Atua wāhine (female deities) were marginalised in the revisionist versions, with female figures redefined as submissive and subservient to male figures.

Many Māori have adopted or are influenced by Western colonial beliefs about the role of women and men within our society and the reinterpretation of Māori sexuality (Moewaka Barnes, 2010). This occurs through a planned hegemonic process (Bedgood, 1980) that has actively undermined Māori value systems. There have been concerns expressed about current day roles of men (Te Karaka, 2009), fathers (Moewaka Barnes, 2010) and the loss of knowledge about birth-related processes (Beattie & Tikao, 1990).

Whānau violence is one area that has received research attention and is a focus for intervention. Although whānau violence occurred in pre-colonial times, it was considered rare, was not condoned and there were collective responses to ensure accountability for whānau wellbeing (Mikaere, 1994; Moewaka Barnes, 2010). Kruger et al. (2004) describe whānau violence as 'the compromise of te ao Māori values' and suggest that violence is not only perpetuated by Māori upon Māori but is a direct outcome of colonial oppression (Kruger et al., 2004). The undermining of whānau has not only created the conditions for negative behaviours, such as violence, but has broken down the mechanisms for support and redress (Moewaka Barnes, 2010). There is little doubt that, for many Māori, there remains an attempt to maintain whānau structures (Durie, 2001; Moewaka Barnes, 2010; Pihama, 2001). Despite the construct of whānau undergoing changes, the essence remains (Durie, 2001).

Although the processes of colonisation and its impacts on Māori are documented and discussed, little specific research has been done. For example, we have yet to explore how Māori knowledge and structures can be re-invigorated to support hapū ora.

Racism

Definitions of racism incorporate 'a mix of prejudice, power, ideology, stereotypes, domination, disparities and/or unequal treatment' (Berman & Paradies, 2010:228).

Fundamental to racism is an ideology of inferiority, promoted by social norms and institutions. Berman and Paradies (2010) draw together differing concepts into one definition: 'We define racism as that which maintains or exacerbates inequality of opportunity among ethnoracial groups' (p. 217). Racism operates at a number of levels: societal, institutional, personally mediated and internalised, with potential impacts over the life course (Jones, 2000).

Internationally, there is increasing exploration of the links between racism and health and wellbeing (e.g. Brondolo, Love, Pencille, Schoenthaler, & Ogedegbe, 2011; Clark, Benkert, & Flack, 2006; Dominguez, 2008; Paradies, 2006a; Williams & Mohammed, 2009). Commonly cited pathways to the embodiment (tangible effects on people) of the experiences of racism include: inequitable access to the societal resources that support good health (e.g. good-quality jobs, housing, education, health care); differential exposure to environmental risks (e.g. toxic substances, marketing of dangerous goods); negative behavioural responses (such as smoking and other drug use); direct experiences (ranging from micro-assaults in daily life, such as verbal abuse, through to racially motivated physical assault and ethnic genocide) and stress affecting mental health and the immune, endocrine and cardiovascular systems. Of particular emphasis has been research around how clinician and health service bias and discrimination affects health-care utilisation and interactions, issues of clinical decision-making and resulting recommendations (Jones, 2001, 2003; Krieger, 2012; Marmot & Wilkinson, 2003; Paradies, Harris, & Anderson, 2008; Walters et al., 2011).

In Aotearoa/New Zealand, evidence from the New Zealand Health Survey shows associations between self-reported experiences of discrimination and poor or fair self-rated health, low physical functioning, low mental health, cardiovascular disease and smoking (Harris et al., 2006a, 2006b). Socioeconomic deprivation along with self-reported discrimination accounted for almost all the disparity between Māori and non-Māori in these measures. Associations have also been found between discrimination and health care utilisation, suggesting one important causal pathway to the poorer health outcomes associated with discrimination (Harris et al., 2012; 2006a, 2006b). Although this research is now available, research on pathways, mechanisms and experiences of racism remains sparse in Aotearoa/New Zealand.

International research has found links between racism and pregnancy-related outcomes that have implications for the life course. US research found associations between self-reported experiences of racism by African-American women and a higher risk of low birthweight (Dominguez, Dunkel-Schetter, Glyn, Hobel, & Sandman, 2008; Mustillo et al., 2004) and preterm deliveries (Dole et al., 2004; Mustillo et al., 2004) when compared to White Americans. Among women who worked outside the home during pregnancy, racial discrimination in the workplace was significantly associated with very low birthweight (VLBW) preterm infants. The authors suggested that addressing workplace discrimination is important in reducing birth outcome disparities (Collins, David, Handler, Wall, & Andes, 2004).

As a long-term and cumulative experience racism is a stress that has a direct impact on women's health. In addition, pregnant women who experience racism are more

susceptible to antenatal stress (Giscombe & Lobel, 2005), potentially explaining some disparities in birth outcomes (Rosenthal & Lobel, 2011; Wadhwa, 2005).

As a result of racism, a particular and prolonged form of chronic stress is associated with physiological wear and tear, known as allostatic load (Dominguez, 2008). This response is also related to 'weathering' or 'stress age,' a form of premature aging 'attributed to stress-induced alternations in physiologic function produced by life-long exposure to social disadvantage and racial discrimination' (Dominguez, 2008:365).

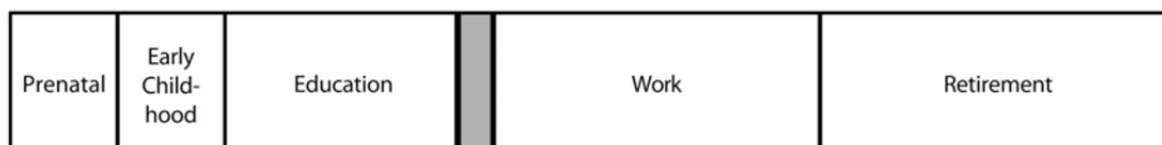
Racism and its emotional and psychological effects may have particular relevance for a life course and intergenerational approach. In a recently published UK study mothers' experience of racism was related to socio-emotional wellbeing of their 5 year old children (Kelly, Becares, & Nazroo, 2013). The authors conclude 'Interventions that aim to improve early childhood development and address ethnic inequalities need to incorporate approaches to tackling racism at all levels of society.' (p. 35)

Racism has been found to be associated with mental health and also been found to be associated with alcohol, tobacco and drug use (Gibbons, Gerrard, Cleveland, Wills, & Brody, 2004; Guthrie, Young, Williams, Boyd, & Kintner, 2002), all of which can influence the health of babies in the early stage, with implications for life course health.

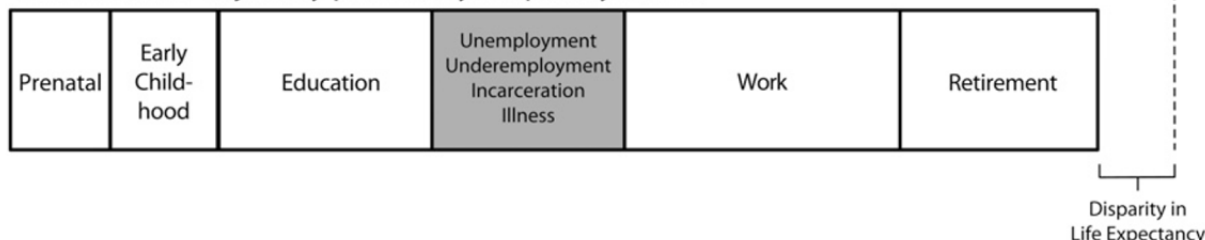
Some literature specifically addresses the impact of racism on the life course. Gee et al. (2012) developed a conceptual model, which provides an example of how life course trajectories, including life expectancy, can be shaped by racism.

Figure 4: A conceptual model of how racism may shape time spent in different stages over the life course

1. General life course trajectory



2. Life course trajectory potentially shaped by racism



Source: Gee et al., 2012

Lu et al. (2010) discuss the cumulative impact of racism throughout the life course (accumulated allostatic load), experiences during pregnancy, and intergenerational effects. The intergenerational impacts of racism include cycles of disadvantage and physiological effects from the intra-uterine environment. Lu et al outline a number of ways in which disparities in birth outcomes between African-American and White American women can be reduced through a life course approach, including undoing racism, improved quality of care, increased support, community building and urban renewal, improving education and reducing poverty (Lu et al., 2010).

Historical trauma is another racism related event that may be intergenerational. It involves events that target communities (e.g. land confiscation and forced relocation) with resulting catastrophic upheaval and effects on mental, emotional and spiritual health that may resonate across generations (Walters et al., 2011). Historical trauma is described as:

a collective complex trauma inflicted on a group of people who share a specific group identity or affiliation – ethnicity, nationality, and religious affiliation. It is the legacy of numerous traumatic events a community experiences over generations and encompasses the psychological and social responses to such events. (Evans-Campbell, 2008:320)

Intergenerational impacts and historical trauma is an emerging field in the literature related to colonisation, but little research has been conducted, and none was found, relating to Aotearoa/New Zealand.

Mezzo level – community, environment and whānau

At a mezzo level, influences include community, the environment and whānau. Literature associated with these influences is discussed including any Māori relevant research. Gaps in knowledge are highlighted.

Community and place

The communities people live, work and play in can have a range of direct and indirect effects on health across the life course (Stevenson, Pearce, Blakely, Ivory, & Witten, 2009). Community conditions, urbanisation, changing whānau structures and workforce demands all have an impact on whānau environments (Kiro, 2011). Access to supportive community organisations such as schools, church, marae and other local amenities are consistent with positive whānau wellbeing. Just as the wellbeing of the community shapes the wellbeing of whānau, so too the wellbeing of whānau shapes the nature and quality of support for fathers, mothers and babies and is integral to their wellbeing.

Place affects people in multiple ways. Urbanisation has resulted in changes to housing conditions and support networks (including a move to smaller family living units), and, more broadly, to Māori social organisation (Durie, 2001; Walker, 1990). Much New Zealand research associated with place focuses on associations between a particular

community feature and an outcome of interest; for example, associations between access to gambling opportunities and gambling behaviour (Pearce, Mason, Hiscock, & Day, 2008); the impacts of alcohol outlet density and drinking and alcohol-related harm (Connor, Kypri, Bell, & Cousins, 2011); neighbourhood poverty, obesity and diabetes (Ludwig et al., 2011) and; neighbourhood deprivation and access to fast foods (Pearce, 2007). Such research highlights an important relationship between the nature of the environment and important social and health outcomes. There is a further call for research that contributes to understanding the mechanisms through which neighbourhoods affect health status (Stevenson et al., 2009).

Neighbourhood deprivation is associated with poor health across the life course. The New Zealand Deprivation Index (NZDep), a small-area, neighbourhood level index of deprivation, is used in Aotearoa/New Zealand to describe patterns of deprivation and in analyses of the relationship between deprivation and key societal outcomes (Salmond, Crampton, & Atkinson, 2007). Although there is considerable literature showing that deprived neighbourhoods are linked with adverse outcomes, there is very little that explores the effects of living in these neighbourhoods (Morrison & Nissen, 2010), including what neighbourhood factors might ameliorate the effects of deprivation. This is salient for Māori whānau, who, as one study found, were more likely than Europeans to move into high-deprivation neighbourhoods and less likely to move out of them (Morrison & Nissen, 2010). The authors of this study concluded resource placement at the community level may help to ameliorate some of the adverse conditions and outcomes experienced in deprived areas. One challenge is to identify what role environmental and community factors play in the relationship between increased neighbourhood deprivation and more poor health outcomes.

Through urban planning, regulation and design, neighbourhood environments can promote safety, physical activity and healthy eating (CSDH, 2008), with potential impacts on physical health and hapū ora, including reductions in diabetes and obesity (Ludwig et al., 2011). One study of two cities in the Auckland region identified aspects of neighbourhoods that were valued by parents and/or supportive of parents; these features included shops, playgrounds and other communal gathering places; walkability and; parent networks, both formal and opportune (Witten, Penney, Faalau, & Jensen, 2006). The study indicated that some investment in place is happening in relation to community resources, but that the level of investment may be related to the overall affluence of the broader area, beyond the neighbourhood level. A wider investigation of this issue might inform investment in the placement of resources and explain some area differences in health outcomes.

There is clearly considerable scope for increased understanding of the impact of community and built environments in supporting hapū ora including exploration of differing impacts of place, for example rural and urban communities and environments.

Environmental toxins

Internationally, deprivation is found to be associated with exposure to a range of environmental toxins, including air pollution, which may be one of the contributors to the effect of neighbourhood on mortality (Crouse, Ross, & Goldberg, 2009; Næss, Piro, Nafstad, Davey Smith, & Leyland, 2007). Some adverse outcomes from air pollution occur shortly after exposure (e.g. headaches, nausea, upper-respiratory infections and daily hospitalisations), while others, (cardiopulmonary diseases and lung cancer) occur after prolonged exposure (Crouse et al., 2009).

Systematic research into air pollution and infant mortality found associations between air pollution (e.g. carbon monoxide and nitrogen dioxide) and preterm births, lower birthweights and increased risk of death from respiratory illnesses. Researchers conclude 'more evidence is emerging that air pollution exposures in pregnancy and early childhood put children at higher risk of adverse health outcomes' (Ritz & Wilhelm, 2008).

In Aotearoa/New Zealand, relationships between outdoor pollution and deprivation have also been found (Pearce & Kingham, 2008), with impacts on mortality and respiratory symptoms (Fisher et al., 2002). Air pollution can occur indoors as well. In Aotearoa/New Zealand the situation may be unique, with coal and wood heating, unflued gas heaters and a lack of insulation, (Fisher et al., 2002); it is hoped that current insulation and housing initiatives will reduce these risks. People who spend considerable time indoors, such as the young and the old are most at risk from indoor air pollution (BMA, 1997 cited in Fisher et al., 2002). This may also be true for pregnant mothers and newborn infants and the relationship between indoor air pollution and the health of pregnant women, mothers and their newborn babies is as yet under-researched in Aotearoa/New Zealand.

Insecticides, pesticides and other environmental toxins can cause fetal defects and occupational or ongoing environmental exposures, such as to food and water pollutants, are also of concern. Ostrea et al. (2002:329) note that 'Maternal exposure to environmental toxins can have significant effects on the fetus'. Exposures 'have been linked with higher rates of mental retardation, intellectual impairment, and behavioral problems, such as conduct disorder and attention deficit hyperactivity disorder' (Lanphear, Vorhees, & Bellinger, 2005:203).

Many heavy metals, some pesticides and toxins can have direct effects and interfere with hormones, impairing, for example, the nervous system and brain development. Harmful effects can result from accidental poisoning from mercury and PCBs³, and effects have been observed even at low levels (e.g. as a result of consuming contaminated fish) (Ostrea et al., 2002).

There remains limited research within the Aotearoa/New Zealand setting as to the impact of these environmental pollutants and toxins on pregnancy, infant wellbeing and life course impacts.

³ Polychlorinated biphenyls.

Whānau

Whānau wellbeing is influenced by access to both internal assets embodied in individuals and external assets that are derived from collective, societal and structural conditions (Moewaka Barnes, 2010). Resilience, an internal asset, involves an individual's capacity to draw on personal resources. The concept of community or whānau resilience as a collective attribute has gained some traction in the literature (Te Puni Kōkiri, 2009). However, there is also critique of the limitations of resilience as an individual concept that does not address structural determinants (Kirmayer, Tait, & Simpson, 2009).

