



*Planned early relocation of
pregnant women who live in
geographically isolated areas
to near major birthing
centres - a review of
literature*

By

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Declaration

I hereby declare that the work herein, now submitted as a thesis for the degree of Master by Research of the Charles Darwin University, is the result of my own investigations. All references to ideas and work of other researchers have been specifically acknowledged. I hereby certify that the work embodied in this thesis has not already been accepted in substance for any degree, and is not being currently submitted in candidature for any other degree.

Signed

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Definition of Terms

Country - A term used by Aboriginal people to refer to the land to which they belong and their place of Dreaming. Aboriginal language usage of the word 'country' is much broader than standard English³.

First Nations – This term is used to describe people specifically Indigenous to Canada and Northern America. The First Nations peoples of Canada are also known as Aboriginal or Inuit in some regions. The term First Nations is used with respect in this thesis to prevent confusion with Indigenous Australians.

Geographically isolated – For the purpose of this study, residing >100 km from a major birthing centre, by easy road access; residing on an island; residing in or on a remote property without easy road access e.g. cattle station (ranch), small mining town, isolated tourist resort.

High-Income Country - those countries that are defined by the World Bank as having a high-income economy with a GNI per capita of US\$12,056 or more.

Indigenous Australians – This term is used with respect to people of Australian Aboriginal and Torres Strait Islander descent. Often referred to as Aboriginal or Indigenous people or population. The term *First Nations*

peoples is not used to describe Indigenous Australians in this study, in order to differentiate Canada and North America from Australia.

Long distance – For high-income countries this has been considered to be >100 km but it is understood that in low to middle-income countries, where transport may be difficult or unavailable, that walking distance and travel time should be considered in any discussion.

Low-Income Country - those countries that are defined by the World Bank as having a middle-income economy with a GNI per capita of <US\$995⁴

Maternity Facility – Facility with access to emergency obstetric care.

Maternity Waiting Facility – Accommodation provided close to a hospital or birthing centre for pregnant women in low to middle-income countries. Also known as Maternity Waiting Home or Silk Home.

Middle-Income Country – those countries that are defined by the World Bank as having a middle-income economy with a GNI per capita of US\$996-12,055. This is a combination of countries further separated by the World Bank into Lower or Upper-Middle Income⁴

Non-Indigenous – in Australia, people who are not of Aboriginal or Torres Strait Islander descent.

Planned – Decided on and arrangements made in advance, in consultation with medical practitioners and family members, i.e. not emergency or urgent.

List of Abbreviations

CARPA	Central Australian Rural Practitioners Association Inc.
DoH	Department of Health
GNI	Gross National Income
GP	General Medical Practitioner
HIC	High-income country
Km	Kilometre(s)
LMIC	Low to middle-income country
MDG	Millennium Development Goals
MeSH	Medical Subject Headings ⁵
MGP	Midwifery Group Practice
MMR	Maternal Mortality Rate (deaths per 100,000)
MWF	Maternity waiting facility
NSW	New South Wales

NMR	Neonatal Mortality Rate (deaths per 1,000 as defined by the World Health Organization) ¹
NT	Northern Territory of Australia
NTG	Northern Territory of Australia Government
PATS	Patient Assistance Travel Scheme
PICO	Participants, Intervention, Community, Outcomes
QLD	Queensland
RDH	Royal Darwin Hospital
UK	United Kingdom of England, Scotland, Wales and Northern Ireland
UN	United Nations
USA	United States of Australia
WHO	World Health Organization

Abstract

Globally, since the latter part of the 20th Century, maternal and neonatal mortality rates have continued to reduce. However, in high-income countries (HICs), rates are still higher for women living in rural and remote locations compared to those in living metropolitan areas⁶. Pregnant women residing in Indigenous communities in the Northern Territory of Australia must relocate from home at 36-38 weeks gestation to wait near a hospital for the birth of their baby and remain in that place until given medical clearance to return home. The situation is similar for non-Indigenous women but they do have more choices available to them regarding the place, date and time of relocation.

HICs, such as Australia, provide advanced primary and secondary health services which are available to all residents, whether free or by payment.

Reports from the World Health Organization (WHO) and the World Bank show improvements in maternal and neonatal health outcomes over time and that the Millennium Development Goals (MDGs) were being largely met. Missing from these reports are data on the inequalities of health outcomes within HICs for people who live in geographically isolated areas. This study discusses current policies and practices in maternal health care around the world and particularly in the remote Northern Territory of Australia (NT). I sought to identify evidence

of any effect on maternal and neonatal health from the requirement for pregnant women, with low-risk pregnancies, to relocate from home at 36-38 weeks gestation to stay near a maternity facility.

The study was undertaken as a review of literature in three different styles comprising systematic, grey, and narrative and culminated in an umbrella view of the overall results. This work contributes to the current range of literature by showing that there has been no rigorous research directly applicable to the primary research question.

This study highlights the need for further research into what women want in relation to birthing choices. In order that women can be free to choose the place of birth of their baby, research must be conducted which unequivocally demonstrates whether planned early relocation from their local community to near a major birthing centre, at 36-38 weeks gestation, has any effect on the health of the mother or baby. These choices will need to be balanced against increasing costs for the provision of health services to remote areas and the lack of midwives, nurses and doctors able (or willing) to work away from urban settings.

Vignettes - The Inspiration for my Thesis

Imagine you are a young Aboriginal woman living on an island off the coast of the Northern Territory of Australia. You live in a small community of around 400 people. You know everyone and have lived there with your family all your life. The only non-Indigenous people are medical staff, school teachers and council officials. You speak English as a second language. You can read and write fairly well due to English being the taught language at school. You are on social media and watch television.

You have a partner and you are happy to discover you are pregnant. There are Aboriginal Health Practitioners and midwives at the local health centre who help you with antenatal advice and checks. However, you are told by staff at the local health centre that you will have to travel to Darwin for ultrasounds and eventually to give birth at the regional hospital. You will have to stay in Darwin when you are 37 weeks pregnant to wait until your baby is born. You will stay afterwards until you are told you and your baby are well enough to go home.

You accept this as it is what everyone must do nowadays but it makes you sad. You will have to leave your family and go and stay amongst strangers. You are also sad because you would have liked your baby to be born in his or her own country where the ancestors belong.

Figure 1: Box 1-Vignette 1

Imagine you live in outback Australia on a cattle station (ranch) 300 km by road from the nearest large town where you know there is a major hospital. You have an airstrip on your property, which is maintained by station workers but is inaccessible during wet weather. It is mainly used for small aircraft during the cattle mustering season. Weather permitting, a mail plane lands fortnightly with mail and specially ordered provisions. You and your partner make a 2 hour drive to your GP for a check-up as you think you may be pregnant. Your GP runs a rural practice in a small town 200 km from your home and 100 km from the hospital. He/she has one partner and employs a registered nurse/midwife. The practice is open during normal business hours and on call for emergencies. The road connecting your property is well maintained, bituminised, and you are accustomed to the long drive. He/she confirms that you are pregnant and tells you the practice provides antenatal care but does not provide an obstetric service. He/she further states that, even if your pregnancy is low-risk, he/she would advise you to relocate to a major centre, at 36-38 weeks, where there will be a hospital with emergency obstetric services available, to ensure a safe delivery. This had not occurred to you, you don't mind the long drive and had assumed you would make your way to the birthing centre, adjacent to the hospital in the major centre 300 km from your home, either at the onset of labour or a day or two before your due date.

This is a stressful situation. Where should you go? Where will you stay? When should you go? How much will it cost? What are the risks to both you and your baby if you choose to stay at home? Your GP can't answer all your questions. He/she does not have any evidence to back up his/her statement but does not have the experience or confidence to deliver babies.

Figure 2: Box 2-Vignette 2

Chapter 1. INTRODUCTION



Figure 3: Healthy pregnant woman leaving home alone to stay near a major birthing centre. Courtesy Meera Klessa Photography © Copyright 2019

1.1. Background

The importance of safe and optimal birth outcomes for mothers and newborns is undisputed throughout the world. Medical advancements have greatly reduced historically high rates of maternal and infant mortality and morbidity⁷. Studies have now been conducted to ascertain whether safe and culturally appropriate delivery is being better attained in hospital rather than at home^{8,9}. These studies

generally focus on women who live in metropolitan and urban areas with assumed easy access to maternity facilities. However, maternal and newborn care for healthy pregnant women living in isolated areas needing to relocate at or near 3 weeks prior to their estimated date of delivery is largely unexplored in the literature.

The practice of encouraging pregnant women, who live in geographically isolated areas, to relocate to be near a major birthing centre may reduce risk. It has largely been associated with low-income countries where poor or limited access to medical care is available or affordable in their local community. The World Health Organization Millennium Goal 5 states as one of its key points that:

“Most maternal deaths in developing countries are preventable through adequate nutrition, proper health care, including access to family planning, the presence of a skilled birth attendant during delivery and emergency obstetric care”¹⁰.

The publication does not refer to Australia but the same factors are an issue for many rural and remote dwelling women in Australia, particularly those of

Aboriginal or Torres Strait Islander heritage who live in remote areas of the country¹¹.

Limited access to health services is a real issue for people living in geographically isolated areas such as those found in the Northern Territory of Australia (NT). Women who reside in geographic areas which are not serviced by specialised maternity services, such as those which can undertake a caesarean section, must decide what the risks of remaining at home are. Where delivery is to occur is discussed with GPs and midwives at early antenatal appointments. However, with no home birth services available in geographically isolated areas, the reality is that choice is limited; it becomes *where* the woman will go for delivery rather than whether she will remain at home or deliver at a medical facility.

Australia is a highly developed country classified as high-income by the World Bank. However, the majority of the population live in urban settings and service provision, although available to all residents, is concentrated in the main population centres.

In the context of this information, the broad question being asked is:

Is it really necessary in this day and age to require healthy pregnant women, who live >100 km from maternity services, to leave their homes and families at 36-38 weeks gestation to wait near a hospital to have their baby?

1.2. Purpose of the study

This study is an assessment of academic literature, the overall purpose of which is to:

- Assess, by conducting literature searches, if, there is evidence that complications during labour and after delivery are reduced for women with a low-risk pregnancy who live a long distance from hospital when they relocate a few weeks prior to the onset of labour (compared to standard care in the local community);
- Describe the evidence supporting the policy of encouraging pregnant women to relocate from home for a period prior to their due date;
- Provide information which can be available to women and their families to allow them to make an informed choice based on the best available evidence;

- Uncover whether there is currently sufficient high-quality information to support health professionals in decision making on referrals and recommendations in relation to women with low-risk pregnancies who reside in geographically isolated areas;
- Use the results to provide information for Government policy makers which can enable them to use the information in the development of evidence based policies;
- Use the results to provide future researchers with pertinent information for the design of future research, particularly:
 - Interrogation of the aggregated data to this point in time; and
 - Qualitative case studies that identify how different groups of women perceive relocation and what choices they would like to have available to them.

1.3. Significance of the study

Contemporary evidence available to support appropriate and safe models of care for delivery for women living in remote contexts is limited. Studies often concern women in low or middle-income countries. Such case studies may not

be applicable to women living in rural and remote isolated areas in high-income countries as Australia.

Currently, it is not known if relocation for confinement affects or leads to complications in delivery health outcomes for the mother or neonate when compared to those who stay in their local community. This lack of clear evidence and “easy to access” information perpetuates the on-going debate regarding whether a pregnant woman, who resides in a geographically isolated area, should relocate to near a maternity facility^{12,13}.

This uncertainty about relocation can create confusion for both health practitioners and the women and their families. A Canadian study¹⁴ published in 2011, concluded that stress and anxiety levels were high for rural pregnant women, due both from a lack of continuity of care and financial concerns¹⁴.

Additionally, Sweet’s¹⁵ publication regarding research conducted in South Australia found there was additional stress to those involved with a reduction in rural maternity services being reduced. This closure of services was partly due to practitioners leaving rural practice because of the medical indemnity crisis in the late 1990s and early 2000s (as the cost of insurance premiums for obstetric services increased significantly). Stress to families was also caused by

the uncertainty of the best choice to make regarding place of birth and time of relocation¹⁵. This study is reviewed further in Chapter 3 of this thesis.

Government health services in high-income countries such as the UK and Canada have written policies regarding the provision of maternal and neonatal care for women who are geographically isolated^{16,17}. The Australian Government's Maternity Services review in 2009¹⁸ describes similar practices being in place in Australia. However, despite mention being made of organisations such as Congress Alukura in Alice Springs and on the Australian Government's *healthdirect* website^{19,20}, there is no published policy for residents of the Northern Territory (NT). The practise of relocating geographically isolated pregnant women has become embedded in referral procedures and is widely accepted, by both families and health care professionals, as being a requirement²¹⁻²⁴. This matter is discussed in detail in Chapter 4 of this thesis.

As mentioned above, globally, since the latter part of the 20th Century, maternal and neonatal mortality rates have continued to fall. However, in high-income countries, mortality rates are still higher for women living in rural and remote locations compared to those in living metropolitan areas⁶.

Table 1 based on 2015 figures demonstrates the disparity between Indigenous Australian and non-Aboriginal neonatal deaths in the Northern Territory of

Australia (NT)²⁵. The majority of Indigenous Australian women living in the NT are from geographically remote and very remote areas. In 2011, 58.3% of the 68,850 NT Indigenous population lived in a very remote area compared with 8.2% of the NT non-Indigenous population. Although geographical location is only one of the factors impacting on the mortality rate it does play a significant role in inequity of access to health services. This is also referred to in Chapter 2 of the 2005 publication on the Social Determinants of Health²⁶ where geographical location is included as having an influence on the overall balance on factors that influence population health²⁶.

Table 1. Numbers and rates of neonatal deaths, by Aboriginal status in the Northern Territory, 2015 (per 1000 live births) ²⁵				
	Indigenous Australian		Non-Aboriginal	
	Number	Rate	Number	Rate
Neonatal deaths	10	7.9	5	1.9

In the early part of the 21st Century, in high-income countries, problems in pregnancy concerning either or both the mother and the baby are generally identified during antenatal visits. Pregnant women with problems such as diabetes and high blood pressure, or those who have multiple foetuses or where foetal abnormalities have been detected are described as high-risk. In the case of a high-risk pregnancy, the mother receives additional care and support which

further reduces the risk of poor pregnancy outcomes for her and her baby²⁷.

Women experiencing a low-risk pregnancy, who live near and have access to maternity services, can now expect a safe delivery for themselves and their babies.

Where there is no pre-diagnosed morbidity or underlying reason to class a pregnancy as high-risk, women and their families should have a choice in their place of birth and mode of delivery. The significance of this study is that it reviews current policies and practices bringing them together in a single reference document and identifies the gaps in evidence that would normally be used to support them.

1.4. Assumptions

On commencement of this study, I assumed that good quality studies of the intervention of relocation prior to birth, particularly randomised controlled trials and data analysis, had already been conducted. I assumed that the following information would be available:

- costs and other data regarding economics;
- statistics on maternal and neonatal outcomes, for rural versus urban residents, in high-income countries;

- information regarding policy development and updates;
and that
- legislation, regulations and formal policies, for all
high-income countries, would be readily available on
websites.

These assumptions were checked and tested and informed the search strategy in the systematic review. Early reading on this topic suggested that only limited data would be uncovered. It was this lack of available information that made the study particularly interesting and led to an expansion of the research to include a broader search for policies and practices for similar women on a global scale. Both my personal experience and professional career led me to the pre-conceived opinion that there would be sufficient data available to conduct a systematic review and meta-analysis.

1.5. Ethics

An ethics application was not submitted for this work. The study is a literature review of existing studies with no direct person contact or any use of private information.

1.6. Outline of the contents of each chapter

1.6.1. Chapter 2: Methods

This chapter describes the methods used for each of the three reviews (systematic, grey literature, and narrative), and the ensuing umbrella view, conducted in this thesis. It contains both narrative style descriptions and tables. Each review was analysed independently then the overall results were brought together in an umbrella view.

1.6.2. Chapter 3: Results of the systematic review

The systematic review, following Cochrane Collaboration methods, is a well-respected assessment of health interventions. It proved extremely useful in determining that no study exactly matching the topic of the research question has been conducted.

Studies examining the effects of having to leave home to wait in unfamiliar surroundings for the birth of your child are limited. A systematic review of published studies examining maternal and neonatal outcomes for relocated women compared with those who remained in their local community and received standard care was conducted.

The systematic review was intended to investigate whether any randomised controlled trials (RCTs) or other studies had been published in relation to maternal and neonatal health outcomes for women forced to relocate from home at 36-38 weeks gestation to stay near a hospital providing maternity services. The systematic review was based on positivist theory which supports “The view that all true knowledge is scientific, and is best pursued by scientific method”²⁸.

1.6.3. Chapter 4: Results of the grey literature review

With the systematic review being unable to provide clear evidence on the best practice for birthing choices for geographically isolated women, the study was expanded to incorporate a broader literature search for policies and practices utilised in other high-income countries. These materials are usually classified as ‘grey’ literature.

Information uncovered in the search of grey literature has, in the absence of other peer-reviewed materials, formed a large part of this thesis. The broad range of information, policies, practices and legislation were analyzed and then became the main form of evidence that has led to the conclusions proposed in this thesis.

1.6.4. Chapter 5: Results of the narrative literature review

The narrative review section of this thesis is an identification, analysis, and synopsis of existing literature. With scant peer-reviewed research materials uncovered in the systematic review, this study was expanded. I searched broadly for policies and practices regarding maternity care services around the world in countries with health service provision for all residents and whether there were fees and charges attached. The intent was to gain an understanding of policies and practices in maternity services throughout the world and compare them with those available to women in Australia. In particular, I wanted to make comparisons with the Northern Territory of Australia with its Indigenous population and vast distances between population bases.

The narrative review was an exploration and review of published studies, grey literature and websites. It includes literature uncovered during the systematic review (see Chapter 2) but which had to be excluded because it did not meet the inclusion criteria. It includes an exploration of current policies and practices in HICs for maternity care of geographically isolated pregnant women and current practices in low to middle-income countries (LMICs). It highlighted any evidence relating to maternal and neonatal health outcomes which may be available to support policies and practices.

This process provided new information by examining combined theories and results from individual studies. Accordingly, the resulting thesis encompasses both rigorous scientific methods and interpretations, combined with studies which include theories such as social constructionism and relativism. These theories recognise that people have different views from each other, often formed through personal experiences, based on the view that there are no universals, and that things like truth, morals, and culture can only be understood in relation to a person's own socio-historic context²⁸.

The HICs most affected by long distances between towns or cities are Australia and Canada. These two countries also have a resident First Nations population many of whom are culturally and linguistically different from the mainstream population. The discrepancy, or to use contemporary language "the gap", in birth outcomes between mainstream and Indigenous Australians and First Nations women is investigated and discussed in this chapter.

1.6.5. Chapter 6: An umbrella view of results

This chapter summarises the overall research findings and synthesizes the data collected from the three types of review conducted for this study.

1.6.6. Chapter 7: Conclusion

The concluding chapter makes recommendations for future research, summarizes the key problems, solutions, methods, and results. It also presents the theoretical and practical implications of this research²⁹.

1.7. Summary

The idea for this study came about during my years working for St John Ambulance (NT), Northern Region. A common job for the ambulance service is to transport pregnant women living in hostels to their antenatal appointments at Royal Darwin Hospital. All of these cases involved Indigenous Australian women who had flown in from remote communities and were staying in temporary accommodation in or around the suburbs adjacent to Royal Darwin Hospital. In discussion with colleagues the question often arose whether the health of these women was enhanced or compromised by this forced relocation. I noted that these pre-booked patient transport jobs did not include non-Indigenous women. I wondered what the situation was for them. I had been one of these women. I lived in Jabiru in the 1990s and when I was pregnant there was no discussion regarding antenatal services and the choice of place of delivery was left entirely to my partner and I. The stark difference between my own experience and that of Indigenous Australians is that I had a choice and a

clear understanding that any decisions being made regarding my health care would be done as part of a consultative plan.

This thesis aims to draw together historical and contemporary policies and practices and make recommendations for future research on this topic.

CHAPTER 2. METHODS:

2.1. Overview

Initially, in order to answer the research questions described in Chapter 1, it was thought that a systematic review of intervention trials would be sufficient. The systematic review process is viewed by the academic world as an efficient way to access a body of research in that it can be readily subjected to critical appraisal. It provides a clear interpretation of results, explores differences between studies, and is a reliable basis for decision making³⁰. When conducted according to the appropriate protocols, such as clearly defining the review question and the eligibility criteria for the selection of review materials, the information from a systematic review is a source of unbiased information. This is useful for policy and protocol development and future research³⁰.

Cochrane Collaboration methods informed the conduct of the systematic literature review included in this thesis³⁰. The specific format utilised in this review was the one commonly used by the “Effective Practice and Organisation of Care Group” (EPOC)³¹. The search was designed to find evidence regarding the intervention and implementation strategies for the research questions. This review was therefore a specifically designed systematic search of published

literature referring to randomised controlled trials or quasi randomised trials relating to maternal or neonatal health outcomes for pregnant women from high-income countries (HICs) who had to relocate from their home community to wait for around 3-4 weeks to give birth at a maternity facility. These were all healthy women with uncomplicated pregnancies living >100 km from maternity services.

The EPOC format³¹ recommends that consideration should generally be given to four types of study designs:

- Randomised controlled trials (RCTs);
- Non-randomised controlled trials;
- Controlled before-after studies;
- Interrupted time series studies and repeated measures studies.

A benefit of RCTs is that beliefs cannot influence random events so the researchers' beliefs cannot influence the selection of interventions³⁰. However, it is unlikely that all women or their families would agree to participation in an RCT. RCTs are designed to be objective and not influenced by personal feelings, biased viewpoints, or opinions. However, women are likely to have strong personal preferences when it comes to family matters and the safety of their children. Women being approached to participate in an RCT would not like to

think a better outcome for both themselves and their baby would be provided by being in a different intervention group. This is discussed further in 2.2. below.

Other research designs which were expected to be uncovered by the search strategy included controlled before and after studies, interrupted time series studies, cohort studies, regression discontinuity designs and higher order interaction designs.

As a systematic review has pre-specified eligibility criteria and search methods which can be replicated by others, the search strategy should give the same results for each person who conducts the search. However, just like other forms of research, the process does have its limitations. These include the fact that conducting a randomised controlled trial on pregnant women is not straightforward nor, as mentioned earlier, would women always agree to randomisation where pregnancy and birth is involved³².

A key feature of a Cochrane Systematic Review is the use of the Participants/Intervention/Comparison/Outcomes (PICO) model³³. This is usually laid out as a table (see Table 2), which provides a guide for designing search strategies and to aid in clarifying the research question by separating four main parts under separate headings. PICO can be used for the main study and also be

used for each included study, with each one having its own PICO³³. All four

columns in Table 2 below were applied to the study and are defined in Table 4.

Table 2 - Description of the Cochrane PICO model

P	I	C	O
Participants Or Population, Patients, Problem	Intervention	Comparison	Outcomes
Who are the patients? Demographics, risk factors. What is the Problem (condition, disease)?	What is the intervention being investigated? What are they being exposed to?	What is the comparison (population group, placebo, alternative method)?	What happens? What are the relevant outcomes? (Is there an impact on the participant group – medically or psychologically?)

In order to capture as much relevant data as possible it is important to use a systematic search method and explicit search terms. Search terms to identify the P and I of the PICO are the most important part of the search strategy. The methods that were used in this first review are detailed in 2.2 below.

In this instance however, while following the Cochrane format of predetermined features, it was found there was a paucity of academic materials that could answer all the research questions. It therefore became necessary to go wider and conduct a review of grey literature.

Grey literature searching as described by Rothstein³⁴ is really a method for finding “hard to find” research. The term grey literature can be used to describe works in the following examples: unpublished works, web-based studies, government policies, pamphlets, magazine or newspaper articles, theses, fact sheets. The search for grey literature is described in 2.3. below.

Having exhausted the search for literature referring to the initial topic by both systematic and grey literature methods it was decided that the study would be expanded to identify the policies and practices relating to a similar demographic of women on a global scale. This was undertaken using an integrated narrative approach and is described in 2.4. below.

The objective of these broader reviews was to build on the results of the search conducted for the systematic review. Literature which did not meet the inclusion criteria was relevant to the overall intent of this thesis. A large volume of published literature, grey literature, and Government and agency websites pertaining to policies on maternal health care services for healthy (low risk) pregnant women in HICs were uncovered and have been used as a comparison with Australia, in particular the NT.

Part 2.5. below describes the umbrella method used to synthesize the data collected from the three types of review conducted for this study.

A similar search strategy for each review of literature was conducted. It was not possible to find all relevant data by searching a single database such as PUBMED alone. To ensure a thorough search for literature, training via workshops at Charles Darwin University Library and with Cochrane Australia were undertaken. A checklist for data sources such as the one developed by Greenhalgh² was created (see Figure 4. below)

Example checklist for data sources
<ul style="list-style-type: none">• Pubmed (Medline) database• Cochrane controlled clinical trials register (CENTRAL)• Other medical and paramedical databases• Foreign language literature (translated into English)• Grey literature• Raw data from published trials (sought by personal communication)• References and references of references• Other unpublished sources known to experts in the speciality (sought by personal communication)

Figure 4: Box 3-Adapted from Greenhalgh²

A focussed systematic review was undertaken on a *very tightly defined topic*³⁵.

The outcome of the systematic review resulted in the original research topic being altered from the narrowly focussed review of interventions to become a search for the history of policies which have led to current practices, particularly in the NT. This was combined with an integrated review of what happens to women pregnant women in geographically isolated areas around the world.

This broader topic was researched by conducting both a grey literature search and a wide-ranging narrative review so that the results of the systematic review could be better understood. This method is described by Boland in the Sage publication on conducting a systematic review for a masters thesis³⁵.

All records were then collected together under an “umbrella” to synthesize the literature for further discussion.

2.2. Systematic Review

Prior to commencing the systematic review, a protocol was developed in order to ensure the study was conducted with rigour. A protocol is a plan (or template) where the review question has been clearly defined and the methods for study selection qualify assessment, and analysis are appropriate and transparent. This ensures that all people undertaking the same review, or

checking it for validity, are following the same plan and can expect a comparable result. Systematic reviews are expected to be conducted by a team generally made up of one major author (team leader) and two subsidiary authors but this can be varied as required. As this review was being conducted as part of a masters by research, there was one review author. One of the supervisors did, however, check all the eligibility criteria.

Details of the protocol for this systematic review were registered on the International prospective register for systematic reviews, PROSPERO, as CRD42018105980 and can be accessed at https://www.crd.york.ac.uk/PROSPERO/display_record.php?RecordID=105980³⁶

The protocol was developed between May and September 2017 and the main study was undertaken between September 2017 and July 2018.

2.2.1. Criteria for considering studies for inclusion

A data extraction form was developed to assess the essential criteria for inclusion or exclusion (see *Appendix A-1*).

To be eligible for inclusion, studies had to meet the criteria relating to population (low risk, geographically isolated, pregnant women in high-income

countries), intervention (relocated at 36-38 weeks gestation to wait near a maternity facility) and study design (RCTs, CRCTs, QRCTs, etc.)

The comparison population who chose to remain at home would also be required to have been included in the study design.

The primary questions used to determine eligibility for inclusion were:

- Does the study have a main objective to explore birthing options for healthy pregnant women? *Note: this may include options for place of birth*
- Does the study include outcome measures relating to maternal and neonatal health? *Note: these can be medical and/or social health outcomes.*

2.2.2. Search methods for identification of studies potentially eligible for inclusion

Electronic Searches

The Cochrane Pregnancy and Childbirth Group's Trials Register, the Cochrane Effective Practice and Organization of Care (EPOC) specialised register, the

Cochrane Library overall trials register, CENTRAL, PUBMED (MEDLINE), CINAHL, ScienceDirect (EBSCOHost), ProQuest Dissertations and Theses.

Medical Subject Headings (MeSH)⁵ terms including – Women, pregnant women, parturition, relocate/relocation, pregnant/pregnancy/ childbirth, remote, rural, distance, travel, socioeconomic, wait/waiting, maternal health services/rural health services/organization and structure, Aboriginal/Indigenous, geographic.

Databases differ in the search strategies that can be used to find relevant studies.

