THE HEALTH OF RESETTLED REFUGEE CHILDREN: A MODIFIED SYSTEMATIC REVIEW 2001-2009

by

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Abstract

Background

New Zealand regularly accepts refugee children and their families for resettlement. Refugees as a population have been reported previously as having high health needs in resettlement. A search for current evidence specifically about resettled refugee child health to inform primary health care nursing practice found limited information. The main evidence to guide practice was *Refugee Health Care: A Handbook for Health Professionals* (2001a) which provided a useful overview of refugee health care but had limited information about children and as it was published in 2001 was potentially out of date.

Question and approach

What does the published research report about the health of resettled refugee children? A modified systematic review process was used due to the broadness of the research question.

Search strategy

A two phase search strategy of six electronic databases using key words Refugee, Health, Child, Infant, Baby, Resettle was conducted in January and February 2010.

Selection criteria

Primary research studies that were eligible for review inclusion had a study population of refugee children aged 12 years or younger who had resettled in a third country, focused on any aspect of health and were published between 2001-2009. Refugee children not resettled, that is displaced, in camps or immigration detention were excluded as were studies that had an exclusive study population of children aged 13 years or older.

Data collection

The abstracts of 194 studies were read and assessed against the inclusion/exclusion criteria and 145 were excluded. The full text was obtained for the remaining 49 studies that were read and assessed against the inclusion/exclusion criteria and 25 studies excluded. The remaining 24 studies were critically appraised using the RAPid appraisal tool from the Joanna Briggs Institute by the researcher and the second reviewer at the Joanna Briggs Institute. Nine were excluded following this appraisal.

Results

Of the 15 studies in the review nine focused on physical health, four focused on psychological health and two on health service use. The studies were mainly descriptive and concerned with establishing the population prevalence of infectious or deficiency diseases found in refugee

children on arrival or in the first months of resettlement. The synthesis updated three health issues that were elevated blood lead levels that increased after arrival in the USA, an 82% rate of H pylori infection in African refugee children in Australia and the widespread prevalence of low vitamin D levels in refugee children in New Zealand and Australia.

Conclusions

Refugee children as a population have special physical health needs at least in early resettlement. There is limited research on the health of resettled refugee children except in early resettlement. Limited comparisons could be made between the review findings and other populations of New Zealand children. These comparisons indicate that resettled refugee children as a population have a higher incidence of the health issues that were identified by the review than the general child population in New Zealand. A review limitation was the exclusion of nine studies because of design issues identified in critical appraisal with RAPid. Although the review findings had little to say about the socio-economic determinants of health of resettled refugee children they are able to inform primary health care nurse practice from a population health and an individual care perspective.

Key words

Refugee Health Child Infant Baby Resettle

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Table of contents

List of Tables

List of Figures

Chapter 1: Introduction

Millions of people worldwide are homeless due to war, including in 2008, over 16 million officially classified as refugees (United Nations High Commissioner for Refugees, 2009). Most remain exiled and displaced but a small number will, under a United Nations High Commissioner for Refugees (UNHCR) mandated process, resettle in another country. New Zealand is one of a handful of countries that has a formal commitment to accept refugees annually for government assisted resettlement (United Nations High Commissioner for Refugees, 2007). About 2894 (37%) of the quota refugees who resettled in New Zealand from 1999-2008 were children aged 0-14 years (Quazi, 2009). The New Zealand government is committed to providing health care for refugee children who become New Zealand residents immediately on arrival for resettlement.

This thesis reports the findings of a modified systematic review on child refugee health in resettlement. The findings of the review are synthesised for new knowledge to inform primary health care nursing practice in New Zealand. This review is important because historically children aged 0-14 years are the largest proportion by age group of refugees who resettle in New Zealand. This first chapter introduces the clinical scenario that led to the research, provides a summary of the research process used and introduces the thesis as a whole.

Clinical scenario

In my practice working as a primary health care nurse providing a community based Well Child service for children aged 0-5, I see young resettled refugee children several times per year. An example was a new arrival, a little girl, recently arrived from Kenya. In my role as the Well Child nurse for her geographical area I was advised by the family refugee support worker that she was in need of health care and I met the child and her family at home soon after becoming aware of her arrival. It was a challenging visit. Her health appeared poor, she was underweight and she had chronic infections. I tried to elicit (with the help of a telephone interpreter) what concerns the family had (nothing much they were just very happy she was with them now) then focused on her growth and nutrition. At the time, I reflected on what I knew about this population of children, their context of resettlement and their health needs.