International literature on indigenous peoples indicates that family and community play an important role in promoting resilience (Chewning et al., 2001; Edwards, Mitchell, Gibson, Martin, & Zoe-Martin, 2008; Kirmayer et al., 2009). Walters' (2009) research with 'two-spirit people' found that internalised colonisation was more closely associated with negative impacts of historical trauma and contemporary discrimination, but that family, culture, language and land were important protective buffers. Wexler et al. (2009) suggest a complex interplay between marginalisation and resilience. They suggest collective resilience may arise in response to marginalisation and discrimination reinforcing a sense of collective rather than individual struggle.

Whānau are affected by a range of factors that challenge even the most resilient. Incarceration can be particularly disruptive for family life, through increasing the number of single-parent families; decreasing the availability of male support, instability of living arrangements for children; and reduced service and resource support. Eddie Durie has called for a research focus on the impacts of male incarceration on communities and whānau (Gordon & MacGibbon, 2011).

Adversity and disruption influence whānau wellbeing, with implications for hapū ora and life course health. Young parents in particular are highlighted as experiencing particular challenges and need for support. Children of teen parents may be at increased risk of low birthweight, behavioural problems and reduced cognitive ability (Fergusson & Woodward, 1999, 2000; Jaffee, Caspi, Belsky, & Silva, 2001; Wylie, Stewart, Hope, & Culshaw, 2009), and clearly appropriate support and care are especially important. In addition, social structures and conditions such as prejudice, stigma and socioeconomic circumstances may have an impact on the wellbeing of teen parents, with implications for their offspring (Collins, 2010; Tuffin, Rouch, & Frewin, 2010; Wilson & Huntington, 2006; Wylie et al., 2009).

The literature on young Māori parents and whānau support is limited in relation to hapū ora, however there has been some research and evaluation. In a study of adolescent Māori mothers, social support from friends and whānau was critical, with teen parenting units being highly valued in supporting mothers to continue their education (Rawiri, 2007). Evaluation of a Counties Manukau based support programme offering educational opportunities and life skills to young mothers also found positive outcomes for mothers and babies (Parata, 2008).

Policy plays an important role in shaping environments at the mezzo level. Approaches focusing on families (parents and children), mothers and babies include service-focused government initiatives such as: Strengthening Families; a range of support services from organisations such as Plunket, Early Start and Māori providers and; programmes that provide parental support and skill building. Although many of these are generic or adapted for Māori contexts, there is evidence that, when appropriately delivered, they do provide benefits for Māori; for example, considerable effort has gone into delivering the Incredible Years parenting programme effectively for Māori (Altena & Herewini, 2009). A recent review of parenting programmes found that rigorous evaluations of whānau parenting programmes were urgently needed (Lambert, Crengle, & Smylie, 2012).

Whānau Ora is one policy initiative that focuses on whānau and aims for integrated and whānau-focused service provision, focusing on the internal assets of whānau (Whānau Ora Taskforce, 2009). Whānau Ora has the potential to have direct impacts on conditions for mothers and babies. Evaluations of Whānau Ora will provide valuable information about the effectiveness of this policy.

Summary – macro and mezzo determinants and influences

There are clear relationships between macro level socio-economic determinants and maternal and child health and wellbeing. Although the impacts of colonisation are well documented and research has found associations between racism and health, there is limited research exploring the relationship with hapū ora within an Aotearoa/New Zealand context. Macro policies and conditions, community and neighbourhood influences and effects, and whānau and parental relationships and structures provide the constraints and enablers of individual maternal circumstances and choices.

At the mezzo level, there is a range of research linking place and environments to health and wellbeing outcomes. Whānau, as the immediate groupings responsible for the care and nurture of pregnant women and babies, have considerable potential to influence the health of their members. The resources and assets that whānau access, strongly influence their ability to provide positive care and to function for the wellbeing of all. As with macro level determinants, there are research gaps and a number of areas are highlighted for potential exploration.

Chapter 3: Mother and baby – micro level factors

Maternal health, wellbeing and experiences can have considerable effects on babies *in utero* and during the early days after birth. A wealth of evidence describes profound impacts on newborn infants and across the life course as a result of events *in utero*.

In this section micro level conditions and exposures affecting babies *in utero* and in the days following birth are discussed. These include maternal stress and mental health; substance exposure; physical health; nutrition and maternal/baby attachment. The micro level is also a focus for interventions and services that aim to have a direct impact on mothers and babies. As with the previous section, gaps in knowledge and research are highlighted.

Maternal mental health and stress

Background

Women with compromised mental health are less able to provide sensitive, responsive infant care. In resource constrained settings, infants whose mothers are depressed are less likely to thrive and to receive optimal care than those whose mothers are well. Social support and partner support are important during pregnancy and postpartum (Leight, Fitelson, Weston, & Wisner, 2010; Milgrom et al., 2008).

The New Zealand Mental Health Survey (Oakley Brown, Wells, & Scott, 2006) found that being Māori, being female, having a lower socioeconomic position and being younger are all associated with increased prevalence of mental disorders. Māori with the lowest education level, lowest household income and highest deprivation had higher rates of disorders, including serious disorders, compared to those with more education, higher income and less deprivation (Baxter, 2007).

In 2011 the Ministry of Health released *Healthy Beginnings. Developing perinatal and infant mental health services in New Zealand* (Ministry of Health, 2011a). This report aims to inform services and highlights the increased risk for women in developing mental illness during pregnancy and the perinatal period and the increased risk of recurrence of existing mental illness. The authors found that Māori women were at increased risk of mental ill health in pregnancy and perinatally and identified the need for a culturally responsive and whānau approach to developing services (Ministry of Health, 2011a).

Depression and postpartum depression

There is a dearth of epidemiological research on stress and the mental health status of Māori women during pregnancy or postpartum. Only one published research paper measuring and investigating postpartum depression in Aotearoa/New Zealand has reported findings for Māori (Webster, Thompson, Mitchell, & Werry, 1994). This paper

found disproportionately high rates of depressive symptoms and postnatal depression among Māori women three months postpartum.

The strains and adjustments of pregnancy (Giscombe & Lobel, 2005), related fears and anxieties, and birth itself (Milgrom et al., 2008) are stressful for many women. Internationally, postnatal depression has been linked to interventions associated with childbirth, such as caesarean section (Blom et al., 2010; Carter, Frampton, & Mulder, 2006) and perinatal complications (Blom et al., 2010). Risk factors for postnatal depression include lower and higher maternal age, lower socioeconomic status, a history of traumatic experience or abuse, depression during pregnancy, and a family and personal history of depression and stressful events (Milgrom et al., 2008).

As well as influencing maternal health and the ability to care for a child, depression during pregnancy may influence the fetus (Leight et al., 2010), with implications for life course health. Evidence suggests that *in utero* exposure to elevated levels of maternal stress has both physiological and psychological effects on offspring (Sandman, Davis, Buss, & Glynn, 2011) that could be transmitted across generations (Kuzawa & Sweet, 2009). Evidence on the significance of the timing of the stress exposure is conflicting, but emerging research indicates that there may be timing-related effects (Davis & Sandman, 2010; Rice et al., 2010).

There are clearly large gaps in research associated with Māori maternal mental health including the level of need, influences on mental health and strategies for addressing Māori maternal and infant mental health needs.

Paternal mental health

A small body of overseas research has noted the importance of paternal mental health, indicating that both parents may be affected by mental health issues during pregnancy. Figueiredo and Conde (2011) measured anxiety and depression in women and male partners from early pregnancy to three months after birth. They found 16 percent of parents (fathers and mothers) were highly anxious and/or depressed during pregnancy, and suggested that more interest should be taken in the mental health of both parents during pregnancy. No Aotearoa/New Zealand studies were found and again this is an area with significant knowledge gaps.

Impact of maternal mental health and maternal stress on infancy and life course

Mechanisms for the causal relationship between maternal mental illness and offspring outcomes are complex, as are attempts to tease out the effects of a multiplicity of potential influences. However, there is strong evidence that increased cortisol levels are implicated (Leight et al., 2010). Stress increases the activity of glucocorticoids, particularly cortisol (Khan et al., 2010), which affects nearly every organ and tissue in the body (Davis & Sandman, 2010) and is important for normal fetal development. However, cortisol crosses the placenta, raising concerns about the effect of excessive amounts of hormones, which may adversely affect fetal growth and development. Impacts on fetal functioning, such as increased fetal heart rate, have also been observed (Kinsella & Monk, 2009; Van den Bergh et al., 2005).

Children exposed to excess stress *in utero* may be at increased risk of neuro-developmental disorders, future mental illness and poor emotional adjustment (Kinsella & Monk, 2009) or depression in adolescence (Pawlby, Hay, Sharp, Waters, & O'Keane, 2009), behavioural and emotional problems during infancy and childhood (Wadhwa, 2005) and impaired cognitive functioning and cardiovascular disease (Davis & Sandman, 2010; Hocher, 2007). Hocher (2007), in discussing the relationship between increased risk of cardiovascular disease and social stress during pregnancy, describes increased social stress among pregnant women without support from family, with no stable partnership, fearful of losing career opportunities and concerned about financial support once the baby is born. Maternal antenatal depression has also been found to be associated with later antisocial behaviour in children (Kim-Cohen, Moffitt, Taylor, Pawlby, & Caspi, 2005). Hay et al. (2010) found that depression in pregnancy significantly predicted violence in adolescence, even after controlling for other possible environmental causes.

Associations have also been found between fetal maturation and antenatal maternal stress (Sandman et al., 2011), including traumatic life events such as earthquakes (Glynn, Wadhwa, Dunkel-Schetter, Chicz-Demet, & Sandman, 2001) or increased racial discrimination associated with dramatic events such as 9/11 (Lauderdale, 2006). Fetal maturation is associated with a range of life course outcomes discussed in 'Nutrition and epigenetic research', below.

On the positive side, studies have shown 'beneficial effects on birth outcomes of stress-reducing or coping interventions' (David & Collins, 1991:240). Data suggests a need for maternal support to find ways to cope with stress and anxiety, but interventions are generally individually focused.

While Māori may share some similarities with their overseas counterparts in relation to stress and trauma, there may also be some important context-specific differences. No New Zealand research was found on the *in utero* impacts of stress or racism, and the majority of overseas studies do not address racism as a particular and ongoing stressor, potentially underestimating the degree of stress that particular groups of pregnant women might experience.

Maternal substance use

In Aotearoa/New Zealand alcohol is the most commonly used drug, followed by tobacco, cannabis and other illicit drugs. Challenges to research include the accuracy and consistency of exposure measurements and confounding by other exposures (e.g. there may be an association between alcohol use and/or smoking in pregnancy with nutrition). A further challenge is how to take into account the postnatal environment and its impact.

Alcohol

Alcohol use in pregnancy has long been recognised as harmful to the developing fetus, with impacts on life course health (Jones, 2011; Sood et al., 2001). Fetal alcohol spectrum

disorder (FASD) refers to a range of effects, including impacts on growth, cognitive and behavioural outcomes and brain development (Riley, Infante, & Warren, 2011); other effects may be more subtle. In particular, some attention, learning and memory effects may be difficult to detect and link to maternal alcohol use. Using overseas estimates, and accounting for alcohol use in Aotearoa/New Zealand, Sellman and Connor (2009) estimate that FASD prevalence here could be greater than 5 percent.

In 2006/07 around 28 percent of women who had been pregnant in the previous three years reported that they had drunk alcohol during pregnancy; there was no significant difference between Māori women and the total population (Ministry of Health, 2009). Some women may not have known they were pregnant, and 68 percent reported they had been advised not to drink during pregnancy (Ho & Jacquemard, 2009).

Sellman and Connor (2009, on p.1 of 6) state concern at only 68 percent of women reporting that they were advised not to drink during pregnancy, given that this is 'the unequivocal recommendation from the Ministry of Health since 2006.' This indicates that knowledge about the impacts of alcohol use during pregnancy may not be as effectively transmitted as it could be. Clear messages might contribute to an increase in women abstaining during pregnancy. However, different drinking patterns between Māori and non-Māori women associated with socioeconomic disadvantage (Droomers, 2002) and linked to colonisation (Moewaka Barnes, McPherson, & Bhatta, 2003; Pōmare et al., 1995) suggests structural and support conditions as well as clear messages need to be considered.

Research investigating how Māori women negotiate drinking alcohol during pregnancy highlighted that 'Māori women's decisions about drinking alcohol when pregnant are shaped by social and cultural expectations about gender roles, as well as their knowledge about alcohol and pregnancy' (Stuart, 2009: ii). Conclusions from this research included the importance of lead maternity carers providing clear information about alcohol in pregnancy and the need for further research to explore both contributing factors and approaches to addressing alcohol use in pregnancy among Māori.

Alcohol use in pregnancy is an important maternal health issue and one that has direct implications for wellbeing of babies and across the life course. Although there is some research in this area further investigation into approaches for addressing alcohol use in pregnancy and life course impacts is required.

Tobacco

In 2006/07, half of Māori females were smokers compared to 20 percent of Pākehā females (Curtis, Harwood, & Riddell, 2007). Māori children from poorer families are significantly more likely to live in households with smokers (St John & Wynd, 2008). In a 2006/07 study, 18.9 percent of Māori children aged 0–14 years were exposed to second-hand smoke in their homes, twice the exposure of all New Zealand children (Ministry of Health, 2008b). Others found this was related to the higher prevalence of smoking among Māori adults rather than higher rates of smoking inside (Edwards et al., 2009). This exposure is a significant contributor to children's ill health, leading to hospital admissions for chest infections (St John & Wynd, 2008) and SUDI (Ministry of Health, 2001).

In utero tobacco exposure is associated with increased risk of neonatal (the first 28 days after birth) and perinatal (variously defined as three to five months before birth and up to one month after birth) mortality and complications, including increased risk of miscarriage. Lower birthweight associated with smoking is well recognised (McLeod, Pullon, & Cookson, 2003). Impacts on the life course include associations between exposure *in utero* and attention deficit hyperactivity disorder (ADHD) (Sciberras, Obioha, & Efron, 2011) and cognitive outcomes (Julvez, cited in Huizink, 2009). The importance of the timing of exposure is uncertain, but dose-response relationships are evident (van Meurs, 1999) and maternal second-hand exposure has also been associated with lower birthweight (Ward, Lewis, & Coleman, 2007). The Smokefree Environments Act has influenced exposure in workplace and recreational environments (Asthma and Respiratory Foundation of New Zealand, 2005), but exposure in the home may still be an important consideration.

The majority of tobacco users are addicted, and quitting requires considerable effort and support. Between 2004 and 2007, using data from the 61,000 women who had a midwife as their Lead Maternity Carer, 45 percent of Māori women smoked during pregnancy compared to 16 percent of Pākehā women (Dixon, Aimer, Lynn Fletcher, Guilliland, & Hendry, 2009). However, Māori women had the greatest reduction in smoking at discharge from midwifery care: 20 percent reduction versus 7 percent for Pākehā women. An earlier study found that socioeconomically deprived women and women with partners who smoke are more likely to continue smoking after the first trimester (McLeod et al., 2003). Additional resources to facilitate cessation among whānau as well as individual pregnant Māori women may be required.

Cannabis and other illicit drugs

In a 2007/08 survey, Māori men and women were more likely to have used cannabis and BZP party pills⁴ in the past year compared with the total population; no significant differences were found in the use of other drugs (Ministry of Health, 2010a). Cannabis use at least monthly appears to increase with increasing socioeconomic deprivation and is reported to have harmful effects on employment, home life and financial position (Ministry of Health, 2010a).