Thesauri in databases such as Pubmed and CINAHL allow the researcher to ‘explode’ subject terms to include more specific terms automatically in the search. This means that where a word is searched as a MeSH⁵ term the database will automatically look for other terms such as a search in Pubmed for the term

infant mortality as seen in the following screenshot (Figure 5):

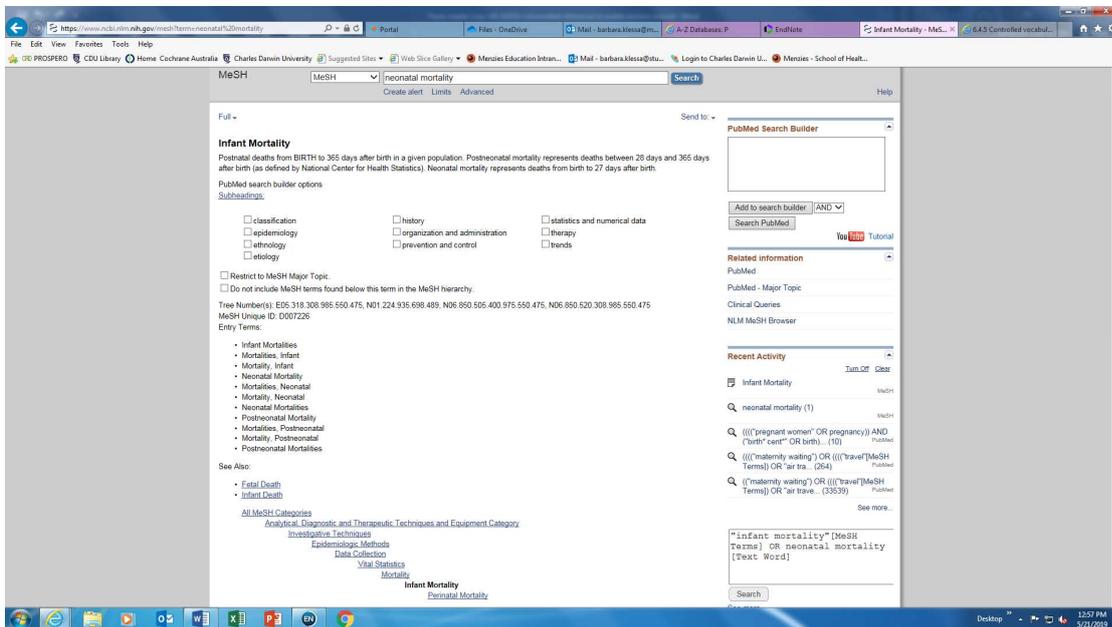


Figure 5: Screenshot of Pubmed database search for the term neonatal mortality as MeSH⁵

Consideration was also given to the country of origin of the individual databases as terms may default to English (UK) or English (USA) spelling. It was particularly important in undertaking searches for this systematic review where words such as randomised or randomized were choices in the exploded search tree.

The database CINAHL uses 'expanders' which narrows the search by headings such as 'subject major', as seen in Table 3.

The Cochrane database of clinical trials (CENTRAL) has yet another system as seen in the following screenshot (Figure 6) where the word 'parturition' is

exploded to include a long list of synonyms.

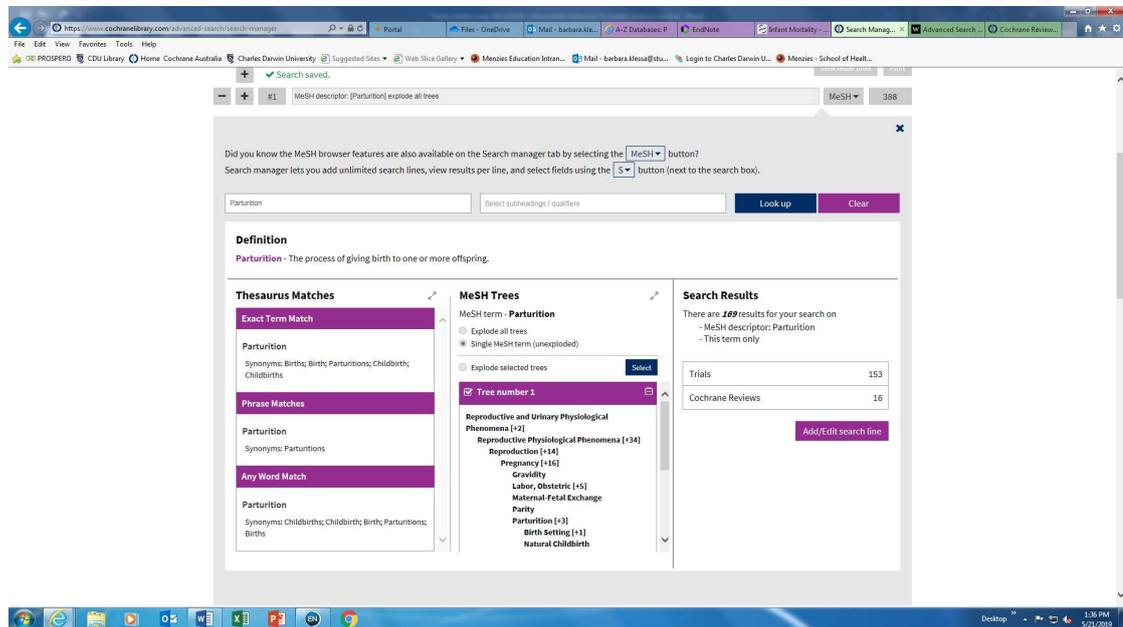


Figure 6: Screenshot of exploded tree for word “parturition” in CENTRAL

The following table (Table 3) is a description of the search strategy used in this systematic review. It can be easily replicated but the end date must be set at 2018 to exclude studies that have been published since then. This search strategy was developed over several months with many versions being tried in order to find relevant literature. All searches have all been saved and can be provided on request.

Table 3 – Review search strategy and terms

Database	Search Terms
<p>PUBMED (Adding the P and I from the PICO)</p> <p style="text-align: center;">P Participants 49466 results</p>	<p>(((((("mothers, gestational"[MeSH Terms]) OR "pregnant women"[MeSH Terms]) OR "maternal health services"[MeSH Terms]) OR "aborigines, Australian"[MeSH Terms]) OR "indigenous health services"[Text Word]))</p>
<p style="text-align: center;">IIntervention 32796 results</p> <p style="text-align: center;">P+I = 237 results</p>	<p>("maternity waiting") OR (((("travel"[MeSH Terms]) OR "air travel"[MeSH Terms]) OR "patient transfer"[MeSH Terms])))</p>
<p>CINAHL (EBSCoHost)</p> <p style="text-align: center;">Search refined by headings</p> <p style="text-align: center;">Total before narrowing by 'subject major: 4,508'</p> <p style="text-align: center;">Total after narrowing: 212 results</p>	<p>(pregnancy OR "pregnant women") AND ("maternal health services" OR "rural health services" OR "maternity waiting") OR (birthing OR "women's rights") AND (relocate OR transfer)</p> <p>Expanders – Apply related words Start with "Rural Health Services" Then choose "more" Narrow by Subject Major: Maternal health; Health services accessibility; Prenatal care; Midwifery; Obstetric care; Delivery, obstetric; Patient attitudes; Quality of health care; Community health services; Expectant mothers; Health and welfare planning; Obstetrics; Midwifery Service; Rural population; Health services, Indigenous;</p>

	<p>Perinatal care; Home childbirth; Obstetric services; Referral and consultation; Rural health; Health care disparities; Patient satisfaction;</p>
<p>ScienceDirect</p> <p>3202 results</p> <p>Filtered to research articles and review articles</p> <p>2639 results</p> <p>Filtered to 2 journals Midwifery and</p> <p>International Journal of Gynaecology & Obstetrics</p> <p>84 results</p>	<p>(pregnancy OR “pregnant women”) AND (“maternal health services” OR “rural health services” OR “maternity waiting”) OR (birthing OR “women’s rights”) AND (relocate OR transfer)</p>
<p>CENTRAL (Cochrane trials register)</p> <p>73 results</p> <p>Search Name: saved Wiley search using MeSH 210519</p> <p>Date Run: 21/05/2019 06:15:27</p> <p>Comment: This is a rerun of CENTRAL</p>	<p>ID Search Hits</p> <p>#1 MeSH descriptor: [Parturition] explode all trees 388</p> <p>#2 MeSH descriptor: [Pregnant Women] explode all trees 203</p> <p>#3 MeSH descriptor: [Vulnerable Populations] explode all trees 254</p> <p>#4 MeSH descriptor: [Rural Population] explode all trees 1513</p> <p>#5 MeSH descriptor: [Health Services, Indigenous] explode all trees 34</p> <p>#6 MeSH descriptor: [Oceanic Ancestry Group] explode all trees 161</p> <p>#7 MeSH descriptor: [Term Birth] explode all trees 146</p> <p>#8 MeSH descriptor: [Residence Characteristics] explode all trees 1337</p>

	#9 MeSH descriptor: [Health Services Accessibility] this term only 618
	#10 MeSH descriptor: [Delivery Rooms] explode all trees 68
	#11 pregnan* (Word variations have been searched) in Trials 56615
	#12 MeSH descriptor: [Rural Population] explode all trees 1513
	#13 ^{37-#5} in Trials 1782
	#14 Hospital Maternity Services in Trials 107
	#15 ("hospital"):kw in Trials 41519
	#16 MeSH descriptor: [Mothers] explode all trees 1558
	#17 MeSH descriptor: [Maternal Death] explode all trees 16
	#18 MeSH descriptor: [Perinatal Death] explode all trees 47
	#19 #17 OR #18 in Trials 52
	#20 MeSH descriptor: [Maternal-Child Health Services] explode all trees 30
	#21 #14 OR #19 in Trials 158
	#22 #3 OR # 4 OR #5 OR #6 OR #8 in Trials 716283
	#23 #21 AND #22 in Trials 73

2.2.3. Data collection and analysis

The following PICO was developed to ensure the search strategy could be clearly defined.

Table 4 – PICO developed for systematic review

P	I	C	O
Population	Intervention	Comparison	Outcomes
The population being studied was healthy pregnant women in high-income countries who live more than 100 km from a maternity facility	The practice of encouraging pregnant women to relocate from home 36-38 weeks gestation to stay near a maternity facility	Women who chose to remain in their area of normal residence, including delivery and transfer during labour	Primary: Specialist obstetric intervention during labour and delivery for either or both mother and neonate. This included any health problems in the neonatal period

2.2.4. Types of outcome measures

The main outcomes that were selected were discussed in depth with the primary supervisor of this thesis who is an expert clinician in the field. The primary outcomes to be measured were selected due to being medical issues which would require specialist maternity services. The secondary outcomes were selected to address the psychosocial effects of the intervention. Although

there are several maternal and neonatal primary outcomes listed, mortality is the most important in both cases.

The outcomes to be measured which were agreed upon were referred to during the selection process. It was agreed that the list of outcomes to be measured would be very important for decision-making as, for example, they could be entered into a summary of findings table (see Figure 7) to be sorted.

It is recommended that no more than three main outcomes (desirable and undesirable) should be selected and these should be essential for the basis of decision-making³⁰. These are listed and discussed in Chapter 3.

2.2.5. Statistical procedures and convention

Cochrane systematic reviews depend highly on decisions relating to why and which data from included studies are presented and analysed and being clearly transparent in order they can be replicated³⁰.

This systematic review depended on data having been analysed and presented showing maternal and neonatal outcomes from RCTs or other trials relating to the title of the review.

Where randomised controlled trials, cluster-randomised controlled trials or quasi-randomised trials were identified from the search, The GRADE Approach³⁸ developed by The Cochrane Collaboration would be used to assess the quality of the evidence provided.

There are 5 factors that should be used to assess whether to downgrade a body of evidence:

- Limitations in the design and implementation.
- Indirectness of evidence
- Unexplained heterogeneity or inconsistency of results.
- Imprecision of results.
- High probability of publication bias.

If all (or most) of the above limitations were found in a randomised controlled trial or other study, then the quality of its evidence would be in doubt and a very low rating would be assigned to it.

Cochrane has developed a summary of findings table which can be used to summarise the evidence. Using a table such as this one (see Figure 7) makes comparison with results from all members of review teams easily comparable.

This style of table enables sorting of the evidence and provides a pictorial overview of comparisons and whether there is a major effect from the intervention.

[experimental intervention] compared with [control intervention] for [health problem]						
Patient or population: [participants] with [health problem]						
Settings: [setting]						
Intervention: [experimental intervention]						
Comparison: [control intervention]						
Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	[control]	[experimental]				
*The basis for the assumed risk (e.g. the median control group risk across studies) is provided in footnotes. The corresponding risk (and its 95% confidence interval) is based on the assumed risk in the comparison group and the relative effect of the intervention (and its 95% CI). CI: Confidence interval; RR: Risk Ratio; [other abbreviations, eg. OR, etc]						
GRADE Working Group grades of evidence High quality: Further research is very unlikely to change our confidence in the estimate of effect. Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate. Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate. Very low quality: We are very uncertain about the estimate.						

Figure 7: Example of "summary of findings" table from the Cochrane Revman database³⁰

In order to present outcomes statistically a meta-analysis of the results was expected to be conducted. Meta-analysis is the statistical combination of results from two or more separate studies. While developing a meta-analysis plan it is important to consider heterogeneity (variation across studies) and to conduct sensitivity analyses. If the results are low in number it will be critical to ensure that the data provided is representative of the true situation.

The meta-analysis of this review was intended to be a comparison of studies which included the outcomes for the intervention group i.e. those who relocated, versus the outcomes of those who remained at home.

The contrast between the two groups was to be assessed as the “intervention effect” and analysis would include both quantitative and narrative reports. It should be noted that a results bias can arise if the numbers are very low. A reporting bias can result from assessment of narratives, so it was understood that it would be important to account for risk of bias. Examples of reporting bias are that the same study has been recorded in more than one publication or in more than one language.

The search strategy for this review was designed to eliminate the risk of multiple counts for the same study through removal of duplications (see PRISMA³⁹ flow diagram Figure 6). Briefly, PRISMA is a checklist method which can be used as a schematic basis for reporting systematic reviews or other types of research. It is freely available as a downloadable template.

Despite all the work and effort which went into the preparation of the search strategy for the systematic review, no intervention trials on this tightly focussed topic were discovered. This led to the subsequent change of direction to find out how the current policies in the NT had been established and become common practice. This included searching grey literature and conducting a broad search for policies in high-income countries (HICs) around the world describing their approach to the relocation of pregnant women.

2.3. Grey literature Review

Initially, the purpose of searching for grey literature was to highlight useful and even valuable information that was missed during the systematic search (described in 2.2. above).

With no intervention trials uncovered, the study was expanded to include a search for information on relocation policies and practices for geographically isolated pregnant women. The grey literature being reviewed for this study comprised Government documents and practical advice to staff working in regional areas. Additional criteria were the mention of policies, practices and other legislative issues regarding maternal health services relevant to place of birth. Most of the information relating to the relocation practise in the NT was found on the NT Department of Health Intranet. Importantly, for this thesis, the grey literature included searches conducted at the NT, Department of Health Library where I was granted permission to access their Intranet. The Intranet site is not available to the general public. This also included theses, non-peer reviewed journals, newspaper articles, hand searched reference lists and other unpublished sources known to experts in the specialty.

Historical information was sourced from departmental web pages and personal requests to librarians and staff.

The grey literature search could not be included in the systematic review as it is not entirely replicable by other people due to some of the information being provided by individuals. However, it became a very useful source of information for the discussion and outcomes of this thesis and was therefore expanded into a separate chapter.

Hand searching of reference lists, websites such as The World Bank, World Health Organization, United Nations and individual country and health service online information was also conducted.

Legislation, Regulations, Policies and Guidelines from other countries were searched by entering words such as 'legislation' or 'policies' into government web sites for different countries in individual country Government legislation repositories.

English language electronic databases searched were Pubmed, EBSCOHost, ScienceDirect, the Cochrane Library (Wiley) and Proquest Dissertations and Theses. Intensive hand searching and personal communications to track down non-published literature such as policies, reports and legislation were undertaken. All papers that addressed the topic were read, with more consideration given to papers where the population of interest was planned

relocation of healthy pregnant women at or near 3 weeks prior to delivery in HICs.

There was no restriction on language but due to time constraints only papers written in English or already translated into English were considered for review.

There was no restriction on date.

2.4. Integrated narrative review

As the name implies, this type of review is a study of a combination of materials not uncovered in the previous two reviews described above. It also includes a broad search and description of records found to be important for the thesis as a whole. The studies resulting from the database searches in 2.2. and 2.3. above frequently contained information including the perspective of women, the cultural appropriateness of relocation, issues of social and family disruption and consideration of human rights regarding choice of place and type of birth. This was a major factor in the decision to expand the project to review other literature pertaining to the relocation of pregnant women and policies and practices for maternity services throughout the world. In high-income countries (HICs); I also decided not to restrict the study to evidence provided by intervention trials alone.

As with the systematic review (described in 2.2. above) the main geographic area of interest was the Northern Territory of Australia (NT). However, with limited literature available, the search strategy included, i) Australia as a whole; ii) Global HICs; iii) a selection of low to middle-income countries (LMICs); and iv) a separate section examining refugee and migrant women. The decision to include materials relating to migrant and refugee women was due to similarities in their experiences described in qualitative records.

These are examples of keywords and search terms used while developing the search strategy:

- Pregnant women, relocation, rural communities, Indigenous populations, equity in health care access, high-income country, maternal health, neonatal health, birth, choice, human rights, travel, expenditure, economics, policies, practices, health gains, maternity waiting homes/facilities, distance, geography, perspectives of women, cultural security, health literacy, social and family disruption, socioeconomic status of women.

The number and titles of papers retrieved were too numerous to list with in excess of 50,000 results from PUBMED alone. The search strategy was refined by

separating titles into 2 groups - participants and interventions (see PICO typology above³³). The total results of both were then combined which resulted in a manageable number. After initial scoping for appropriateness these results were then categorized by groups in Endnote:

- Global isolated pregnant women.
- Relocated pregnant women.
- Maternal and neonatal outcomes.
- Maternity Waiting Homes.
- Cultural security.
- Human rights.
- Migrant and refugee women
- Grey literature
- Combined hand searches
- General information.

The groups in Endnote were first checked for duplications and then the titles assessed for relevance. Relevant literature was then further sieved by reading abstracts. Those that were relevant were then read in full and reviewed.

As with the grey literature search described in 2.3. above, hand searches of references were conducted.

When deciding on a method to classify countries for this thesis it was noted that varying reports and publications refer to countries as high, medium and low-income. All the references included made distinctions when discussing participants, conducting trials, or undertaking investigations. For consistency, the definition by the World Bank (see Table 5) was adopted for this study⁴⁰. The search criteria included looking for countries with a universal health system in order to compare them with Australia. As such, low, lower-middle and upper-middle income countries were grouped together under the heading low to middle-income (LMIC). The classification by GNI was used to detect HICs for this thesis. This information was then used to investigate general data and health service provision in individual countries.

Table 5 – World Bank Country Classification 2018

Threshold	GNI/Capita (current US\$)
Low-income	< 995
Lower-middle income	996 - 3,895
Upper-middle income	3,896 - 12,055
High-income	> 12,055

Literature regarding LMICs is included where there are similarities with disadvantaged geographically isolated pregnant women and those with low socioeconomic status in rural and remote Australia.

2.4.1. Criteria for considering studies for this review

The main criteria were HICs with similar characteristics and demographics to Australia and studies relating to pregnancy, geography, health service provision, maternal mortality rate, neonatal mortality rate, written in the English language, description of policies and practices and birthing choices.

As discussed in the grey literature review methods above, additional criteria for inclusion were mention of policies, practices and other legislative issues regarding maternal health services. In this case, these criteria were in published literature.

Results from studies conducted in LMICs are not likely to be transferable to the population of HICs. People of low socioeconomic status in HICs have different issues to deal with e.g. cultural disadvantage and lack of access to services readily available to the mainstream population.

2.4.2. Search methods

After sieving titles, 4908 full text documents and websites were saved into Endnote. The final count was 2209 articles after duplicates were removed.

The sorting was done manually as the use of a database, such as Covidence⁴¹ or Grade³⁸, was not really practical. Databases such as these are useful when there are real numbers to crunch. In this case, it was a search for something elusive.

Relevant publications found through hand searching of reference lists were more likely to be written with emotion and had titles which did not show up in a formal search strategy. Examples included “I wanted to give birth *here*”⁴² and “The quiet story”⁴³.

The titles were checked for relevance and further sieved into a list of relevant abstracts. After checking abstracts for eligibility criteria and excluding all studies that did not meet the prescribed inclusion criteria, the entire article or study was reviewed.

Website searching was conducted to find statistics, graphs, maps and general country information. This was conducted on a needs basis and was labour intensive. These sources were revisited up until submission to ensure information was correct and up to date.

Information from organisations such as The Australian Bureau of Statistics, The World Bank, World Health Organization and United Nations was located by directly searching their individual websites.

The search areas were primarily defined by geographic location. This facilitated the clear collection of data which could then be explored and discussed. In addition, as mentioned in 2.4. above, reference is made to migrant and refugee women as some similarities in their circumstances were uncovered in the literature.

The bias of this study was the Northern Territory of Australia and the most in-depth literature search was undertaken for that region.

2.5. The umbrella view - Synthesis of the information gathered from the three types of reviews described above

The three reviews described above were all conducted in separate but similar formats in order to find as much information as possible. This would enable a thorough discussion and subsequent recommendations to be undertaken. All the reviews were brought together in the form of an umbrella view in order to both describe and explain the results of the data collected in Chapters 3-5.

The systematic reviews were identified from the search strategy described in 2.2.2. above. They were ineligible for inclusion in the systematic review section of this thesis but were suitable for inclusion in the umbrella view.

The collection of information from the three reviews (plus the additional review of reviews included in Chapter 6) were combined and then further sorted to provide a firm foundation for the discussion and conclusion for this study. The overall objective of the umbrella view was to assess the quality of the three reviews described above. The umbrella view did not search for primary studies but did include reviews of reviews.

2.6. Summary

In order to find and describe evidence that the relocation of geographically isolated low-risk pregnant women in high-income countries (HICs) is in the best interest of both mother and newborn, three separate literature review were conducted. The purpose of separating the reviews was to conduct differing search strategies in order to uncover the broadest range of published and grey literature on this topic.

The following results chapters describe the outcomes of each review and conclude with an umbrella view of the combination of the results.

CHAPTER 3. RESULTS OF THE SYSTEMATIC REVIEW

3.1. Introduction

As described in the Cochrane Handbook for Systematic Review (5.4.1. Listing Relevant Outcomes)³⁰ the term “outcomes” is used to describe what may otherwise be considered to be criteria for defining the boundaries of searches. The inclusion of important outcomes in a review will enable the author to highlight gaps in the primary research. The outcomes chosen for this thesis were also intended to be used as evidence that further research is required in this area.

Outcomes can be selected from a wide variety of sources including, for example, the clinical experiences of the author. For this thesis the outcomes were selected as the most commonly occurring in the literature.

3.2. Types of outcomes to be measured

As mentioned in Chapter 2 above, following Cochrane protocols, the primary outcomes to be measured were selected because they were medical issues which would require specialist maternity services. The secondary outcomes were selected to address the psychosocial effects of the intervention.

Main Outcomes

In this study there were two main outcomes:

- Maternal mortality
- Neonatal mortality

Secondary outcomes – maternal

- Forceps delivery
- Post-partum haemorrhage
- Episiotomy
- Sepsis
- Retained products
- Emergency (unplanned) caesarean section
- Readmission within four weeks postnatally
- Epidural or spinal analgesia
- High-dependency care required
- Perineal trauma
- Other specialist obstetric intervention during labour and delivery (define)

Secondary outcomes – Neonatal

- Birth trauma (briefly described)
- Stillbirth
- Apgar < 7 at 5 minutes
- Sepsis
- Transfer to high-care unit
- Meconium aspiration syndrome
- Encephalopathy
- Length of stay
- Readmission within four weeks of birth
- Other specialist paediatric intervention at the time of birth
for the neonate

Secondary outcomes – social and emotional

- Women's reports of social and/or economic problems
related to the planning phase of the relocation and
separation from family and friends
- Women's reports of depression or anxiety at the time,
during and after the relocation and separation from their
family and community

- Women's expression of their satisfaction or dissatisfaction with the confinement experience
- Cultural safety
- Other social, economic or public health issues recorded

3.3. Types of participants

All participants or participant communities must have agreed to be randomised or quasi-randomised for inclusion in any study.

The participants in this study were all pregnant women in high-income countries, with a low-risk pregnancy, who live in geographically isolated areas.

The term geographically isolated is used to describe distances >100 km from a major birthing centre with good road access, or areas which can only be accessed by air or sea transport.

High-income countries (HICs) are those defined by the World Bank (see definitions). Women from low or middle-income countries (LMICs) and women experiencing a high-risk pregnancy were excluded.

3.4. Types of interventions

The intervention was the practise of relocating healthy pregnant women from home at 36-38 weeks gestation, to stay near to a facility providing maternity services which can provide emergency obstetric care if required. The women would be residing in hostels, hotels or other private arrangements e.g. staying with family or friends. The women may have relocated alone or been accompanied by family or friends. Women being housed in special care centres, such as “alongside midwifery units” (which are found adjacent to hospitals and are provided with resident nursing staff), were excluded.

The maternal and neonatal outcomes of those women who relocated would be compared with those of pregnant women who stayed in their local community and received standard care.

3.5. Types of comparison participants

Low-risk pregnant women in HICs who reside in geographically isolated areas and remain at home to receive standard care in their local community. They may have been relocated for medical reasons or chose to self-relocate at or near the expected date of delivery. They may have chosen a home birth or to transfer to a birthing centre at the onset of labour. The important distinction is that they

were not randomly allocated to the relocate group at 36-38 weeks gestation (even if they did subsequently relocate).

3.6. Overall completeness and applicability of evidence

Overall, the evidence available to support appropriate and safe models of care for delivery for women living in remote contexts is limited. The majority of the studies concerned women in LMICs and were not applicable to women living in geographically isolated areas in HICs (similar to the Australian context). Those studies that related to HICs did not report the primary outcomes specified in this review.

Those studies that referred to the secondary outcomes had not included randomisation. Currently the physical and social health impact of relocating pregnant women for confinement is not known. It is not known if relocation for confinement leads to more or less complications in delivery, or better or worse health outcomes for the mother or neonate. Similarly, the emotional and social wellbeing of relocated women is recognised as a human right⁴⁴. The evidence of any effect on women investigated in this study remains limited.

No previous reviews were uncovered which had specifically looked at the planned early relocation of pregnant women for delivery to near a major centre.

3.7. Timeframe

This review was conducted between May 2017 and December 2018.

3.8. No studies that met the inclusion criteria were found

There were no randomised controlled trials, cluster-randomised controlled trials or quasi-randomised trials identified from the search.

Some small changes were made to the original protocol as the search did not uncover any published literature on this subject. The search terms were expanded to ensure the strategy had not missed any relevant study. For example, where it was initially intended to use the search term “relocation” this was expanded to include synonyms such as transfer, move, transport and travel.

3.9. Data extraction and management.

Data from studies and trials were to be collected in an excel spreadsheet which could then be easily transferred into database management software such as Covidence. Once sufficient data was collected and sorted it would be added to the Cochrane review manager database known as Revman⁴⁵. This database has

various data management programs inbuilt and can be used for statistical analysis and presentation of results depending on the type required.

Where more than one study on the same subject is found then meta-analysis can be conducted. There were no randomised controlled trials, cluster-randomised controlled trials, or quasi-randomised trials identified from the search so the software packages were not used.

3.10. Characteristics of studies excluded from the systematic review search

During the systematic review process the following list of publications met some of the inclusion criteria (but not all). These are discussed in alphabetical order by author's name.