It could be presumed that a refugee child who arrives in New Zealand has, by definition of refugee status, less than optimal health at least in early resettlement. After all, resettlement is

required for the child and family because of drastic circumstances in their home country (Ministry of Health, 2001a). Refugees arrive with very few possessions, and often with a personal or family history of war trauma, ill health, no income, stress and dislocation from family and cultural roots. This presumption that a refugee child could have compromised health when they resettle was both confirmed and challenged by working in a community that regularly accepts new refugee families. Confirmed, because when I met refugee children in the early months of resettlement they, like the little girl above, often had poor health. Challenged, because I observed that while the family was glad to be in a peaceful country and the child's physical health improved early on, that further into resettlement many families struggled with issues such as accessing health care, isolation, unemployment, housing, financial and health problems. With current knowledge about socio-economic determinants of health, these factors would give cause for concern for child health outcomes further on into resettlement (Public Health Advisory Committee, 2010).

As a nurse working in the community being able to find and usefully apply to practice, current evidence about the health of children and families generally as well as specific health information about sub populations of children and families is essential. I reflected that my practice-based knowledge about the health needs of resettled refugee children as a population was not detailed enough to inform my nursing practice for this little girl. I searched for health evidence specific to the context of a refugee child who is resettling in New Zealand to inform my nursing practice on how best to care for this group of children. I found medical research that indicated that as a population refugees who resettle in New Zealand have some known health needs, at least in early resettlement, such as low Vitamin D levels (Blok, Grant, McNeil, & Reid, 2000) and a higher prevalence of specific infectious illnesses than the general New Zealand population (McLeod & Reeve, 2005). There was also sociological research that explored the experience of refugees in resettlement in New Zealand and reported on issues such as difficulties with social support, housing, employment and health (Dunstan, Dibley, & Shorland, 2004; McMillan & Gray, 2009). A study by Ward (2006) called *They Are The Reason Why We Came* specifically looked at parenting supports for refugee women and their children in Wellington and reported the complexities of parenting in resettlement.

However the main evidence found to guide mine and other health practitioners' refugee health care practice in New Zealand was a Ministry of Health book *Refugee Health Care: A Handbook for Health Professionals* (Ministry of Health, 2001a). The book is designed as a resource for

health care workers who care for clients from a refugee background. The book aims to support health workers to provide what is described in the foreword as "an integrated approach to refugee resettlement" (p. v) where health is seen as being influenced by many factors including access to timely health care, language support, housing, education and employment. The book introduces some of the contextual factors of being a refugee by describing the refugee experience pre-resettlement, the arrival process in New Zealand and the elements of effective communication during a health visit. It also includes summary tables of health issues refugee clients may have and what is known about specific health issues for different groups of refugees. The breadth of health issues indicates that refugees as a population can have significant health needs on resettlement. Some information specifically about refugee child health is contained in prompts dispersed throughout the book that signpost possible issues such as anaemia, failure to thrive, developmental delay and incomplete immunisation. The book was useful as it provided an overview on refugee health in resettlement and as a preliminary source of information specifically on refugee child health but as it was published in 2001 and referenced material published before this was potentially out of date.

Research question

This background search identified a gap in updated and appraised health knowledge about refugee children who resettle in New Zealand. This knowledge deficit created a tension in my nursing practice as evidence based practice requires the use of evidence about a clinical issue combined with client values and preferences and nurse expertise in order to make competent clinical decisions (DiCenso, Guyatt, & Ciliska, 2005). A need to find and examine recent research on the health of refugee children in resettlement in a systematic way in order to provide a current evidence base to inform primary health care nursing practice with resettled refugee children was identified. A systematic review of the literature was directed by the question:

What does the published research report about the health of resettled refugee children?

This review had four objectives:

- To find health literature published between 2001-2009 relevant to the refugee children who resettle in New Zealand.
- To critically assess the literature using the RAPid critical appraisal tool, to extract individual study results and to synthesise the findings to update the information available about the health of refugee children in resettlement.

- To compare the review findings with what is known about children's health in New Zealand.
- To discuss the implications of the review findings for primary health care nurse practice.

Pivotal decisions in undertaking a review are defining terminology, deciding the type of review, selecting the databases and search terms, critically appraising the literature, synthesising the findings and making recommendations for practice. A summary of these is provided next.