Some research has found that exposure to cannabis *in utero* may increase the risk of low birthweight, impair fetal development and have long-term cognitive, emotional (Campolongo, Trezza, Palmery, & Cuomo, 2009; Wang, Dow-Edwards, Anderson, Minkoff, & Hurd, 2006), and mental health effects (Jutras-Aswad, DiNieri, Harkany, & Hurd, 2009). A large Netherlands cohort study found that intra-uterine exposure to cannabis was associated with higher rates of aggressive behaviour among girls at 18 months of age (Marroun et al., 2011). However, UK research found no association between cannabis use during pregnancy and perinatal mortality or morbidity and a small influence on birthweight (Fergusson, Horwood, Northstone, & ALSPAC Study Team, 2002).

⁴ Prior to the classification of BZP as a Class C controlled drug; Misuse of Drugs (Classification of BZP) Amendment Act 2008 (NZ Government, 2011).

Maternal physical health

Maternal health and wellbeing before, during and after pregnancy has direct and indirect impacts on babies, with implications for life course health. Māori women's health needs can increase during pregnancy, with implications for the health of the baby.

Oral health

Māori mothers have high oral health needs, which can increase during pregnancy, but they experience significant barriers, including lack of information, support and accessibility (Makowharemahihi, 2006). Studies show that poor oral health in pregnant women can affect the child *in utero* (Boggess & Edelstein, 2006; Stuart, Gilmour, Broadbent, & Robson, 2011). Although not conclusive, it is suggested that 'high bacterial loads resulting from periodontal disease increase risk of miscarriage, premature birth and low birth weight' (Stuart et al., 2011:31).

Research is currently being undertaken as a partnership between the University of Otago and Tainui health services, investigating the best approaches to identifying and meeting the oral health needs of Māori mothers and babies, starting in pregnancy (personal communication Professor John Broughton, August 2012). This research will provide valuable information on an important health issue.

Gestational diabetes

Gestational diabetes mellitus is an area of particular concern in relation to maternal health impacts on babies, and is more common in Māori than Pākehā women (Harwood & Tipene-Leach, 2007). Data collected during 2008 shows that gestational diabetes was diagnosed in over 6 percent of Māori women compared with 3 percent of Pākehā women (National Women's Hospital, 2008 cited in Bristow, Rowan, & Rush, 2009). There is evidence of increased risk of obesity in offspring, particularly if the mother remains untreated (Bristow et al., 2009; Westgate et al., 2006). Suggestions that genetic differences explain high rates of diabetes in some populations have been strongly criticised (Krieger, 2005) as misinterpreting the social disadvantage that largely contributes to ethnic disparities in diabetes (Paradies, 2006b).

Screening of pregnant women for diabetes is widely recommended between 24 and 28 weeks. However, at least 24.1 percent of mothers of babies who died (perinatal death occurring at or beyond 28 weeks' gestation) in 2008 were not screened; this low level of screening 'could mask a higher rate of mortality due to diabetes' (Perinatal and Maternal Mortality Review Committee, 2010:45).

Obesity is difficult to treat and 'tends to track from childhood into adulthood' (Bristow et al., 2009:16). As with diabetes, maternal obesity, which is associated with high postprandial glucose levels, is also thought to put offspring at greater risk of developing metabolic disorders (Bristow et al., 2009; Gluckman et al., 2008).

Nutrients

It is thought that nutrition is important to brain development. Schlotz and Phillips (2009) argue that 'there is accumulating evidence that maternal gestational status of micronutrients such as iron, fatty acids and folate as well as fish intake during pregnancy may have long-term consequences for behavioural problems and cognitive function later in life' (p. 910). Iron deficiency, although preventable, affects many New Zealand babies, and higher rates of anaemia in Māori infants may be related to Māori mothers' lower haemoglobin values, but this requires further investigation (Emery & Barry, 2004). A lack of iron during infancy can result in serious health effects that include altered mood, impaired brain development and immunity. A particular concern is that iron therapy may not improve the cognitive function of iron-deficient children, stressing the importance of early prevention (Emery & Barry, 2004). Folate is implicated in neural tube defects, with Māori having higher rates of neural tube defects evident at birth than non-Māori non-Pacific babies (The Children's Social Health Monitor, 2011). More specific effects, particularly in relation to nutrition, are discussed in the following section.

Nutrition and epigenetic research

Early epigenetic studies on associations between events that happen before birth and risk of disease in later life associated low birthweight with increased risk of hypertension, obesity, insulin resistance and abnormal levels of blood fats. More recently, attention has focused on the mismatch between intra-uterine growth and catch-up growth following birth, rather than on birthweight or size alone (Bristow et al., 2009; Gheorghe, Goyal, Mittal, & Longo, 2010; Nair, Nair, & Chacko, 2009). Overnutrition has also been considered.

Research indicates associations between fetal growth and greater risk of heart disease, diabetes and osteoporosis in later life, neurobehavioural conditions (Nathanielsz & Thornburg, 2003; Office of the Prime Minister's Science Advisory Committee, 2011), temperament and cognitive functioning (Schlotz & Phillips, 2009). Being small at birth and becoming relatively overweight in childhood is also associated with early menarche; this is most dramatic in 'children who transition from highly deprived environments early in life to enriched environments in childhood' (Gluckman, Low, & Franko, 2011:23).

Researchers in this area note that measurements such as birthweight and body length are crude proxies for undernutrition *in utero* (Schlotz & Phillips, 2009). Joss-Moore and Lane's (2009) literature review on the long-term impacts of intra-uterine growth restriction (IUGR) found that IUGR may interrupt developmental processes or produce changes of 'key regulatory factors'. As a consequence, there may be changes to gene expression, with long-term impacts (p. 230). According to Bristow et al. (2009), early undernourishment may result in reduced muscle mass and fat storage capacity, so that when the baby becomes introduced to a more nutrient-rich environment, they are more likely to be stored as ectopic/visceral fat, leading to potentially long-term health consequences.

Gluckman et al. (2005) argue that changes *in utero* are 'not made for immediate advantage, but rather in expectation of the future postnatal environment' (p. 134). This suggests that the baby *in utero* makes adaptive metabolic, physiological and anatomical changes as a result of the uterine nutritional environment that influence its response to future environments. However, Wells (2007) argues that it is more reasonable to expect offspring to look to the past rather than to the future and 'align their developmental trajectory with the maternal phenotype [combination of genes and environment], the key factor in determining their nutritional supply' (p. 331). Wells discusses the concept of long-lasting intergenerational effects as a plausible argument: 'information received by the human fetus is not about the environment *per se* but about the conditions of its mother and her recent ancestors' (p. 333). Extending this concept, Kuzawa and Thayer (2011) write that epigenetic studies suggest that developing organisms respond to 'cues of historical environments experienced by ancestors in the recent past' (p. 222).

Because the highest risk of coronary heart disease may be in children born small who subsequently become large (Wells, 2007), a focus on imbalance in environments may be of immediate benefit (Nair et al., 2009). Given evidence that breastfeeding is associated with a decreased risk of obesity (Agency for Healthcare Research and Quality, 2009), breastfeeding support, education and advocacy may be of particular importance for mothers of low birthweight babies; young Māori women are over-represented in this cohort. It is also important that services understand the importance of weight gain in relation to individual growth, and not as a requirement to attain a standard based on national averages.

A study by Godfrey et al. (2011) offers evidence of the influence of maternal nutrition on the child's risk of obesity and disease in later life. They found maternal carbohydrate intake during pregnancy was associated with children's adiposity at age nine. They conclude that the findings 'provide strong evidence supporting a role for developmental plasticity in determining individual risk of metabolic disease' (p. 1533). Godfrey et al. believe their study 'provides additional support for the argument that all women of reproductive age should have appropriate nutritional, education, and lifestyle support to improve the health of the next generation' (p. 1533).

It is important to note that a relationship between low birthweight and increased cardiovascular disease risk has not always been found. An earlier New Zealand study by Daly et al. (2005) of a retrospective cohort of 855 Auckland high school students failed to find a significant association between low birthweight and increased cardiovascular disease risk factors in adolescence; the sample included people from Māori (18 percent), Pacific (46.1 percent), Asian (3.9 percent) and European (32.1 percent) ethnic groups. The researchers proposed that fetal programming research is unlikely to 'result in any substantial health gains in adulthood' and that the 'focus of cardiovascular disease prevention should remain in adolescence and adulthood, rather than in pregnancy' (Daly et al., 2005:9).

Although fetal gender is rarely considered in the research, Joss-Moore and Lane (2009) suggest that 'an important and interesting consideration is the impact of sex on the development of metabolic disease in [individuals with] IUGR, with men appearing to be

more severely affected' (p. 231). According to Hocher (2007), some studies suggest that organ development can be affected by maternal conditions without affecting fetal growth. The limitations of the birth size and weight measurements used above have led to more recent research directly evaluating the 'effect of specific pregnancy exposures, such as smoking, stress or nutrition, on subsequent disease risk' (Schlotz & Phillips, 2009:909). These approaches may 'indicate where interventions to improve maternal and child health could have long-term benefits' (Schlotz & Phillips, 2009:909).

A search of epigenetic literature found no Māori specific analysis related to hapū ora. It appears that studies did not have sufficient Māori samples for this to occur. This is a significant gap.

Whānau support: care and attachment

Research has found that parental infant attachment and informal learning may have lasting effects on brain function and maturation (Gluckman et al., cited in Office of the Prime Minister's Science Advisory Committee, 2011:26). Attachments involve hormones, but effects of attachment may also be mediated through epigenetic mechanisms (Gluckman et al. cited in Office of the Prime Minister's Science Advisory Committee, 2011:26). Most data is from animal studies, although the Office of the Prime Minister's Science Advisory Committee (2011) points to emerging and supporting data from human studies. In particular, the maternal experience in the early days and years of life has important effects on health and development throughout the life course.

Secure mother–infant attachment is an important predictor of resilience in later life including higher self-esteem, reduced anxiety and reduced hormonal responses to stress. (Office of the Prime Minister's Science Advisory Committee, 2011:9)

Research on the impacts of breastfeeding supports the emerging attachment findings from human studies. Longitudinal studies in Canada (Baker & Milligan, 2008) and Aotearoa/New Zealand (Fergusson, Beautrais, & Silva, 1982; Horwood & Fergusson, 1998) have found associations between cognition (Aotearoa/New Zealand and Canada), education (Aotearoa/New Zealand) and social development (Canada). However, although an international review found reductions in the risk of acute otitis media, non-specific gastroenteritis, severe lower respiratory tract infections, atopic dermatitis, asthma in young children, obesity, type 1 and 2 diabetes, childhood leukaemia, sudden infant death syndrome (SIDS), and necrotising enterocolitis, it did not find a relationship with cognitive performance (Agency for Healthcare Research and Quality, 2009). A study by Iacovou and Almudena (2010, 2012) found different effects depending on whether babies were demand fed or fed to schedule: demand-fed babies showed better subsequent academic and cognitive outcomes than schedule-fed babies.

Leave provisions and support can help to promote increased breastfeeding. For example, increased maternal leave provisions in Canada were related to an increase in exclusive breastfeeding to six months (Baker & Milligan, 2008). Social and family support and advice have been identified as critical in a number of New Zealand studies (Abel, Park,

Tipene-Leach, Finau, & Lennan, 2001) and overseas studies (Arora, McJunkin, Wehrer, & Kuhn, 2000), although Khoury et al. (2005) acknowledge that such support is critical but hard to change.

Another contribution to attachment, 'kangaroo' or 'skin to skin' holding originated as a way to maintain a baby's temperature in the absence of an incubator. Primarily seen as reinforcing the infant's relationship with its mother, paternal relationships can also benefit. Research suggests the practice can encourage active parenting, reduce stress for carer and child, improve breastfeeding success and increase maternal confidence (Johnson, 2005; Ludington & Engler, 1999).

Parental bonding and parent-child relationships can affect quality of life and mental health in later life (Canetti, Bachar, Galili-Weisstub, De-Nour, & Shalev, 1997; Rikhye et al., 2007). Findings related to poor maternal care and bonding have found associations with, in particular, obesity and heart disease in later life (Sloboda, 2011). Paternal bonding can be affected by incarceration (Gordon & MacGibbon, 2011), and young fathers in particular may face difficulties in their relationship with the mother and in maintaining relationships with their children (Families Commission, 2011).

Although interpersonal partner violence has been researched we know less about the effects of interpersonal partner violence on children (Harold, 2011). Adults are more likely to fatally maltreat a child if they are poor, have little education, are unemployed, are young, have poor mental health, abuse alcohol or drugs, have experienced family violence as a child, and have a history of offending, including early offending (Ministry of Social Development, 2006). Child abuse and neglect can have wide-ranging and overlapping impacts, including physical, psychological, behavioural and societal consequences. (US Department of Health and Human Services, 2008).

Summary – maternal influences on infant and life course outcomes

There is a wealth of research demonstrating the importance of a positive maternal environment for infant health, development and wellbeing and for a range of outcomes across the life course. Research shows the importance of maternal mental and physical wellbeing and the value of appropriate nutrition and avoidance of harmful substances.

Whilst local research highlights that Māori women are at risk for mental health, physical health and substance exposures in pregnancy, there is less research fully exploring the contributing factors or baby/child or life course consequences or impacts of preventive or intervention programmes and services. The field of epigenetics raises a number of considerations associated with the longer term health consequences associated with *in utero* exposures however again, there are many gaps in knowledge and understanding of the implications for Māori life course pathways and outcomes.

Chapter 4: Maternity care for Māori

This chapter describes maternity services and examines available maternity data sources. It then discusses Māori maternity service needs, and examines research on Māori women's experiences of maternity services. We consider the potential for maternity services to improve Māori birth outcomes that may affect the life course. Knowledge gaps and the need for more research and evaluation of maternity services are identified throughout the chapter.

Maternity services

Aotearoa/New Zealand has free maternity services, which include primary care in the community from midwives and doctors, and hospital specialist or secondary or tertiary care. Primary maternity services are funded nationally by the Ministry of Health (Guilliland, Tracy, & Thorogood, 2010).

Primary maternity services are expected to ensure each woman, and her whānau, has every opportunity to have a fulfilling outcome to her pregnancy and childbirth, through the provision of services that are clinically and culturally safe and based on partnership, information and choice. They should recognise that pregnancy and childbirth are a normal life stage for most women, with appropriate additional care available when required. Services are expected to 'achieve Māori health outcomes and reduce Māori health inequalities by facilitating Māori access to maternity services, ensuring appropriate pathways through those services and that maternity services address the primary maternity needs of Māori.' (New Zealand Gazette, 2007:1052).

The Primary Maternity Services Notice 2007 (New Zealand Gazette, 2007) specifies that services are to be provided by a lead maternity carer (LMC) who is responsible for assessing the mother's needs, planning her care with her and the care of her baby, and ensuring the provision of maternity services; these include antenatal, labour, delivery and postnatal care. Where the LMC is unable to provide a required aspect of care, they are responsible for ensuring that this is covered by another provider.