Table 6 – Characteristics of excluded studies

Study	Reason for exclusion	Reference and Title
Buser 2016	A scoping review to ascertain if there was a need for future research in maternity waiting homes in low to middle-income countries. This review excluded articles which related to high-income countries and any infant and/or maternal health outcomes which were not related to maternity waiting homes	Buser JM, Lori JR. Newborn Outcomes and Maternity Waiting Homes in Low to middle-income Countries: A Scoping Review. <i>Matern Child Health J</i> 2017;21(4):760-9.
Kornelsen 2009	This Canadian study was a retrospective, comparative investigation which was part of a larger multi-methods study examining the effect on referral centres of closures of small rural hospital maternity services. This part of the study focussed on the increased likelihood that rural parturient women will undergo induction of labour if they travel from remote areas to receive specialist maternity services.	Kornelsen J, Moola S, Grzybowski S. Does Distance Matter? Increased Induction Rates for Rural Women Who Have to Travel for Intrapartum Care. <i>Journal of Obstetrics and Gynaecology Canada</i> 2009;31(1):21-7.
Houd 2004	This Canadian study was a 5-year retrospective survey of the perinatal care in a remote community called Inukjuak. It considered whether it was statistically “safe” for women to remain in their small isolated community to give birth, with no possibility of caesarean section or transfer during labour.	Houd S, Qinuajuak J, Epoo B. The outcome of perinatal care in Inukjuak, Nunavik, Canada 1998–2002. <i>International Journal of Circumpolar Health</i> 2016;63(sup2):239-41.
Moffitt 2006	This Canadian paper was observational, it contained a personal reflection of working in remote Canada. It discussed the medical travel policy for childbirth from a postcolonial perspective.	Moffitt PM, Vollman AR. At what cost to health? Tlicheo women's medical travel for childbirth. <i>Contemporary Nurse</i> 2006;22.
Grzybowski 2015	This was a retrospective multi-jurisdictional cohort analysis. It was a Canadian study of the safety of rural maternity services.	Grzybowski S, Fahey J, Lai B, Zhang S, Aelicks N, Leung BM, et al. The safety of Canadian rural maternity services: a multi-jurisdictional cohort analysis. <i>BMC Health Serv Res</i> 2015;15:410.

Study	Reason for exclusion	Reference and Title
Pilkington 2014	A retrospective study using the 2001–08 <i>national data on births according to municipality of residence for mainland France</i> . This French study referred to distance as <5-≥45 km from a maternity unit.	Pilkington H, Blondel B, Drewniak N, Zeitlin J. Where does distance matter? Distance to the closest maternity unit and risk of foetal and neonatal mortality in France. <i>European Journal of Public Health</i> 2014;24(6):905-10.
Waldenström 1997	A randomised controlled trial comparing an in-hospital birth centre with standard maternity care. This Swedish study did not relate to travel or distance	Waldenström U, Nilsson CA, Winblad B. The Stockholm birth centre trial: maternal and infant outcome. <i>Br J Obstet Gynaecol</i> 1997;104(4):410-8.
Ravelli 2011	A retrospective cohort study comparing differences in perinatal mortality between Dutch provinces and to determine the significance of risk factors including travel time from home to the hospital during labour. In this Dutch study a “long travel time” was considered to be ≥20 minutes to hospital during labour.	Ravelli AC, Rijninks-van Driel GC, Erwich JJ, Mol BW, Brouwers HA, Abu Hanna A, et al. Differences between Dutch provinces in perinatal mortality and travel time to hospital. <i>Ned Tijdschr Geneeskd</i> 2011;155:A2689.
Rowe 2012	A retrospective cohort study undertaken in the UK, looking at transfer during labour or within 24 hours of birth.	Rowe RE, Fitzpatrick R, Hollowell J, Kurinczuk JJ. Transfers of women planning birth in midwifery units: data from the birthplace prospective cohort study. <i>Bjog</i> 2012;119(9):1081-90.

In the literature the subject of maternity waiting homes (MWH) regularly arose, as can be seen in the following examples in the references⁴⁶⁻⁶². However, these facilities are not entirely relevant to this study. MWHs are generally provided in LMICs. However (similar to my review question), women utilising them will have had to leave home and, in some instances, travel a long distance to stay in

these facilities to wait until the birth of their baby. Buser et al (2016) noted in their review the studies contained very limited qualitative or quantitative measures of the impact of maternity waiting homes on neonatal health. Additionally, Buser's literature search demonstrated a lack in studies and knowledge in neonatal health outcomes in settings where women have travelled to wait to give birth. Their review did not uncover controlled trials or longitudinal studies⁵⁹. Buser's study was a scoping review rather than a full systematic review and their objective was to uncover whether there was sufficient evidence to warrant a systematic review (and/or further study). Their review focussed on low resource settings (low-income countries), which differs from the objectives of this systematic review. Nonetheless, the general gap in knowledge around neonatal morbidity, when the mother has relocated for a period of time prior to parturition, is similar⁵⁹. Any research in that area would help to inform the design of trials being developed for high-income countries.

Kornelsen (2009) compared intervention rates and pregnancy outcomes between women who travelled to receive maternity services and those who already resided near them. The main focus of the study was on the rates of induction for rural parturient women and whether geographic location was a factor in birth date decision making. Her study reported on newborn outcomes and the stress that "travel to give birth" causes to the mother, especially if she has to leave

other children behind. Her study did not meet the inclusion criteria as it did not refer to length of time the mother had stayed away from home prior to parturition. Of interest in this paper was the mention that women sometimes requested induction in order to be able to return home to their local community. Her study also mentioned “out-of-pocket expenses” for the women who travelled, a factor which has been rarely referred to in the literature⁶³. Costs are relevant to this thesis and are further discussed in the Narrative section.

A discussion of the medical travel policies for Inuit women from the Northwest Territories paints a picture that has many similarities to Australia in its provision of remote area maternity services from a post-colonial perspective.

The author (Moffitt) has spent many years working with the First Nations women of the Canadian Northwest Territories and it was her intention to raise awareness of the risks to cultural safety caused by the childbirth policies.

Examples of reasons for the continuation of these policies from the Provincial Government’s point of view are fear of litigation and difficulty in attracting and retaining health professionals in remote areas. In the discussion relating to “risk”, there was no reference to maternal or neonatal health outcomes. There was mention of the psychosocial impacts of the “evacuation”. The “feeling” of the mothers is very much an individual experience the experiences of those women (whether or not they are First Nations), is not easily categorised⁶⁴.

A further Canadian study, by Houd 2004,⁶⁵ explored whether it was statistically “safe” for women to remain in their community to give birth. The research was a retrospective cohort study, from 1998-2002, of perinatal care for women from a very remote area of northern Canada. This paper also highlighted many similarities to remote Australia with reference to women being in a “high-risk” pregnancy due to behavioural habits such as smoking and alcohol consumption. In addition, a high proportion of the women suffered domestic violence. The return of midwifery services to the region has provided women with a choice. This has been taken up despite there being no possibility for a caesarean or emergency medical evacuation. It is of particular interest that the forced evacuation of pregnant women from that region took place from 1960-1986. After that period, midwifery services were introduced and women could be part of the decision-making process. The small community of Inukjuak was included in the program in 1998 and the author concludes that, due to the introduction of midwifery services, 25% of pregnant women can and do remain in their community to give birth⁶⁵.

A multi-jurisdictional cohort analysis of maternal and newborn outcomes in three Canadian Provinces looked at small rural maternity services in relation to risk and safety. Although distance to maternity services was discussed, this study did not review the planned early relocation of pregnant women.

Therefore, it did not meet the eligibility for inclusion in this systematic review section. The author, Grzybowski⁶⁶, has undertaken other studies of remote area maternal services in Canada and his work is referenced in the global discussion section of this thesis^{66,67}.

In 2011, Ravelli⁶⁸ examined the Netherlands Perinatal Registry to investigate any differences in perinatal mortality between Dutch provinces. The author considered excessive distance in Holland as ≥ 20 minutes travel time to hospital while in labour. The study did not meet the inclusion criteria of this study. It was not possible to fully review this paper as only the abstract was available in English. However, there were some interesting social issues raised such as additional impact on birth outcomes being influenced by age, parity, ethnicity and socioeconomic status⁶⁸.

Another study from Europe⁶⁹ was identified by the search strategy. This study was an assessment of a trial birth centre compared with standard maternity care in a hospital in Stockholm, Sweden. It has been included in this discussion as it was the only randomised controlled trial which was identified in the search. The study compared a birth centre with standard maternity care and the outcomes were medical interventions and maternal and infant outcomes. This study provided useful information about how to randomise women when designing a

trial. Researchers randomly allocated women (who had expressed an interest in birth centre care) to either the trial birth centre care or standard care in any of seven hospitals within the greater Stockholm region. The study was undertaken over three and a half years from late 1989-mid 1993⁶⁹. Data were collected from records from the seven hospitals and from the trial birth centre. The author discussed that, as birth centre care was a new service in Sweden, results were not conclusive and further study was required. He further noted that, as the birth centre was being run on a trial basis, there may be more enthusiasm amongst staff who felt they were participating in “pioneering work”. This might have them more attentive to the patients. One important factor (that is often noted in all studies of alternative care versus standard hospital care) is that there are less likely to be medical interventions during labour outside hospitals.

A French study, which considered whether distance to a maternity unit impacted on perinatal outcomes, introduced some interesting factors regarding socio-economic compounders. Relative risk by travel distance to a maternity unit was assessed at distances between <5-≥45 km to the closest maternity unit. The study did not include any data on women who may have relocated to near a maternity unit prior to the onset of labour and was therefore not directly applicable to my question. This investigation was conducted as a retrospective study with data extracted from the French National Vital Statistics Registry and

the French neonatal mortality certificates in the time period 2001-8. The main purpose for undertaking this study was the decline of rural maternity units in France. Surprisingly, the poorest outcomes were identified in women who lived closest to a maternity unit. This was considered to be due to area-level socio-demographic factors such as migrant women living in poorer areas. In large cities this could be in the vicinity of a large hospital. These women were less likely to access appropriate antenatal care and may be more exposed to other lifestyle risk factors such as smoking or the experience of domestic violence⁷⁰.

The final study, which was screened for eligibility, was a prospective cohort study and was from the UK. The purpose was to identify the number of women, who had planned to give birth in a maternity unit, who were transferred to a consultant-led obstetric unit during labour or within 24 hours of birth. The authors also described the reason why. There was no mention of travel distance or whether any of the women had relocated to stay near the maternity unit.

Although the study was initiated due to women in the UK now having a choice in the birth setting and being able to plan or “book ahead” it did not contain any information directly relevant to the topic of this thesis⁷¹.

3.11. Summary of the systematic review

PRISMA³⁹ 2009 Flow Diagram

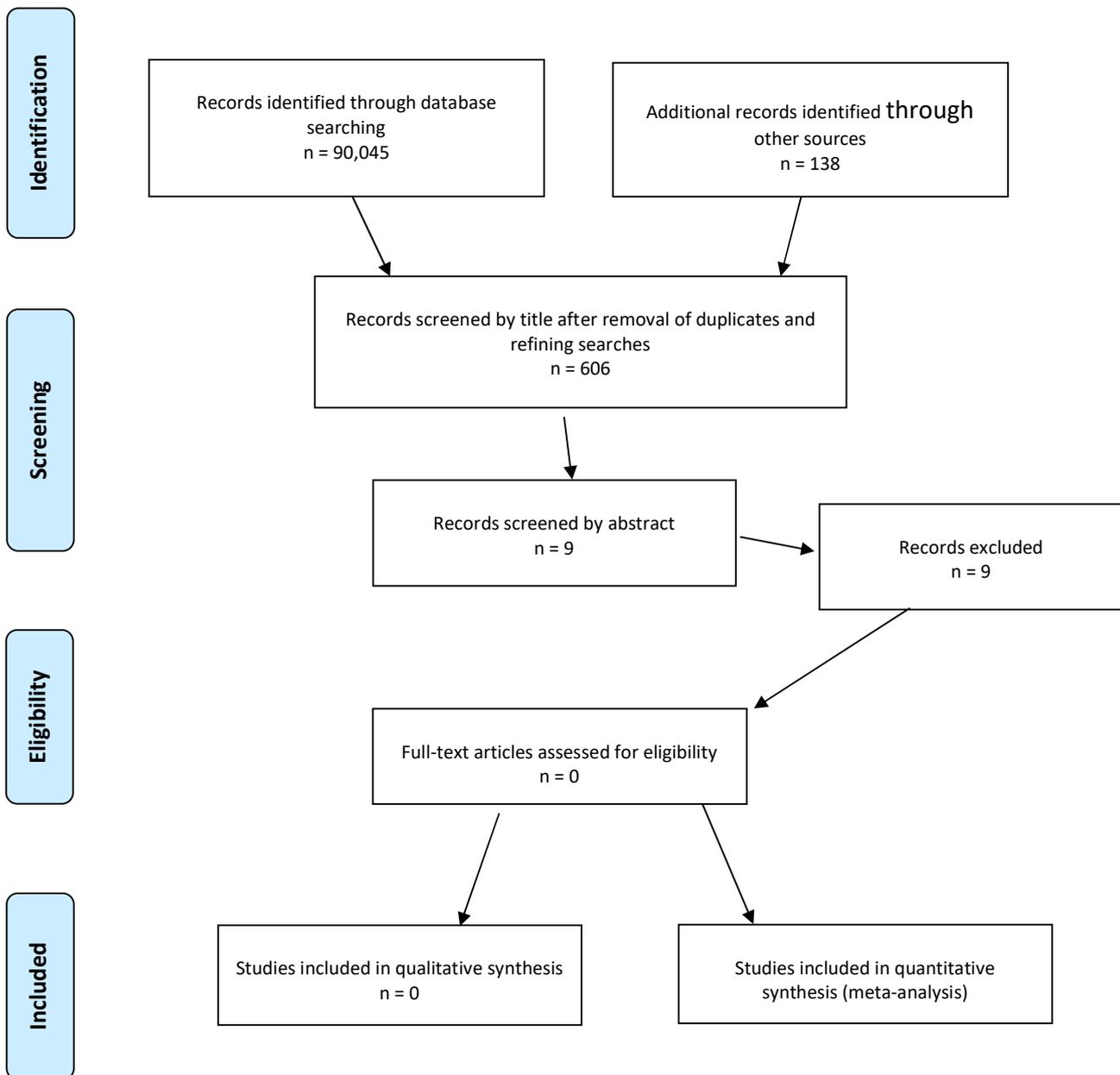


Figure 8: PRISMA³⁹ flow diagram of systematic review process

As the above diagram shows, 0 studies met the inclusion criteria of this systematic review. This meant that high-quality evidence was not available to support robust conclusion regarding the stated objectives. This study therefore resulted in an “empty” review. It uncovered a lack of quality evidence to support current relocation practises.

Despite much being written on women’s rights, with respect to birthing options^{72,73} and policies and procedures being in place⁷⁴⁻⁷⁶, there is a paucity of high quality evidence to support the early relocation of low-risk pregnant women from geographically isolated areas, at 36-38 weeks gestation. While there is ongoing debate regarding home versus hospital birthplace choice, this is usually in the context of locations where a woman could quickly and easily access emergency medical care if required^{77,78}.

Statements in Health Department documents and on web pages were found, as discussed in 2.4. above, stating that pregnant women *will* relocate at 36-38 weeks gestation. There is no evidence of any choice or alternatives being offered⁷⁹.

The inability to answer the original review question or address my main objectives led to a desire to know what the situation may be for women in similar circumstances throughout the world. Although this study made a decision that a distance of >100 km from a major birthing centre would be used

to define geographic isolation, it was acknowledged that for many women in low to middle-income countries (LMICs) this distance would be much less. For example, if there are no passable roads or if you have no access to public transport, you may have to walk to a place where you can receive medical care. This issue of distance was also raised by Fisseha (2017)⁸⁰ in her study of factors influencing the uptake of skilled delivery services in northern Ethiopia. Her study found that approximately 50% of the 1,796 study participants reported that they would choose to birth at home rather than walk >30 minutes to hospital. Additionally, approximately 40% of the study participants reported difficulty in accessing transportation. The author mentioned that similar problems with access to transport were experienced by women in Nepal, Zambia, and wider Ethiopia. She makes an interesting statement that the concern about distance to or difficulty in access to transport to a health facility is subjective and therefore dependant on the mother's own preference. The "requirement" for women to relocate goes against fundamental human rights where women should have choice in all their lifestyle decision making.

The research conducted for this thesis suggests that, due to the current lack of appropriate scientific evidence, policy makers are making decisions that are influenced by historical practise, political pressure, and legal advice.

HICs, such as Australia, provide advanced primary and secondary health services which are available to all residents. The reality is that access to these services, for people who live in geographically isolated areas, is available only after travelling long distances and at high economic and social costs.

The search conducted for this review did not find any mixed methods studies, individual or cluster-randomised controlled trials, or other rigorous studies that evaluated the outcomes for low-risk pregnant women relocating to near a maternity facility for the last few weeks of their pregnancy and remaining there during the perinatal period. It was found that other systematic reviews had mainly focussed on LMICs. Where HICs had been studied, no appraisal had been made of maternal and neonatal outcomes in women who relocated to wait to give birth.

This review has demonstrated that limited research has been undertaken globally and no directly relevant research has been undertaken in the Northern Territory of Australia (NT).

The following chapters will consider the implications of this scant information for families, policy makers, and health practitioners in the NT. Despite the lack of evidence, constant efforts are being made to close the gap in health inequality between the Indigenous, rural, and mainstream populations. The chapter will

incorporate a broader review of literature pertaining to policies and practices for geographically isolated pregnant women throughout the developed world.

Some studies of developing countries are included if they are directly relevant to the remote Australian context.

CHAPTER 4: RESULTS OF THE GREY LITERATURE REVIEW

4.1. Introduction

The term grey literature can be described as any work, either published or unpublished, which does not readily appear in database searches even when MeSH⁵ terms are applied⁸¹.

Grey literature has formed a major part of this thesis, largely due to the paucity of information uncovered during the systematic searching of published literature. Useful information in the form of newspaper articles and web pages was critical for developing the umbrella view of the project (Chapter 6).

Details of Patient Assistance Travel Schemes (PATS) were found on health department web pages. There are similarities between jurisdictions but the most striking in administration difference is that for countries with Indigenous populations. Examples of information uncovered in the grey literature search include details of Patient Assistance Travel Schemes (PATS) in the following table (Table 7). It is noteworthy that the table shows that Australia is alone in enforcing relocation via PATS in remote regions.

Table 7. Example of variation in choice outcomes in Patient Assistance Travel Schemes (PATS)			
Country and Region where applicable	website	Choice	Enforced
Australia – Indian Ocean Territories	https://shire.cc/en/your-community/medical-information.html		X
Australia – New South Wales	https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2012_070.pdf	X	
Australia – Northern Territory	https://digitallibrary.health.nt.gov.au/prodjspui/bitstream/10137/778/5/Patient%20Assistance%20Travel%20Scheme%20%28PATS%29%20Guidelines.pdf		X
Australia – Western Australia	http://www.wacountry.health.wa.gov.au/index.php?id=pats	X	
Canada	https://www.canada.ca/en/services/health/aboriginal-health.html	X	
Canada - Ontario	http://www.slmhc.on.ca/	X	
New Zealand	https://www.health.govt.nz/new-zealand-health-system/claims-provider-payments-and-entitlements/national-travel-assistance?mega=NZ%20health%20system&title=National%20travel%20assistance%20claims#servicescovered	X	
Scotland	https://www.ohb.scot.nhs.uk/service/maternity	X	
USA	https://www.ihs.gov/clao/includes/themes/newihstheme/display_objects/documents/ANAIDR_PublicLaw_106-417.pdf	X	

4.2. The Northern Territory of Australia (NT)

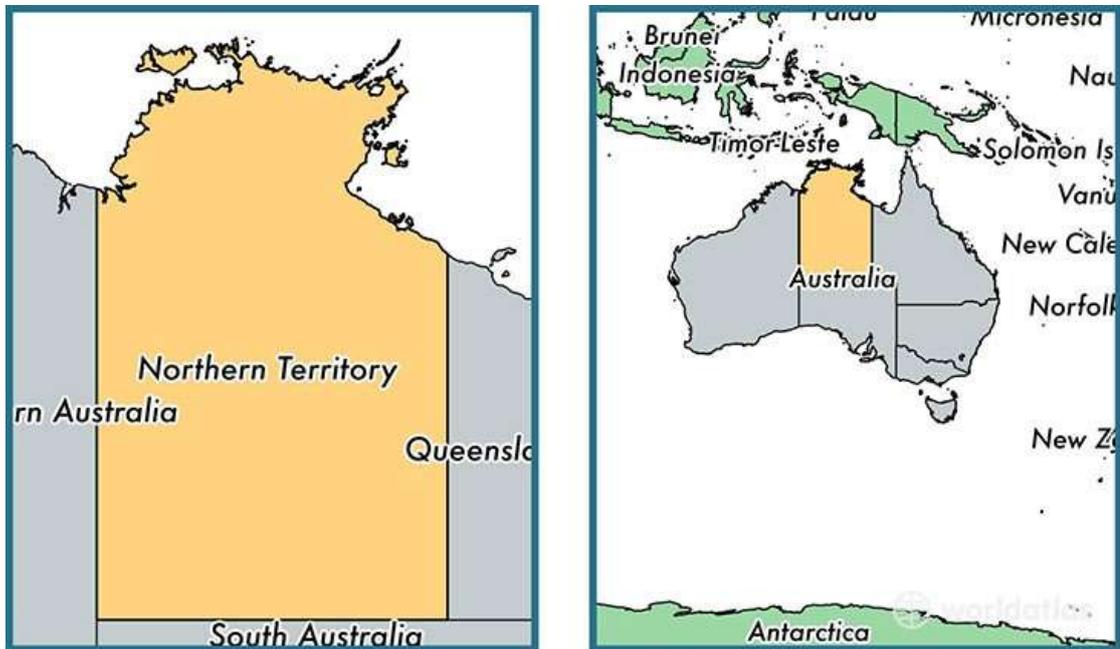


Figure 9: Location of the Northern Territory of Australia. Courtesy Worldatlas.com

The NT comprises a land area of 1,346,200 km² located in the centre of the continent and extending to the Northern sea boundary between Cape York in Queensland and the North Kimberly coast in Western Australia. There are also over 800 islands around the NT coastline. Some of these islands are large such as Melville Island (5786 km²), Groote Eylandt (2285 km²), and Bathurst Island (1693 km²) and have major populations.

Melville Island is the largest of a group of Islands, known as the Tiwi Islands, which are situated North of Darwin.

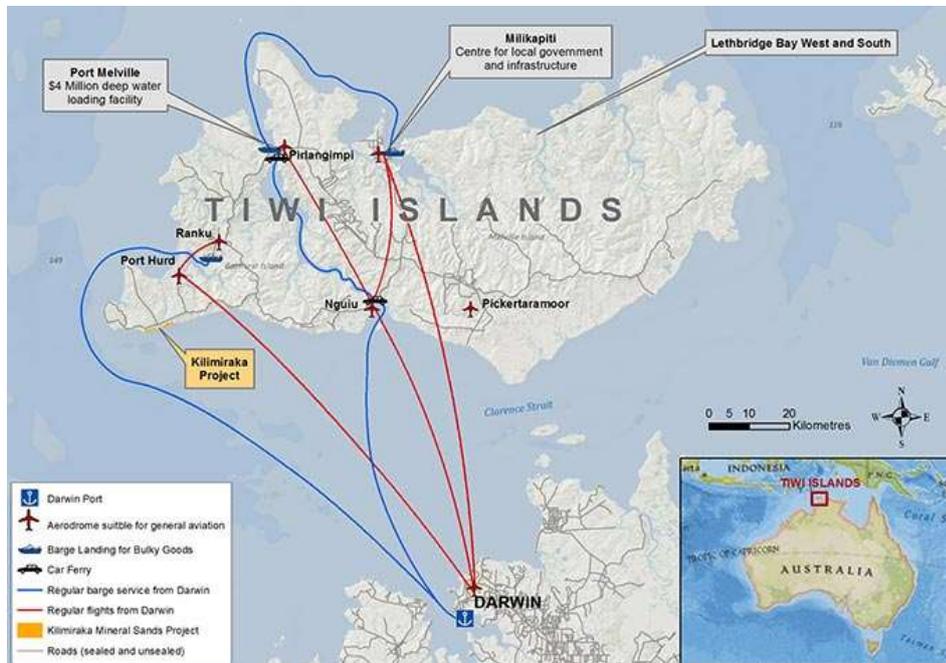


Figure 10: Location of the Tiwi Islands. Courtesy Google Images

In October 2018 ABS data⁸² showed the population of the NT was 247,491 with the lowest median age in the country at 32.6 years. Of those, 57,490 were women between the ages of 15-44 years. The overall population of the NT who identified as Aboriginal or Torres Strait Islander was 25%. Population by place of residence showed 66,764 people residing in the remote electoral regions of Arafura, Arnhem, Barkly, Daly, Namatjira, Nhulunbuy and Stuart (these names are subject to change by the Australian Electoral Commission)⁸³.

Most of the information for the Northern Territory of Australia (NT) was uncovered within the Northern Territory Government (NTG) web pages and the

Northern Territory Department of Health (NT DoH) library archives. The search of grey literature showed that there are policies and practice guidelines for NTG staff and local health practitioners⁸⁴. The procedural guidelines relate to all residents but full support in organising travel and accommodation is only provided to Indigenous Australian women.

Pregnant women living in Aboriginal Communities in the NT will be referred to appropriate services by their local health clinic. Through the Patient Assistance Travel Scheme (PATs), they have their travel plans (flights, ferry or road), hospital admission and accommodation organised by the NTG and all costs paid through a combination of direct NTG funding and Medicare. Medicare is Australia's universal health scheme. It is a Commonwealth Government program that guarantees all citizens access to a wide range of health services at little or no financial cost⁸⁵.

The Australian Government has recognized the disparity between Indigenous and non-Indigenous Australians in many areas and improvement in Indigenous health outcomes is seen as very important. As mentioned earlier this has become known as "closing the gap"⁸⁶.

4.2.1. Application of best available evidence to the Northern Territory of Australia (NT)

The study began with the pre-conceived understanding that all pregnant women living more than 100 km from a major centre in the Northern Territory of Australia (NT) are advised to relocate to be near a hospital at 36-38 weeks gestation. The NT DoH web page clearly states this in its area on pregnancy information “Once you are 37 weeks pregnant you need to travel to a hospital to await the birth of your baby” and GPs complete a referral form⁷⁹ This information mentions remote Aboriginal communities and does not make any reference to women living in other remote locations. There is no mention of, or advice for, non-Indigenous women, despite the legal requirement for all women to have “equitable access” to public medical services (See 4.2.3. below).

In the NT, the current practice is for healthy (low-risk) pregnant women, who live in geographically isolated areas, to be relocated, at 36-38 weeks gestation, to be near a maternity facility⁸⁷⁻⁸⁹. The practice is described on the NTG web site and appears to be an unwritten ongoing policy because, despite extensive searching and enquiry, no official policy document could be identified^{20,27}.

In 2016, there were 3,927 babies born in the NT with 1374 being of Indigenous Australian descent. The data do not show how many were born in their

Community or other geographically isolated area, or whether the mother relocated to a major centre prior to birth²⁵. Data from the Australian Institute of health and Welfare (AIHW) mention remote residents and provide statistics on birth outcomes. These data do not mention women who have relocated to wait to give birth⁹⁰.

There are two cities, Darwin in the “Top End” and Alice Springs in Central Australia, each with a major hospital. There are three smaller towns, Katherine, Nhulunbuy and Tennant Creek each with a regional hospital. The Government health service for the NT tends to be managed as two separate regional entities with the Top End comprising Darwin, Katherine and Nhulunbuy. Central Australia comprises Alice Springs and Tennant Creek. Tennant Creek is the commercial centre of the Barkly Region which has five remote health clinics and a mobile clinic serviced by the NT DoH. There are special provisions for birthing services in the Barkly Region due to the extreme remoteness and inaccessibility at certain times of the year. The remaining residential areas of the NT comprise Aboriginal communities ranging in population from 3,000 to single families (these latter are often known as “homelands”). The larger Aboriginal communities have a health centre but are not set up to provide overnight accommodation or birthing services. Doctors and midwives are available to deliver a baby if a mother presents at the health centre in labour and the

aeromedical services, Careflight in the Top End and The Royal Flying Doctor Service in Central Australia, will be dispatched to retrieve the mother and newborn. In the NT, flight nurses are required to be midwives (Author's personal knowledge). There are 41 NTG DoH, clinics with 37 of those being in Aboriginal communities⁹¹.

The two main hospitals in the NT located in Darwin (Royal Darwin Hospital) and in Alice Springs (Alice Springs Hospital) provide full maternity services. The smaller regional hospitals in Katherine, Nhulunbuy and Tennant Creek do provide obstetric services but do not have specialist neonatal intensive care units. Pregnant women living in those regions can receive their antenatal and postnatal care in the nearest regional hospitals which for some Aboriginal communities are not far to travel. Unlike pregnant women in low-income countries (LMICs), although some aspects of NT Aboriginal communities are lacking in services, there is generally transport available for Community members to travel to medical appointments. In the larger communities, serviced by health centres, there are regular visits from specialists and antenatal and postnatal appointments can therefore take place locally⁹². A manual developed for remote medical staff also states that Indigenous Australian women **will** relocate to a major centre⁹³.