Definitions

A key aspect of a review is terminology. In this review, three concepts needed to be defined for search purposes. These are the definition of a refugee, a child and of resettlement.

A Refugee

The establishment of the United Nations High Commission for Refugees (UNHCR) after World War II enabled a formal system of recognition for people who because of civil unrest or war were displaced within their country, exiled from their country or who fled into a neighbouring country. Such people are called a refugee. That is:

"any person who, owing to a well founded fear of being persecuted for reasons of race, nationality, membership of a particular social group or political opinion, is outside the country of his/her nationality and is unable, or owing to such fear, is unwilling to avail himself/herself of the protection of that country" (United Nations Conference on the Status of Refugees and Stateless Persons, 1951).

A refugee is different from a migrant (Ministry of Health, 2001a). Refugees are forced migrants who are in need of protection (McMillan & Gray, 2009; United Nations High Commissioner for Refugees, 2004). The term refugee in the meaning of this review is not interchangeable with other terms such as migrant but denotes a particular life experience that informs about the needs of the person.

A Child

The age nominated as a child for the purpose of this review was 12 years and under. There were two reasons for this. Firstly, adolescence can be viewed as a distinct developmental stage, with needs that are different from a younger child (Berk, 2009). Secondly, there is research that relates specifically to adolescent refugees (Geltman, Grant-knight, Ellis, & Landgraf, 2008;

Murray, Cohen, Ellis, & Mannarino, 2008; Rousseau, Drapeau, & Rahimi, 2003). This literature review included research with the age range of 0-12 years. It did not exclude research that included older children but did exclude research that just focused on the adolescent refugee.

Resettlement

The process of finding homes for refugees is described by the UNHCR in 2007 as looking for durable solutions. The durable solutions are repatriation, integration into country of exile and resettlement in a third country. Resettlement is the formal process in which people recognised by the UNHCR as refugees are allocated places in a country quota for permanent resettlement. Even though less than one percent of all refugees will resettle under a UNHCR mandated resettlement process, resettlement is an important way that countries share the burden and responsibility of refugees (Feller, 2007).

Methodology

A systematic review methodology directed a search of six electronic databases for primary research literature to answer the research question. While there are various ways to review literature, a systematic review provides a methodology to search for, organise, analyse and synthesise data. The systemisation of the process is a means of reducing internal bias and is congruent with the overarching aim of this review to provide research evidence to support clinical decision-making in practice. The methods used for this review were based on the Joanna Briggs Institute (JBI) systematic review protocol (Joanna Briggs Institute of Evidenced Based Nursing and Midwifery (JBIEBNM, 2000, 2001)). There were some modifications to the standardised systematic review process and these are discussed, as well as the theory of a systematic review and the systematic review methods undertaken by this review, in detail in Chapter 3.

Search summary

A two phase search strategy was done. The phase 1 search strategy used key words and variant endings, refugee* health* (child* or infant* or baby) resettle* in the MEDLINE database. The word resettle was found to limit the retrieval by excluding research that met the inclusion/exclusion criteria but did not have the word resettle in the abstract. The phase 2 search strategy omitted the key word resettle. Six electronic databases were searched and excluding duplicates, 194 articles were obtained. These 194 articles were then assessed by the

inclusion/exclusion criteria and 24 studies were selected as eligible for submission for critical appraisal.

Critical appraisal

The critical appraisal tool selected for this review was the online Rapid Appraisal Protocol Internet Database (RAPid) programme from the JBI. The 24 studies were critically appraised using RAPid, by the researcher and then by a second reviewer at JBI. Fifteen studies were ultimately successfully RAPid critiqued and are the substance of this review. These 15 studies are available to refer to via the Joanna Briggs website and are located in the RAP library (http://jbiconnect.org/tools/rapid/library/). Of the nine studies that were excluded from the review after the RAPid assessment process, eight were excluded because of study design and one was not appraised by the second reviewer at the JBI in time for consideration by this review. These nine studies are detailed in Appendix 2 as well as discussed in Chapter 3.