The range of LMCs includes self-employed midwives, general practitioners, private obstetricians, and staff (obstetricians and midwives) employed in district health boards (DHBs). DHBs are required to provide maternity services to women who need specialised care (high-risk or complicated pregnancies), women who choose to use DHB services, and women who are unable to find an LMC. DHBs may provide an LMC midwifery service or a team approach from a number of midwives. Most LMC services are provided in the community, with antenatal care often provided in homes or community clinics. Most women give birth in hospitals or primary birthing/maternity units, which are funded by DHBs. Postnatal care is usually provided in the home for four to six weeks following birth. LMCs claim their fees from the Ministry of Health's business unit Sector Services (formerly HealthPAC).

The Baby Friendly Hospital Initiative (BFHI) and Baby Friendly Community Initiative (BFCI) aim to protect, promote and support breastfeeding in hospitals and health services in the community. According to the Breast Feeding Authority, rates of breastfeeding on discharge increased from an average of 56.6 percent in 2001 to 83.4 percent in 2010 in accredited Baby Friendly Hospitals. Accreditation includes specific expectations related to the Treaty of Waitangi and culturally responsive practice (New Zealand Breast Feeding Authority, 2011).

In 2010, according to results of the *Midwifery Workforce Report Updated 2010*, 134 midwives (5 percent of the workforce) nominated Māori as their 'first ethnicity'. A further 72 midwives (2.7 percent) nominated Māori as their second ethnic group, and four (0.1 percent) nominated Māori as their third ethnic group (Midwifery Council of New Zealand, 2010). There were also eight Māori medical practitioners, 32 nurses and five physiotherapists working in obstetrics and gynaecology (Ministry of Health, 2011d).

There is a clear need to increase Māori representation within the maternity workforce so that the needs of Māori women are better addressed. Efforts to increase the Māori health workforce in general are showing signs of success, with growing numbers of Māori students in health sciences and professional programmes. However, more focused research on strategies to increase the Māori workforce, leadership, and models of practice in the maternal and neonatal sector would be useful.

Maternity data

The last 10 years has seen considerable development in databases related to maternal and newborn health and services 10 years. Perinatal information about mothers and babies is collected through the recently rebuilt Maternity Data Collection (MAT), which draws data from LMC payment claims and inpatient or day-patient maternity events during pregnancy, birth and up to 3 months after a birth (National Health Board Business Unit, 2011). Data about the mother include demographic details, provider details, and clinical factors relating to pregnancy and birth. Information on baby includes birth status, demographics, birthweight, gestational age, breastfeeding and postnatal admissions.

MAT Data Collection is used to monitor the quality of maternity services by DHB through the New Zealand Maternity Clinical Indicators series. Unfortunately the indicators have not been reported by ethnicity in the two reports published to date (Ministry of Health, 2012c, 2012d). This is a significant omission since there are likely to be differences in care received by Māori and other women.

Other monitoring reports include the series Report on Maternity (Ministry of Health, 2012e), the Maternity Factsheet (Ministry of Health, 2011b), and the Maternity Snapshot series which provides provisional data (Ministry of Health, 2011c). These reports provide ethnic specific data for most indicators.

The New Zealand College of Midwives Research Database includes clinical data on clients of midwives who belong to the Midwifery and Maternity Provider Organisation (MMPO), a

subsidiary of the College. As around 75 percent of LMC midwives are members of the MMPO (Dixon et al., 2009) the database is a substantial resource for midwifery related research.

The Perinatal and Maternal Mortality Review Committee (PMMRC) reviews maternal and infant deaths for potentially avoidable factors and reports annually. Key results are presented by ethnicity (Perinatal and Maternal Mortality Review Committee, 2012), although Māori data is not reported where numbers are small; recommendations generally include a focus on Māori where relevant. The Committee promotes quality improvement initiatives resulting from the annual reviews and identifies potential areas for further research and intervention. The PMMRC also co-ordinates the New Zealand arm of the Australasian Maternal Outcomes Surveillance System (AMOSS) which monitors rare and severe disorders of pregnancy, focusing on specific conditions for a period of time. To date, little data on Māori outcomes has been reported from the AMOSS dataset; the planned project on rheumatic heart disease among pregnant women should have high relevance to Māori.

A maternity services consumer survey is conducted periodically to measure women's perceptions of and satisfaction with care received before, during, and after birth (Ministry of Health, 2012b). Information from Māori women is reported, although low Māori response rates (25 percent in 2011 compared to 51 percent for Pākehā) may introduce selection bias.

Local hospital databases (Anderson et al., 2012; 2013) and community laboratory databases (e.g., Lawton et al., 2004) have also been used to answer research questions related to maternal and newborn risk factors, birth outcomes, tests and services received. Other databases include regulated workforce registers, the national immunisation register, and other well child databases.

These datasets provide a rich source of quantitative information on pregnancy and birth outcomes. There is considerable capacity to investigate specific issues affecting Māori outcomes and the effectiveness of maternity care, viewed through a Māori centred or equity lens. Increased linkage across datasets and the development of capacity to follow mothers and babies (including subsequent babies) longitudinally could support a whānau centred approach to research on life course effects.

Alongside the statistical information, the voices of Māori women, their partners and their whānau must also be heard. The National Health Committee's 1999 Review of Maternity Services provided fora for Māori throughout the country to be heard, including those living in isolated and rural areas. Other significant consultation processes have been undertaken with Māori communities in relation to the development of He Korowai Oranga, and Whānau Ora for example. Further systematic opportunities for Māori whānau to be heard and to influence the shape of maternal and newborn services would be valuable.

Maternity care needs

At the time of the 2006 Census, Māori comprised around 15 percent of the New Zealand population (Statistics New Zealand, 2007). However, in 2010, of the 64,936 liveborn babies recorded in the National Maternity Collection, 26.5 percent were Māori (16,348 babies) (Ministry of Health, 2012e). The relatively high proportion of Māori babies is driven by a youthful Māori population structure, resulting in a greater proportion of Māori women of reproductive age, and a higher Māori fertility rate. In 2010 the crude birth rate for Māori women was 108 births per 1000 reproductive-aged women, compared to a national rate of 70 births per 1000 (Ministry of Health, 2012e). In 2007 the median age of Māori women giving birth was 26 years, compared to 30 years for New Zealand mothers overall (Ministry of Health, 2011c).

In 2010 Māori women were more likely to have babies at a young age, which is often framed in the literature as a 'risk' factor. Māori women are more likely than non-Māori women to start having babies in their late teens and early 20s (Ministry of Health, 2012e). It is noteworthy that current teenage birth rates are much lower than they were in the 1960s and 1970s (Kaipuke Consultants Ltd., 2012). However, New Zealand research identifies key issues for teen parents when accessing health services, including societal stigma and prejudice, even in service providers charged with their care and support (Collins, 2010; Families Commission, 2011; Tuffin et al., 2010; Wilson & Huntington, 2006). These factors may contribute to findings in some of the literature that teen mothers are less likely to access antenatal care, enrol late and attend fewer antenatal classes (Wylie et al., 2009).

Socioeconomic inequalities in birth outcomes are pervasive (Blumenshine, Egerter, & Barclay, 2010), including strong associations with stillbirth and neonatal death (Perinatal and Maternal Mortality Review Committee, 2012). Māori mothers have greater levels of deprivation than other ethnic groups, with the exception of Pacific peoples. In 2010, 45 percent of Māori women giving birth lived in the most deprived quintile areas compared to 22 percent of non-Māori women (Ministry of Health, 2012e). Māori babies were more likely than non-Māori to be born with a birthweight under 2.5 kg or born preterm (before 37 weeks gestation) (Ministry of Health, 2012e). Māori mothers also had a higher rate of stillbirths and neonatal deaths than Pākehā mothers during the period 2007 to 2010 (Perinatal and Maternal Mortality Review Committee, 2012).

Recent research identified a higher risk of maternal death among Māori women (Perinatal and Maternal Mortality Review Committee, 2012). During the period 2006 to 2010 there were 57 maternal related deaths, of whom 22 were Māori women (39 percent). The maternal mortality rate for Māori was 29.4 per 100,000 maternities, over three times the rate for Pākehā women (9.3 per 100,000) (Perinatal and Maternal Mortality Review Committee, 2012). The most common causes were suicide, pre-existing medical disease (including valvular heart disease and cancer), and amniotic fluid embolism. Noting that young socially disadvantaged Māori women were especially vulnerable, the PMMRC emphasised that 'the mental health needs of Māori women during pregnancy must be identified and services delivered in culturally appropriate ways' (Perinatal and Maternal Mortality Review Committee, 2012:87). The Committee acknowledged that high rates of

rheumatic heart disease among Māori and Pacific women confer a higher risk of valvular disease, and recommended ensuring that services make appropriate referrals for women with pre-existing conditions.

The high rate of maternal mortality among Māori women indicates there may also be a high rate of maternal morbidity. Serious avoidable maternal morbidity (SAMM) events that result in the mother having a prolonged stay in intensive care are not routinely reported. However, a pilot audit identified factors contributing to potentially avoidable SAMM events and events where practice improvements could be made.

Higher rates of maternal risk factors among Māori women indicate that there should also be higher rates of referral to primary care providers (e.g. general practitioner, midwife, smoking cessation, drug and alcohol services, maternal mental health) and obstetric specialist care. Recently, guidelines for referrals by LMCs were released in an effort to increase the safety and consistency of maternity care (Ministry of Health, 2012a). Research on barriers and facilitators of appropriate referral to, and utilisation of, these services for Māori women may be required to ensure equitable access is achieved.

Māori experiences of maternity care

This section discusses Māori women's experiences of maternity service provision, covering antenatal, labour, birth and postnatal care; this includes discussion on services delivered to Māori, such as screening, and Māori perceptions of services.

Experiences of antenatal care

In 2010, 83 percent of Māori women had an LMC, compared to 92 percent of Pākehā women and 61 percent of Pacific women (Ministry of Health, 2011b). Just over a third of Māori women registered with an LMC in their first trimester, compared to two-thirds of Pākehā women. The majority of Māori women (75 percent) had an LMC by the third trimester, with a further 8 percent registering during the third trimester. In the 2011 Maternity Consumer Survey, 75 percent of Māori respondents reported being quite satisfied or very satisfied with the overall care provided by their LMC (Ministry of Health, 2012b).

A higher proportion of late registration with an LMC may partly explain the lower average number of ultrasound examinations received by Māori women (2.0 compared to 2.6 for Pākehā women) and the greater likelihood of having no ultrasound examinations (12 percent compared to 7 percent) during their pregnancy (New Zealand Health Information Service, 2007). In 2011, a lower proportion of Māori women reported paying for services related to pregnancy (40 percent compared to 73 percent of all women). The most common service paid for was an ultrasound scan (Ministry of Health, 2012b).

There is no routine reporting of tests received during pregnancy. Since 2008, the Ministry of Health has recommended routine testing for sexually transmitted infections (STI) in pregnancy, as untreated infections can lead to preterm birth and other complications for

mother and baby (Ministry of Health, 2008a). Chlamydia is one of the most prevalent infections and if untreated has a 20-50 percent chance of being transmitted neonatally. However, a recent audit of STI testing at Middlemore Hospital found 34 percent of pregnant Māori women had not been tested (Ekeroma, Pandit, Bartley, Ikenasio-Thorpe, & Thompson, 2012) indicating there may have been a number of untreated infections. In 2011, ESR notifications showed 105 infants were diagnosed with chlamydia and two were diagnosed with gonorrhoea. This raises questions about how systematically screening tests are conducted with pregnant women and the need to monitor service provider knowledge and adherence to recommended practice. Due to the higher prevalence of STIs among the late teens and early 20s age group (the group with the highest birth rate among Māori) any service gaps in testing during pregnancy will have a greater impact on Māori mothers and babies.

Some Māori women expressed concerns about their experiences of maternity services in relation to professionalism and cultural safety, including ignorance, insensitivity and rudeness (Health Services Consumer Research, 2008). A qualitative study by Wilson (2004) identified four key areas that were important to Māori women and their health in general: connecting through whānau, nurturing wairua, using mātauranga (knowledge) and undertaking self-care activities. In one interview a respondent emphasised the need to feel respected, 'to be able to identify with people that are helpful and not condescending, and who recognise the need for Māori women to contribute to their own perspective' (p. 146).

Māori women were less likely than Pākehā women to participate in antenatal classes (Dwyer, 2009; Health Services Consumer Research, 2008). Transport, in particular the cost of transport, was identified as a practical barrier to attending antenatal classes (De Joux, no date; Dwyer, 2009; Ratima, Ratima, Durie, & Potaka, 1994). Focus groups with Māori women from isolated communities have drawn attention to issues of poverty and lack of transport as barriers to accessing antenatal care (National Health Committee, 1999).

In earlier research, Māori women expressed preferences for culturally relevant antenatal education that is: held in culturally appropriate venues; integrates customary Māori practices (e.g. mirimiri and karakia) and a focus on spiritual needs; takes a more informal approach; includes whānau; is delivered by Māori women and; provides opportunities to share experiences, including those of older women (Abel, Finau, Tipene-Leach, Lennan, & Park, 2003; Ratima et al., 1994). Dwyer (2009) found only six antenatal education providers had programmes tailored for Māori and recommended further programmes be developed.

These studies highlight the importance of services being able to provide equitable and high quality antenatal care that is clinically safe, adheres to best practice, and is respectful and inclusive of Māori world views and practices.

Access to information to make choices

Health literacy is about the capacity to access and use health information. Nutbeam (2000) distinguishes between functional, interactive and critical health literacy, all of

which may be important dimensions in Māori interactions with health services. Interactive health literacy is concerned with relationships and supportive environments for skill development and decision-making and critical health literacy aims to increase critical thinking about social and economic determinants. As such, health literacy can reach beyond individual capability to include community or societal capacity to act on environmental and broader impacts on health.

A 2006 survey found that New Zealanders generally have poor literacy skills with Māori on average scoring below the minimum needed to meet complex demands of everyday life (Ministry of Health, 2010c). Māori males had lower literacy scores than Māori females and there were also particular concerns noted about young people. Higher levels of education and income were associated with better health literacy skills. The report states 'Health literacy is essentially the skills people need to find their way to the right place in the hospital, fill out medical *and insurance forms*, and communicate with their health providers' (Ministry of Health, 2010c:1). The survey used four domains: prose and document literacy, numeracy and problem solving. These domains are largely consistent with Nutbeam's (2000) description of functional interactive health literacy as the capacity to access and use health information, although problem solving capability extends beyond this.

In the 2007 Maternity Consumer Survey, Māori women were more likely than Pākehā women to say that they did not receive enough information from their LMC to make an informed choice about antenatal tests (Health Services Consumer Research, 2008). The 2011 survey identified information on selecting a LMC as the main priority area for information improvement (Ministry of Health, 2012b).

Findings on the effectiveness of antenatal education on specific birth outcomes such as low birthweight or preterm birth have been mixed (Albizu, Goni, & Mejías, 2000; Burton, Hutchinson, Helgeson, & Connor, 2000; El-Sabagh, 2002; Tough et al., 2003). Nevertheless, Māori women and their whānau have the right to the best possible knowledge and skills related to pregnancy, childbirth and parenting.