There is contemporary information available for geographically isolated pregnant women on the NT DoH website²⁷, and in flyers / pamphlets which are placed in health clinics and doctors' surgeries⁹¹. Most women receive the information they require when first attending a medical practitioner at their first antenatal consultation. The information that geographically isolated pregnant women receive does not refer to legislation or policies. The information fails to advise women that they have a choice in whether to relocate to wait to have their baby at a major birthing centre or stay at home until nearer their delivery date.

4.2.2. Birthing in the NT in the 1960s and 1970s

Data on Indigenous Australian births and deaths in the NT have only been collected since 1964 and first published 1965⁹⁴. The Australian Government first recognised Indigenous Australian people in the national population census in 1971. Royal Darwin Hospital also provided hospital discharge records to the Australian Bureau of Statistics (ABS) for the National computerised discharge record. As a result, the NT DoH had further data with which to cross check its own figures. The NT DoH had by then established a network of clinics and staffed health centres throughout the region. This enabled data collection on rural births and deaths which had gone hitherto unrecorded. At around the

same time a Maternal and Infant Mortality Committee was convened and the first paediatrician in the NT was employed, Dr Alan Walker. Dr Walker's pioneering work included data collection on Indigenous Australian maternal and neonatal mortality which led to the recognition of the gap in health outcomes between urban and rural residents and for the first time a clear indication of the poorer health status of Indigenous Australian mothers and babies. The literature does not separate urban and rural non-Aboriginal women and assumes that Indigenous Australian women live in non-urban settings. However, there are no other figures available. As the major city, Darwin, was still really only a regional town, it is fair to assume these figures are a reasonable representation.

The following table (Table 8) shows early data on NT neonatal mortality rates (NMR) expressed as number of infant deaths under 4 weeks old per 1000 live births. Prior to 1972 Indigenous Australian figures include residents from other States. Women from northern South Australia travel to Alice Springs to give birth. These figures were separated from 1973 onwards after Indigenous people were included in the Census. This meant that newborns had their residential address recorded, not just their place of birth.

Table 8 – Northern Territory neonatal deaths and death rate by ethnic group 1965-1979 (expressed as number of infant deaths under 4 weeks old per 1000 live births)¹

YEAR	AUSTRALIA	NORTHERN TERRITORY	
	Overall rate	Non-Aboriginal	Indigenous Australian
1965	13.2	21.5	40.4
1966	13.3	19.8	61.1
1967	13.3	26.6	38.4
1968	12.9	23.0	38.8
1969	12.9	12.2	40.1
1970	12.9	21.0	31.2
1971*	12.2	14.6	44.8
1972	12.0	13.8	37.8
1973	11.8	11.6	31.2
1974*	11.6	15.3	34.3
1975**	9.8	20.8	23.4
1976	9.9	16.3	24.0

1977***	8.7	19.2	42.6
1978	8.2	12.9	20.6
1979		11.0	20.7

*Commencement of the identification of the Indigenous Australian population in national census collections

**NT non-Aboriginal figures are influenced by population disturbance from Cyclone Tracy (25/12/74)

***The Aboriginal outstation movement was gathering momentum and has been considered as a faltering in the trend of Indigenous Australian women electing to give birth in a hospital. The figures for the Darwin region continued on a downward trend and the overall result was due to an increase in the death rate in the Katherine and Alice Springs/Barkly regions

4.2.3. Northern Territory Patient Assistance Travel Scheme

The Northern Territory Department of Health (NT DoH), Patient Assistance Travel Scheme (PATS) refers to the following legislation.

“The legal authority on which the delivery of patient travel assistance programs is based is the Northern Territory of Australia Medical Services Act 1982, Section 9.1, 2 & 3 (as updated 2018)⁹⁵. Under the Australian Health Care Agreement, the Northern Territory is responsible for ensuring that eligible persons should have equitable access to public hospital services, regardless of their geographical location (Clause 13 (3))”.

The statement is open to interpretation as, for example, *access to public hospital services*, are available to everyone who arrives at the door. This does not mandate how the access is to be provided to people who may live a long distance away. The PATS, operated by the NTG, is developed and reviewed by local policy makers. It applies to all Indigenous residents and non-Indigenous women^{84,96}. Unlike PATS in other States, the NTG provides the same care to all residents. The only difference between services for Indigenous and non-Indigenous patients is the culturally sensitive Indigenous Specific Primary Health Care Services (ISPHCS) with interpreters and Indigenous liaison officers available for support.

The alternative for geographically isolated pregnant women in the NT, the majority of whom are Australian Indigenous women, is for them to remain in their community, or town. Anecdotally, pregnant Indigenous Australian women have been known to “hide” their pregnancy to avoid being sent away from home. It is also known that Indigenous Australian women do not consider themselves pregnant until the foetus quickens (can be felt moving in utero). This leads to uncertainty in expected due date and may contribute to many Indigenous Australian women presenting to their local clinic (or major city emergency department) in labour.

The population of geographically isolated pregnant women, both Indigenous and non-Indigenous, who live on cattle stations (large farms), tourism enterprises, small islands and other small communities with no primary health care facilities available, are required to plan early in their pregnancy how best to access antenatal services and where they will deliver their baby⁷⁶.

The financial cost of transporting and accommodating pregnant women and, where permitted, their support person, to regional centres where maternity facilities are located to await delivery is very high⁹⁷.

In financial year 2018-19 patient travel costs (covered by the NT DoH) for healthy pregnant women residing more than 200 km from maternity services were as shown in the following table (Table 9):

Table 9 – Northern Territory Patient Travel Scheme Costs

Service	Cost	Comment
Accommodation	\$60.00	Flat rate per person per night A person can choose where they stay. Aboriginal hostel costs cover meals, laundry etc. If a person chooses to stay at alternate accommodation, they will be paid the flat rate and must cover other costs themselves.
Road Travel in private vehicle	20 cents per km driven over 200 km in one direction.	Refer to Appendix in the Patient Assistance Travel Scheme guidelines for further details and special circumstances ⁸⁴
Air travel	Return flight per person	The cost paid is for a return flight on either a standard carrier or a charter. Where the seat is on a charter flight from an Aboriginal community the cost of the seat will be calculated by the number of persons flying on the day e.g. 1/5 of the cost of 5 people flying in a 5 seater plane.
Transport from Outstations	20 cents per km driven over 200 km in one direction The woman must claim dollar equivalence	Some residents will require to travel to a major community where there is an airfield. The travel plan and costs will be individually discussed and arranged with the PATS Travel Clerk
Transport from remote cattle stations or other independent dwellings	20 cents per km driven over 200 km in one direction The woman must claim dollar equivalence	Patients may have their own aeroplane, helicopter, or boat. The travel plan and costs will be individually discussed and arranged with the PATS Travel Clerk

An issue which arises for women who are not within easy road access of a major centre is that they may need to fly. Australian airlines have travel policies regarding how close to parturition a pregnant woman can fly. It can be seen in the Table below that some smaller companies will allow pregnant woman to fly without any restriction. The PATS operated by Australian State Departments of Health do not include costs for air travel on public airlines or private charters unless the latter is conducted as a medical transfer.

Table 10 – Airline rules for transporting pregnant women

Airline	Pregnancy rules for uncomplicated pregnancy
Aimnorth ⁹⁸	<ul style="list-style-type: none"> • No medical clearance required • No restriction on date • Must be able to comply with seat belt regulations
Jetstar ⁹⁹	<ul style="list-style-type: none"> • Medical clearance required after 28 weeks gestation • Flights of less than 4 hours: <ul style="list-style-type: none"> ○ Single pregnancy – up to the end of the 40th week ○ Multiple pregnancy – up to the end of the 36th week
Qantas Airlines ¹⁰⁰	<ul style="list-style-type: none"> • No medical clearance required • Flights less than 4 hours duration <ul style="list-style-type: none"> ○ Single pregnancy – up to the end of the 40th week ○ Multiple pregnancy – up to the end of the 36th week
Tigerair ¹⁰¹	<ul style="list-style-type: none"> • Medical clearance required from 28th week • Flights less than 4 hours duration <ul style="list-style-type: none"> ○ Single pregnancy – up to the end of the 40th week ○ Multiple pregnancy – Up to the end of the 36th week
Virgin Australia ¹⁰²	<ul style="list-style-type: none"> • Medical clearance required from 28th week • Flights less than 4 hours duration <ul style="list-style-type: none"> ○ Single pregnancy – up to the end of the 40th week ○ Multiple pregnancy – Up to the end of the 36th week
Chartair, Hardy Aviation and Fly Tiwi air charters to remote Indigenous Communities ¹⁰³	Personal communication from air charter companies states that they use the same guidelines as other carriers. They do not have specific information on their web pages but do state that they carry non-emergency patients on behalf of the Northern Territory Department of Health.

Airlines listed in Table 10 are those most commonly used for domestic flights in Australia. Women residing in remote communities and on islands may be accustomed to using air charters. Those living on cattle stations may have access to their own aircraft. Investigation into permission for pregnant women to fly shows that there is unlikely to be any date restriction for remote residents choosing to wait until close to their due date to travel into a major centre⁹⁸. As these are the carriers more likely to be used by women in remote areas, there is no reason to include the issue of being allowed to fly as a factor in a relocation policy.

Midwives are still employed at many rural clinics and regional hospitals. However, employment conditions are unlikely to permit the provision of home birthing services. They could call for assistance if an emergency caesarean or other obstetric help is required but the travel time to emergency obstetric services is many hours away. Similarly, the arrival time for an ambulance or aero-medical retrieval service could also be several hours.

Further information regarding the NT, where published work is referenced, is presented in Chapter 5.

4.3. Island communities administered by Australia

The Australian External Territories are described in more detail below. The population demographic of the outlying islands and External Territories includes overseas workers. It is not known how many choose to return to their country of origin to give birth. There is a paucity of literature on this with one conference paper having been uncovered during the literature search and one newspaper report^{104,105}.

A conference paper from 2008 described the relocation of pregnant women from remote island territories to Perth in Western Australia (WA). The population mainly affected were of Chinese and Malay descent and for most women the relocation was a time of hardship as they may not have any friends or relatives to lodge with in Perth. Furthermore, the cultural desires of this group were overlooked in that many are followers of the Muslim faith and it is important for the father to be present at the birth of his baby. The fathers are mainly farmers and labourers and could not take extended leave from their work to travel to the mainland with their wife.

4.4. Grey literature from around the world

The most informative grey literature search results were from individual country government web pages and keyword searches for items such as airline carrier rules.

4.5. Summary of grey literature review

The grey literature has provided a wealth of information for this thesis. Hand searching through Health Department Library archives, newspaper articles and web sites was very time consuming. However, this is necessary to avoid missing materials through the filtration process used for search methods when conducting a systematic review. The information uncovered during the review of grey literature has confirmed that policies and practices are not always based on legislative requirement, do not appear to be supported by evidence, and have been changed over time in accordance with local and national political preferences. Without the grey literature, this thesis would have presented an incorrect conclusion that there was a paucity of work being conducted in the area of advice to families and practice models for health care professionals. The grey literature uncovered that Departments of Health and individual health provision agencies that provide services to rural and First Nations Peoples do a

great deal of work to support their clients. Service provision, however, is constrained and dictated by funding and “Government of the day” attitudes.

The following narrative review chapter uncovers materials which have been published and compliment the results of the grey literature review.

CHAPTER 5: RESULTS OF THE NARRATIVE LITERATURE REVIEW.

5.1. Introduction

This chapter will discuss and review literature and current policies and practices for the care of geographically isolated pregnant women. The focus is on High-Income Countries (HICs) with similar health services and geography to Australia, in particular the Northern Territory of Australia (NT). The literature will be viewed from a social context and provide information which can be used when considering policy development and research.

While conducting the systematic review (Chapter 2) several published systematic reviews were identified. As the process for identifying the materials in Chapter 2 was following strictly defined rules it was not possible to include published systematic reviews in the results. They have therefore been included in this chapter, under their own heading, in order to readily identify them.

The HICs referred to in this chapter were selected due to individual similarities and comparisons with Australia and being recognised as high-income by the World Bank¹⁰⁶. Furthermore, studies from countries such as Sweden and the UK regularly arose during literature searching.

The following section will provide information which is relevant globally. This will be followed in turn by a detailed examination of literature from Australia and other HICs.

5.2. Global overview

Throughout the world, pregnant women of all races, religions, socioeconomic status and so on are faced with being a first time mother. They often look to family, friends, and medical experts for information and advice¹⁰⁷. For geographically isolated women the place of birth and access to health services also has to be considered.

The United Nations - Millennium Goal 5: Improve Maternal Health¹⁰ has as one of its targets “*Achieve, by 2015, universal access to reproductive health*”. This is widely accepted as having been achieved in HICs but the provision of and access to maternity services still vary from country to country and also vary widely within countries.

The World Health Organization’s (WHO) Global Strategy for Women's, Children's and Adolescents' Health (2016-2030) states that neonates accounted for 45% of deaths in children under 5 years in 2015 and that there has been a 43% reduction in maternal deaths between 1990-2015¹⁰⁸. This still shows that

globally 830 women die each day from pregnancy and childbirth related factors⁴⁴. Factors attributed to this mortality rate are commonly linked to the environmental and socioeconomic status of the family¹⁰⁹. For example overcrowded housing, poor nutrition, and poor sanitation are all contributing factors to poor health regardless of how much a mother and her family may want to safely deliver a healthy baby. However, little mention is made of maternal and neonatal health outcomes in countries which are considered extremely high-income but have an unrecognised or even ignored low-income segment of their population.

Government health services in countries such as the UK, Canada and Australia have produced policies (some of which are unwritten) regarding the provision of maternal and neonatal care for women who are geographically isolated. These three countries use similar, if not the same, regulatory systems all based historically on those developed in Westminster (historical term for The British Parliamentary and legal style). The provision of health services in other HICs show similarities, with the main variation being on what level of funding is provided by their Government and how much is “user pays”¹⁰⁹.

The available literature which discusses health services provision in HICs provides little or no information about service delivery to geographically

isolated areas. This is likely to be because there are few HICs with such isolated communities as those found in Canada, Australia and the United States.

Additionally, pregnant women living in isolated regions frequently are lower in numbers than those in urban or metropolitan areas, live in small towns or on farms with the advantage of good road access and ambulance services available for urgent transport when required. It is probable that this matter of needing to travel long distances for childbirth is only relevant to a minority of the population. Consequently, it does not rate highly as a key priority for funding or resource allocation. It is, however, very important to individual families with the health and wellbeing of their children being considered a top priority.

No other HICs with the vast land masses encountered in Australia, Canada and the United States could be identified. As mentioned in the introduction to this chapter, there are regional mountainous areas in high-income European countries, and islands off countries such as Scotland, where geographical isolation is considered a factor due to difficult terrain and long road travel time. In South America, Chile is a HIC with universal health care provided¹¹⁰. Binfa's report stated that >90% of births take place in hospital but no information on relocation policies was mentioned or uncovered in further literature searches.

With many HICs now housing a refugee population, there are many similarities and comparable experiences between these women and Indigenous Australians. There is a paucity of information available in relation to migrant women regarding choice of birthplace and geographic location within a country. Those who are housed in refugee camps have no choice regarding any health services provided to them. Those who have been granted residency are most likely to be in an urban setting and will attend the nearest health service available¹¹¹⁻¹¹³.

A common thread globally, in records regarding migrant and ethnic minority women, is the desire for safe, kind, and respectful care. Sadly, this is not always the case, with many women reporting being bullied and disrespected by health care workers¹¹⁴. Difficulty in communication and lack of continuity of care are also major concerns¹¹⁵.

Women who are refugees will be provided with some health care in managed refugee camps, commonly provided by the International Red Cross or Medicines Sans Frontiers^{116,117}. In addition to the trauma of being uprooted from their home community, they will be faced with language and cultural challenges.

5.3. High-income countries (HICs)

High-income countries (HICs) are those that are defined by the World Bank as having a high-income economy with a GNI per capita of US\$12,056 or more¹¹⁸.

Table 11 – Data of populations for high-income countries

<i>Country</i>	Population	Density per km²	Land mass km²	GGHE-Dⁱ %	GNI per capitaⁱⁱ	MMRⁱⁱⁱ Per 100,000	NMR^{iv} Per 1,000
<i>Australia</i>	25,088,636	3	7,692,024	17.4	60,440.00	6	2.1 Indigenous ^v NMR Per 1,000 7.9
<i>Canada</i>	37,203,651	3.73	9,984,670	19	51,930.00	7	3.5 Indigenous ^v NMR Per 1,000 Not found
<i>Chile</i>	18,315,171	25	743,532	19.7	14,310.00	22	1
<i>France</i>	65,480,710	118.69	551,695	17	43,320.00	8	2.4
<i>*Greenland</i>	55,992	.03	2,166,086	No record	No record-	No record	6 in Denmark Indigenous ^v NMR Per 1,000 12
<i>Japan</i>	126,930,140	335.66	377,930	23.4	48,280.00	5	0.9
<i>Lithuania</i>	2,866,591	43.9	65,300	12.8	-	10	<1

<i>New Zealand</i>	4,792,409	18	270,467	22.5	40,830.00	11	2.76 Indigenous ^v NMR Per 1,000 ¹¹⁹ 3.65
<i>Netherlands</i>	17,132,908	409	41,850	19	49,810.00	7	2.3
<i>Norway</i>	5,393,602	16.68	323,802	17.6	93,080.00	5	<1
<i>Singapore</i>	5,851,104	8,264.94	710	13.6	54,020.00	10	1.1
<i>Sweden</i>	10,043,012	22.33	450,295	18.5	57,900.00	4	2.3
<i>UK</i>	66,861,350	275.66	242,900	18.9	43,860.00	9	2.6
<i>USA</i>	328,497,714	35.11	9,372,610	39.5	56,700.00	14	4.05 Indigenous ^v NMR Per 1,000 ¹²⁰ 4.28

i. GGHE-D - Domestic general government health expenditure as a percentage of general

government expenditure, 2016^{4,121}

ii. MMR – Maternal mortality rate (WHO 2015)

iii. NMR – Neonate mortality rate (IGME¹²² 2017)

iv. GNI – Gross National Income per capita in \$US

v. Indigenous – only results for countries with a clearly acknowledged Indigenous population are included.

The World Bank and the WHO publish global statistics including maternal and neonatal mortality rates. Table 11 describes the low maternal (MMR) and neonatal mortality rate (NMR) in HICs. MMR is routinely reported as per 100,000 live birth¹²³ and NMR as per 1,000 live births¹²². Global statistics

provided by the World Bank¹⁰⁶ and WHO¹²¹ provide an overall picture of populations. They do not separate out Indigenous, disadvantaged or isolated populations when reporting on countries based on their status as high, middle or low-income¹²⁴.

The listed countries have well established health care systems but have disadvantaged and disempowered Indigenous populations and increasing migrant and refugee populations. As previously discussed, it is common for migrants and refugees to reside in urban areas but they can experience medical isolation for other reasons.

The WHO published a review of maternity waiting homes in low-income countries in 1996. As no further work in this area has been completed, this 20+ year old review has been used as a historical reference⁵³. The WHO report only refers to maternal care in developing countries stating that developed countries already provide hotels or dormitory style accommodation near hospitals. In the report, no reference or evidence was provided to support this statement. The WHO report does provide information on best practice arrangements for maternity waiting homes but research into the contemporary situation is required in order for it to remain relevant. Comber¹²⁵ drew on

information in the 1996 report in her 2013 study. This study is discussed in section 2.8.2.

No other HIC exactly matches Australia. Table 11 shows that population, density and land mass are not factors that relate to health services expenditure as a percentage of general government expenditure. With the exception of the USA, each country has a similar percentage of general government expenditure directed towards health services, free (government funded) health services available, high quality maternity services, women have equal rights and can make choices regarding their birthing preferences, low maternal and neonatal mortality rates, and literature published in English.

The majority of countries, other than Canada and the USA, do not have a large land mass with remote dwelling residents and ethnic minority Indigenous populations. However, remoteness is relative with literature from smaller countries describing time to travel to maternity services due to difficult terrain¹²⁵ or residents living on offshore islands¹²⁶

An international audit of 10 European regions conducted in 2003 discussed perinatal mortality and suboptimal care. This study did not, however, relate to geographical location or socio-economic status of the pregnant women. It concluded that perinatal outcomes were linked to poor antenatal care and poor

health practices by mothers e.g. smoking¹²⁷. It had been hoped that a study across so many regions would have provided useful information on birthing choices for women in these regions but that was not included. The study did state that differences in perinatal mortality could be explained by disparities in antenatal, intrapartum and neonatal care but no mention of ability in accessing the care was mentioned nor why there were these differences.

Two countries which have similar legal and policy development frameworks to those in Australia are the United Kingdom and Canada. Australia and Canada are both members of the Commonwealth of Nations which were formerly part of the British Empire. Although both Australia and Canada have grown in independence and self-governance, there remains shared history which includes the adoption of the Westminster system of Government.

In both Canada and Australia, country statistics show that mortality in Indigenous Australians and First Nations peoples is not equal to the mainstream population. Reports on Indigenous Australians and First Nations populations are frequently produced as a separate report. Within these countries, and particularly within regional areas, it is known that mortality rates for mother and baby are higher. Government agencies and health care providers within HICs are continually trying to improve this situation. An example is in

Australia where it now common to hear the term “closing the gap” which will be described in more detail in the NT section of this Chapter⁸⁶. Briefly, this is in reference to the knowledge that there is a gap of several years in life expectancy between non-Indigenous and Indigenous people, for both men and women.

The following section will describe the Australian context, explaining the layout of the country and its related Island Territories. This section will review and discuss literature regarding Australia which relates to maternal and neonatal care and outcomes for women who reside in geographically isolated areas. The NT is discussed in detail under a separate heading.



Figure 11 Australia and its External Territories. Courtesy Google Images

5.3.1 The Australian context

Australia is a high-income country (HIC) with a high-quality health system and provision of services to all residents including those on the distant islands and territories shown in Figure 11. However, for residents of rural and remote areas, these services are not always readily available, regardless of socioeconomic status¹²⁸. In particular, the closure of rural maternity wards in the last few

decades has made birthplace choices more complex than they were for early settlers and residents of remote Aboriginal communities. Australia has a Human Rights Commission¹²⁹ and is a signatory to the Millennium Development Goals and the United Nations Declaration on the Rights of Indigenous Peoples¹³⁰.

Australia also provides funding to low and middle-income countries (LMICs) through humanitarian programs and as a member of the Organization for Economic Co-operation and Development (OECD)¹³¹.

Global statistics show that Australia has amongst the lowest maternal and newborn mortality rates¹²¹. These statistics however, do not reflect the disparity in maternal and neonatal mortality between Indigenous and non-Indigenous Australians.

The Australian Institute for Health and Welfare (AIHW) shows the following statistics in its 2016 report:

“Australia’s maternity services are among the best in the world—with one of the lowest maternal mortality ratios (MMR) reported globally in 2015 (6 maternal deaths per 100,000 women who gave birth, compared with 9 in the United Kingdom, and 11 in New Zealand and the United States of America) (WHO et al. 2015). However, in 2008–2012, the ratio in Australia for Aboriginal and Torres Strait Islander mothers was double that of other Australian women who

gave birth (14 per 100,000 compared with 6.6 per 100,000) (AIHW: Humphrey et al. 2015). Monitoring MMR alongside other indicators designed to assess the safety and quality of maternity care (such as the type of delivery a mother has) is important to ensure that there is continual improvement in the quality of maternity services (see the National Core Maternity Indicators, or NCMI) (AIHW National Perinatal Epidemiology and Statistics Unit & AIHW 2013)”⁷⁴.

In Australia with its mainly urban dwelling, coastal population and sparsely populated regional areas there may be hundreds of kilometres between urban centres. Some cities are >1000 km apart. The population of Australia in mid-2018 was 24,952,000⁸². The distance between the east and west, in a direct line, is 4,030 km, and 3,685 km from north to south.

Although there is a national maternal health strategy, pregnant women who live in small rural communities and other geographically isolated areas, such as islands, do not always have access to midwifery services. This lack of services prevents them from having the choice to give birth at home, even if they wanted to. These women must travel long distances either by road or air (and sometimes sea) to access major health services and in many cases primary health services. A woman’s GP (or local community health care practitioner) will

advise her at her first antenatal appointment of the available options in regard to place of birth^{84,132} (see vignette at start of document).

There is a central (Commonwealth) Government based in the Capital City, Canberra, in the Australian Capital Territory (ACT). Australian health service provision has been legislated by the Commonwealth Government since Australia was granted independence within the terms of *The Commonwealth of Australia Constitution Act 1900* (UK). Australia is divided into eight States and Territories, each with its own Government running a Health Department in addition to the overall Commonwealth Government which has regional offices in the capital city of each State or Territory. Policies and service provision practices can differ between these tiers of Government and the respective Departments, which leads to confusion from people seeking the use of services. Administration of particular services (such as ambulance services and hospitals) also vary from region to region.

5.3.1.1. Island communities administered by Australia

There are many populated islands around the coastline. The islands are subject to the laws and regulations of the nearest part of Australia and are considered to belong to that State or Territory. An example is Lord Howe Island (see Figure 12) which, although very remote, is part of New South Wales and

consequently health service provision is provided by the South Eastern Sydney Local Health District¹³³. There are limited maternal health services on the island. The island hospital provides antenatal care but not a birthing service¹³⁴. Pregnant women have to travel to the mainland for the birth of their baby. They can claim reimbursements of some costs via the Isolated Patients Travel and Accommodation Assistance Scheme (IPTAAS)¹³².

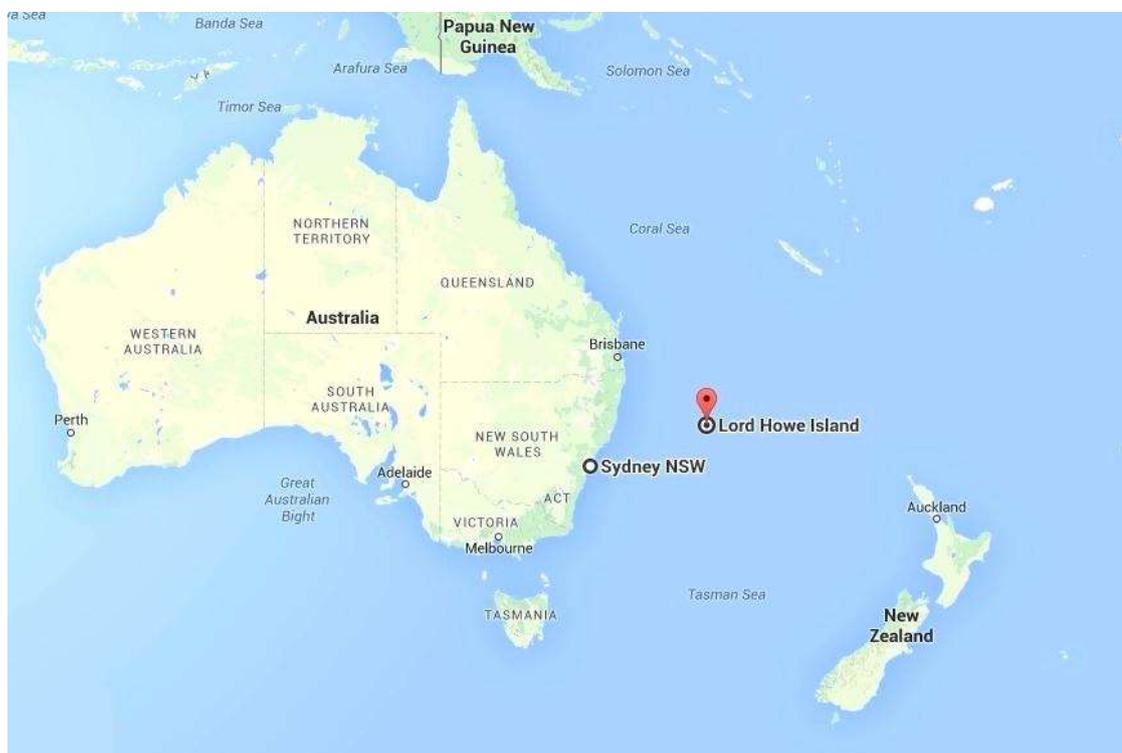


Figure 12: Location of Lord Howe Island. Courtesy Google Images

There are also populated islands known as External Territories each subject to jurisdiction under a mixture of Commonwealth, State and Territory Laws. The residents are Australian citizens and entitled to health care services. Each

External Territory has its own right to make provision for maternity care. The Australian External Territories are Christmas Island, Cocos (Keeling) Islands, Norfolk Island and Antarctica (Australian area), Heard and McDonald Islands¹³³.