Findings

The studies were mainly descriptive, concerned with physical health and were done in early resettlement to establish the population rates of infectious and deficiency diseases that were probably acquired before the children were resettled. Child specific prevalence rates added to previous knowledge on prevalence of acquired infectious illness and health issues in refugee populations found on arrival or in early resettlement screening. Prevalence varies according to age/ethnicity and region of origin before resettlement. Comparisons of refugee child health with others indicate higher prevalence of ill health in refugee children. Updated information was found on lead levels in refugee children in early resettlement, on the prevalence of Helicobacter pylori infection in a cohort of refugee children from Africa and on the prevalence of Vitamin D deficiency in refugee children in Australia and New Zealand. Findings on the psychological health of refugee children in resettlement were limited. Barriers to health service use were found. The findings are discussed fully in Chapter 4.

Discussion

This review found high prevalence rates of infectious and deficiency diseases in refugee children that were diagnosed by health assessment and screening on arrival for resettlement or in early resettlement. Comparing these findings with health data about the New Zealand child population indicates that resettled refugee children as a population have health needs that are different from the general child population in New Zealand at least in early resettlement. The review findings

provide useful evidence to inform primary health care nurse practice from a population health perspective as well as an individual health perspective. There is very limited information on the health of refugee children after early resettlement.

Thesis overview

This first chapter has outlined the reasons for this review, that is because young refugee children resettle in New Zealand annually as part of our formal humanitarian refugee resettlement programme, that previous research indicates refugees as a population to have high needs, and a search for current evidence available to support primary health care nurse practice in New Zealand identified a gap in recent knowledge specifically about the health of young resettled refugee children.

Chapter 2 provides a brief summary of what previous international research has reported on refugee child health. The history and current practice in primary health care nursing and what is known currently about refugees in New Zealand is then described. A summary of New Zealand literature on resettlement of refugees is detailed and New Zealand health policy documents and research that relate to refugee child health care in New Zealand are described.

Chapter 3 discusses the historical and current evolution of the methodology of a systematic review process and details the modified systematic review process of this study including the search strategy, the inclusion/exclusion criteria and the application of the critical appraisal tool RAPid.

Chapter 4 presents the analyses and synthesis of the findings of the 15 critiqued studies. Firstly by a research overview that shows the research to be in three areas: physical health, psychological health and health service. The findings of each area are then presented with individual tables and synthesis.

Chapter 5 discusses the literature findings and looks at the implications for primary health care nursing practice. This review is concluded by articulating the strengths and limits of the research and recommendations for future research.

Chapter 2: A background to refugees in New Zealand and primary health care nurse practice

Introduction

This chapter presents a brief overview of previous research findings on the health of resettled refugee children and introduces primary health care nursing and the New Zealand context of refugee resettlement. Firstly, what is known from previous research about the health of refugee children in resettlement is outlined. The process of resettlement in New Zealand is described next and what is known about the health of refugees in New Zealand is provided. An ecological theory of health is then described as this provides a framework for understanding the primary health care and population health contexts of this review. The use of evidenced based practice by primary health care nurses is discussed and lastly health promotion for refugee children is outlined.

A background search for previous research about the health of refugee children in resettlement found research that mainly had a psychological focus and takes into account the war trauma that refugee children have often experienced. For example, a body of international research focused on the mental health of children and adolescents and identified them as a vulnerable sub group of refugees (Fazel & Stein, 2002; Lustig, et al., 2004). A theme of the research was to look at the relationship between experiences of the child pre-resettlement and psychological disturbance after resettlement (Davies & Webb, 2000; Geltman, Augustyn, Barnett, Klass, & McAlister Groves, 2000; Hodes, 2002; Levenson, 2000; Papageorgiou, et al., 2000; Summerfield, 2000). Within the child refugee population there is a subgroup of refugee children who arrive for resettlement unaccompanied, that is they are not in the care of other family members. This group have been shown to have significantly more mental disturbance than accompanied refugee children, have very high rates of Post Traumatic Stress Disorder (PTSD) and lack social support (Batista, Wiese, & Burhorst, 2007). The plight of such unaccompanied refugee children was articulated in the stories about children who fled on foot from war torn Sudan, the so called “lost boys of the Sudan” and were resettled mainly in the USA (Geltman, et al., 2008; Luster, Qin, Bates, Johnson, & Rana, 2009).

Other research concerned immunisation (Christiansen & Barnett, 2004; Lifson, Thai, & Hang, 2001) and reported that establishing the immunisation status of a refugee child or adult on

resettlement was not clear-cut as often documentation was missing or the history of immunisation limited. The needs of refugee children were also considered in research about public health policy (Gracey, 2004; Hjern & Bouvier, 2004; Lynch, 2001) that reported that refugee children had special health needs on resettlement and that public health policy and operations needed to take these needs into account.