Experiences of care during and after the birth

Location of labour and birth

Approximately 3 percent of babies are born at home each year. In 2010, 4.2 percent of Māori mothers intended to have a home birth and 3.9 percent actually delivered at home. Most Māori women delivered their babies in a maternity facility, with the majority birthing in a secondary (49 percent) or tertiary (28 percent) facility⁵ (Ministry of Health, 2012e). Primary facilities have in-house midwifery care but do not have onsite obstetric and medical specialists (Guilliland et al., 2010). Māori women were nearly two times more

⁵ Percentages calculated from the Ministry of Health's *Report on Maternity, 2010. Accompanying tables* downloaded from <http://www.health.govt.nz/publication/report-maternity-2010>. April 15th 2013.

likely to give birth in primary units than non-Māori women (16.9 percent compared to 8.8 percent) (Ministry of Health, 2012e). Among respondents to the 2011 Maternity Consumer Survey, 17 percent of Māori women gave birth at a location they did not plan, a factor that affected overall satisfaction with care (Ministry of Health, 2012b).

In 2007 Māori mothers had the shortest average hospital stay between delivery and discharge (1.7 days) among the ethnic groups. Pākehā mothers were almost two times more likely (19.4 percent) to be transferred to another service than Māori mothers (10.4 percent) (Ministry of Health, 2010b). Māori babies had the shortest average length of postnatal stay (2.6 days) and Pākehā babies had the longest average length of postnatal stay (3.1 days) (Ministry of Health, 2010b). One in five women in the 2011 Maternity Consumer Survey reported leaving hospital before they felt ready. Close to half left because they did not like the hospital environment and half because the hospital was too full or there was pressure from staff; some left because of responsibilities at home.

Access to appropriate obstetric intervention

In 2010 Māori mothers were more likely to have a spontaneous delivery without assistance (74.9 percent) than non-Māori mothers (61.7 percent) and less likely than other ethnic groups to have a caesarean section. In that year, 17 percent of Māori mothers had a caesarean section (10.6 percent acute and 6.4 percent elective), compared to 25.9 percent of non-Māori mothers (13.8 percent acute and 12.1 percent elective). The rate of assisted deliveries (forceps and vacuum extraction) was higher for non-Māori (10.2 percent) than for Māori mothers (5.1 percent) (Ministry of Health, 2012e).

There were also differences in the rates of other obstetric procedures. In 2010 the rates⁶ of inductions and epidurals were lowest for Māori mothers (16.3 and 15.9 per hundred deliveries, respectively, compared to 21.0 and 28.3 per hundred deliveries for non-Māori mothers). Māori mothers were also less likely to have an episiotomy (4.8 per hundred deliveries compared to 12.8 per hundred) and slightly less likely to have augmentation of labour (27.1 per hundred deliveries compared to 29.1 per hundred for non-Māori mothers (Ministry of Health, 2012e).

In the College of Midwives database, over half (54 percent) of the Māori women who gave birth during the period 2006 to 2008 had active management (i.e. were given a uterotonic agent to induce contraction) in the third stage of labour (birth of the placenta and membranes). This was slightly higher than the proportion of Pākehā women (50 percent) (Dixon et al., 2013). Women giving birth in hospital settings were more likely to have active management.

Disparities are evident in access to obstetric intervention for Māori women. Analysing National Women's Hospital data from 1992 to 1997, Sadler et al. (2002) found that Māori

⁶ These rates of procedures exclude women who had an elective caesarean section, but include women who may have had an emergency caesarean (Ministry of Health, 2012. *Report on Maternity, 2010*. Accompanying tables. <http://www.health.govt.nz/publication/report-maternity-2010>

women are significantly less likely to undergo induction of labour, pre-labour caesarean section and operative vaginal delivery; the study adjusted for age, parity, obstetric risk and transfer of care. Analysing national caesarean section rates from 1997 to 2001, Harris et al. (2007) found that non-Māori women were significantly more likely to have a caesarean section than Māori women, after adjusting for age, parity, deprivation, selected clinical factors and DHB. A study of nulliparous women⁷ giving birth at Auckland hospital during 2006 to 2009 found no significant difference between Māori and Pākehā rates of elective or emergency caesarean section, after adjusting for BMI (an independent risk factor for emergency caesarean section), age, deprivation and other clinical factors (Anderson, Sadler, Stewart, Fyfe, & McCowan, 2013); the authors acknowledged this may differ elsewhere.

While there is evidence of the effectiveness of obstetric procedures during labour and birth in preventing perinatal and neonatal deaths (Darmstadt et al., 2009; Lee et al., 2011), the link between Māori access to obstetric interventions and inequalities in adverse birth outcomes for mother or baby is unknown.

Acceptability of care

The way in which mothers were cared for during the birth has the greatest impact on overall satisfaction with maternity services care. In 2011, a high proportion of Māori respondents to the Maternity Consumer Survey (86 percent) reported being 'quite satisfied' or 'very satisfied' with care received during the birth of their baby and with care received at home following the birth (Ministry of Health, 2012b). An earlier study found that Māori women living in isolated communities faced particular difficulties in accessing providers responsive to their cultural needs due to a lack of suitable providers (National Health Committee, 1999). Further research, including reasons for the higher level of dissatisfaction is needed.

One study described negative experiences that took away individual and whānau agency during birth and postnatally (Rimene et al., 1998). There were also deeply distressing stories of experiences when their babies had died. Of the more positive stories, hospitals' increasing acknowledgement of the importance of returning the whenua was noted, along with increased acceptance of having the father present at the birth. Cultural concerns also featured in the 1999 Review of Maternity Services (National Health Committee, 1999), and were raised in the 2008 Review of Maternity Services in the Wellington region (Ministry of Health, 2008c:90). Hospitals around the country have implemented tikanga best practice policies that establish, for example, protocols for the return and storage of the whenua and the importance of whānau supports (Auckland District Health Board, 2003).

It is unclear whether the Maternity Consumer Survey is the appropriate instrument to elicit concerns about or satisfaction with cultural aspects of care from Māori whānau. More information is needed to assess the impact of these developments on Māori whānau

⁷ Women who have never given birth to a viable or live infant.

experiences of maternity care. Research is also required on how to develop cultural competence at the organisation and system levels that will achieve better outcomes for Māori mothers, babies and whānau.

Neonatal intensive care units (NICU)

Giving birth can be a stressful time, and premature and difficult births heighten stress and anxiety for whānau. A New Zealand qualitative study examining the care of premature babies in hospital-based neonatal intensive care units found that, although whānau appreciated the clinical care received, there were concerns about poor staff communication, lack of information, mispronunciation of te reo Māori and a lack of staff understanding of Māori world views and practices, including tikanga and concepts of whānau. While some staff responded well, others did not (Pihama & Lee, 2010). These issues highlighted a disjunction between policy (e.g. tikanga best practice policies) and practice (Pihama & Lee, 2010). Differences in urban/rural experiences emerged, where additional stress was experienced by whānau who resided outside the main centres, requiring them to travel significant distances. Thompson's (2009) study of Māori whānau experiences of NICU identified a range of ways that services and whānau could support positive experiences at this critical time.

Maternity care and the life course

Pregnancy is an important period during which health and support services can provide information, care and resources to enable the optimal environment for fetal and neonatal stages of life. Māori women have a higher prevalence of maternal risk factors compared to other women, and therefore have greater maternity care needs. There has been a significant focus on quality of maternity care in Aotearoa/New Zealand in recent years. However, more research is needed to ensure quality improvements in maternity care are designed, implemented and evaluated for their impacts on Māori women, babies, and whānau.

Lu and Halfon (2003) proposed that ethnic disparities in birth outcomes require a focus not only on exposures to risk and protective factors during pregnancy, but over the life course of the woman. This is consistent with recommendations from a review of pregnancy outcomes for Māori women between 1980 and 2001 (Mantell, Craig, Stewart, Ekeroma, & Mitchell, 2004). Their review, in noting the sensitivity of Māori SGA (small for gestational age) rates to socioeconomic deprivation, proposed that broader social and policy interventions may be more effective for improving birth outcomes than those that are more narrowly pregnancy focused.

According to Lu et al. (2010), from a life course perspective, quality antenatal care is especially important as part of a continuum of health care for mothers and as the starting point for the child's developmental trajectory. The concern is to ensure that conditions for mothers and babies over time will optimise birth outcomes. The focus moves beyond exo and micro systems to strengthening families and communities and addressing wider determinants. Reproductive health is not considered as a disconnected stage, but rather

as an integrated part of the life course continuum, a time when broader conditions and inadequacies in care may converge to contribute to adverse birth and life course outcomes for Māori.

Chapter 5: Sector engagement

This chapter provides a summary of information gained from stakeholder key informant interviews and questionnaire. The methods for this part of the project are described in Chapter One. The following summarises the perspectives of key informants.

The interviews are reported on here under the macro, mezzo, micro and exo system levels used in this document. Where online feedback respondents provided comment, these, with source attributed, have also been included. Only one new research area, which was outside the scope of this study, emerged from the online feedback: the impact of cultural identity, cultural connectedness, knowledge and understanding of whakapapa and te reo on mothers.

Conceptual and theoretical approaches

Life course research approaches were familiar to some stakeholders and, when discussed, respondents could relate them to Māori concepts. In particular, respondents spoke of pregnancy as a time when the mother needs particular care and support, not just for her own wellbeing but for that of her baby and for the child's future wellbeing.

Respondents considered that life starts in the womb and that influences on the mother during pregnancy also affect the baby. This was considered consistent with Māori understanding and supportive of the significance of the early stages of life. The need to understand and provide initiatives from pre-pregnancy onwards was emphasised by respondents.

Another discussed the need for broader and more holistic markers of health, arguing that current measures were too crude and did not take into account, for example, such things as the important bonding that occurs through breastfeeding.

Generally it was agreed that interventions need to be evidence based and that research and evaluation provide an important platform for informing interventions. However, the meaning of the term 'evidence' varied depending on what was considered to be valid in different spheres and in what ways something becomes evidence.

A range of interventions were discussed, a key theme being that although pregnancy, birth and the early days constitute a significant stage, interventions need to cover the whole life course and involve societal issues and whānau, not just individuals, in approaches to child wellbeing:

The evidence points to the importance of early intervention but this doesn't work in isolation and we need to support whole communities, parents, grandparents. You can't say that this is where the interventions can be most effective and ignore others, say that once you reach a certain age that you have to deal with problems yourself. We need interventions at all ages and stages [and] to acknowledge the

importance of all generations in caring for children and for pregnant women and mothers. (Māori health service provider)

Macro: national and state

Discussion

Whānau poverty was considered an important issue by many respondents, and this, along with discrimination, was described as resulting in multiple burdens and stressors for Māori, and also for some population groups such as marginalised women, poly drug users and teen parents. Addressing child poverty was further identified as a particular concern by stakeholders and was related to the rights of children.

Poverty was related to poor housing, having to work up until birth, needing to quickly return to paid employment, and having difficulties meeting costs related to pregnancy and health services. Housing policy was seen as not always being supportive of women with children, particularly in relation to criteria for accessing state housing stock.

Respondents viewed racism and colonisation as interwoven, with impacts on hapū ora at multiple levels. Questions were raised about racism and colonisation as factors that could, for example through maternal stress, have impacts *in utero*.

Some people raised perspectives on social exclusion by policy intent, particularly in relation to perceptions that agencies and policies considered the 'hard to reach' as requiring 'too much effort'. Concern was also raised that whānau were framed as deserving or undeserving and, as a consequence, may be treated differently. This social exclusion, along with other processes that create disparities, was also considered to contribute to an increase in disparities.

Research priorities

Research areas suggested by respondents included how racism and colonisation, possibly through maternal stress, affect babies *in utero*; how policies and systems include and exclude marginalised groups and; housing need and policy in relation to mothers with children. Respondents emphasised the need to inform structural and systemic approaches and solutions.

Mezzo: community issues

Discussion

Geographic location was described as either enhancing or hindering whānau abilities to support one another. Some communities sought to mitigate poverty by pulling together:

If you're pregnant in these times, what I tend to see with families who would be considered lower decile [have seen this in rural areas] they cluster more together, share resources ... neighbours will share kai ... they create whānau. (Kaimahi)

State sector respondents, in particular, talked about the need to aim for and build on whānau strengths. It was acknowledged that it is often assumed that the nuclear family is the fundamental economic unit.

Māori providers spoke about a number of approaches they were involved in which they felt were having positive impacts. Key success factors were providing relaxed, fun and informal environments where parents and wider whānau could talk and share their knowledge and experiences, having the right kaimahi (workers) and the right messages, and going to parents rather than waiting for them to seek out services.

Whānau could provide a positive space for mothers and babies, particularly involving tikanga and wairua practices that can connect both mother and baby to whānau and reinforce the value and place of both. The idea that birth is a time of special celebration, when a child is welcomed into the whānau, was contrasted with how this is sometimes marked today; for example celebrations centred on alcohol consumption. Celebrating the joy of pregnancy and birth was seen as having the potential to open up a range of possibilities.

Respondents talked about societal norms and structures, including the urbanisation of whānau, whereby kaumātua are not placed within the whānau structure, and how that affects wellbeing and the transfer of knowledge. Māori concepts, including intergenerational relationships, were widely discussed. The mokopuna-tūpuna relationship was seen as particularly significant, conceptually and as an undervalued basis for informing practice.

The thinking is wrapped up in those words, puna – we don't have any evidence to say that it works that way and the frustration is to 'prove' it. We know things work but research is what makes things evidence (Māori health service provider).

Relationships between parents, children and the wider whānau were seen as dynamic and reciprocal. These relationships shaped the parents' ability to support the child emotionally and reflected the collective intergenerational nature of Māori social structures. Respondents described complementary and balanced areas of knowledge and expertise for men and women. It was felt that men were often excluded from support and involvement in pregnancy and birth, in contrast to the roles men used to play in various iwi. Grandparents, uncles and brothers were described as missing from the literature, with most literature only providing a role for fathers. The intergenerational nature and impacts of male incarceration were discussed, with the suggestion made that quality early care and attachment might help to reduce the number of Māori in prison.

Abuse and neglect was described as an important area, but one that tended to stay in the domain of agencies and crisis interventions. Violence was seen as affecting women and impacting on their relationships with their babies. The determinants of violence were

considered to be broad, but resources and services did not always reflect the importance of this area.

Some families – young parents in particular – were singled out for attention, with stakeholders refuting the idea that being a young parent was synonymous with being a bad parent. Early or unplanned pregnancies were not framed as problems, but the focus was on the needs of parents, in particular the parenting, education and health service needs of young people who may not be well supported by whānau or other networks. Stigma attached to teen parents was also seen as a negative impact on wellbeing. Families of children with disabilities also face additional stressors, and it was uncertain whether services were able to adequately support these families.

Breastfeeding was seen as a critical influence on child wellbeing, for which women need broad support, including social acceptance and workplace and whānau support. Good nutrition and encouragement were seen as important for supporting perseverance. One reason suggested for not breastfeeding was that it might not be a part of the mother's experience, and if no one else in the family breastfeeds they may not want to be the only one to do it. Others had heard about mothers not breastfeeding because it might disrupt their social life and they wanted to drink. Some community initiatives were seen as effective, and stakeholders spoke about the valuable role that coaches and peer supports could play, but funding was being reduced in this area. A need for more breastfeeding advocates, particularly Māori, was also expressed.

Research priorities

Research areas suggested by respondents included how communities can support whānau; how whānau relationships and structures can be supported and strengthened to care for mothers and babies; how fathers and other males can be included in hapū ora and; how Māori knowledge and narratives can contribute to more inclusive whānau and community approaches to hapū ora. One respondent wanted to know why people stay in the justice system and the intergenerational impacts of these cycles.