These Islands are very remote being thousands of km away from the Australian mainland, and very much closer to other countries.



Figure 13: Location of Cocos and Christmas Islands. Courtesy broomekimberley.com.au

Pregnant women from the Cocos and Christmas Islands are relocated to Perth in West Australia to wait to have their baby. Although birthing services are provided in Perth, the West Australian Government is not responsible for organising or subsidising patient transport. The islands are under the jurisdiction of the Commonwealth Government of Australia and health services are provided by The Indian Ocean Territories Health Service under an administration agreement^{104,105,135,136}.

Note: At the time of writing, the Commonwealth Government of Australia is proposing to reopen the Immigration Detention Centre on Christmas Island. Part of the discussion includes provision of medical services including emergency obstetric services.

Antarctica and the Heard and McDonald Islands populations comprise visiting researchers who are unlikely to be pregnant while undertaking projects. Any woman requiring maternity services will return to the mainland or her country of usual residency.¹³⁶

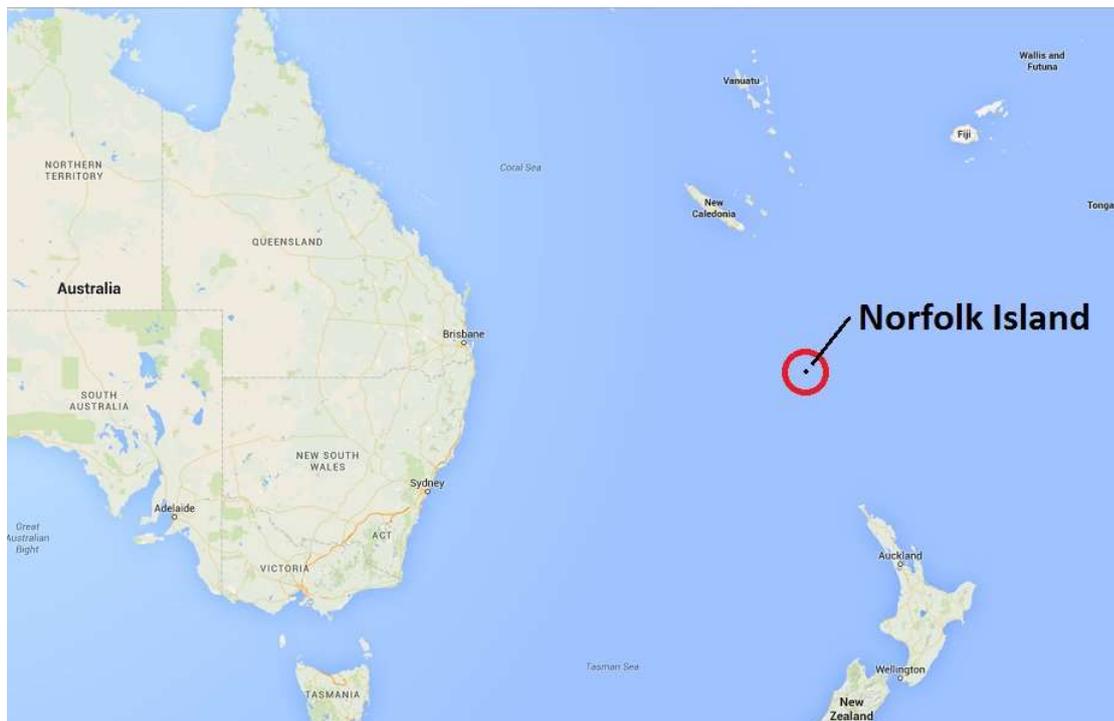


Figure 14: Location of Norfolk Island. Courtesy usu.org.au

An example of maternity health services on Norfolk Island states *“As the hospital doesn’t support on-site birthing, mothers are required to travel to the mainland 6 weeks prior to the planned gestation date, with accommodation and other costs paid by the mother”*¹³⁷. The island only came under full Australian jurisdiction in 2016 and the residents are now entitled to receive Medicare benefits and take out private health insurance⁷⁴. There is no reference to whether there is any reimbursement for planned travel for maternal services. Medicare and private health insurers cover use of hospital services for birth but that does not include travel. The population demographics on Norfolk Island comprise people from around the globe but no Indigenous population.

Overall, where there are hospitals on the islands listed above they are very limited in their acute care provision. They do not provide birth services except in emergency situations where initial care will be provided while waiting for an emergency evacuation team to arrive from the mainland. At the commencement of antenatal care, all pregnant women are referred to the mainland for the birth of their baby. As noted in Chapter 4.3. above, little is known about the actual number of cases this involves. The “revolving door” of residents in these islands may result in people not being recorded in the four yearly censuses so statistics from the ABS cannot be relied on as accurate for this population demographic.

5.3.1.2. The mainland of Australia

In mainland Australia in 2014, maternal mortality was 6:100,000 live births with the global average for high-income countries being 13:100,000 live births. There are an estimated 124,000 Indigenous Australian women of child-bearing age in Australia (ages 15–44), and each year approximately 10% give birth⁹⁶. Over one-fifth (22%) of Indigenous Australian women of child-bearing age live in remote or very remote areas²⁵. Australia has one of the highest maternal and neonate survival rates in the world. However, the Indigenous Australian population still has a very poor comparative rate. In the period 2011-2012 neonatal mortality per live births in the Northern Territory Indigenous Australian population was

7:1,000 where the non-Indigenous neonatal mortality rate was 2.4:1,000 and the whole of Australia 2.1:1,000²⁵. A United Nations press release (18 July 2017) regarding the Every Woman Every Child initiative stated that “reaching marginalized and overlooked communities” and “ensuring that they are counted and heard” will be a major factor in research, development and funding¹³⁸. The allocation of funds is directed towards LMICs and Australia as a HIC is a major contributor. The issue of poor health in the Indigenous Australian populations is not included in the Every Woman Every Child initiative.

Homer (2012)¹³⁹ found that continuity of health care provider was a major factor for Indigenous women, even if they resided in an urban setting. This is supported by other findings in Australian Indigenous health. For example, research conducted by Harrington et al¹⁴⁰, where interviews were conducted in a remote Northern Territory community to try and understand non-compliance with rheumatic fever prophylaxis found that a local holistic approach was important¹⁴⁰. Homer’s work looked at an Aboriginal Health Service in Sydney where Indigenous Australian midwives built a trusting relationship with the pregnant women. These women reported being happier with a relationship with an Indigenous Australian midwife. The midwife visited them in hospital and was a familiar face when there was the usual change-over of mainstream

nursing staff during shifts. She also alluded to the fact that other studies have not found major sociological health impacts in disadvantaged groups of women. Such studies were not restricted to Australian Indigenous women. This latter group are clearly at a much higher disadvantage than their non-Indigenous counterparts^{86,139,141}.

Indigenous Australian pregnant women in geographically isolated areas receive antenatal care at remote health centers from both local staff and visiting specialist midwives and doctors⁹². Indigenous Australians struggle with the same issues of disempowerment, low health literacy, low socioeconomic status, language differences and cultural practices, experienced globally by First Nations populations, and relationships with medical staff are difficult to establish and maintain as there is likely to be a high turnover of staff.

Although every Australian is entitled to welfare benefits and Medicare, it cannot be assumed that pregnant women are satisfied with the birthing options available to them, or that relocating a long distance to near a major birthing centre, for a period of six or more weeks (the perinatal period) is a pleasant experience⁴³.

As mentioned above, Australia produces laws and policies in line with the Westminster style of government. There is a democratic process which enables

comment to be made on proposed legislation and indeed, public consultation is a mandatory part of the development of new or renewal of legislation. Unlike Canada, the legislation governing maternal and neonatal health applies to all residents. However, in practise it does tend to single out Indigenous Australian women due to the majority of non-Indigenous Australians living in or near capital cities with easy access to medical services (including specialist care when required). There is no specific reference to non-Indigenous women, rather, the distinction is made between rural and urban residents^{115,142}. It is rare to find any reference to island or External Territories residents, other than Indigenous Australian, in any publications relating to inequalities in maternal health services provision for geographically isolated women in Australia.

For the purposes of this study, literature was found which discussed the emotional, economic, and cultural effects on mother and newborn resulting from their relocation from home to a major birthing centre to give birth.

However, at this point in time data on medical impacts of relocation was unable to be located. Importantly, for this thesis, the relocation to stay and wait in accommodation near a major birthing centre at 36-38 weeks gestation whether they were Indigenous Australians or non-Indigenous Australians living in very remote areas of Australia has not been researched.

The closure of rural maternity units and the subsequent increase in babies being born before arrival at hospital or being born without midwifery services is discussed in a “*retrospective study utilising routinely collected perinatal data*” for the years 1992–2011 undertaken in Queensland¹⁴³. The author is one of only a few regular writers on this topic and her work has been a good source of information for this thesis. The data was examined to see if there was any evidence of correlation between babies born before arrival at hospital and a reduction in the number of rural maternity units. This particular paper discusses the need for further research into the implications that the closure of rural maternity services may be adversely affecting maternal and neonatal health outcomes. Although the issue of travel distance was raised, the study did not include any data or discussion on women who relocated to wait near a maternity unit to give birth. A limitation of their research was the fact that it is difficult to assess the exact geographical location of the mother’s residence. This factor also created a limitation in this thesis in Chapter 3. The paper does not define distance or travel time or account for the risk status of the pregnancy. Neither was any mention made of whether the babies had been born at home, during transport by parents, or by ambulance. Despite this, it is useful to note that issues regarding the reduction in rural maternity services is being raised as a topic in more than one State or Territory in Australia.

The difference in practise for Australian women from those in Canada is that there is no legal statute requiring them to relocate. They are not legally forced but rather are actively encouraged by health practitioners to leave their local community and stay near a major birthing centre. This means moving from a small population base of people they know, to live in a large urban setting where they may be unfamiliar with the language and way of life¹⁴⁴. This language barrier is also relevant to women from islands or External Territories. They may not speak or read English as their first language, In fact, English may be a foreign language, and they may also have cultural and religious beliefs surrounding maternity care and birth which are quite different from the mainstream “Western” health practises found in Australia. This demographic of women appears to be largely invisible in the literature. It is not known exactly how many women per annum this may relate to but ABS figures from 2018 show the number at 30⁹⁰.

Research regarding birthplace choices and concerns regarding travel time while in labour have been published. A study from Tasmania which was part of a wider project to identify women’s needs in maternity services used a mixed-methods approach to interpret qualitative data from interviews and quantitative data from surveys¹². Tasmania is an Island State South of mainland Australia which is not large in overall land mass but has accessibility issues caused by

mountainous areas and twisty narrow roads. The study has shown that women would be prepared to remain at home and transfer to a birthing centre if they did not have to drive for more than an hour. 59.2% of 260 women who participated in the study stated that one hour's drive would be acceptable where the number dropped to 25.2% who would drive 1-2 hours and then dropped right down to 1.5% being willing to drive for a longer period to reach a major birthing centre (described in that study as "travel to safe delivery").

This study shows that women in a HIC, such as Australia, will choose a hospital setting over home delivery based on their opinion that there is less risk to mother and newborn by having ready access to emergency obstetric services if this is required. The study does not discuss planned early relocation, its focus is on the distance to birthing services. As with the purpose of this thesis, one of the intentions of this research was to provide information that will be useful to policy makers¹².

A further Tasmanian study, in 2012, reviewed the birthplace choices and experiences of geographically isolated women. The women were surveyed regarding the reasons for their decision to remain at home and transfer to a major birthing centre when labour commenced. The authors concluded that the evidence gathered would be of use for future health service design. The study

did not review the patient outcomes that were intended to be identified in this thesis¹⁴⁵.

A study of rural birthing services in Queensland found that inequalities in perinatal care is growing as populations become more centralized and rural hospitals decline in number. The authors concluded that their work provides useful baseline information and that further quantitative studies are required. They also state that policy decisions and changes in maternity care will need to be taken into consideration¹⁴⁶. A small study of the changes in midwifery services in rural Australia, focussing on a small town in New South Wales, has found that midwifery led care can be a successful alternative where rural birthing services have declined. The success of this model was dependent on maintaining the staff at the birthing service. During the project there were GP obstetricians and midwives employed who could provide continuity of care¹⁴⁷.

In 2015, a retrospective review of birth location for rural South Australian (SA) women from 1991 to 2010 studied trends in available maternity services to identify how many women were having to birth outside their normal area of residence. The information was collected from the Pregnancy Outcomes Statistics Unit in South Australia. Results were similar to statistics from other areas in Australia in regard to the decline of rural maternity services over the

last few decades. In SA, the number of rural maternity units declined from 62 to 23 which is a 64% reduction in number. The study found that the reason for women relocating to metropolitan areas to give birth may not be entirely due to the closure of rural maternity units. It is possible that women choose to travel to a main hospital to give birth. The conclusion stated that around a quarter of pregnant women who live in rural areas of SA relocate to give birth. The exact number of women is unknown. This is because data were difficult to collect for several reasons such as postcode for place of residence not being available, residence and place of birth being recorded as the same during hospital stay. The paper does not refer to the stage of the pregnancy at which the women relocated or the distance travelled. It focusses more on the reason for the closure of the rural maternity units. It does provide useful information on the reasons behind these closures, such as the problems encountered with recruitment and retention of medical practitioners to rural areas and the “medicalisation” of childbirth. The author also makes comment that, regardless of the reason why women relocate to metropolitan centres to give birth, they experience adverse outcomes. This matter was not dealt with in depth and the adverse outcomes mentioned were suboptimal antenatal care, lack of continuity of care, financial burden, stress from family disruption, travel and isolation, as well as culturally, socially and emotionally inappropriate models of care. There was no discussion

on how these matters might affect maternal and neonatal health from a clinical perspective apart from mentioning there would be suboptimal antenatal care¹⁵.

Overall, geographically isolated pregnant women in Australia are provided with the opportunity and right to access good quality maternity services. The only factors to consider is distance and where and when to seek medical support services, however, as discussed in the following section, this is not always a personal choice available to all women. The NT has similarities to Queensland, Western Australia and Northern New South Wales but in other ways it is a unique location. The NT situation is described in depth in the following section.

5.3.1.3. The Northern Territory of Australia

The figures on this page show the discrepancy between the location of hospitals and location of remote Indigenous communities.

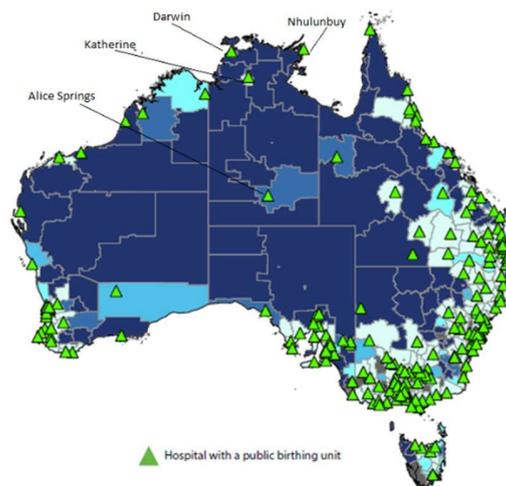


Figure 15 Location of hospitals with a public birthing unit: Courtesy AIHW, Australia's health 2016, p.291.

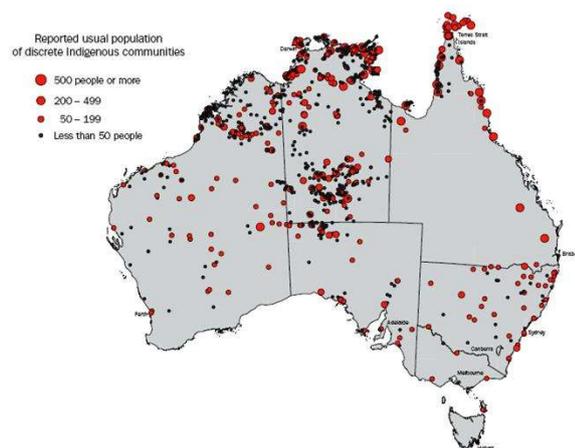


Figure 16 Location of discrete Aboriginal communities Source: Australian Bureau of Statistics, Housing and Infrastructure in Aboriginal and Torres Strait Islander Communities, Australia, 2006 (Cat. 4710.0)

A Midwifery Group Practice was established in 2009 in the NT as part of the Commonwealth Government's proposal to "close the gap" between Indigenous and non-Indigenous maternal and neonatal health outcomes. The fundamental point of the service is to provide a woman with a midwife at her first antenatal visit who then coordinates her care right through to the end of the neonatal period. If the same midwife cannot provide continuous care the woman is introduced to others who she also becomes familiar with. This change of carer can arise due to the vast distances between communities and major centres. The woman will therefore be familiar with midwives at her local community clinic and also at the hospital in the major centre where she will attend for ultrasounds and delivery. A publication in 2016 discussed a study of women in the Top End of the Northern Territory (NT) which was conducted to ascertain if there was any difference in quality of care since the introduction of the Midwifery Group Practice¹¹⁵. The work was a retrospective comparative cohort mixed methods study of access and quality of care two time periods 2004-6 and 2009-11. The study sites were the two largest Indigenous Communities in the NT and Royal Darwin Hospital (RDH) and the study cohorts were from the two communities¹¹⁵

Babies records were linked to their mothers and the findings were that there was no significant difference in neonatal outcomes but that there was an

improvement in continuity of care. The author recommends further studies in maternal services in remote areas which is in accord with the conclusion to this thesis¹¹⁵.

A retrospective descriptive study in Central Australia published in 2016 described maternal and newborn outcomes for women who accessed the Midwifery Group Practice¹⁴⁸. The main hospital in Central Australia is in Alice Springs. Women and newborns who require specialist care will usually be transferred to Adelaide. The study shows that midwifery continuity of care can be established for women who reside in geographically isolated areas.

Furthermore, women can have a degree of choice in their birthplace or type of birth. The author refers to the policy of relocating women in the Northern Territory at 36-38 weeks gestation and notes that this is a factor involved in the use of the Midwifery Group Practice. The relocation is not discussed as a factor in maternal and neonatal outcomes but the information provided by the author is very useful.

The costs of the provision of maternity services with the Midwifery Group Practice have been discussed by Gao (2013)⁹⁷. This study was also a retrospective and prospective cohort study and in this case the comparison was the costs of maternal and neonatal care between a baseline group of Indigenous women

from two remote communities and Indigenous women from seven communities who received care from the Midwifery Group Practice. The study periods were 2004-6 and the cohort after the introduction of the Midwifery Group Practice were 2009-11. The disparity between time frames and the number of communities included in the study has not been discussed.

In the NT, standards of care and access to health services varies between remote communities due to ease of access to the location, varying climatic conditions, population sizes, ability to attract and retain health service personnel, local and national politics and funding arrangements. This situation is reflected in Denning's study of a similar population in Northern Canada¹⁴⁹.

For women who have to find accommodation while staying in an urban centre there are no exact replicas of maternity waiting homes in Australia. However, there are hostels and hotels which provide accommodation for people from remote areas. They can be used as general short term accommodation by anyone but also specialise in providing outpatients with accommodation to utilize while waiting for hospital treatment such as chemotherapy, dialysis, and major surgery. Pregnant women from remote communities will also use these facilities if they cannot find alternative accommodation with family and friends. Some

accommodation is provided specifically for women from remote Indigenous communities.



Figure 17 Accommodation for Aboriginal women at Royal Darwin Hospital

Unlike Maternity Waiting Homes which are used in some low to middle-income countries (LMICs), the hostels available for use by patients from geographically isolated areas of the NT are not serviced by medical practitioners or visiting health services. They are run more like a short-stay hotel or motel with a caretaker residing on the premises. If a resident requires urgent medical attention the caretaker will call 000 for an ambulance. Otherwise patients travel by bus or taxi to keep medical appointments either at the nearest Emergency Department or with a local Aboriginal Health Service¹⁵⁰. The new Gudang Dalba hostel pictured above is located on the campus at Royal Darwin Hospital and is

proving popular with Indigenous Australian women. It is a culturally sensitive accommodation option and only a short walk to the main hospital building.

The Central Australian Rural Practitioners Association (CARPA) has produced a remote primary health care manual in alliance with the Centre for Remote Health and the Central Australian Aboriginal Congress^{93,151}. The Standard Treatment Manual for Women's Business in remote and Indigenous health services in Central and Northern Australia also known as *Minymaku Kutju Tjukurpa: 'Women Only Story'* provides information and guidance for health professionals working with Indigenous patients. An aim of this manual is to provide advice regarding culturally sensitive issues in treating women and advice for managing pregnant women is provided. The manual provides detailed information on cultural sensitivity during antenatal care and describes how to assist in a birth. However, it follows on with no lead-in and suddenly states that "at 38 weeks – *Transfer to regional centre to wait for birth*". There is no suggestion that the woman may have a choice or be involved in the planning or decision making. Any newly appointed health care professional would be forgiven for assuming there was no alternative. It can be assumed that the information on assisting with a birth is documented for emergency settings but no explanation is provided in the manual¹⁵².

As mentioned above CARPA has produced a clinic manual for primary health care practitioners in remote and Indigenous health services in Central and Northern Australia. This manual refers readers on to the Women's Business Manual in relation to pregnancy and has no mention of referral services other than for alcohol treatment⁹³.

As previously mentioned, information for new and visiting health care practitioners is not always easy to find. New or visiting staff are largely dependent on induction procedures and support from existing staff. There is a document on the NT Department of Health intranet which provides information on authorised clinical protocols and procedures for primary health care in remote settings. It provides links to sources of information and is very useful for new and existing workers in the NT¹⁵³.

The Midwifery Group Practice is described in a factsheet for NT Department of Health staff. This document has no mention of cultural sensitivity or of including the woman in the discussions and planning around her pregnancy. The language of the document is very formal and, if a newly arrived health care professional reads it, there is doubt that they would be inclined to think about cultural sensitivity⁹².

In comparison, the non-Indigenous population must book their own accommodation, pay up-front and then claim their expenses. There is a company recommended for use by patients in the NT called Corporate Keys which advertises “hospital stays” accommodation. Patients can book a serviced apartment near the hospital of their choice at 40% reduction of normal rate depending on the length of stay¹⁵⁴. The non-Indigenous population group of the NT includes many temporary residents on short term contracts either with private employers or Government agencies. It is generally accepted that pregnant women residing in geographically isolated areas of the NT will relocate to their home State and live with close family in the weeks leading up to the onset of labour. This means they do not remain with the same midwife or obstetrician throughout their pregnancy. The maternal and neonatal outcomes for this group of relocated women has not been researched nor are the actual numbers known. Data from the published NT Midwives’ Collection show that 4% of women who gave birth in 2015 were non-Indigenous living in a non-urban location. This was not expanded on and this fact again reinforces the need for data collection with greater in-depth data. All further reference to non-Indigenous mothers included all residents with no separation by residential area¹⁵⁵.

Although the core financial costs are covered, this does not mean there is no stress or other difficulties placed on the women and their families. Despite no formal policy being uncovered during the literature search, there are authorized procedures and best practice manuals available for NT Department of Health staff and visiting health care professionals to refer to. As mentioned in the 2.3. above these grey literature documents are available on the internet but they are not widely advertised and families or visiting health care professionals may not find them unless given a direct reference.

A study of inequalities between Indigenous and non-Indigenous women in Australia discussed remoteness and the consequent lack of accessibility to services as a reason for poor outcomes for maternal and neonatal health. The study was a retrospective comparison between urban and remote dwelling Indigenous Australian women in the NT from 2003-5. The study included women with high-risk pregnancies, but the overall discussion was of use in this thesis. The authors found that there were sufficient data to provide meaningful information regarding the disparity between remote dwelling and urban Indigenous Australian maternal and neonatal health outcomes¹⁴⁴. Only two remote communities were included in the study whereas the comparison group of urban women were from all over the NT. Indigenous Australian people tend to be quite mobile in that they move around between regions and it is possible

that women who were identified as urban dwellers could have moved from a remote setting for any given period of time. There are also significant differences between communities such as whether alcohol is permitted or whether the location is by the sea or in the desert, so it is questionable whether the results are a generalizable picture of the typical situation⁹⁰.

In an ethnographic study in 2009, using a very small sample size of only seven women from one Aboriginal community, there was a consistent message that women did not feel in control of their own birth choices and the relocation to an urban setting to give birth causes a dislocation from their country^{3,43}. This study was conducted prior to the introduction of the Midwifery Group Practice, so the situation may be different in that community now. It would be interesting to revisit "Saint Gerard", the community used as the base for the study, and conduct a follow up study. No further work from this community has been published.

Barclay's study published in 2014 evaluated the outcomes of changes to maternity services in the NT created by the introduction of the Midwifery Group Practice. Again, two communities were chosen for data collection and the results showed significant improvement in quality of care, the proportion of women accessing antenatal care, and consequent improvement in maternal and

neonatal health outcomes. There is still much improvement required but these are positive steps towards “closing the gap”¹⁵⁶.

The Australian Health Ministers Advisory Council (AHMAC) recommends that health care should be available to all Australians, especially maternal and perinatal care¹⁸. The 2012 Annual Report showed the NT is continuing to develop and expand midwifery-managed models of care for low-risk (described within the document as “normal risk”) women through:

- an increase in the number of midwives working in a caseload model at the Royal Darwin Hospital Birth Centre,
- expansion of the Midwifery Group Practice at Alice Springs Hospital, and
- increasing the number of Remote Area Midwife positions.

What the report does not show is the reality of the circumstances for each individual woman and her immediate family.

Despite advances in health service quality, the closure of small rural maternity units has become commonplace in high-income countries (HICs). This has resulted in pregnant women and their families being faced with decisions regarding planning their place of birth. These changes have added greater

difficulties and stress implications in addition to those experienced by people who live in urban settings¹⁵⁷.

The maternal age of the non-Indigenous population in the NT is also lower than the national average (with the mean age being 28.7 years)¹⁵⁵. It is unknown whether this group includes women who live in geographically isolated areas. It is also unknown whether they use social media platforms to access antenatal care advice or where they choose to go for the birth of their baby^{158,159}.

It is recommended that qualitative research be undertaken in the form of questioning those young mothers who are relocated to a major centre in the NT and compare them with women who reside in an Aboriginal community which has high quality primary health care facilities and resident midwives. Additionally, a study of their birth outcomes should be undertaken.

It is normally possible to conduct retrospective cohort analysis but in the NT reports on births often do not record the mother's actual residence. Data reported by the Department of Health refer to "remote" residents and there is no clear separation of place of residence or place of birth¹⁵⁵. It is unknown during writing, but possible, that the Australian Government's recently introduced "My Health Record" will make collection of this data possible¹⁶⁰.

As previously mentioned there are women, both Indigenous and non-Indigenous Australians, living in isolated circumstances. They could be living on small islands with no local services, on cattle stations (large ranch style farms) often many square thousand km in size, or in small or remote communities. There are a number of isolated tourism enterprises which can only be reached by helicopter or boat. These are defined as boutique or unique enterprises and are fully staffed. No data have been uncovered regarding pregnant women employed in these areas. The situation for pregnant women who are not resident in Aboriginal communities is not mentioned in information on the Northern Territory Government (NTG) website. It is assumed that these women receive independent information from their GP or at an antenatal visit and must make their own birth plans.

In interstate or overseas studies of geographically isolated patients the postcode of the residential address of geographically isolated women has been used to identify the distance they may travel to give birth¹⁵. In the NT, this method of data collection is not possible as there are no post codes for small, remote, Aboriginal communities.

For the majority of Aboriginal communities mail is initially collected at a major centre in the capital City, Darwin (Winnellie Post Office, code 0822) (Refer to

Figure 18) then transported around the coast on a barge or air lifted out to the nearest large centre with an air strip from where it is further sorted to be collected from a central point. Houses in remote communities have a lot (allotment) or house number for recognition by essential service providers but

- The Northern Territory has 280 undeliverable community points.
 - To ensure deliveries can be completed to all remaining communities, Australia Post contracted the services of various airlines to get the mail to these communities.
 - Each community has a dedicated Private Mail Bag at either:
 - Alice Springs (0872) – Alice Springs DC
 - Winnellie (0822) – Winnellie Delivery Annexe
 - Katherine (0852) – Katherine DC
 - Tennant Creek (0862) – Tennant Creek PO
 - Once the article arrives at the above locations, the article is scanned as delivered, with signature. This scan does not indicate delivery to the customer.
 - Each community has a selected day for dispatch. Delivery can take a further five days to be received after being put into the Private Mail Bag.
- Once the chartered flights arrive to the community, members of the community council oversee the sorting/collection of articles.