A search for previously published New Zealand literature on the health of resettled refugee children found that refugees as a population may have multiple physical and psychological health issues in resettlement (Ministry of Health, 2001a). Three papers from the medical literature considered health care practice for refugee children in Australia and New Zealand (Davidson, et al., 2004; Koh, Zwi, & Walls, 2009; Zwi, et al., 2007). All three papers reported that as a population, resettled refugee children can have complex health needs, require comprehensive health assessment on arrival for resettlement, require culturally safe care, and that common health issues include nutritional deficiencies, infectious disease, mental health, and health service access. They also mention developmental disorders, child abuse and protection issues and incomplete immunisation. All three papers take a comprehensive approach to health assessment and recommend that assessment includes a migration history (Davidson, et al., 2004) and a family genogram (Koh, et al., 2009) but none used a critical review process. The Royal Australasian College of Physicians considers equity and social capital and say "child health workers have a role in advocating for the provision of favourable circumstances in order for refugee children to develop resilience" (Zwi, et al., 2007, p. 16).

As well as the medical research described above, a sociological perspective was found in research that provided background information about refugee resettlement experience in New Zealand and this and other New Zealand research is discussed next.

Current knowledge about refugees in New Zealand

Resettlement in New Zealand

New Zealand has been proactive in accepting refugees since the end of World War II and formalised this arrangement in 1987 with a commitment to accept from the UNHCR 750 refugees, called quota refugees, annually defined under UNHCR humanitarian categories as refugees in special need of government assisted resettlement (United Nations High Commissioner for Refugees, 2007). Table 1 shows that refugees are currently formally resettled

through the UNHCR to mainly 10 resettlement countries of which New Zealand is one. Other countries eventually accept refugees for permanent resettlement on an *ad hoc* basis after the refugee has applied for asylum but do not formally plan for and welcome refugees as these 10 countries do. New Zealand has an evolving refugee resettlement strategy that aims to provide a comprehensive framework for good resettlement outcomes for all refugees (Department of Labour, 2010).

Table 1. Places available for refugee resettlement by the UNHCR in 2008*

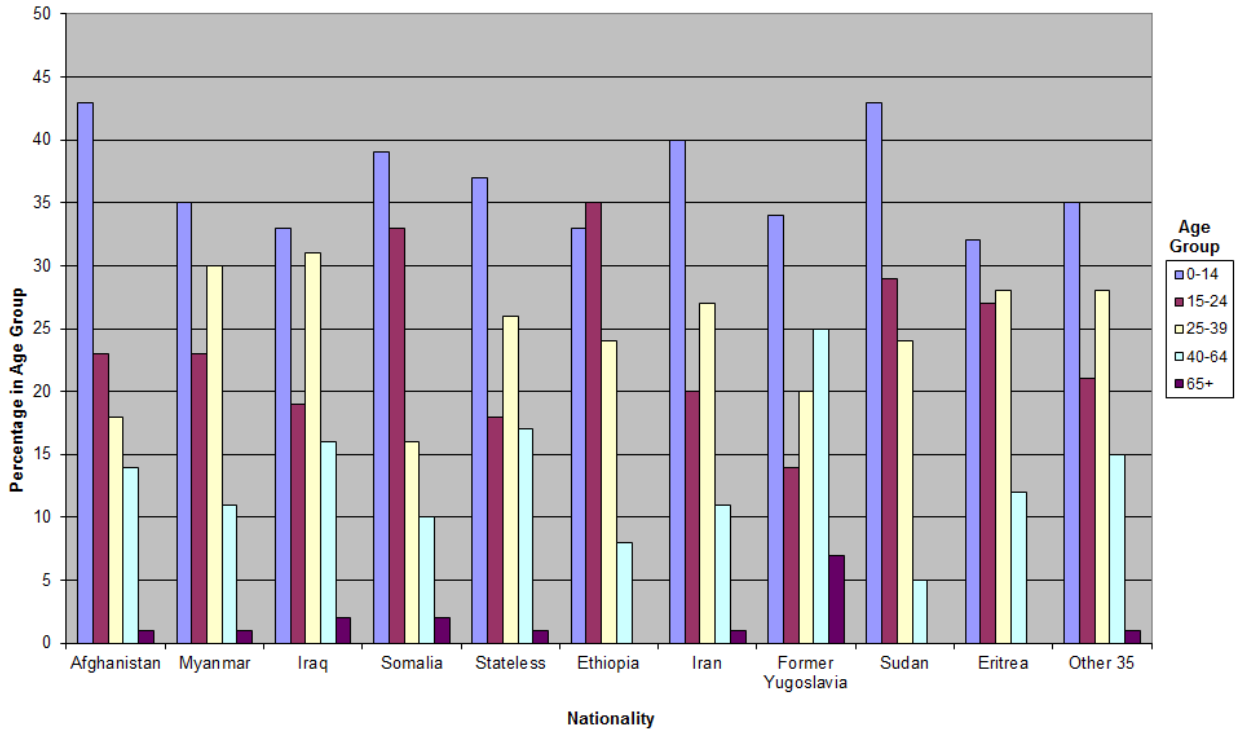
Countries	Number of places
USA	56,750
Australia	6,500
Canada	6,140
Sweden	1,900
Norway	1,200
Finland	750
New Zealand	750
United Kingdom	750
Denmark	500
Netherlands	500
Others	1,000
Total	76,740