Questions were raised about the effectiveness and resourcing of a number of current interventions and agencies aimed at whānau and parents, particularly in terms of providing support for young parents, parents with disabilities, and families of children with disabilities, and in supporting breastfeeding. There was a sense that there were improvements, but gaps in knowledge and delivery remained, particularly the contribution of Māori knowledge to the planning and development of some of the more mainstream initiatives.

Research exploring how to prevent abuse, how to break the cycle of abuse, the reasons why abuse occurs and the effects that it has on the mother, child and whānau were considered important steps to improving outcomes and safety for mother and child. One survey respondent suggested that it might also be useful to study abuse against mothers in the workplace and from parents, including in-laws.

Micro: mothers and babies

Discussion

Maternal health and wellbeing was considered to have a significant influence on birth outcomes and child wellbeing and on the wellbeing of the whānau more broadly. In turn, whānau was considered essential for maternal wellbeing.

Specific concerns were mentioned, including stress, depression, alcohol consumption, tobacco use, nutrition and physical activity. It was suggested that low levels of physical activity contribute to the length of time women are in labour. Poor nutrition was linked to knowledge about food, but was also seen as a societal and economic issue, with 'bad kai' described as more affordable.

Alcohol and tobacco were seen to be important influences *in utero*. Fetal Alcohol Syndrome and Fetal Alcohol Effects were mentioned, along with comments that women may drink when they are not aware they are pregnant. Issues of toxic influences on pregnant women and tamariki were seen as being not only about maternal drinking and drug taking but also about the mother and child's environment. It was observed that smokefree environments are a major focus in this area, with less emphasis on alcohol and very little on cannabis.

Changes in approaches to smoking and pregnancy over time were also mentioned. Some stakeholders said that smoking had not always been advised against previously, with mothers being told they should not stop during pregnancy because it would 'shock their system'. There was also a notion that smoking would help to keep mothers calm; this was taken as a possible indication that stress was understood to have negative effects on pregnant women.

Most service provider respondents did not engage with the terms 'epigenetics' or 'fetal programming'. Although many were aware that alcohol, tobacco and other toxins, such as mercury and lead, had negative influences on babies *in utero*, with implications for the life course, this was not commonly associated with epigenetics. When an overview of the field was provided, reactions were mixed, with some saying what came to mind were 'Nazi programmes' and 'genetic engineering' and questions about whether Māori would benefit.

Those who were more familiar with the area discussed the research on 'skinny babies being born' and the push for babies to put on weight, when the evidence is now suggesting this may not be the preferred approach. Others spoke about the area in relation to brain development, mental health, cardiovascular disease and diabetes. Concerns were expressed over interpretation of the evidence; it was seen as dense, inaccessible and not something that had been presented to providers in ways they could use.

One criticism from a respondent familiar with the field was that, although 'the implications were profound', the research tended to be interpreted at an individual level and was rarely placed in the wider context of society and broader environmental conditions.

It would be a really valuable thing to do – translate it effectively, realise its significance, implications for everyone and we all have a role to play in addressing these factors. Biological programming is separated off and has profound implications (Māori health service provider).

Research priorities

Research priorities included information on reducing *in utero* exposure to toxins, particularly how women might be encouraged to abstain from drinking if they might be pregnant; epigenetic research that provides Māori specific analysis and interpretation and; information on how epigenetic research can inform policy and on-the-ground service provision and information.

Exo: health systems and services

Discussion

There were concerns expressed about how well maternity services provide for Māori, specifically in relation to what was seen as an individualistic model. Stakeholders talked about tikanga and practices that had guided the birthing process and were concerned at the changes that had taken place. There were particular concerns that tapu (restricted) and noa (ordinary) might not be observed in the storage and handling of the whenua. Stakeholders spoke with regret of the ways that birthing practices had been disrupted as part of the process of colonisation.

Changes to aspects of care were seen to have had a range of impacts. Some of the pastoral care ethic around pregnant women was considered to have been eroded, with women being discharged earlier and given less support. Fathers were seen as largely excluded and whānau were marginalised; however, it was conceded that this has happened consistently in hospitals over time. In more recent times there appeared to be a move away from home visits to clinic attendance and a focus on moving mothers through hospitals as quickly as possible after birth, with some parents leaving without the skills and knowledge needed, particularly in relation to breastfeeding. However, some of the dedicated birthing and birth care units were highly praised, with smaller and rural units often being described as more flexible and whānau friendly than the larger hospitals.

Whānau agency was seen as a key factor in experiences of birth: whānau need to know their rights and insist on being heard in order to be a part of the process. It was acknowledged that not all mothers have this support and are usually not in a space to advocate for themselves. Factors that have an impact on birthing experiences and whānau inclusion and support are waiting room facilities and size, provision of car parks, policies on visiting hours, how many people can be present, and whether whānau can stay the night.

A range of 'poor cultural competencies', inappropriate encounters and processes were discussed. Concerns about the cultural competency of staff, along with a lack of Māori staff (including nurses and midwives), were raised. It was felt that young parents in particular need to have other young people working with them, and that older kaimahi might not always be the most appropriate.

Discussions about midwives drew mixed responses. They were seen as important in the care process, but were also seen as limited in the time they were able to spend with clients, given case load requirements and restrictions on what they were paid to provide. There were also concerns about the level of knowledge of some of the midwives and whether they were able to bring tikanga processes to those who wanted this.

One stakeholder discussed the poor quality of relationships between some midwives and obstetricians, potentially resulting in negative impacts on birthing practice. One specific issue was a perceived reluctance to contact obstetricians in more precautionary circumstances. There was a concern that if an obstetrician was called out but not needed they might react negatively, resulting in some midwives waiting until concerns grew more serious.

The need to deal with preconceived ideas and racism in the mainstream service workforce was raised. Some stakeholders spoke of Māori 'being failed before they even walk in the door' and the stigma that might be attached when approaching services for help or in being targeted by services. Some stakeholders were particularly concerned with issues for vulnerable women – women who were stigmatised or faced particular challenges, such as sex workers, or substance and poly-drug users. These women could be suspicious of services, be judged harshly, not be 'wanted' by maternity services and have their rights disregarded. A concern was also expressed that some of these parents perceived high levels of infant mortality as normalised. There were also issues for some groups of people, including those who are 'hard to reach', move frequently, may not access care and may not want to be reached (e.g. gang members). One survey respondent suggested that transport issues, poverty, rural location and a lack of knowledge of available services were barriers to service use.

Research priorities

Respondents suggested research on Māori knowledge and practices, particularly how they could be incorporated into existing mainstream services and how they could inform new approaches. Knowledge about changes in care and differences between units and services that work well for Māori, and those that do not, were also an area of interest, along with questions on how whānau inclusion and agency could be increased and how to work with a range of whānau – including those who are young, 'hard to reach' and vulnerable. Workforce issues, including competency in working with Māori, and the training, support and retention of Māori, were seen as needing investigation.

Chapter 6: Hapū ora research approaches and priorities

In this chapter we briefly summarise and discuss life course research approaches and then draw on the literature review alongside stakeholder interview and questionnaire data to discuss and present four research priorities.

Research approaches

The mechanisms and interactions by which maternal experience in pregnancy affects later health and wellbeing in infants and children are complex and variable. This complexity, and the associated debates in the literature, requires careful consideration. While some researchers focus on 'environments' and health services, many continue to focus on individual behaviour and biology. A strongly individual focus can serve to allocate individual blame and fail to take into account wider societal issues and causes of inequities.

This review found a growing number and range of research models, designs and methods investigating the complex relationship between environmental exposures during pregnancy and fetal, infant, child and adult outcomes. Approaches taken involve life course epidemiology (including longitudinal studies), animal model research, neuro-endocrine studies, developmental biology and epigenetics. The emerging field of epigenetics seeks to describe and explain the influence that environmental events have on the fetal stage of the life course, and implications for longer-term health and wellbeing.

A 'determinants of health' approach to understanding maternal and infant health, with implications across the life course is strongly supported by this review. This approach recognises the importance of looking beyond individual level causes, to address underlying environmental influences that shape the lives and experiences of Māori whānau and influence maternal and infant wellbeing.

Research also needs to encompass interactive linkages across the life course with particular attention paid to the processes that create and maintain inequities. There is very little literature on what a Māori life course approach might look like, including gaps in knowledge on guiding concepts, transitions and features. Current conceptualisations of the life course may not be aligned with Māori concepts.

A key challenge for this review was to understand and reconcile the focus on individual level risks and outcomes, inherent for example in epigenetic analyses, with those of population approaches and Treaty imperatives to address the conditions that perpetuate inequitable adversity and outcomes such as the experiences and impacts of colonisation and racism. Over recent years, international research has sought to link such experiences and impacts with individual biology e.g. linking biochemical outcomes associated with stress to considerations of the impact of stressful events such as racism. Recent research is starting to shed light on why and how broader experiences such as racism have an

impact *in utero*. Emerging research is increasing our understanding of the relationships between broader determinants of health and fetal and infant development; this includes research that explores implications for life course health.

Opportunity in research exists for synergies between Māori knowledge and practice, social determinants approaches and the various fields of research covered in this review. Epigenetics, fetal programming, plasticity and associated research have not entered significantly into the Māori health research agenda and it was evident from the engagement phase that such terms elicited reactions of concern, particularly in relation to notions of genetic manipulation or selection.

Perspectives of key informant stakeholders aligned with the literature in recognising pregnancy and early life as significant times that influence a baby's development, health and wellbeing across the life course. Stakeholders also recognised how various research approaches and findings could be interpreted and used in their work, albeit with cautions attached. In turn, epigenetics and associated research requires much better translation, critical appraisal and a diversity of contributions, particularly in relation to wider determinants of health and applying emerging findings to practice.

Research priorities

The research suggests complex relationships exist between environments, biology and timing. Life course and epigenetic approaches in particular recognise that there are key times when specific influences impact on current and longer-term health and wellbeing. Life course approaches have an increasing role in informing health and social policy, as decision-makers consider the nature of interventions, when in an individual's life interventions may best be placed, and what may be the longer-term benefits of intervention earlier in the life course. Longitudinal cohort studies provide opportunities for investigation of many exposures and outcomes and their relationship across the life course. New directions in research involve bringing together biological research and epidemiological studies, incorporating the benefits of both, linking population health to individual biology. Drawing on the literature review and stakeholder engagement, it would seem safe to conclude that, from a holistic and Māori focussed perspective, hapū ora outcomes could be enhanced by:

- drawing more strongly and explicitly on Māori world views in relation to maternity services
- identifying and addressing conditions, needs and care required for particularly vulnerable groups including mothers, babies and their whānau living in poverty
- understanding and reducing experiences of maternal and whānau stress, including stress associated with the broader determinants of Māori health such as racism and marginalisation

- increasing the awareness of, and emphasis on, maternal mental wellbeing and preventing and addressing maternal mental ill health
- increasing the awareness of, and emphasis on, Māori maternal support and health needs.

For each of these areas, the provision of quality data and ongoing monitoring and evaluation is required for hapū ora related needs, service provision, programmes and outcomes.

Working from the knowledge gaps and needs identified in this review, four overarching priority areas emerged, providing a balance between the responsibilities of government, communities and whānau:

1. Ensuring high quality data as a foundation for research, monitoring and evaluation.
2. Addressing societal conditions such as poverty and deprivation and meeting the needs of vulnerable populations.
3. Supporting mother, baby and whānau through services and social support and by better understanding stress and maternal mental health issues.
4. Improving services for maternal and newborn care, including maternal mental health care.

These priorities are summarised in the following table.

Hapū Ora: wellbeing in the early stages of life

Addressing societal conditions

- In what ways do policies affect pregnant Māori women, mothers and their whānau who are experiencing hardship?
- In what ways do policies affect vulnerable and marginalised pregnant Māori women, mothers and whānau?
- How do agencies consider and support pregnant Māori women, mothers and whānau who are experiencing hardship?
- How do societal norms affect vulnerable and marginalised pregnant Māori women and new mothers?
- How can the inclusion and agency of vulnerable, and marginalised pregnant Māori women, new mothers and whānau be improved?
- How can health effects of systemic racism be better understood and addressed?
- How do societal conditions such as community resources affect the ability to support hapū ora?

Supporting mother, baby and whānau

- What are the experiences of women and whānau in relation to care and support at all stages of pregnancy, birth and after care?
- What are the effects of parental incarceration; how can we address this?
- What are the relationships between maternal stress and life course outcomes?
- In what ways does racism/discrimination affect cortisol levels and life course outcomes?
- What do we know about the mental health status, 'causes' and service needs of Māori women of childbearing age?
- How can nutrition related epigenetic research contribute to Māori maternal and newborn health?
- How can healthy pregnancies be supported in relation to alcohol and other substance use?

Improving services

- How well and in what ways do existing services meet the needs of Māori? What changes might be required?
- What are maternal and whānau experiences of services?
- How do health professionals practise maternity related care for Māori?
- How can and are, Māori world views, values, knowledge, and practices incorporated into services and interventions?
- Do Māori women receive best practice maternity care in relation to monitoring and screening?
- How do services identify, respond to and provide a continuum of care in relation to Māori maternal mental health needs? How can we improve practice?
- What changes might be required for services to integrate mental health and maternity care needs?
- How can workforce capacity and capability issues be addressed?

Society/State

Community environment

Mother, baby ,whānau

Health services

Effective research, monitoring and evaluation

What data is available for monitoring and evaluating policies, systems and services?
What are the gaps?

What data needs to be collected and/or analysed by ethnicity?
Who is or is not doing this and who should be responsible?

What are best practice approaches to data collection, analysis and use of data?
What are the enablers and barriers to providing quality ethnicity data?

How appropriate are current indicators of newborn wellbeing for Māori?
In what ways are whānau reflected in the data?

What maternal mental health related information is available in routinely collected data?
What are the gaps?

What data is available for monitoring Māori maternal mental health related service contact?

Ensuring Treaty responsibilities are systematically addressed

Guiding concepts, transitions and features

A Māori life course approach

Priority 1: Research, monitoring and evaluation

Quality data provides reliable evidence for strategies, policies, service design, and delivery to improve Māori health. In addition, the process of monitoring and evaluation may encourage people and organisations to scrutinise behaviours and practices, leading to self-improvement.

The review identified a number of specific areas where data and/or analyses were needed in relation to Māori maternal and child health status and outcomes including birth outcomes and maternal mental and physical health. Data is also needed on service effectiveness, access and utilisation, including contact with and utilisation of antenatal education, hospital inpatient, outpatient and obstetric care. Co-parents⁸, including fathers, are largely absent from available maternity data and there is a need to develop measures that reflect whānau.

The routine collection and analysis of quality data by ethnicity is crucial to understanding where disparities exist and developing approaches for monitoring and improving the health of pregnant Māori women and Māori babies. National consistency in monitoring ethnic disparities and time trends related to hapū ora is 'important as it allows examination of how Māori health status and outcomes are changing, and whether disparities are increasing, remaining stable, or reducing' (Cormack & Harris, 2009). Analysis of Māori outcomes and equity is not always undertaken. This limits the ability of policy and practice to address issues of health and wellbeing for Māori women and infants, and runs the risk of increasing inequities.