*Figure 18: Northern Territory Postal Service.
(Information supplied by personal
communication with Australia Post in June
2018)*

the residents are often unaware of this number. They will collect their mail from a central location such as the council office or health clinic where they are known individually. The place of residence cannot therefore be connected to a post code for the purpose of data collection.

To provide advice to stakeholders, and make changes to current practises, there needs to be clear evidence to support any recommendations. It is proposed that

a mixed methods study including contemporary qualitative data collection and retrospective quantitative studies would provide preliminary evidence to support future planning for health services in the Northern Territory (and possibly in the wider Australian context).

For example a retrospective case series study could select a remote community where it is known that all pregnant women relocate at 36-38 weeks gestation and compare the maternal and neonatal outcomes with the same number of similar women residing close to a major birthing centre.

Better qualitative and observational qualitative studies are recommended for initial research due to major limitations in designing a randomised controlled trial. Pregnant women will want to know any effect being randomised into one group or the other will have on their baby. This has been discussed by Oude in the randomised controlled trial conducted in the Netherlands in 2015¹⁶¹.

Research conducted for this thesis has found that pregnant women in geographically isolated areas of the NT are not forced to relocate from their local community. However, it is widely acknowledged that this is the expectation of the mother, her family, and health care providers. Anecdotal comments by members of the public and health professionals state that women are happy and feel safer to deliver their baby in hospital.

It is also worth considering whether future policies should be considering “when” a woman should relocate to near a major birthing centre rather than “if”. Has the time come (with ready and available transport, good antenatal services in remote areas, and consultations via telemedicine) to allow a woman to remain at home until closer to her due date?

To undertake any qualitative studies in the NT, similar to those conducted in the Netherlands, considerable work will be required on the development of the introductory material. This is due largely to the population of child-bearing age women being proportionally Indigenous Australian, non-English speaking, and with relatively low health literacy^{25,162,163}.

5.3.2. Canada

Historically Canada was governed by the United Kingdom (UK) and was subject to laws administered by the British Parliament. The country received independence and had an independent constitution developed with the introduction of *The British North America Act* (1867). British North America became known as Canada and in order to manage its First Nations peoples *The Indian Act* (1876) was introduced which gave the governors of the country authority over the First Nations peoples, naming them as wards of the Crown. This history is described in detail in Lawford's thesis from the University of Ottawa submitted in 2011¹⁶⁴.

Lawford's thesis also explored the evacuation policy relating to geographically isolated pregnant women living in remote and sparsely inhabited regions of Canadian Northern Provinces and Alaska. She found that the Canadian policy of relocating pregnant women commenced around 1892 and was founded on the plan to assimilate the "primitive natives". Her research did not discover the historical context for development and implementation of the evacuation policy and she states in her thesis that there is no literature on the subject. Her study provides useful information in regard to the psychosocial impact of evacuation but does not describe evidence of any medical effect on the birth outcome for

mother or neonate. The thesis was undertaken using feminist and First Nations methodologies and did not address clinical health outcomes or provide statistics. There are similarities in treatment of First Nations women to those experienced by Indigenous Australian women which can be explained by our understanding of colonisation and development under British rule.

A paper published in 2015 described access to primary health care services for remote Canadian provinces¹⁶⁵. Pregnant women who live in geographically isolated areas of Canada have a similar demography and history to those in Australia. Climatic conditions represent the main difference. Australia is subject to climatic variations but regional areas now have either (or both) good roads and an all-weather accessible air strip. Climatic conditions are a major factor regarding accessibility for Canadian women with large tracts being impacted during winter months by snow and ice. Many of these women live on what are known as reserves (rather than in the Australian concept of communities) and have limited road access for much of the year. Oosterveer's study in 2015 shows that all year accessibility is considerably changed from the report of poor access in Denning's thesis of 2009¹⁴⁹. The paper shows that all-weather roads, ice roads and all-weather air strips are now provided to main areas of Canada's Northwest Territories. The similarity to Australia, in addition to geographic distances between major centres of population, is in the lack of or difficulty in

access to local health services, language barriers, cultural differences between the patient and the health practitioner, in fundamental beliefs and in practises relating to birthing. Policies which force Canadian women to relocate long distances to near maternity facilities, the introduction of Western health practices, and loss of rights has created stress which has impacted on cultural security¹⁶⁶.

A Canadian thesis, Denning (2009) was found to be the closest document relevant to this project in all searches undertaken. This study was a retrospective analysis of the Canadian Maternity Experiences Survey 2006-2007. The number of cases surveyed was 229 women who had given birth to a live singleton infant between eleven and fourteen months before the study was conducted regardless of pregnancy risk factor. The group of women who transferred more than 100 km to give birth included the period up to three (3) days prior to the onset of labour. The author used this time factor to distinguish them from the women who were medevacked (*sic*) during labour. The author did not give a reason for why or how 3 days before labour was calculated. Despite the difference in time frame from the main questions in this thesis, some of the outcomes being measured were similar. The results provided useful information relevant to the issues being faced by geographically isolated women at opposite ends of the world. In discussing this studies' findings, no mention was made of whether

airlines restrict flights for pregnant women close to their due date. Investigation into Canadian airlines shows that standard rules apply for major carriers and charter companies do not mention travel while pregnant in their information^{167,168}.

The study reported that there was no significant difference in neonatal outcomes between women who were transferred and those who remained at home. The author stated that the only factor that appeared to influence neonatal morbidity in her study was whether or not a mother had smoked during the last three months of her pregnancy. The author concluded that her work provides useful baseline information and that further quantitative studies are required. She also states that policy decisions and changes in maternity care will need to be taken into consideration¹⁴⁹.

A further Canadian study in 2011 has stated that “distance matters” in relation to maternal and neonatal outcomes for pregnant women travelling to give birth. The author Grzybowski (2011) had a practical approach and calculated distance as time from home to hospital rather than using geographic distance. The travel times were calculated by recording geographic information system mapping (GIS) from the centroid (longitude and latitude cross point) from the nearest referral maternity service to the postal code centroid in the location of the

mother's community. The distances were further defined into catchments to women residing 1 to 2, 2 to 4, and >4 hours from the nearest maternity service with Caesarean section capability. This was a retrospective cohort study of maternal and newborn data linked to specific geographic catchments by the British Columbia Perinatal Health Program (BCPHP). The participants did not relocate for a period of time prior to birth but the author found that it was unlikely that women living >4 hours from maternity services would remain at home. The number who relocated (or where they stayed and for how long after the birth of their baby) was not mentioned in the study. The total number of births in the study between 1 April 2001 and 31 March 2004 was n=49,402. The author did not state where the home residence of the births at level 4-6 obstetric services was, so it is unclear if the numbers of births in levels 1-3 settings is an exact count.

The study found that rural women will experience more interventions, such as induction, than those living near a major birthing centre. The author stated that the further a woman travels to give birth the higher the risk. This is due in part to stress which can be associated with complications such as preterm labour. Again, the author did not provide actual numbers of those who had relocated in advance to wait near a maternity facility to give birth⁶⁷.

5.3.3. Other high-income countries compared with Australia

In France, some rural maternity units have been closed. Because of this, Combier¹²⁵ in 2013 examined the effect of the increased travel time for rural parturient women to reach maternity services and if an impact on maternal or perinatal outcomes was observable. The study was limited to the Burgundy area and the mean time of transport was 15 minutes. Burgundy is a large area covering 31,600 km² and contains mountainous regions which require roads to be circuitous. The population density is lower than the rest of the country being 51 inhabitants/km² unlike 118 for the rest of the country. The author did not provide data on the birth rate for this area or whether the population density or inaccessibility was a contributing factor to the findings. In the study, travel time was divided into four categories: 0–15 min, 16–30 min, 31–45 min, and 46 min or more. The author selected 15-min time classes because the mean travel time to a maternity ward in France in 2007 was 14.26 min and 30 min because this corresponds to the governmental objective for emergency services. Furthermore, travel time to hospital was based on the time taken by a high-speed ambulance which means that the women were already receiving medical care from paramedics. The author in her conclusions stated that because none of the 337 women living >45 minutes from a maternity ward gave birth outside a hospital it was not possible to assess the association between delivery outcomes and

access distance longer than 45 minutes. She did not mention any data on time frame or choices in relation to relocation prior to birth. The author referred to maternity waiting homes and discussed the potential use of this model in HICs. The author did not mention how long the women might stay at these premises. It appears that Combier¹²⁵ is referring to dormitory style accommodation serviced by midwives which can be used by pregnant women when they arrive at hospital thinking that their labour is imminent¹²⁵.

Greenland is part of the Kingdom of Denmark, governed by the Home Rule administration¹⁶⁹. A literature review of birth settings in Arctic Greenland (Montgomery-Anderson 2013) describes the country as the world's largest island and states that it contains a predominately Indigenous Inuit population with their own language and culture. The review was undertaken using a narrative review theory and a content analysis framework. Politics have taken a lead role in making changes to what happens to women during pregnancy. Since the post colonial period, Indigenous Greenlandic women have been relocated from their home communities to give birth in hospital. This study did not refer to the mode of transport or associated costs. There was mention that in Greenland there is no road access between large towns but no description of how travel is undertaken was provided. There were correlations made with Australian Indigenous communities in regard to women having less choice in

birthplace than in the past from a cultural perspective. The author concluded that research conducted in Canada and Australia should be used to inform future directions in Greenland¹⁷⁰.

Montgomery-Andersen published an earlier study from Greenland in 2010 where she discussed the referral of all at-risk pregnancies to the major hospital in the capital city, Nuuk. This was a retrospective qualitative study of 15 interviews conducted with Greenlandic women with high-risk pregnancies who had been relocated to Nuuk to wait to have their baby. The author found that cultural security was important and there was a feeling of disempowerment but also of acceptance of the situation. There was no report on maternal or neonatal outcomes.¹⁷¹

New Zealand is a high-income country which provides free health care to all residents and has an Indigenous (Maori) population. Many Maori are socially and culturally disadvantaged. Although it is not a large country, there are geographically isolated women living in mountainous and island areas who have difficulties with access to health services¹⁷². However, reimbursement for additional costs can be claimed through a National Travel Assistance program. Women can choose their place of birth and their preference for the type of care e.g. midwifery lead or clinical¹⁷³.

The Maori population live in both urban and remote locations and have access to public funding for maternity services. This has been described by Hunter (2011) where she has an objective to examine whether ethnicity is a factor in a woman's choice of birthplace. This paper gives a clear description of the service availability for women and shows New Zealand to be amongst the most progressive countries in the world in regard to inclusion of families at the centre of decision making. The study demonstrates that, although Maori women have a high need for culturally sensitive maternity care, they largely choose to birth in a tertiary maternity facility. Hunter's study provided considerable insight into choices available for women and the numbers who chose to birth at home versus a tertiary facility. However, it did not include any examination of why women made their choice. The conclusion stated that women do tend to give birth in their planned place of birth but whether this shows any impact on health was not explored. Furthermore, there was no information on maternal or neonatal outcomes⁷³.

A study by Posthumus (2016)¹⁷⁴ from the Netherlands discussed differences in the utilisation of obstetric services based on geographic, ethnic, and socio-economic differences. All women in the Netherlands are entitled to obstetric care access. The Netherlands does not have an Indigenous population but the author refers to and includes "non-Western" women as a separate cohort. These

women largely reside in poorer neighbourhoods and are of a lower socio-economic status. The results show similar behaviours to Indigenous populations from other HICs in that a larger number of this group of women give birth in a tertiary facility than the mainstream population. Additionally, they are more likely to be referred to obstetric care but receive fewer interventions e.g. caesarean section. This study was limited to observation and the reasons for choices made by women were based on assumptions. The impact on maternal and neonatal health was not included nor was geographic isolation taken into consideration¹⁷⁴.

Similarly to New Zealand, the UK is a relatively small land mass when compared to countries such as Canada and Australia. It is an island nation and has many inhabited small islands around its coastline. These may not be a long distance from the mainland “as the crow flies” but transport and access can create a geographically isolated section of the population. This does not prevent them from access to the high-quality medical services available for residents living on the mainland, but travel time has to be considered for both planned and emergency transfer.

In 2016 the UK had a population of 65.6 million and in England and Wales alone, there were 679,106 live births in 2017. The stillbirth rate decreased to 4.2

per 1,000 total births in 2017, the lowest rate on record with figures available back to 1927. In the decade since 2007, the stillbirth rate has decreased by 19.2%^{175,176}.

The UK National Health Service (NHS) provides care for all residents and anyone requiring health services that are not readily accessible will be transported by road or air at no cost to the patient. Unlike Canada, Australia, and New Zealand, these remote dwelling residents are part of the mainstream population. In general, they do not have cultural or linguistic barriers to accessing the services. Pregnant women in the UK can choose their place of birth and the majority continue to elect to give birth in an obstetric unit¹⁶. A paper published in 2011 reviewed perinatal and maternal outcomes by planned place of birth. The research focussed on home births versus births in obstetric units. There was no mention of distance being a decision-making factor on the choice of place of birth, instead a characteristic of the study group was residence in socioeconomically disadvantaged areas¹⁷⁷.

In the North of Scotland, there are island communities with restricted access to primary health care. All residents are entitled to free health services but this does not include the cost of travel except where there is a referral or an emergency. Very remote island communities provide maternity services in their

largest centres and midwives are placed in the smaller centres. Women can make the choice whether to birth at home, in their local community hospital, or travel to the mainland. In the case where women are referred to the mainland, reimbursement claims are available in certain circumstances, and are outlined in the Highland and Islands Patient Travel Scheme^{126,178}. It is clear that there is no “forced” relocation and that women and their families are fully included in discussions regarding their choice of place of birth.

Women who plan to travel to the mainland for the birth of their baby can book into accommodation adjacent to the hospital of their choice. Women from remote Scottish Islands will usually travel to the nearest mainland major city, Aberdeen, where they can stay inexpensively in a choice of hostel type accommodation they will have to incur the costs but as mentioned above there is some ability to claim reimbursement¹⁷⁹.

Residents of the republic of Ireland are not considered to be geographically isolated. A study of midwife-led care versus consultant-led care enrolled pregnant women who were healthy with low-risk of complications. The study was undertaken as an unblinded, randomised trial with the participants and their carers fully informed of their allocation in the trial. The midwife-led units were specifically opened for the purpose of the trial. In order to manage costs

the participants were randomised at a ratio of 2:1 into the midwife-led units. The overall outcome was that there was no significant difference in maternal and neonatal health outcomes between the two care options and that women who receive midwife-led care experience fewer interventions¹⁸⁰.

The United States of America (USA) is a vast country with very remote areas. The USA has an Indigenous population also referred to as Indians, Native Americans, or First Nations People. Despite the large land mass, the very long distances that women have to travel to receive health care is not the same as in Australia and Canada. The USA is divided into 52 states each with its own health care system and high-quality hospitals and facilities. The country has 12 Indian nations providing their own health services to 567 federally recognized American Indian and Alaska Native Tribes. Governance of legal issues regarding Indian Nations is undertaken by the United States Government Department of Health and Human Services / [Indian Health Service](#), which is the Federal Health Program for American Indians and Alaskan Natives¹⁸¹. Information on their webpage states “The Indian Health Service Tribal Self-Governance Program recognizes that tribal leaders and members are in the best position to understand the health care needs and priorities of their communities”¹⁸².

For remote dwelling women on Indian Reserves, provision of maternity services is conducted by each separate local health service. There is provision for free services where direct claims for reimbursement are now made by the service provider within the terms of the Alaska Native and American Indian Direct Reimbursement Act of 2000¹⁸³.

The appendices in the United States Commonwealth Fund - International Health Care System Profiles¹⁸⁴ do mention that there may be disparities in reporting from countries where inequalities between population groups exist but does not elaborate on how these may be identified.

The Commonwealth Fund¹⁸⁴ has compiled health care profiles for nineteen high-income countries to compare them with the USA. The data show that health expenditure in high-income countries includes high level service provision for maternity services¹⁸⁴. The consequent low maternal and neonatal mortality is expected and women have access to high quality emergency obstetric services when required. However, the data do not include any mention of geographic isolation or consideration for Indigenous populations within these countries. The report highlighted that *“Women in the U.S. have the highest rate of maternal mortality because of complications from pregnancy or childbirth, as well as among the highest rates of caesarean sections”*. The report also states that access to

care and high costs are a contributing factor. Whereas other HICs provide universal health care either directly or via superannuation funds, the USA continues to have a large sector of the population with limited access to health care services due to costs¹⁰⁹.

Global studies of the preferences of pregnant women show that safety, for both themselves and their baby, is an overriding consideration when deciding on the place to give birth¹⁸⁵⁻¹⁸⁷. The term “safety’ can be interpreted in different ways and may include:

- Knowing someone with expertise is nearby if required;
- Feeling secure from physical threat.

These may be very different issues depending on the location and socioeconomic status of the woman in labour.

Migrant and refugee women in HICs (a long way from their immediate family) often experience language barriers and may have cultural beliefs regarding pregnancy and birth which are very different from those of the country they are residing in. Malin (2009) describes poorer neonatal outcomes for this group of women, in Finland, where high quality health services are readily available to all residents. The study did not refer to the geographic location of the women, nor any distance required to travel to receive maternity care. The study

mentioned women from the Baltic states and Russia and it was interesting to note that women from those countries had better birth outcomes than those from Sub-Saharan and African countries. The latter group experienced lower birthweight babies and premature births. This was considered to be attributable to “the healthy migrant effect” where migrant women from European countries were likely to be young, healthy, educated and already of high socioeconomic status. The healthy migrant effect does not take into account the many women refugees from countries affected by terrorist activities, wars and natural disasters. This would suggest that relocation per se is not a contributing factor to maternal and neonatal health outcomes, rather, that any effect is dependent on the personal circumstances of the individual woman and whether she migrated by choice¹³.

Migrant women who have been issued a residency permit in the USA are considered the same as any other residents. They have access to medical services through health insurance. Illegal migrants have no rights to any service.

There is a paucity of information on this subject in published literature or on government web sites. Even in HICs, migrant (especially illegal migrant) women are virtually an “invisible” sector of the population in any country¹².

Countries such as Sweden have a large intake of low socioeconomic migrants. Many of these people are from Somalia and other Sub-Saharan countries. In her study of perinatal mortality, Essen (2002)¹⁸⁸ found that sub-optimal care in a country with such a high standard of health services was partly due to socio-cultural understanding of pregnancy. She recommends that public policy should include antenatal education for ethnic minority residents, This education should be supported by interpreters¹⁸⁸. This Swedish finding is consistent with reference to migrant populations found in other studies.

Studies from South America and Asia are similar to those from Africa and North-East Europe in that the countries are mainly classed as LMIC and there is the additional difficulty of limited publications in English.

To ensure that HICs from all continents were represented in this study, Chile was selected from South America as it is a HIC with a large land mass (although it was not included in the list of HICs which were in the study by Gunja for the Commonwealth Fund)¹⁰⁹. A mixed methods study to evaluate the implementation of a “Model of Integrated and Humanized Health Services” stated that <99% of babies in Chile are born in hospitals. There is public and private health funding and the public system covers health care for 100% of the poorest population, including maternal and infant health¹¹⁰. The author states

that a large proportion of the population resides in Santiago. Regional hospitals were included in the study in order to assess if there was any difference in perceptions of care outcomes in very regional areas. The findings from this large study (>1700 participants) were that there was little difference between regional and urban settings. There was frequent augmentation of labour and almost 20% of low risk women in spontaneous labour delivered by caesarean section. Where both the planned/programmed and emergency caesarean sections are included in data collection this proportion increases to almost 40% nationally. The midwifery model of care is not being taken up and the author highly recommends further studies. The results can be used to provide information on what women want and ascertain why their birth preferences and choices are continuing to be unheard.

Countries such as Japan and Singapore provide high quality health services which are “user pays” but subsidised through health insurance (which is debited from incomes). Neither of these countries have very isolated populations and all women can access medical services without having to travel long distances.

Reports regarding maternal and neonatal health services in HICs consistently describe women having access to high quality maternity care with birth choice

readily available. Issues for women living in geographically isolated areas (regardless of ethnicity) do not arise and are only uncovered through specific literature searching. The extent of the problem is therefore not commonly known.

5.3.4. Low to middle-income countries (LMICs) compared to Indigenous and low-socioeconomic populations in HICs

The primary focus of this thesis is on HICs. The literature regarding pregnant women in LMICs warrants mention as it provides interesting information in relation to geographic isolation and the situation for those women mentioned in the previous section. As also mentioned in the previous section, advances in health statistics for maternal and infant health continue to be demonstrated in annual reports from HICs and United Nations' statements^{44,90,176,189}. The situation is not so assured for pregnant women who live in underdeveloped or war-torn countries. While coping with poverty, loss of loved ones and even their homes, they are experiencing political upheaval. Added to this is the burden of living a long way from a major birthing centre. In the case of countries in turmoil, medical services may no longer be available¹⁹⁰.

Much has been written regarding limited access to services within LMICs, however, the issue of disadvantaged versus advantaged populations and

isolation due to geographical contexts varies considerably within and between countries. Women having poor or no access to transport, other than walking, means that geographical isolation can be measured by miles or time required to walk to access maternity services¹⁹¹. Populations within countries such as Australia or Canada contain a mix of high, medium and low-income socioeconomic status for individuals. The geographical location of residents impacts on their ability to seek or access services such as maternity care¹⁹².

Neonatal and maternal morbidity and mortality remain significant health problems in the 21st Century, especially in LMICs and among disadvantaged populations in HICs e.g. Indigenous Australians, especially those who live in remote communities¹⁹³

Factors which need to be remembered include that in LMICs:

- Women have poor access to transport;
- Distance measured might be as miles or km to walk or in time;
- There may be a limit to health services available in a region;
- Health service design may be different from that in a high-income country;

- Costs may be an important decision-making factor for families;
- Women may be from low-socio economic or culturally disadvantaged groups e.g. Indigenous or migrant.

The WHO has published a review of maternity waiting homes⁵³. The document was published in 1996. No further work has been completed, so this 20 plus year old review was only used as a reference. The WHO report only refers to maternal care in developing countries stating that developed countries already provide hotels or dormitory style accommodation near hospitals. In the report, no reference or evidence was provided to support this statement. The WHO report does provide information on best practice arrangements for maternity waiting homes at that time. Research into the contemporary situation is required in order for it to remain relevant. Combier¹²⁵ drew on information in the 1996 report for her 2013 study.

In LMICs, the advent of maternity waiting homes (also referred to as maternity waiting facilities or silk houses⁴⁶) has been shown to improve maternal and neonatal outcomes for geographically isolated women. Despite this, maternal and newborn mortality continues to be higher for these women compared to those living close to major birthing centres. Literature shows that the maternity

waiting facilities in many countries are not pleasant places to stay. They are not always clean, the women have to provide their own food and bed linen, and they do not always feel safe. The birth outcomes are also influenced by socio-economic status, maternal morbidity, religious beliefs, culture, education, poor health literacy, access to antenatal services, the quality of the hospital nearest to the maternity waiting facility, and environmental health issues (such as clean drinking water, sanitation and housing). Geographically isolated women can experience the same personal issues of intimate partner abuse, general domestic violence, loss of self-esteem, fear and anxiety as those in urban areas. Their problems are exacerbated by a lack of services to turn to and, in small communities, even a safe house to flee to¹⁹⁴.

Maternity waiting homes are usually situated near a hospital. Although there is variance in the service they provide, the general concept is, as their title suggests, a house to live in while waiting for the commencement of labour¹⁹⁴.



Figure 19: Example of a maternity waiting facility

In the last four decades there has been a marked growth in the advent of maternity waiting facilities in LMICs. A paper published in 2017 shows the results of a systematic review of the implementation of these facilities. A key finding was that poor health literacy, travel distance, and culturally inappropriate care all impact on the utilisation of these facilities. The paper describes the disparity in maternity waiting facilities throughout the world. The authors recommend that guidelines and protocols on the design, structure, and provision of services for maternity waiting facilities should be developed. They recommend that these facilities should be embedded as a normal part of health systems. In Australia, the closest equivalent to these facilities are Aboriginal hostels which are described in more detail in the Australian section. The paper did not discuss any effect on maternal and neonatal health, nor define distances

that may have been travelled by the women utilising the facilities. The authors concluded that articles they had reviewed did not provide information that would be used for development of the desired protocols and guidelines⁴⁹.

During the search for the narrative review studies from countries such as Guatemala, Zambia, Ethiopia, Nepal and Timor Leste were retrieved. These studies showed that women in LMICs are not provided with welfare payments nor do they have easy road access, motor, or air transport. Those who choose to utilize maternity waiting facilities must make their own travel arrangements^{47,50,51,194}.

African countries also comprise those previously under British rule which are now a part of the Commonwealth of Nations. An example is Zambia, previously known as Northern Rhodesia (from 1911) and renamed at independence in 1964. A paper published in 2017 (Henry), reviewed the quality of maternity waiting homes in Zambia to assess if the usage of these facilities for delivery was affected by their quality. One of the sample characteristics in the study was the distance to a facility. In this study, distance was based on travel time, a long distance being more than 2 hours (regardless of transportation type). Results show that pregnant women will utilise maternity waiting homes and shelters near medical facilities. There is no mention of the length of stay prior to, or after,

delivery and the authors state in their conclusions that amongst components critical to maternal and newborn health there should be a system for identification and referral of the women⁴⁸.

In contrast to developed countries, the definition of 'distance' to a health facility can be measured by the time it would take to walk there. Fisseha (2017) found that in Northern Ethiopia the distance to a health facility, and lack of transport thereto, reduced the likelihood that that a pregnant woman would make use of the service. However, the author states that the result is based upon mothers' comments and that other factors may influence their decision (such as comments from families and negative perceptions about the facility itself)⁸⁰.

One would expect to find that birthing options in South Africa would be similar to those in previous British Colonies. South Africa became an independent country of the British Empire in 1910 having earlier been colonised by the Dutch from 1652-1806¹⁹⁵. The long history of apartheid created distinctions in the availability or accessibility to health services between different sectors of the population.

In her research in 2016, Maredza reports that 80% of births in South Africa now take place in health facilities and there is a national policy of free maternal and child health care at public facilities¹⁹⁶. Child mortality is still high and that is

partly due to the ongoing rate of mothers infected with HIV. She also states that although there is a high percentage of facility use for birth that the facilities themselves are not all high quality. Many are poorly managed and poorly equipped to deal with neonatal care. As in other countries, poor access to emergency (or any) transport is a compounding factor in women's ability to access medical services. The study does not mention distance or any geographic isolation factors.

5.4. Review of published systematic reviews

As discussed in Chapter 3, Cochrane methods for conducting systematic reviews excludes the inclusion of published systematic reviews (although the trials within reviews can be included). This meant that despite published systematic reviews being identified in the search results, they could not be included or discussed. However, the following systematic reviews provided evidence that the issue of distance to maternity facilities for geographically isolated pregnant women is given little consideration by researchers, governments, and policy makers. The following table provides a summary view of the selected reviews.

Table 12 - Summary of systematic reviews reporting studies of maternal and neonatal relocation

Study	No. of relevant studies assessed	Context (setting, country, HIC, LMIC)	Interventions	Summary of results
Downe, Finlayson, et al. 2016 ¹⁹⁷	<p>2 searches were conducted.</p> <p>Papers retrieved from 1st search. n=21</p> <p>Papers retrieved from 2nd search n=13</p> <p>Papers retrieved from back-chaining n=4</p> <p>Total n=38</p>	<p>All continents except Australasia were included.</p> <p>The women were aged 13-49 years and the time frame was 1994-2013</p>	<p>The processes and outcomes of antenatal care provision that are important to healthy pregnant women."</p>	<p>An assessment of what women need, want, and value in pregnancy. This review did not refer to Australia but offered useful information relevant to this thesis.</p>
Hoang, Le, and Ogden. 2014 ¹⁹⁸	<p>Full text articles retrieved n=10</p>	<p>Rural Australia, Canada, Scotland and England</p> <p>Pregnant women residing in rural areas</p>	<p>This was not a comparative study. It did not follow the PICO format</p>	<p>Systematic review</p> <p>An assessment of qualitative research into models of care for rural women.</p>

Hodnett, Downe, et al. 2012 ⁹	Trials which met the inclusion criteria n=10	Sweden. Pregnant women at low risk of obstetric complications	Care during labour and birth in an alternative institutional birth setting. Antenatal and postnatal care may also have occurred in the alternative setting	Cochrane review The primary objective was to evaluate the effects, on labour and birth outcomes, of care in an alternative institutional birth setting compared with care in a conventional hospital labour ward. This study looked at birthing places which although an alternative to a hospital setting, had obstetric services available.
Hollowell, Li, et al. 2016 ¹⁹⁹	Included studies n=9	United Kingdom Women identified as low-risk or with experience in accessing UK maternity services	This was not a comparative study. It did not follow the PICO format	A systematic review and narrative synthesis of quantitative literature on preferences and choices by women in relation to place of birth
O'Driscoll T, Kelly L, Payne L, et al. 2011 ²⁰⁰	Articles retrieved n=22 Qualitative studies	Northwestern Ontario, Canada	This was not a comparative study. It did not follow the PICO format	The objective was to understand the perinatal knowledge and experiences of First Nations women from Northwestern Ontario who travel

	retrieved n=5			away from their remote communities to give birth.
Okoroh, Ekwutosi, M et al. 2016 ²⁰¹	Not stated	United States and territories	Transport and back-transport (return to home) for mothers and newborns in different jurisdictions	This was described as a systematic review but did not follow the process conventions.
Olsen and Clausen. 2012 ⁷⁷	Trials retrieved n=2 of which only 1 was found eligible	All pregnant women	Planned hospital births V planned home births (with a qualified midwife present	Cochrane Review This study looked at planned home births with an experienced midwife present and medical backup available if required. The review did not consider the geographical location of the women or the distance to emergency medical support
Scarf, Rossiter, Vedam, et al. 2018 ²⁰²	Studies included in meta- analysis n=28	Healthy pregnant women, with low risk pregnancies, in HICs	Intended place of birth, determined at or close to onset of labour	Systematic review and meta-analysis. This review examined whether there were significant differences between different

				planned birth places in critical maternal and perinatal outcomes
van Lonkhuijzen, Stekelenburg, et al. 2012 ¹⁹⁴	RCTs and QRCTs retrieved n=0	All pregnant women	Antenatal care and education provided at the Maternity waiting Facility MWH	Systematic review of trials to assess the effects of a maternity waiting facility on maternal and perinatal health. This review related to LRCs only. These facilities provide access to antenatal care

The objective of the systematic review conducted by Downe, et al. 2015¹⁹⁷ was to review what women want, need and value in pregnancy. There was no reason given for the exclusion of Australasia in the study, but did state that two Australian papers^{203,204} were included after the search had been completed and that these studies reinforced the findings. The study found that qualitative techniques were the most common study type and of those the majority were collected from individual interviews and groups. The participants were from varied socioeconomic backgrounds but no mention was made on their geographic location in relation to time or distance to maternity services. The conclusion was that the uptake of antenatal care was closely linked to the care and treatment provided by health services (and the individuals working within

the systems). Although this review did not relate to Australia or geographic isolation, it is evident that there is a recurring theme, amongst all women, in the sentiments expressed.

The systematic review conducted by Hoang, 2014¹⁹⁸ was a comprehensive study of qualitative research into the understanding the needs of pregnant rural women. In particular, the issue of the closure of rural obstetric services was identifies as a main factor which now forces women to travel long distances to give birth. There was no definition of “distance” and the focus was on travel during labour, not the relocation from home to wait near a maternity facility. Nonetheless, this review concluded with very similar statements to those in this thesis. It provides further argument to the need for government policy makers to be provided with sound evidence in order to include the wellbeing and social needs of the women and their families in development of policies and regulations¹⁹⁸.

A Cochrane Systematic Review has investigated literature on “Alternative versus conventional institutional settings for birth” and the authors concluded that “Hospital birth centres are associated with lower rates of medical interventions during labour and birth and higher levels of satisfaction, without increasing risk to mothers or babies”. The women included in the study had

choices between standard hospital settings and freestanding birthing centres⁹.

The outcomes of the study found that birthing centres were associated with less interventions and that women overall seemed more satisfied with their experience outside a conventional hospital setting. The author does conclude that there needs to be more qualitative and quantitative evidence before a sound judgement can be made. The participants were all HIC residents, again from Western Europe. There was no reference to geographic location of the participants, so it can be assumed they had ready access to the facilities they chose to attend⁹.

A systematic review by Hollowell (2016)¹⁹⁹ of women's preference in birthing location examined policies and the need to make changes. Her review involved studies which focused on the need to improve antenatal care and improve obstetric services nearer to rural communities. Her results did not contain information relating to planned relocation¹⁹⁹. The review uncovered that there are policies regarding choice of birthplace for women in the United Kingdom. These are different for each country, Scotland, England, Wales, and Northern Ireland. These policies generally state that women can choose their place of birth^{16,126,179}.

In 2011, a systematic review of Canadian women's experiences found that loneliness and boredom were main factors affecting relocated First Nations Women. O'Driscoll (2011)²⁰⁰ used qualitative data collected from semi-structured interviews of 13 First Nations women aged 17-34 from remote communities in Northern Ontario, who had travelled to the Sioux Lookout Meno Ya Win Health Centre in Ontario²⁰⁵ at 38 weeks gestation to give birth. It was noted that the families of these women did not receive any funding for partners or children to accompany or visit the women unless the mother was under 18 years of age or there were other medical complications (the "other" medical complications were not specified). The author mentioned in her conclusion that at the policy level, there is a need to understand the implications of the absence of funding for partners or escorts to be present for birthing. No statistics or references to studies in this issue were provided. There were no figures provided on maternal or neonatal outcomes nor any comparison study undertaken. Feedback comments on the Sioux Lookout web page stated this was particularly sad for women who had to leave very small children behind²⁰⁰.

The systematic review in 2016 (Okoroh)²⁰¹ of United States maternal and neonatal transport policies found that fifty States have travel policies in place. These relate to neonate care rather than maternal antenatal care and there is no mention of planned travel for geographically isolated women, whether from a

reserve or a non-Indigenous area²⁰¹. Additionally, although transport to receive health services is provided, there is limited provision of “back transport” (only nineteen of thirty-four states provided this service). This means that many families must find their own way home and pay the costs. This could lead to people deciding not to travel to receive care if they have no way to get home afterwards, (Author’s observation as this matter was not discussed in the study). The review was limited to publicly available web-based information and did not include published literature.

Olsen’s (2012)⁷⁷ systematic review looked at planned home births with an experienced midwife present and medical backup available if required. This was a review of randomised controlled trials (RCT) comparing planned hospital birth with planned home birth in low-risk women in Western European HICs. The review did not state exactly which countries were involved but from the discussion it would appear the main results from their search strategy came from the UK and Netherlands. Only two RCTs were found to meet the selection criteria and of those only one³² included any of the pre-specified outcome data. However, the RCT had only 11 women and the authors stated that the trial was too small to enable conclusions to be drawn. The review did not consider or include any studies of the geographical location of the women or the distance to emergency medical support. However, the authors suggest that women and

planners (*sic*) may appreciate more evidence and ethically designed trials to enable them to make decisions based on the best available evidence. Although the trials suggested in this review do not relate to relocation per se, the study shows that information and readily available high quality evidence are an important issue affecting many aspects of clinical trials⁷⁷.

Scarf (2018) has conducted a systematic review of maternal and neonatal outcomes based on planned place of birth (note: *place* means physical location such as home or birthing centre) and concluded that there was “*little significant impact on adverse perinatal outcomes*”²⁰². This study was a retrospective and prospective cohort study and formed part of the Birthplace in Australia study, funded by the National Health and Medical Research Council (Australia). It focussed on the physical place of birth rather than comparing hospital versus home birth, which has been the subject of other studies^{9,77}. Despite being a thorough review and meta-analysis, there was no mention of distance or time spent away from home. This study was the first to use the ResQu Index an innovative instrument to appraise research specifically on place of birth created by one of the co-authors, Vedam^{202,206}. This instrument was developed specifically to assess studies that compare different birth settings, and takes account of the unique characteristics of place of birth research. Development and content validation by an international panel of experts are described

elsewhere (Vedam et al., 2017). The instrument provides a quantitative summary score based on 27 criteria to rate the quality of research evidence at study level: high (scores of 75% and above), moderate (65– 74%) and low (less than 65%). Throughout the literature search, many reports regarding place of birth and choice of care have been uncovered. This review concluded that

“High-quality evidence about low-risk pregnancies indicates that place of birth had no statistically significant impact on infant mortality. The lower odds of maternal morbidity and obstetric intervention support the expansion of birth centre and home birth options for women with low-risk pregnancies”.

Although Scarf’s study compliments that of Olsen (2012), these reviews still do not consider the extreme geographic isolation of women in Australia and Canada. They also do not consider the political drive to meet the Millennium Development Goals, especially for Indigenous Australians and First Nations peoples.

Van Lonkhuijzen, 2012¹⁹⁴conducted a systematic review of the efficacy of maternity waiting homes (MWH). The study mentioned that these facilities had been around since the 1960s with their main purpose being to reduce geographic isolation for pregnant women living in remote areas. MWH enable

women to stay close to medical facilities until the end of their pregnancy.

However, he also reports that MWHs are for high-risk pregnancies and are located in low-income countries only. Despite this study being ineligible for inclusion in this thesis, there are similarities in the actual experience of the women to the population being researched in the very remote areas of the NT. The studies from various countries around the world found that there was an increase in maternal and newborn survival where women had ready access to medical facilities. However, the use of MWHs has not been readily accepted by many women due to factors such as culture (including the need for a husband's permission), poor cleanliness, overcrowding, and cost. This is another example of the recurring theme throughout this thesis where government policies do not take into consideration the desires of pregnant women to give birth in a safe and caring environment.

The systematic review found that there were no randomised controlled trials or cluster-randomised controlled trials that evaluated outcomes for women using an MWH in a low-income country¹⁹⁴. This is consistent with the results of the systematic review described in Chapter 2 of this thesis.

The systematic reviews described above varied in their style and design. All admitted to limitations. Each review concluded that further research was

required. The overall result in relation to this thesis was that no research or trials have been conducted that are directly relevant to the topic of this thesis. The review of reviews did not provide any new evidence to answer the primary research question of this thesis.

5.5. Summary of narrative literature review

Although information regarding maternal and neonatal health is readily available through organisations such as the World Health Organization (WHO) and from individual country health reports and bureaux of statistics, there are few or no data on maternal and neonatal health outcomes for geographically isolated or Indigenous populations. The WHO report on inequalities in child mortality did not include any HICs despite reporting on inequalities within countries²⁰⁷. It has been mentioned in a report on the health of American Indians (First Nations Peoples) that this could be partly due to the difficulty in capturing true data because many people during a census will not identify their ethnicity. This also occurs when registering a birth or death¹²⁰.

CHAPTER 6: AN UMBRELLA VIEW OF RESULTS

6.1. Introduction

The most appropriate technique to source and analyse the information required was initially believed to be a systematic review utilising the well-respected Cochrane framework. However, as per Chapter 3, it was established early in the research that there was no study that met Cochrane standards that could be used to provide answers to the research questions. It was therefore necessary as per Chapters 4 & 5 to conduct grey literature and broad narrative reviews to further explore the research questions. For the purpose of analysis it therefore became necessary to find an appropriate way of bringing all the relevant information from all three reviews together. An extensive search of literature identified that this problem had been encountered before and analysis could be achieved by conducting an “umbrella view”.

This chapter therefore:

- Defines and describes what an umbrella view is;
- Explains and justifies its adaption as part of the research;

- Presents and analyses the main findings using the umbrella view; and
- Based on the findings makes conclusions and suggests future directions.

6.2. What an umbrella view is and how it was adapted to meet the needs of this study

This umbrella view is not to be confused with the term “umbrella *review*” which is gaining traction in literature. The latter is described by Grant and Booth²⁰⁸, in their description of the varying types of reviews used in health research, as “*a method of creating an overview of compiled results from a large number of published systematic reviews, with no search for primary studies*”²⁰⁸. The intent of an umbrella review is to produce results which describe what is known; recommendations for practise, what remains unknown and give recommendations for future research

The word “view” has been chosen by the author of this thesis to both describe and explain the results of the data collected in Chapters 3-5. The idea to somehow merge all the results under an umbrella was an attempt to identify if the research questions could be answered by analysing all the merged information together and if any clear directions would emerge.

The method used to present the results for this umbrella view was to tabulate the overall search numbers into a PRISMA chart³⁹ (described in Methods Chapter 2.2.5.) then sieve down to a final outcome. This is not a rapid method as used in some Cochrane reviews²⁰⁹, nor can it be put through a database such as NVivo²¹⁰ or by using the Grade Approach³⁸. These methods are predominantly used by teams in sorting and sieving quickly for rapid reviews and to provide data for statistical analysis. It was felt that the method of scrutinising the documents, publications and grey literature did not allow for a forest plot or any other statistical representation as it really was a careful step by step examination of all the data collected to see if it could answer the original research questions.

Accordingly, the purpose of the umbrella view was to compile the results of the three reviews described in Chapters 3-5 in a manner that could clearly demonstrate what research questions could be answered and where there were gaps in evidence specifically pertaining to geographically isolated pregnant women in high-income countries (HICs).

6.3. Overview of combined results

As indicated in Figure 20 below, overall, 4,908 materials with some relevance to the topic were identified through database searches that utilised title and abstract search. Just over 50% of the search results were found to be duplicates or irrelevant. This was due to being sourced from multiple online databases where there was some overlap. The remaining 2,699 published documents, web sites and grey literature were individually checked for relevance and a further 2,491 were discarded. The final 208 records were all found to contain relevant information and have been referenced in this thesis.

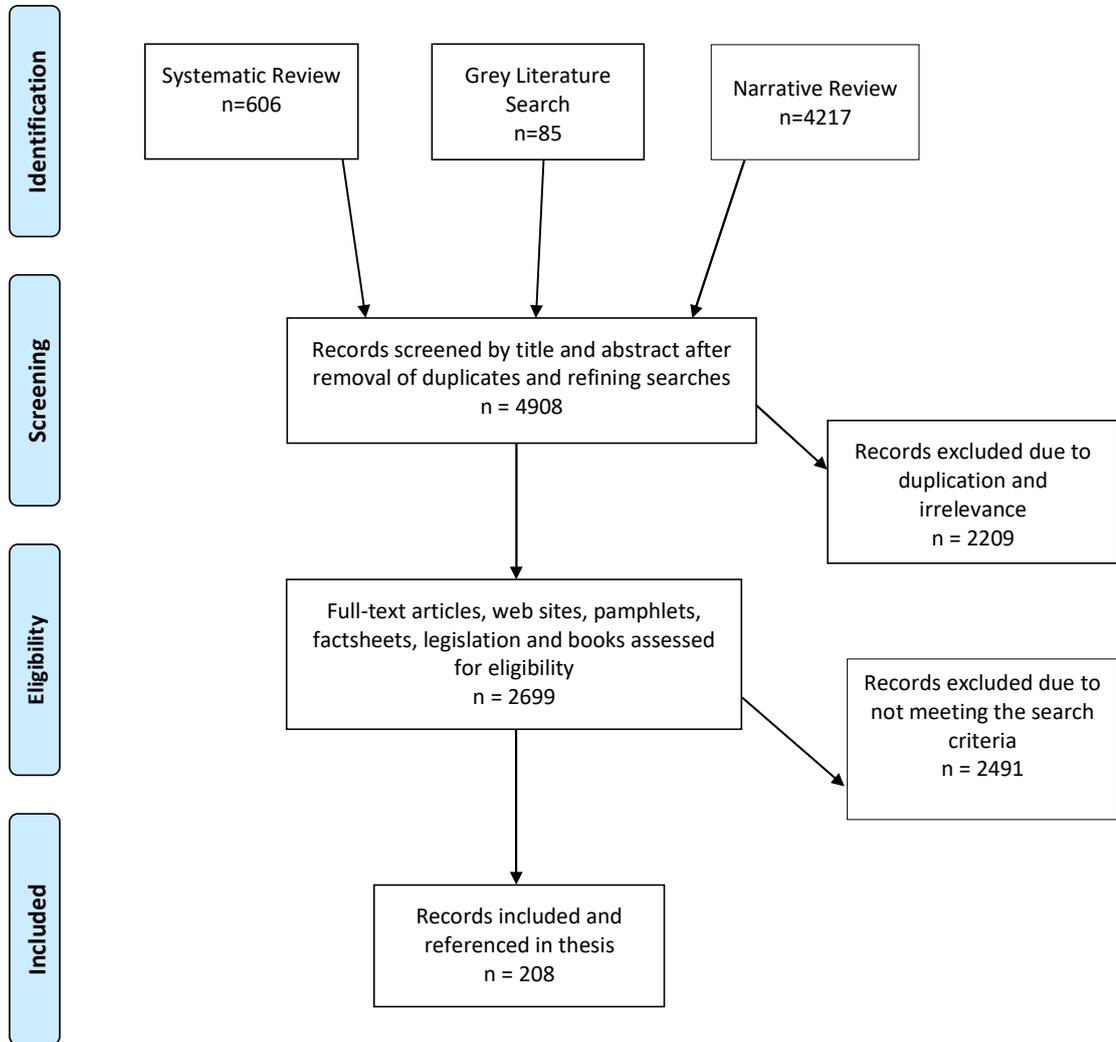


Figure 20: PRISMA flow chart of results of combined reviews³⁹

6.4. Analysis of the umbrella view

Table 13 – Main findings from the reviews/view

Review/view type	Main findings	Comments
Systematic review	No published literature that could be used to answer the research questions. This resulted in an “empty” review. If anything, it did confirm that there is a gap in research in this area.	<p>The formal criteria for undertaking a systematic review precluded the use of published material which may have uncovered the information being searched for.</p> <p>Results found that very little research had been conducted in the Northern Territory of Australia but policies and practices were firmly entrenched.</p> <p>European researchers measure travel time from home to hospital, by ambulance, when discussing impacts on maternal and neonatal health. Where they do look at remote geographical areas, they are more likely to discuss Canada than Australia.</p>
Review of grey literature	<p>The only comparable work being undertaken is found in Northern Canada. However, none of the studies answered the research questions.</p> <p>No reviews that compared policy, strategies or outcomes in different nations.</p>	Departments of Health throughout the world operate in isolation when it comes to producing standard operating procedures for antenatal services. There are similarities where it can be seen that national maternity plans have been referred to. In an area like the Northern Territory of Australia, with its geographically isolated population being Indigenous Australians, there are compounding

	<p>The grey literature provided a variety of information whose value will be discussed in the results of this thesis.</p>	<p>factors relating to culture and historical maltreatment which impact on policies and practices in health service delivery.</p>
<p>Narrative review</p>	<p>It became evident that research has mainly focussed on low to middle-income countries where health services may be poor or lacking altogether.</p> <p>No studies were uncovered which answered the research questions.</p>	<p>The search methods for the narrative review were much less stringent than those defined for the systematic review. This enabled the author to uncover a wide range of information which, although not precisely answering the research question, painted a picture of the reality of maternal issues for geographically isolated pregnant women throughout the world.</p> <p>Australia is known to be a very high-income country, with advanced health services, and the geographically isolated population is acknowledged but not really given much consideration by city based policy makers and health service providers.</p>
<p>What the Umbrella view reveals</p>	<p>Conducting a variety of search strategies gives a complete picture of whether or not research on a topic has been conducted. It ensures that material, published or unpublished are not “missed” in formal searches.</p> <p>This allows the author to be firm when stating that there is no evidence that an area of research has been conducted.</p>	<p>By placing all of the results from the above reviews under the umbrella it can be seen that health services for pregnant women are conducted by people who are passionate about their work.</p> <p>However, these passionate people are few in number and not many have the voice required to make a difference in the regulatory frameworks surrounding health service delivery in their local area.</p>

Table 13 above shows that formal search strategies do not necessarily uncover evidence of research having been undertaken on a particular topic. The literature shows that maternal and neonatal health services are provided throughout the world in varying forms. The focus of research is on provision rather than accessibility. Where accessibility is mentioned, it is in the context of socio-economic status of the people or funding ability of the country involved. Neither of these apply to Australia where the disparity is cultural and geographical.

Combining the search results under an umbrella resulted in a confident statement that at the present time research cannot identify if the relocation of geographically isolated pregnant women, at around 36 weeks gestation, has any impact on maternal or neonatal health outcomes.

In HICs it is hard to believe that in the 21st Century with good transport, an educated population, antenatal advice and information so readily accessible that women should be dictated to about the place in which they should give birth. Women living in urban areas expect to choose the type or place of birth that they want. Similarly, it may come as quite a surprise to women in rural and remote areas to discover that their options are limited. It could be argued that many women would choose to attend a hospital to give birth and that the need

to relocate to a major centre is acceptable. The main issue that this study wanted to explore was whether having to relocate and wait a month or more was optimal in terms of overall maternal and neonatal outcomes.

The grey literature and broad narrative review were essential in providing both published and unpublished literature and information to fully answer the research questions. However, neither the broad range of literature accessed and analysed nor the reviewed systematic reviews have provided objective research evidence that this semi-forced relocation is best practice for maternal and neonatal health outcomes.

Relocation policies remain subject to opinion. They are limited in content where they take into account contemporary views about birthing and social support. Recognition of Indigenous values varied from state to state (and country to country) and is frequently overshadowed by the financial implications. This thesis was the first to describe both policies and how cultural values influence policy and strategy. Information regarding practises in Australia was largely found in the National Maternity Services Plan, National Strategic Framework for Rural and Remote Health which was released by AHMAC on 27 April 2012²¹¹.

From the lengthy and rigorous search over several months, it is concluded that Canada and Australia (as HICs) are unique in their provision of maternity services to geographically isolated pregnant women. No other HIC pays the travel, accommodation, food, living expenses and treatment costs for rural and remote residents plus transport and accommodation for their companion of choice for some Indigenous women.

As discussed in 5.3. above, many costs are covered by other HICs through provision of a Government funded or National Health Service. In some countries, for example Japan and Singapore as mentioned in 5.3.3. above, there is an expectation that people will have some form of private health insurance. There is also a general understanding that if a person chooses to live in a place with limited access to health services, they must make their own arrangements when services are required.

Governments in the early part of the 21st Century are concerned about cultural security and the history of maltreatment of their Indigenous populations.

Australia meets the UN Millennium Development Goal, Target: 5.B *Achieve, by 2015, universal access to reproductive health*, by stating that “maternity services are provided to all residents”. The “how” of the provision is the issue that is questionable. At the superficial level, politicians and health service providers

can be satisfied that key priorities are met and do not have to be concerned about the personal impact on families caused by these practises.

The WHO's Global strategy for women's, children's and adolescent's health (2016-2030) does not refer to HICs. It provides updated information regarding the "Every woman every child" strategy. The intent of the strategy and the goals that are proposed for all countries are very welcome for women and children. However, with Australia being recognised as a country with one of the highest levels of health care in the world²¹², the situation for remote dwelling residents (in particular the Indigenous population) is not mentioned at all. This, from a global perspective leaves remote dwelling Indigenous people invisible and State and Territory governments unaccountable.

In her conclusions regarding relocated women in Canada, Denning¹⁴⁹ commented that *"Perinatal care should be tailored to fit the needs, available infrastructure, and demographic profile of each community, due to the wide variation in each of these aspects that exists in northern Canada"*¹⁴⁹. Ideally this should be the case for future health care planning in the NT where communities are very different, not only by geography and climatic conditions, but in infrastructure, language, population size and demography. The ability of health service providers and the policy makers to support this approach is dependent on

funding. Research which provides quality evidence to support policy decisions will be invaluable.

The work commenced in this thesis needs to be expanded to consider changes in attitudes with the younger generations. It is known that in 2015 over 50% (51%) of Indigenous mothers in the NT were under 25 years old and, of those, 8% were under 18 years old¹⁵⁵. They will no doubt be utilizing social media and have access to broader education and may be more health literate than their mothers and grandmothers^{213,214}. Future research should consider this and not rely on historical attitudes to cultural security.

6.5. Summary of umbrella view results

The results of the umbrella view of all the materials show that there are a few researchers who are passionate about the maternal and neonatal health of geographically isolated pregnant women, for example Grzybowski, Kildea, Kruske and Rolfe,^{12,67,115,215}. Their work over the years has considered travel time from home to hospital, access to local maternity services, psychological, financial, and physical considerations across socio-economic divides.

Qualitative research in Australia and Canada, exploring how geographically isolated women feel about relocating from their home community to give birth does not capture the information being sought by this thesis.

CHAPTER 7: CONCLUSIONS

7.1. Limitations of the study

Currently, recommendations for practice cannot be included in this study due to insufficient evidence being uncovered in the literature.

Data collected by the Australian Bureau of Statistics (ABS) in Australia has changed over time because Indigenous people were only being recognised, and counted as citizens, from the early 1970s. A momentous constitutional change in 1967 meant that Indigenous Australian people were fully included in Census results for the first time, beginning with the 1971 Census²¹⁶. Maternal and neonatal outcomes for geographically isolated women are generally separated into comparisons between urban and rural residents or Indigenous and non-Indigenous women. Very limited data have been recorded on the ethnicity of geographically isolated pregnant women living in remote areas, but not in an identified Aboriginal community, and whether or not they remained in the NT to give birth.

Time and resources for this study were limited as it was self-funded by the author. Publications and websites were limited to the English language.

7.2. Conclusions

The focus of the study is the Northern Territory of Australia (NT) and it initially began as a systematic review of literature to identify and discuss randomised controlled trials and quasi-randomised controlled trials on maternal and neonatal health impacts caused by the relocation of geographically isolated pregnant women at 36-38 weeks gestation.

The study posed the questions:

- Is there clear evidence of any effect, on maternal and neonatal health, caused by the relocation of pregnant women who live in geographically isolated areas, at 36-38 weeks gestation, to near a major birthing centre, compared to those who choose to remain in their local community and receive standard care?
- Is there evidence supporting the policy of pressuring pregnant women to relocate from home for a period prior to their due date?
- Has research on this topic been conducted in high-income countries and, if so, have cultural values been taken into consideration?

As the research progressed it was found that there was a paucity of published literature on this topic. The identification of the limited amount of literature available on the topic highlights the need for research using rigorous study designs that utilize a mixed methods approach to capture not only clinical outcomes for mother and neonate but also the broader impacts across the socio-cultural dimensions of an expectant mother's life. If there were good quality data that accurately captures where women actually live, then interrogation of databases could occur to match relocation to maternal and neonatal outcomes. This would provide reliable, high quality evidence on the effect on maternal and neonatal health from the planned early relocation of pregnant women experiencing a low-risk pregnancy in geographically isolated areas to near a major birthing centre at 36-38 weeks gestation.

A grey literature review was conducted to uncover policies, legislation, web sites and unpublished materials representing a range of non-peer reviewed information in order to see if that could assist in answering the research questions.

Also undertaken was a broader, narrative based, review of published literature in order to understand and describe the current policies, practises, and recommendations for globally isolated pregnant women throughout the world,

in Australia, and the NT. The narrative review also incorporated the published systematic reviews that could not be included in Chapter 3 due to strict protocols precluding them from inclusion.

After completing reviews of the three sets of literature it can be concluded that:

- This work contributes to the current range of literature by showing that there has been no rigorous directly applicable research conducted on the primary research question.
- This research suggests that the current policy of referring women to a major centre at 36-38 weeks gestation has not been informed by high quality academic evidence.
- There was limited literature which clearly separated women with a low-risk pregnancy from those who had a pregnancy that was not low risk.
- Literature which described the factors impacting on maternal and neonatal health outcomes had not included travel or distance as a possible variable.

One of the objectives of this study was to provide the most up-to-date evidence which could be used to offer information to geographically isolated women in the NT prior to or during pregnancy. The study by Fisseha⁸⁰ mentioned above

demonstrates that information is required by all women regardless of their socioeconomic status. A recurring theme within the reviewed literature is the paucity of easily accessible information available to women regarding maternal and neonatal outcomes for women who relocated to give birth compared to those who remained at home (or in their home community).