Recent developments in the routine collection of maternal and newborn data and in longitudinal studies of birth cohorts have increased the amount of information available and the opportunities for monitoring trends in pregnancies, maternity service receipt, and birth outcomes for mother and baby (see Appendix 3). These datasets could provide a basis for the examination and development of further indicators of newborn wellbeing. Of importance, the Health Quality and Safety Commission (HQSC) is facilitating and presenting data and information to inform the health sector, across a broad range of health areas, including those of relevance to pregnancy, childbirth and infancy.

(a) Best practice for hapū ora health data

The review highlighted the knowledge sitting within current datasets and raised issues associated with data quality and analysis. It also identified a need to consider what further

⁸ Co-parents are defined by Van Egeren and Hawkins (2004) as '*at least two individuals [who] are expected by mutual agreement or societal norms to have conjoint responsibility for a particular child's well-being.*'

data could be collected and in what ways measures and indicators are reflective of and appropriate for Māori. Specific data and monitoring related investigations could include:

- Identifying what maternal and newborn data is collected and available by ethnicity and how it is used (e.g. what data is analysed and used for monitoring and evaluating policies, systems and services?). Determine what can be learned from these data.
- Identifying who is or is not collecting and analysing relevant data and determine who should be responsible.
- Determining further data collection, analysis, monitoring and evaluation needs by ethnicity.
- Examination of enablers and barriers to providing high quality ethnicity data.
- Development of systematic data collection, monitoring and analyses in relation to hapū ora; including processes to ensure appropriate analysis, presentation and use of data.
- Examining appropriateness of current indicators of newborn wellbeing.
- Examining ways that diverse configurations of whānau are reflected or could be reflected in data.

(b) Maternal mental health data

There are significant data and information collections related to mental health within New Zealand health sector routine datasets. Analysis of this data may potentially contribute to knowledge informing some of the gaps found in relation to Māori maternal mental health and lead to further data needs. Areas of research include:

- Identification of data sources that are suitable for the monitoring and analysis of health service utilisation by Māori women for conditions associated with mental health during pregnancy, around the time of childbirth and in the first year of a baby's life.
- Identifying available information and gaps in routinely collected health service and mental health service data (e.g. New Zealand Health Information Service collection and the Mental Health Information National Collection database) about mental health needs associated with pregnancy, birth and the early years.

Priority 2: Addressing societal conditions

Although associations have been established between socio-economic position and a range of largely negative outcomes, there remain a number of gaps in relation to the pathways whereby socioeconomic position and poverty have an impact on hapū ora for Māori. There are questions in relation to the impact of differing policies on Māori at this early stage of life.

The review suggests that societal norms, systems and practices can negatively position pregnant women, new mothers and whānau through processes of stigma, discrimination and marginalisation, with implications for hapū ora. These processes can particularly affect those often considered vulnerable or marginalised, such as people living in poverty, teen parents, solo mothers, incarcerated parents, gang members, sex workers, homeless women, substance users, and women with physical and mental health issues.

The review found no research in Aotearoa/New Zealand that directly examines racism as a contributor to maternal stress and nothing about colonial trauma as a distinct form of stress in this particular area.

Literature shows that deprived neighbourhoods are associated with a range of adverse outcomes. Neighbourhood conditions include resources, services, social cohesion, air quality, accessibility, transport, urban and community form and a diverse range of other features of place; there is very little that explores the actual effects of living in these neighbourhoods (Morrison & Nissen, 2010), including what might ameliorate the effects of deprivation. There is therefore a major gap in our understanding of the mechanisms through which neighbourhood environments affect pregnant women, new mothers and whānau. There are also gaps in information about how positive environments can facilitate positive pregnancy and outcomes for Māori women and whānau.

(a) Resources and hardship

In order to address the knowledge gaps in relation to effects of differential resource distribution and access, research that examines policy, environments and the impacts of poverty and hardship is suggested. Participants in the engagement process emphasised the need for research to inform structural and systemic approaches and solutions. Specific areas of research include:

- Investigating the ways that differing policies consider and affect the experiences and outcomes of pregnant women, new mothers and their whānau who are experiencing hardship.
- Research investigating the approaches taken by relevant agencies to consider, address and support pregnant women, new mothers and whānau who are experiencing hardship.
- Investigation of the mechanisms by which societal resources and conditions (including housing, community level resources and characteristics of place) affect whānau and their ability to support hapū ora.

(b) Vulnerable populations

Considerable knowledge gaps exist in relation to a number of particularly vulnerable populations, such as substance users, mental health service consumers and sex workers. Research is required to understand and address the conditions, needs and care of vulnerable pregnant women and their babies. Key research areas are:

- Investigation of how societal norms affect vulnerable, 'hard to reach' or marginalised pregnant women and new mothers.
- Research into effective approaches to increasing the inclusion and agency of vulnerable, 'hard to reach' or marginalised pregnant women, new mothers and whānau.
- Determining how social and health policy undermines, supports and affects wellbeing of mothers and whānau who are vulnerable and/or marginalised.

(c) Systemic racism

Internationally there is growing research on associations between racism and health including emerging research relating to pathways to embodiment – the tangible effects of racism on people. In Aotearoa/New Zealand this research is mainly focussed on self-perceived experiences of discrimination and associations with health and other outcomes of interest. Research on pathways, mechanisms and experiences of systemic racism is sparse in Aotearoa/New Zealand, where we may have specific contexts not reflected in overseas literature.

- Examination of experiences of racism, experiential pathways to health outcomes and identifying how systemic racism can be reduced and its effects mitigated for pregnant women, new mothers and whānau.

Priority 3: Supporting mother, baby and whānau

Reduced stress, increased wellbeing and supportive environments during pregnancy and postnatally are essential for hapū ora and are likely to lead to improved outcomes. Despite considerable concerns and the disproportionate representation of Māori in prison, the review found a gap in knowledge about the impacts of parental incarceration (mothers and fathers) on whānau, partners and children.

The review also highlighted the importance of maternal stress and maternal mental health (during pregnancy and postpartum) as contributors to outcomes for offspring across the life course. These outcomes include both physical and mental health outcomes. The assertion that 'maternal cortisol and pregnancy-specific anxiety have programming influences on the developing fetus' (Davis & Sandman, 2010:131) suggests an important area of inquiry in relation to maternal stress.

The literature review revealed evidence of high levels of mental health need among Māori women, particularly young Māori women. Despite one study indicating likely greater increase in postnatal depression among Māori women, there is no other published research into the stress and mental health status of this group during pregnancy or postpartum, or any research into the prevention or management of Māori women with mental health needs during these times.

There is considerable evidence that *in utero* undernutrition, particularly the mismatch between intra-uterine growth and catch-up growth following birth is an important chain of

risks for later disease. This has implications for health and support services, including information given to new parents. Although epigenetic research has received increasing attention in Aotearoa/New Zealand, there has been little, if any, examination of what this means for Māori health or what Māori responses are to this field.

The review found a range of evidence about negative outcomes associated with tobacco, alcohol and cannabis use during pregnancy; however, advice on alcohol use in particular, and its potential effects could be more effectively transmitted.

(a) Maternal and whānau care and support

Research is needed to identify the support and care needs and experiences of mothers, babies and their whānau. More specifically, the review revealed gaps in knowledge on parental incarceration and its impacts on whānau. Key research areas include:

- Examining the experiences of women and whānau in relation to care and support at all stages of pregnancy, birth and after care.
- Determining the impact that parental incarceration (mothers and fathers) has on whānau, partners and children and investigation of ways to address this, including alternatives and mitigation.

(b) Maternal stress

Stress can directly affect a pregnant woman's health and wellbeing, and therefore the health and future wellbeing of her child. Racism is a potent and cumulative form of stress. The literature revealed gaps in research linking racism and maternal stress during pregnancy to programming. Suggested research areas include:

- Examination of relationships between maternal stress and potential life course outcomes for their babies.
- Analysis, within a Māori health context of the links/associations between racism, cortisol levels and potential life course outcomes.

(c) Maternal mental health

There is no specific research investigating pathways of care and outcomes during pregnancy and postpartum for women with known mental health needs prior to pregnancy. In addition there is a dearth of published research investigating the development of mental ill health during pregnancy and following childbirth. The recent emphasis on maternal mental health in Aotearoa/New Zealand provides an indication of the importance of this as a health issue and increased knowledge about Māori maternal mental health needs would provide valuable knowledge to support mothers, baby and whānau. Research includes:

- Analysis of the background mental health status and service needs of Māori women of childbearing age; this could include reviewing the mental health status of Māori women based on hospital admissions and mental health data from New Zealand Health Information Service, Mental Health Information National Collection and the New Zealand Mental Health Survey.
- Research examining Māori maternal mental wellbeing and mental ill health during pregnancy and postpartum.
- Investigating possible determinants and other factors associated with maternal mental wellbeing or ill health.

(d) Supporting healthy pregnancies

Maternal nutritional status has an impact *in utero* and is related to the child's risk of disease in later life; however, the review found that available research was rarely transferred in ways that were useful for Māori health practitioners. In order to address this gap, the following research is needed:

- Analysis of current approaches informing Māori women and whānau about nutrition and pregnancy and determining the most effective ways of translating nutrition related epigenetic research evidence into advice, information and support services for pregnant Māori women and their whānau.

Disproportionate use of unhealthy substances by Māori women indicates that, along with effective messages and cessation and reduction approaches, structural and support conditions need to be considered. Building on research associated with Māori women and whānau understandings around alcohol use during pregnancy research areas are:

- Analysis of how effectively information and advice about alcohol use during pregnancy is provided to pregnant Māori women and Māori women of childbearing age.
- Identification of effective strategies for reducing Māori maternal and whānau alcohol use during pregnancy.
- Examination of whānau and community conditions that support healthier pregnancies in relation to substance use.

Priority 4: Improving services: best practice for maternal and newborn services

Māori mothers and their babies experience considerable disparities compared to New Zealand European mother and babies, including persistent differentials in low birthweight, preterm birth, SGA, stillbirth and neonatal deaths. Having a higher prevalence of maternal risk factors compared to other women means Māori women have greater maternity care needs. The literature reports growing evidence that the first trimester is a critical time in relation to hapū ora but we do not know if those that need support have their needs met. There are few practising Māori midwives and differences exist in Māori women's access to

services. Māori women receive fewer antenatal services than other women, are less likely to participate in antenatal classes and receive fewer antenatal visits.

The review found gaps in knowledge about best practice in maternal and newborn service delivery, particularly in relation to the contribution of Māori knowledge to the planning and development of mainstream initiatives. Both quality of care and whānau experiences of care affect birth outcomes and health seeking behaviours, throughout pregnancy and beyond.

Integrated care is a key strategy for improving health service access, delivery and outcomes. There is no single accepted definition but it is generally thought of as a way to reduce fragmentation and achieve care that is coordinated and seamless (Cumming, 2011). Some services appear to work well for Māori whānau while others do not. The variability in care experiences found in the literature was reinforced during the sector engagement process, with Māori knowledge, practices and practitioners seen as having considerable potential to inform service delivery.

(a) Access, utilisation and best practice

In order to address the issues identified, research aimed at examining how maternal and newborn services can better reflect and meet Māori needs was suggested as a priority area. As well as drawing on what already works well, research on how Māori concepts and approaches might guide service delivery could contribute to improved practice, access, utilisation and outcomes. Key research areas include:

- Investigation of how well, and in what ways, existing services meet the needs of Māori; identify potential improvements.
- Examination of ways health professionals practice obstetric, maternity and postnatal care for Māori.
- Examination of how Māori world views, values, knowledge, and practices are or could be incorporated into planning, development, service delivery and interventions; including hospital care, birthing practices and breastfeeding support.
- Determining the extent to which Māori women receive best practice care in relation to monitoring and screening e.g. diabetes, potential birth complications.
- Investigation of maternal and whānau experiences of health services; including identification of barriers and facilitators to access and utilisation.

(b) Maternal mental health services

In order to address the gaps identified in the report, research with a focus on service provision and responses to maternal mental health is suggested as a focus. This includes Māori access to and experiences of maternal mental health care; clinician responsiveness to a spectrum of maternal mental health issues and needs and; coordinated and

continuous care to meet the needs of Māori women. Specific service related research areas are:

- Examination of health service knowledge about Māori maternal mental health needs; determining the spectrum of needs identified and approaches taken to meeting needs.
- Identifying how to improve coordinated and seamless transitions between services/providers and what changes are required for services to integrate mental health needs.
- Identifying pathways of care and where mental health fits within the continuum of care during pregnancy, childbirth and infancy.
- Investigation of health service and support pathways and maternal and infant outcomes for Māori mothers with pre-existing mental illness prior to pregnancy.

(c) Workforce development

Workforce gaps were identified in relation to building the Māori health workforce and in relation to the skills and competencies of non-Māori when working with Māori. In order to provide evidence that could contribute to a more diverse and skilled workforce, the following research areas are suggested:

- Determining training needs and skill gaps in health workforce capacity and capability.
- Identification of available training for the health workforce related to hapū ora.
- Examining how effective and equitable the current training opportunities are and identification of key features of best practice.

Glossary

Antenatal (also prenatal)	Relating to the time when a woman is pregnant
Atua wāhine	Female deities
Hapū ora	The health and wellbeing of pregnant women and their babies
IUGR	Intra-uterine growth restriction
Iwi	Tribe, nation
Kaumātua	Leading Māori elders, both male and female; also used to mean older Māori, aged over 65
Kaupapa	Platform, underlying base
Kaimahi	Māori specific staff
Kuia and koroua	Grandparents, elders
LBW	Low birthweight
LMC	Lead maternity carer, responsible for providing care during pregnancy, labour and delivery
Mana	Prestige, integrity, honour
Marae	Gathering places
Mātauranga	Knowledge
Mauri	Life force, life principle
Mokopuna	Grandchild
Noa	Ordinary, free from restrictions
Pakeke	Adult Māori, those aged 25–64 years.
Rangatahi	Young Māori, usually aged 15–24 years
SGA	Small for gestational age
Tamariki	Child
Tapu	Restricted

Te Ao Māori	Māori world
Tikanga	Māori practices or processes
Taonga	Treasure, something highly prized
Treaty of Waitangi	Signed by the Crown and many hapū in 1840, it granted the Crown governorship of Aotearoa, and guaranteed Māori their rangatiratanga (chieftainship) and ownership of their taonga (treasures), and the rights of British citizens
Tūpuna	Ancestors
Tūrangawaewae	Place of belonging, sense of belonging in respect of where you are from, a place to stand
VLBW	Very low birthweight
Wairua	Broadly interpreted as spiritual/spiritual essence
Whānau	Extended family
Whanaungatanga	Relationships
Whare Tangata	House of humanity, womb

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Appendix 1: Stakeholder participants

The following people and organisations were involved in the stakeholder engagement:

Stephen Allen, Te Rūnanga o Te Rarawa, Te Tai Tokerau Research Consortium (Whānau Ora research programme)

Vyletta Arago-Kemp, Principal Research Analyst Māori, Families Commission/Kōmihāna ā Whānau

Kahukore Baker, Principal Māori Policy & Knowledge Analyst, Families Commission/Kōmihāna ā Whānau

Tasha Bentley, Breastfeeding Advocate, Te Runanga o Te Rarawa

Belinda Borell, Researcher, Whāriki Research Group, Massey University

Ngaropi Cameron, CEO, Tu Tama Wahine o Taranaki Inc

Julia Carr, Senior Policy Analyst, Whānau and Social Policy, Te Puni Kōkiri

Nikki Coupe, Hapai Te Hauora Tapui

Marama Davidson, Human Rights Commission

Terryanne Dobbs, Te Tai Tokerau Research Consortium (Whānau Ora research programme)