The issue for low-risk pregnant women of whether or when to relocate is topical. There have been recent news reports from Queensland and the NT highlighting the emotions and concerns^{24,217,218}. This is exacerbated by lack of quality evidence which people in HICs expect to have available to them on request. For many people, pregnancy and childbirth has moved from being a natural part of life to a medical condition requiring intervention. The frequency of portraying childbirth in the media, such as television and films, within emergency settings has been described by Luce et al (2016)²¹⁹ in their study as partly responsible for this contemporary opinion²¹⁹.

A further aim of the study was to provide evidence that could be used by rural health workers, medical practitioners, Aboriginal Health Workers, midwives, nurses and allied health staff when counselling women during antenatal visits. It is not difficult to understand that the current referral policy has developed over the last 20 or so years due to the increase in liability concerns, the closure of

rural maternity services, the overall lack of rural doctors, and international pressure to provide rural women with a similar access to care that urban women receive during childbirth.

The limited evidence available suggests that women experience fewer interventions when birthing outside a major birthing centre^{67,220}. The debates that continue regarding whether a pregnant woman should relocate to be near a maternity facility may lead to confusion by both health practitioners and the women. However, where women have been referred to a town to wait out the remainder of their pregnancy, they will have no choice but to present to a hospital based maternity service at the onset of labour. This situation further conflicts with the United Nations Declaration on Human Rights. In order that women can be free to choose the place of birth of their baby, research must be conducted which unequivocally demonstrates whether planned early relocation from their local community to near a major birthing centre, at 36-38 weeks gestation, has any effect on the health of the mother or baby.

7.3. Future directions

The results of this study have uncovered that it is not possible to state any implications on maternal and neonatal health outcomes through current relocation practises.

Government policies and procedures are a “one size fits all”. Although there are attempts to cater for different ethnic and socioeconomic groups, this does not satisfy the needs of individual people. For pregnant women, this is especially true. Individuals have their own personal needs as well as those that arise due to their health or other unexpected circumstances during their pregnancy⁴³.

These findings could be of use to the different groups for a variety of reasons. Policy makers need to be advised that the current practises are not based on high quality evidence. Policies are often developed as updates of existing materials or “on the run” when a crisis occurs. The result is that there is usually a very short time frame for research or consultation with stakeholders. The findings of this thesis may be useful as it includes so much relevant information, which has been gathered into one document.

. When seeking advice and information regarding options and choices, the information on Government and non-Government service provider websites is often unclear and even paternalistic e.g. “you *will* relocate at 36 weeks gestation”. Factual evidence regarding maternal and neonatal safety should be available to any family seeking information. This information should also be available to medical practitioners who have patients who reside in remote areas who come to them for counselling and referral decisions.

As a result of this study, further research might well be conducted in order to ascertain

- The impacts, both positive and negative, on maternal and neonatal health
- Whether women are happy with the existing policy
- Whether women would like more choice
- Whether medical practitioners would like more evidence
- Whether policy makers would use this information to guide future policy development
- Whether costs would be increased or reduced through the assessment of data on how many relocated women reach parturition at full term.

Women and their families have a right to know why they are referred to a major centre and whether they can make an informed choice on when they consider relocating. Pregnancy is not an illness and for healthy women, with no complications, the arrival of a baby should be a time of happiness and excitement unmarred by the stressors described in this study.

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APPENDICES

A-1 Data extraction form developed for the systematic review

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A-2 News report regarding the closure of a rural maternity unit

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APPENDIX A-1: DATA EXTRACTION AND ASSESSMENT FORM – BARBARA KLESSA

Study Title: *Planned early relocation of pregnant women who live in geographically isolated areas to near major birthing centres*

Primary aim of review: *To research published literature to discover evidence that relocating women, to be near emergency obstetric care, is beneficial to mother and neonate*

Study ID : <i>(from ref list)</i>	Author:	Year published:
Publication title:		

Review team (<i>Tick and enter date of screening</i>)		Date screened
Peter Morris	<input type="checkbox"/>	
Elizabeth McDonald	<input type="checkbox"/>	
Mark Ferguson	<input type="checkbox"/>	
Barbara Klessa	<input type="checkbox"/>	

The following are required for inclusion		YES	NO
1	Does the study have a main objective to explore birthing options for healthy pregnant women? <i>Note: this may include options for place of birth.</i>	<input type="checkbox"/>	<input type="checkbox"/>
2	Does the study include outcome measures relating to maternal and neonatal health? <i>Note: these can be medical and/or social health outcomes.</i>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX A-1: DATA EXTRACTION AND ASSESSMENT FORM – BARBARA KLESSA

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Do not continue if any of the above are NOT met

OVERALL APPRAISAL - please circle	INCLUDE	EXCLUDE
<p>Reason for exclusion and any general comments:</p>		

Type of study and PICO

Were any of the following study designs used? (<i>Tick as many as are relevant</i>)	Yes No Unclear	Comments and location in text or source (<i>pg. & ¶/fig/table/other</i>)
Randomised Controlled Trial	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

APPENDIX A-1: DATA EXTRACTION AND ASSESSMENT FORM – BARBARA KLESSA

Study Title: *Planned early relocation of pregnant women who live in geographically isolated areas to near major birthing centres*

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Quasi-randomised Controlled Trial	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Controlled Before and After Study	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Other design (please specify):	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Is this a Qualitative Study (brief description to justify inclusion):	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Does the study provide an explicit statement of questions being addressed with reference to PICOS?		<i>Details will be entered later in the document – see p.7</i>
• Participants	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
• Interventions	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
• Comparisons	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

APPENDIX A-1: DATA EXTRACTION AND ASSESSMENT FORM – BARBARA KLESSA

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<ul style="list-style-type: none">• Outcomes		
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Outcome measures

Were any of the required outcome measures met? (<i>Tick as many as are relevant</i>)	Yes No Unclear	Comments and location in text or source (<i>pg. & ¶/fig/table/other</i>)
Primary Outcomes - Maternal		
1. Maternal mortality	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
2. Forceps delivery	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
3. Post-partum haemorrhage	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
4. Episiotomy	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
5. Sepsis	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
6. Retained products	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
7. Emergency (unplanned) caesarean section	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
8. Readmission within 4 weeks postnatally	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
9. Epidural or spinal analgesia:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
10. High dependency care required	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
11. Perineal trauma:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

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<p>12. Other specialist obstetric intervention during labour and delivery (define):</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<p>Were any of the required outcome measures met? (<i>Tick as many as are relevant</i>)</p>	<p>Yes No Unclear</p>	<p>Comments and location in text or source (<i>pg. & ¶/fig/table/other</i>)</p>
<p>Primary Outcomes - Neonatal</p>		
<p>13. Neonate mortality</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<p>14. Birth trauma (brief description)</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<p>15. stillbirths</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<p>16. Apgar <7 at 5 mins</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<p>17. Sepsis</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<p>18. Transfer to high care unit</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

APPENDIX A-1: DATA EXTRACTION AND ASSESSMENT FORM – BARBARA KLESSA

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19.	Meconium aspiration syndrome	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
20.	Encephalopathy	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
21.	Length of stay	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
22.	Readmission within 4 weeks of birth	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
23.	Other specialist paediatric intervention at the time of birth for the neonate	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Secondary Outcomes - Social and emotional			
24.	Women's reports of social and/or economic problems related to the planning phase of the relocation and separation from family and community	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
25.	Women's reports of depression or anxiety at the time, during and after the relocation and separation from their family and community	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

APPENDIX A-1: DATA EXTRACTION AND ASSESSMENT FORM – BARBARA KLESSA

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Were any of the required outcome measures met? (Tick as many as are relevant)	Yes No Unclear	Comments and location in text or source (pg. & ¶/fig/table/other)
26. Women's' expression of their satisfaction or dissatisfaction with the confinement experience	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
27. Other social, economic or public health issues recorded	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Other comments or notes related to any of the outcome measures		

Interventions

<i>Note: use relevant table in following pages</i>	Yes No Unclear	Comments and location in text or source (pg. & ¶/fig/table/other)
Were interventions described?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

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Detailed characteristics of the study

Participants

Description	Tick all which are relevant	Location in text or source <i>(pg. & ¶/fig/table/other)</i>
In which country is the study based?		
How are geographic boundaries defined?	Details: Specific location (e.g. state / county / island / remoteness):	
Which of the following best describes participants' residential location?		

APPENDIX A-1: DATA EXTRACTION AND ASSESSMENT FORM – BARBARA KLESSA

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Rural multicultural town with primary health care available	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/> Details:	
Remote Indigenous Community with primary health care available	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/> Details:	
Remote Indigenous Community with no services – e.g. Australian Outstation	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/> Details:	
Isolated residence such as farm, ranch, cattle station, retreat	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/> Details:	
Island - no road access to birthing services	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/> Details:	

APPENDIX A-1: DATA EXTRACTION AND ASSESSMENT FORM – BARBARA KLESSA

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All weather air strip available	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/>	
All weather road access to major centres	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/>	
Which of the following are used to define the participants?		
Are the participants defined by ethnicity	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/>	
Are participants defined as a group having specific socioeconomic characteristics?	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/>	
Are the participants defined by age?	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/>	

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<p>Are the participants defined by number of pregnancies or births?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	
<p>Are the participants defined by religious beliefs?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	
<p>Is the risk status of the pregnancy stated?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	
<p>Is there reference to the relocation of the participants being planned or enforced?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	
<p>Is the distance the participants travelled stated?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	

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<p>Is the mode of travel described?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	
<p>Is a policy or any legislative framework defined?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	
<p>Duration of treatment period (<i>e.g. Length of stay away from home including neonatal period</i>)</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	
<p>Were any of the following included? (cont'd)</p>		
<p>Providers (<i>e.g. no., profession, Government, private etc. if relevant</i>)</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	
<p>Economic information (<i>i.e. intervention cost or covered by Medicare</i>)</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	

APPENDIX A-1: DATA EXTRACTION AND ASSESSMENT FORM – BARBARA KLESSA

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Resource requirements (e.g. staff numbers, aeromedical service, ambulance, equipment)	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unclear <input type="checkbox"/>	
	Details:			
Continued antenatal care with original midwife	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unclear <input type="checkbox"/>	
	Details:			
Continued antenatal care with original medical practitioner	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unclear <input type="checkbox"/>	
	Details:			
Relocated with at least one support person or family member?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unclear <input type="checkbox"/>	
	Details:			
Compliance	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unclear <input type="checkbox"/>	
	Details:			
Place of residence in confinement and neonatal period, e.g. hostel, rental home, staying with extended family	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Unclear <input type="checkbox"/>	
	Details:			

APPENDIX A-1: DATA EXTRACTION AND ASSESSMENT FORM – BARBARA KLESSA

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Is the distance to a birthing centre stated	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/>	
Is the distance to antenatal appointments stated?	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/>	
Were any of the following included? (cont'd)		
Was home birth with a midwife present an available option?	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/>	
Was transport to a birthing centre at onset of labour an available option?	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/>	
Providers locally available (<i>e.g. no., profession, Government, private etc. if relevant</i>)	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/>	
Were the women given a choice of birthing centre?	Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/>	

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<p>Was accommodation organised on their behalf?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	
<p>Does the study include:</p> <ul style="list-style-type: none"> • Documentation of researcher's discipline? • Institution to which researcher affiliated? 	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	
<p>Are study funding sources clearly stated? <i>(including role of funders)</i></p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	
<p>Are possible conflicts of interest clearly defined? <i>(for study authors)</i></p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	

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<p>Are the key conclusions of study authors clearly stated in the results</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	
<p>Are there references to other relevant studies</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	
<p>Were any of the following included? (cont'd)</p>		
<p>Is there an indication that there has been correspondence for further study information? (<i>from whom, what and when</i>)</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	
<p>Do the CONCLUSIONS provide a general interpretation of the results in the context of other evidence, and implications for future research?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Details:</p>	

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Risk of Bias assessment

(See [Chapter 8](#) of the Cochrane Handbook. Additional domains may be added for non-randomised studies.)

Domain	Risk of bias			Support for judgement <i>(include direct quotes where available with explanatory comments)</i>	Location in text or source <i>(pg. & ¶/fig/table/other)</i>
	Low	High	Unclear		
Random sequence generation <i>(selection bias)</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Allocation concealment <i>(selection bias)</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Blinding of participants and personnel <i>(performance bias)</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outcome group: All/	
<i>(if separate judgement by outcome(s) required)</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outcome group:	

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Blinding of outcome assessment <i>(detection bias)</i>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Outcome group: All/	
<i>(if separate judgement by outcome(s) required)</i>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Outcome group:	
Incomplete outcome data <i>(attrition bias)</i>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Outcome group: All/	
<i>(if separate judgement by outcome(s) required)</i>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Outcome group:	
Selective outcome reporting? <i>(reporting bias)</i>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Other bias	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
Notes:			

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Data and analysis

Copy and paste the appropriate table for each outcome, including additional tables for each time point and subgroup as required.

For RCT/CCT

Dichotomous outcome

	Description as stated in report/paper		Location in text or source (pg. & ¶/fig/table/other)
Comparison			
Outcome			
Subgroup			
Time point (specify from start or end of intervention)			
Results	Intervention	Comparison	

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	No. with event	Total in group	No. with event	Total in group	
Any other results reported (<i>e.g. odds ratio, risk difference, CI or P value</i>)					
No. missing participants					
Reasons missing					
No. participants moved from other group					
Reasons moved					
Unit of analysis (<i>by individuals, cluster/groups or body parts</i>)					
Statistical methods used and appropriateness of these (<i>e.g. adjustment for correlation</i>)					

APPENDIX A-1: DATA EXTRACTION AND ASSESSMENT FORM – BARBARA KLESSA

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Reanalysis required? (<i>specify, e.g. correlation adjustment</i>)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear		
Reanalysis possible?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear		
Reanalysed results			
Notes:			

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For RCT/CCT

Continuous outcome

	Description as stated in report/paper						Location in text or source (pg. & ¶/fig/table/other)
Comparison							
Outcome							
Subgroup							
Time point (specify from start or end of intervention)							
Post-intervention or change from baseline?							
Results	Intervention			Comparison			
	Mean	SD (or other variance, specify)	No. participants	Mean	SD (or other variance, specify)	No. participants	

APPENDIX A-1: DATA EXTRACTION AND ASSESSMENT FORM – BARBARA KLESSA

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Any other results reported (<i>e.g. mean difference, CI, P value</i>)							
No. missing participants							
Reasons missing							
No. participants moved from other group							
Reasons moved							
Unit of analysis (<i>individuals, cluster/ groups or body parts</i>)							

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<p>Statistical methods used and appropriateness of these <i>(e.g. adjustment for correlation)</i></p>		
<p>Reanalysis required? <i>(specify)</i></p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Yes No Unclear</p>	
<p>Reanalysis possible?</p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Yes No Unclear</p>	
<p>Reanalysed results</p>		

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For RCT/CCT

Other outcome

	Description as stated in report/paper		Location in text or source (pg. & ¶/fig/table/other)	
Comparison				
Outcome				
Subgroup				
Time point (specify from start or end of intervention)				
No. participant	Intervention		Control	
Results	Intervention result	SE (or other variance)	Control result	SE (or other variance)
	Overall results		SE (or other variance)	

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Any other results reported			
No. missing participants			
Reasons missing			
No. participants moved from other group			
Reasons moved			
Unit of analysis <i>(by individuals, cluster/groups or body parts)</i>			
Statistical methods used and appropriateness of these			
Reanalysis required? <i>(specify)</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear		
Reanalysis possible?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear		

APPENDIX A-1: DATA EXTRACTION AND ASSESSMENT FORM – BARBARA KLESSA

Study Title: *Planned early relocation of pregnant women who live in geographically isolated areas to near major birthing centres*

Primary aim of review: *To research published literature to discover evidence that relocating women, to be near emergency obstetric care, is beneficial to mother and neonate*

Reanalysed results		
Notes:		

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For Controlled Before-and-After study (CBA)

	Description as stated in report/paper				Location in text or source (pg. & ¶/fig/table/other)
Comparison					
Outcome					
Subgroup					
Time point (specify from start or end of intervention)					
Post-intervention or change from baseline?					
No. participants	Intervention		Control		
Results	Intervention result	SE (or other variance, specify)	Control result	SE (or other variance, specify)	
	Overall results		SE (or other variance, specify)		

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Any other results reported			
No. missing participants			
Reasons missing			
No. participants moved from other group			
Reasons moved			
Unit of analysis <i>(individuals, cluster/ groups or body parts)</i>			
Statistical methods used and appropriateness of these			
Reanalysis required? <i>(specify)</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear		
Reanalysis possible?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear		

APPENDIX A-1: DATA EXTRACTION AND ASSESSMENT FORM – BARBARA KLESSA

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Reanalysed results		
Notes:		

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For Interrupted Time Series study (ITS)

	Description as stated in report/paper		Location in text or source (pg. & ¶/fig/table/other)
Comparison			
Outcome			
Subgroup			
Length of time points measured (e.g. days, months)			
Total period measured			
No. participants measured			
No. missing participants			
Reasons missing			
	Pre-intervention	Post-intervention	
No. time points measured			
Mean value (with variance measure)			

APPENDIX A-1: DATA EXTRACTION AND ASSESSMENT FORM – BARBARA KLESSA

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Any other results reported				
Unit of analysis <i>(individuals or cluster/ groups)</i>				
Statistical methods used and appropriateness of these				
Reanalysis required? <i>(specify)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unclear	
Reanalysis possible?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unclear	
Individual time point results				
Read from figure?	<input type="checkbox"/>	<input type="checkbox"/>		
	Yes	No		
	o	N		
Reanalysed results	Change in level	SE	Change in slope	SE

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Definitions

Assumed risk estimate	An estimate of the risk of an event or average score without the intervention, used in Cochrane 'Summary of findings tables'. If a study provides useful estimates of the risk or average score of different subgroups of the population, or an estimate based on a representative observational study, you may wish to collect this information.
Bias	A systematic error or deviation in results or inferences from the truth. In studies of the effects of health care, the main types of bias arise from systematic differences in the groups that are compared (selection bias), the care that is provided, exposure to other factors apart from the intervention of interest (performance bias), withdrawals or exclusions of people entered into a study (attrition bias) or how outcomes are assessed (detection bias). Reviews of studies may also be particularly affected by reporting bias, where a biased subset of all the relevant data is available.

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Change from baseline	A measure for a continuous outcome calculated as the difference between the baseline score and the post-intervention score.
Clusters	A group of participants who have been allocated to the same intervention arm together, as in a cluster-randomised trial, e.g. a whole family, town, school or patients in a clinic may be allocated to the same intervention rather than separately allocating each individual to different arms.
Co-morbidities	The presence of one or more diseases or conditions other than those of primary interest. In a study looking at treatment for one disease or condition, some of the individuals may have other diseases or conditions that could affect their outcomes.
Compliance	Participant behaviour that abides by the recommendations of a doctor, other health care provider or study investigator (also called adherence or concordance).

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Contemporaneous data collection	When data are collected at the same point(s) in time or covering the same time period for each intervention arm in a study (that is, historical data are not used as a comparison).
Controlled Before and After Study (CBA)	A non-randomised study design where a control population of similar characteristics and performance as the intervention group is identified. Data are collected before and after the intervention in both the control and intervention groups
Exclusions	Participants who were excluded from the study or the analysis by the investigators.
Imputation	Assuming a value for a measure where the true value is not available (e.g. assuming last observation carried forward for missing participants).
Integrity of delivery	The degree to which the specified procedures or components of an intervention are delivered as originally planned.

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Interrupted Time Series (ITS)	A research design that collects observations at multiple time points before and after an intervention (interruption). The design attempts to detect whether the intervention has had an effect significantly greater than the underlying trend.
Post-intervention	The value of an outcome measured at some time point following the beginning of the intervention (may be during or after the intervention period).
Power	In clinical trials, power is the probability that a trial will obtain a statistically significant result when the true intervention effect is a specified size. For a given size of effect, studies with more participants have greater power. Note that power should not be considered in the risk of bias assessment.
Providers	The person or people responsible for delivering an intervention and related care, who may or may not require specific qualifications (e.g. doctors, physiotherapists) or training.

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Quasi-randomised controlled trial	A study in which the method of allocating people to intervention arms was not random, but was intended to produce similar groups when used to allocate participants. Quasi-random methods include: allocation by the person's date of birth, by the day of the week or month of the year, by a person's medical record number, or just allocating every alternate person.
Reanalysis	Additional analysis of a study's results by a review author (e.g. to introduce adjustment for correlation that was not done by the study authors).
Report ID	A unique ID code given to a publication or other report of a study by the review author (e.g. first author's name and year of publication). If a study has more than one report (e.g. multiple publications or additional unpublished data) a separate Report ID can be allocated to each to help review authors keep track of the source of extracted data.
Sociodemographics	Social and demographic information about a study or its participants, including economic and cultural information, location, age, gender, ethnicity, etc.

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Study ID	A unique ID code given to an included or excluded study by the review author (e.g. first author's name and year of publication from the main report of the study). Although a study may have multiple reports or references, it should have one single Study ID to help review authors keep track of all the different sources of information for a study.
Theoretical basis	The use of a particular theory (such as theories of human behaviour change) to design the components and implementation of an intervention
Unit of allocation	The unit allocated to an intervention arm. In most studies individual participants will be allocated, but in others it may be individual body parts (e.g. different teeth or joints may be allocated separately) or clusters of multiple people.
Unit of analysis	The unit used to calculate N in an analysis, and for which the result is reported. This may be the number of individual people, or the number of body parts or clusters of people in the study.

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Unit of measurement	The unit in which an outcome is measured, e.g. height may be measured in cm or inches; depression may be measured using points on a particular scale.
Validation	A process to test and establish that a particular measurement tool or scale is a good measure of that outcome.
Withdrawals	Participants who voluntarily withdrew from participation in a study before the completion of outcome measurement.

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Theodore maternity service stays shut despite community paying for upgrade - ABC News (Australia)... <http://www.abc.net.au/news/2018-07-01/theodore-maternity-service-shut-despite-community-upgrade...>

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Theodore maternity service stays shut despite community paying for upgrade

ABC Capricornia By Inga Stünzner, Jacquie Mackay and Megan Hendry

Posted Sun 1 Jul 2018, 5:35am



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Theodore maternity service stays shut despite community paying for upgrade - ABC News (Australia)... <http://www.abc.net.au/news/2018-07-01/theodore-maternity-service-shut-despite-community-upgrade...>



PHOTO: Mothers will have to deliver their babies further afield, although Theodore will still cater for imminent births. (Giulio Saggini: ABC News)

A central Queensland town that raised money to rebuild its hospital maternity ward ruined in the 2010 floods has been told full birthing services will not return.

RELATED STORY: Rural women 'bullied' into caesareans amid doctor shortage

The hospital had maternity services up until the floods, and since then has only been able to cater for emergency deliveries.

Central Queensland Health and Hospital Services (CQ Health) told Theodore residents the news, despite the town celebrating a grand opening of the refurbished facility two years ago.

Local resident Liv McIntyre said it was complete madness when the facilities were state-of-the-art and there were capable medical and nursing staff available.

"The community rallied, they raised a heap of money from locals ... but they were never given the tick of approval to allow the centre to re-open even though there was a grand opening," Ms McIntyre said.

Ms McIntyre, who lives on a cattle property an hour's drive from Theodore, said it meant women travel away for at least a month and this took a toll.

Ms McIntyre gave birth to her first son in Theodore three years ago when she went into early labour, despite the maternity service still being under construction.

When she was pregnant with her second son, 15 months ago, she had to travel 230 kilometres away to Rockhampton and



PHOTO: Liz McIntyre had to travel to Rockhampton and stay there for nearly two months to have her second child. (Supplied: Liz McIntyre)

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APPENDIX A-2

Theodore maternity service stays shut despite community paying for upgrade - ABC News (Australia... <http://www.abc.net.au/news/2018-07-01/theodore-maternity-service-shut-despite-community-upgrade...>

stay there for two months until she gave birth.

"As you can imagine, the stress of having a toddler up in Rockhampton while you're pregnant and the expenses of being there, you're away from your family, away from your business," Ms McIntyre said.

"It takes a huge toll on everyone."



PHOTO: Liz, pictured with husband Tom McIntyre with their two children, Darcy and Charlie, is concerned about the lack of maternity services. (Supplied: Liz McIntyre)

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Theodore maternity service stays shut despite community paying for upgrade - ABC News (Australia... <http://www.abc.net.au/news/2018-07-01/theodore-maternity-service-shut-despite-community-upgrade...>

Ms McIntyre said there were many younger people returning to the area, so there were lots of children being born or in kindergarten.

"It's a really nice time for Theodore, but it's crazy that option [to give birth] isn't there."

A community disappointed



PHOTO: Theodore's Dr Bruce Chater is disappointed by CQ Health's decision to keep the maternity ward shut. (ABC Capricornia: Ailoe Roberts)

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APPENDIX A-2

Theodore maternity service stays shut despite community paying for upgrade - ABC News (Australia... <http://www.abc.net.au/news/2018-07-01/theodore-maternity-service-shut-despite-community-upgrade...>

The move has disappointed Dr Bruce Chater who has worked in the small town for 35 years, providing obstetric services.

"I think we've delivered over a thousand babies in Theodore, but it's made pretty clear that the decision is the decision," Dr Chater said.

Dr Chater said the town was the very edge of CQ Health's area and the nearest birthing centre in the next health district was Roma.

"It's an enormous distance and we want to make sure that anyone who comes into labour, we've got the skills to — and continue to keep those skills — to deal with things for them to make sure they're safe."

Although the hospital will not provide planned birthing services, it does cater for emergency deliveries and this will continue.

Dr Chater said he wanted to ensure this remained a top-class service.

"A number of women expressed their concerns about being kept safe."

Travelling away

CQ Health's chief executive Steve Williamson, who broke the news to the community, said Theodore Hospital would continue to offer ante-natal and post-natal care.

Women would then have to travel to Biloela just over 70 kilometres away for a couple of weeks before they were due and stay there until they gave birth.

"We talked to the community about that and of course that's a challenge and we took that into account," Mr Williamson said of women being away from their families.

"We took that very seriously.

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"Anything that takes families or mums away from the networks or supports is really, really important."

The decision, however, was made on a number of factors, he added.

This included the distance to Biloela's maternity services, the challenge of providing round-the-clock obstetrics, and the small number of births making it difficult for clinicians to maintain their hours for appropriate clinical credentials.

"The challenge for us is the ability to provide emergency maternity care and particularly emergency caesarean sections, where the bub's life of the mum's life or both their lives might be in danger."

Mr Williamson said when CQ Health weighed this up against the impact on families being apart for two weeks, the safety risk was the most important factor.

However, Theodore Hospital will still provide services for imminent births, and midwives would spend time in Biloela to maintain their skills, he added.

"All hospitals across central Queensland ... are capable of providing imminent birthing services."

Last year, Biloela's maternity ward was shut for weeks when the obstetrician went on holidays.

Regional concerns

The closure of regional services has concerned other groups.

Maternity Consumer Network vice-president Marceline Green has just been to Canberra to raise the issue with politicians.

Ms Green said mothers from Chinchilla, Biloela and Theodore often had to travel on to further centres because local services were on bypass.

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APPENDIX A-2

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"It doesn't necessarily mean that they have only come from within the town of Chinchilla — they could have come from two hours west," she added.

"So if we say they need to go on to Dalby or Toowoomba, that's another hour minimal of further travel, sometimes during labour and sometimes they don't make it."

The Darling Downs Health and Hospital Service recently reopened the maternity ward in Chinchilla on a part-time basis.

It is still looking for a registered midwife.

Shrinking choice

There will be fewer choices birth choices for women in central Queensland with the planned closure of maternity services at Gladstone Mater from October 1.

Mercy Health and Caged Care Central Queensland chief executive Lynne Sheehan said the decision had not been made lightly.

"The number of births at Gladstone Mater has been declining for a number of years now and to run a successful maternity service you require a minimum number of births to ensure the viability of the service," Ms Sheehan said.

"Unfortunately we are no longer reaching that level with fewer than 10 births a month."



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Theodore maternity service stays shut despite community paying for upgrade - ABC News (Australia... <http://www.abc.net.au/news/2018-07-01/theodore-maternity-service-shut-despite-community-upgrade...>



PHOTO: Women will have to travel to another town and stay there for at least two weeks to give birth. (AAP)

Topics: healthcare-facilities, health, womens-health, pregnancy-and-childbirth, theodore-4719, rockhampton-4700, dalby-4406, chinchilla-4413, gladstone-4680, bilccla-4715, toowoomba-4350

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