Dr Amanda D'Souza, Senior Lecturer, Department of Paediatrics, Otago University, Wellington

Moana Eruera, Te Tai Tokerau Research Consortium (Whānau Ora research programme)

Denise Ewe, Kaiwhakahaere Quality Control, Hapai Te Hauora Tapui

Liz Gordon, Network Research, Christchurch

Reweti Hapi, Aukati Kai Paipa Kaimahi, Te Rūnanga o Kirikiriroa

Selah Hart, PA to CEO, Hapai Te Hauora Tapui

Wendy Henwood Te Rūnanga o Te Rarawa, Whariki Research Group and Te Tai Tokerau Research Consortium (Whānau Ora research programme)

Ruth Herd, Pou Tuia Rangahau, Te Rūnanga o Kirikiriroa

Te Kapua Hohepa-Watene, Pou Tuia Rangahau, Te Rūnanga o Kirikiriroa

Kathie Irwin, Kaitohutohu Take Māori, Chief Advisor Māori, Families Commission/Kōmihāna ā Whānau

Victoria Jensen, Researcher, Whāriki Research Group, Massey University

Mariameno Kapa, General Manager, Whānau Whanui, A Project of the Ngāti Hine Health Trust, Whangarei

Cindy Kiro, Head of School, School of Public Health, Massey University & Chair, Te Hononga o Tāmaki me Hoturoa

Beverley Lawton, Women's Health Research Centre, University of Otago, Wellington

Zoe Martin-Hawke, Kaiwhiriwhiri Problem Gambling, Hapai Te Hauora Tapui

Rachel McClintock, Pou Tuia Rangahau, Te Rūnanga o Kirikiriroa

Rangimarie McDowell, Whāriki Research Group, Massey University

Verna McFelin, Chief Executive, Pillars, Christchurch

Verne McManus, Whariki Research Group and Te Tai Tokerau Research Consortium (Whānau Ora research programme)

Georgina Martin, Te Tai Tokerau Research Consortium (Whānau Ora research programme)

Sally Merry, Director of Research, Werry Centre for Child and Adolescent Mental Health, University of Auckland

Alamein Newth, Ngati Porou

Nora Puketapu, Adult Māori Mental Health Needs Assessment and Service Coordination Team, Tu Tama Wahine o Taranaki Inc

Hohepa Patea, Kaihono, Senior Advisor Cultural Development, Families Commission/Kōmihāna ā Whānau

Gene Potae, Kairangahau Māori, Families Commission/Kōmihāna ā Whānau

Steve Randerson, Researcher, Community Action Youth and Drugs, SHORE & Whāriki Research Centre, Massey University (formerly with Strengthening Families, Ministry of Social Development)

Marnie Reinfelds, Ngāti Mutunga, Postgraduate student, Massey University

Lucy Ripia, Health Promoting Schools, Māori Strategic Co-ordinator, Hapai Te Hauora Tapui

Christine Stewart, Policy Analyst, Te Puni Kōkiri

Ken Taiapa, Researcher, Taranaki

Harry Tam, Manager, Sector Policy, Te Puni Kōkiri

Binki Taua, Administrator, Hapai Te Hauora Tapui

Keri Thompson, Pou Tuia Rangahau, Te Rūnanga o Kirikiriroa

Te Pora Thompson-Evans, Kaiwhiriwhiri, Hapai Te Hauora Tapui

Andrew Waa, Acting Team Manager Cross Sector Initiatives, Centre for Social Research and Evaluation, Ministry of Social Development, Wellington

Arianna Waller, Pou Tuia Rangahau, Te Rūnanga o Kirikiriroa

Louise Webster, Child and Adolescent Psychiatrist, Clinical Director, Paediatric Consult Liaison Team, Starship Children's Hospital, Auckland District Health Board

Paul White, Te Rūnanga o Te Rarawa and Te Tai Tokerau Research Consortium (Whānau Ora research programme)

Sarah Widmer, Senior Policy Analyst, Population Health Directorate, Ministry of Health

Mahia Winder, Midwife Advisor, Women's Health, Auckland District Health Board

Tracey Wright-Tawha, Chief Executive Officer, Nga Kete Matauranga Pounamu, Charitable Trust, Invercargill

Appendix 2: Online Feedback

Areas of concern

Participants were asked to rank a list of areas of concern from high to low, depending on how great a concern each area was in their work. Issues related to finances, health services and breastfeeding were ranked at the top of this list (Table 1).

Table 1: Major areas of concern

Area of concern	Average rating out of 10
Financial issues	8.8
Appropriate support services	8.7
Breastfeeding child	8.7
Physical location of health services	8.6
Knowledge of health services	8.4
Appropriate health services	8.4
Whānau support	8.2
Poverty	8.2
Maternal mental health	8.2
Parental skills	8.2
Poor housing	8.0
Nutrition of mother	8.0
Physical abuse of mother	8.0
Mother smoking	8.0

Physical health of mother	7.9
Mother passive smoking	7.8
Child passive smoking	7.8
Physical activity of mother	7.8
Physical abuse of child	7.7
Environmental toxins	6.7
Illicit drugs	6.0
Gambling	5.7
Age of parent/s	5.5

Table 2: Areas where research is needed

When asked to rank these areas in relation to research needs, their relative importance was similar to Table 1. The main differences were that physical abuse of children and environmental toxins were ranked higher and maternal nutrition was ranked lower (see Table 2). Age of parents, gambling and illicit drugs were the three lowest-ranked areas in both questions.

Area where research is needed	Average rating out of 10
Poor housing	8.6
Appropriate support services	8.5
Physical abuse of mother	8.2
Physical abuse of child	8.0
Poverty	8.0
Financial issues	7.9
Parental skills	7.7
Whānau support	7.6
Maternal mental health	7.6
Appropriate health services	7.2
Knowledge of health services	7.2
Breastfeeding child	7.2
Physical health of mother	7.1
Environmental toxins	7.1
Physical location of health services	7.0

Child passive smoking	6.9
Physical activity of mother	6.8
Mother smoking	6.6
Nutrition of mother	6.7
Alcohol	6.5
Mother passive smoking	6.3
Illicit drugs	6.3
Age of parent/s	6.1
Gambling	5.5

Table 3: Importance of research areas to mahi

Research area	Average rating out of 10
The impacts of the mental health of Māori mothers that might affect the baby <i>in utero</i> and throughout the child's lifetime	9.5
Experiences of Māori maternal stress (e.g. racism, colonisation) on Māori mothers that might affect the baby <i>in utero</i> (whare tangata) and throughout the child's lifetime (life course)	9.4
Vulnerable (e.g. homelessness, substance use, mental health issues) women's experiences of health services from pregnancy through to early care of their babies	9.0
Pre-colonial practices of pregnancy, birth and postnatal care and what we can learn from them today	8.4
Rangatahi/young parents' experiences of health services	8.2
Experiences and impacts on Māori mothers that might affect the baby <i>in utero</i> (whare tangata) and throughout the child's lifetime (life course)	8.2
Experiences of maternity care in the community	8.1
Māori fathers' experiences of health services	8.0
Experiences of hospital maternity care in general	7.9

Appendix 3: Data related to pregnancy, birth and early life

Longitudinal studies

Study	Cohorts	Numbers of Māori	Data related to pregnancy, birth and early life	Lead Organisation
Dunedin Multidisciplinary Health and Development Study (DMHDS)	Just over 1000 born in Dunedin in 1972 and 1973. Sub studies include Family Health (parents, aunts, uncles of original cohort); Next Generation (15 year old children); Parenting study (parenting of 3 year olds).	100 Māori in original cohort but Māori children included in the Next Generation study (15 year old children) and Parenting study (3 year old children).	A range of physical, mental, social, and behavioural measures.	University of Otago
Growing Up in New Zealand	6822 mothers, 4401 partners and infants from Auckland, Counties Manukau, Waikato regions due to be born between 25th of April 2009 and the 25th of March 2010. Interviewed during antenatal period; 9 months after birth; 2 years after birth (due to complete mid 2012). Other data collected.	Antenatal period: 1244 Māori mothers and 634 Māori partners. 9 months after birth: 1121 Māori mothers, 571 Māori partners and 1549 Māori babies.	Health during pregnancy, antenatal care and education; breastfeeding and immunisation intentions; nutrition; alcohol, tobacco; mental health; culture and identity; racial discrimination; birth data; infants' health; whānau circumstances, relationships, socioeconomic position, neighbourhood and environment.	Auckland University and partners
E Moe Mama: Maternal Sleep and Health in Aotearoa/New Zealand	1181 women recruited during pregnancy and followed until 12 weeks postpartum. Plans to continue study to examine further outcomes for	421 Māori women and their infants.	The relationship between sleep in late pregnancy and birth outcome (duration of labour and type of birth), and sleep early in the postpartum period and changes in postpartum mood.	Sleep/Wake Research Centre, Massey University

	mother, baby and whānau members.			
Christchurch Health and Development Study (CHDS)	Birth cohort of 1,265 children born in the Christchurch urban region during mid-1977; studied at birth, four months, annually from 1 to 16 years, then at ages 18, 21, 25 and 30.	11% selected Māori (either sole or in combination) at 21 years.	A range of maternal data was collected for the cohort; many of the cohort are now parents and data has been collected in relation to a wide range of areas – family functioning, substance use, mental health etc.	Christchurch School of Medicine and Health Services

Cross-sectional Surveys

Survey	Population and number in study	Numbers of Māori	Data related to pregnancy, birth and early life	Lead Organisation
Maternity Consumer Survey 2011	Maternity Consumer Satisfaction Survey – 3235 women who had live babies born during July and August 2010. Maternity Consumer Survey of Bereaved Women -102 women who had experienced a perinatal death between 1 July 2009 and 30 June 2010.	Consumer Satisfaction Survey included approximately 350 Māori women (23% response rate). Bereaved Women Survey included 13 Māori women.	Satisfaction with information available, antenatal classes, antenatal care, care during birth, postnatal hospital care, home visits, Lead Maternity Carer.	Ministry of Health
Awareness and Knowledge Folate and Folic Acid: survey 2010 NZ women childbearing age.	1000 sampled from general electoral roll and Māori electoral roll.	99 Māori women aged 16-44 years. Māori women under-represented in target age groups and weighted up.	Knowledge of folate and importance of folic acid, and use during pregnancy, opinion on addition of folic acid to bread.	NZ Food Safety Authority
Youth '12 and Youth '07	Youth '12 aiming to survey 10,000 year 9 to 13 students nationally. Youth '07.	Youth '12 Māori numbers unknown. Youth '07 surveyed 2,059 Māori students.	Sexual health, contraception use, ever been pregnant, outcome of pregnancy. Also modules on ethnicity and culture, health and disability, addictive behavior, injury and violence, mental health.	Auckland University www.youth2000.ac.nz
2007/2008 NZ Alcohol and Drug Use Survey	6,500 people aged 16-64 years from August 2007 to April 2008.	1825 Māori surveyed. Number who reported being pregnant in last 3 years not reported.	Use of alcohol and drugs during pregnancy/breastfeeding, advice on use, among those pregnant in last 3 years. Results on advice not to use alcohol.	Ministry of Health www.health.govt.nz

Routinely collected data

Data	Purpose	Māori data	Data	Lead Organisation
National Maternity Collection (MAT)	Provide statistical, demographic and clinical information about selected publicly-funded maternity services up to nine months before and three months after a birth. For strategy and policy development, supporting clinical intervention, maternity service evaluation and quality assurance, to assist clinical governance and for research.	Up to 3 ethnicity codes available for mother and for baby derived from ethnic codes reported to NMDS birth and postnatal events, LMC Labour and Birth claims and NHI at time of delivery. (MAT Data Dictionary 2011)	Combines two sources: 1) primary maternity services under Section 88 of NZ Public Health and Disability Act 2000 from the Lead Maternity Carer claims for payment (quality of data improved from July 2007); 2) inpatient and day-patient health event data from public hospitals and publicly funded events in private hospitals and primary birthing units during pregnancy, birth and postnatal period for mother and baby from the National Minimum Data Set. Coverage varies over time and between DHBs. Mother and baby linked with 97% coverage from 2003.	Ministry of Health www.health.govt.nz
New Zealand Maternal Clinical Indicators 2009 (revised June 2012)	Benchmarked data for DHBs to increase the visibility of the quality and safety of maternity services and to highlight areas where quality improvement could be made. Intended to support the local clinical review of maternity services, in order to identify and implement service improvements.	At October 2012 no Māori data reported. Reported only for total DHB populations annually.	8 indicators for standard primiparae including the proportion having spontaneous vaginal birth, instrumental vaginal birth, caesarean section, induction of labour, indicators related to tears, blood transfusions; three indicators for all women giving birth in hospital including proportion having general anaesthesia for caesarean section, blood transfusions after vaginal birth or caesarean section; and one indicator covering all babies born in hospital – premature births.	Ministry of Health www.health.govt.nz
Perinatal and Maternal Mortality Review Committee	To investigate and report on avoidable factors contributing to maternal and perinatal mortality.	Data reported for Māori maternal and perinatal deaths.	Maternal death working group reviews maternal deaths defined as death of a woman while pregnant or within 42 days of termination from any cause related to or aggravated by the pregnancy or its management, not from accidental or incidental causes. Includes direct (deaths resulting from conditions or complications or their management that are unique to pregnancy) and indirect deaths (from previously existing disease or a disease that	Health Quality and Safety Commission NZ www.hqsc.govt.nz

			develops during pregnancy and is aggravated by physiologic effects of pregnancy e.g. epilepsy, diabetes, cardiac disease and deaths from suicide). 2. Perinatal mortality collection – template for reporting through local DHB coordinators.	
Australasian Maternal Outcomes Surveillance System (AMOSS) and NZ Perinatal and Maternal Mortality Review Committee. From 2010 (5-year study)	To develop an active surveillance mechanism to describe the epidemiology of a variety of rare and severe disorders of pregnancy. Data collected through maternity units in Australia and Aotearoa/New Zealand (includes 24 NZ hospitals).	Unknown: one study reported H1N1 outcomes for Māori/Pacific combined (higher risk).	Conditions studied in NZ at Oct 2012: Amniotic fluid embolism, antenatal pulmonary embolism, placenta accreta and peripartum hysterectomy. Planned conditions: Rheumatic heart disease, gestational breast cancer, vasa previa. Each condition surveilled for at least a year.	Perinatal and Reproductive Epidemiology Research Unit, University of New South Wales www.amoss.co.nz
New Zealand College of Midwives Midwifery Research database	To provide reports on outcomes of midwifery care	Data on Māori mothers and babies is available from ethnicity data recorded in the patient management system of the Midwifery and Maternity Provider Organisation (MMPO). Some studies have reported results by ethnicity.	Data includes pregnancy and birth conditions, procedures and outcomes and neonatal morbidity relating to every episode of care undertaken by the members as it occurs. The MMPO anonymises and aggregates the clinical data and it is transferred to the New Zealand College of Midwives research database	New Zealand College of Midwives www.midwife.org.nz

Potential data sources:

- HQSC – Maternity service quality indicators
- Public Hospital Discharges
- National Immunisation Register
- Medsafe – medications or devices that may cause harm to fetus or pregnant women
- Perinatal and maternal mortality data
- Workforce registers
- Birth registrations
- Mental health data