*Source: United Nations High Commissioner for Refugees (2009). *Report of the United Nations High Commisioner for Refugees, 2008 (covering the period from 1 January 2008 to mid-2009)*: United Nations

Approximately 290 children aged 0-14 years arrived annually in New Zealand as part of the quota refugee programme 1999-2008 (Quazi, 2009). In addition to the annual quota of 750 refugees, a similar number of family reunification refugees are granted entry to New Zealand. The actual number of refugee children who arrived as part of the family reunification programme is unknown and therefore the total number of refugee children who resettled in New Zealand 1999-2008 is not known.

The nationality of refugees who came to New Zealand between 1999 and 2008 is shown in Figure 1. Children aged 0-14 were the largest proportion by age from all the 11 nationalities except for Ethiopia, where young people aged 15-24 were the largest proportion.

Figure 1. NZ quota refugees by nationality and percent in age group 1999-2008*



*Source: Quazi A. (2009). *Quota refugees in NZ: approvals and movements (1999-2008)* Wellington: Department of Labour

While the nationality of refugees who came to New Zealand will have influenced aspects of resettlement, resettlement processes will have varied according to the individual's own personal characteristics. Also resettlement is making the basic adjustments to living in a new country with steps that include an early phase in which the person is helped to meet their basic needs such as housing and health care. An evolution of concepts articulated by McMillan and Gray (2009) sees resettlement as a two way process of give and take by both the refugee and the new country with the goal of integration. This interactive process is interesting when considering children. It may be that the child, simply because of the growth and development that naturally occurs, their ability to learn a new language and the socialising effect of school, integrate quickly. The refugee child who resettles, goes to school and adapts successfully into the new country and culture, while still having memories of their life before resettlement has been named the 1.5 generation (McMillan & Gray, 2009).

The research on refugees living conditions post-resettlement indicates that they are often living in crowded housing, in poorer areas of town and are dependent on a government benefit (Dunstan, et al., 2004; Perumal, 2010; Regional Public Health, 2005). From a population health perspective there is some demographic information available regarding socio-economic

conditions that is encapsulated by the NZ Deprivation Index. This demographic information is a useful measure to understand socio-economic status and is based on multiple measures, collected at the New Zealand Census, such as income and employment. The information from households is collated and forms the deprivation measure for a block of households. This essentially enables socio-economic conditions to be made visible, literally mapped (White, Gunston, Salmond, Atkinson, & Crampton, 2006). NZ deprivation Level 10 is measured as the most deprived area of housing and Level 1 as the least socio-economically deprived area. Many refugee families live in areas classified as high deprivation. For example in 2005, 59% of refugees lived in areas classified as deprivation levels 8, 9 or 10 in the Wellington region (Regional Public Health, 2005).

Refugee health in New Zealand

What is known currently about the health of refugees is known mainly as a whole population. The high incidence of selected infectious diseases found by health screening on arrival is detailed in Table 2 that reports the results of all quota refugees, including children, who were screened 1995-2000 on arrival in New Zealand.

The health of refugees immediately on resettlement was investigated in a large screening study done by McLeod and Reeve (2005) on all the quota refugees who arrived in New Zealand between 1995-2000. McLeod and Reeve detailed the prevalence of infectious illness in this large cohort of 2,992 refugees from diverse countries of which 1,604 (53%) were aged 0-17 years. The analysis and findings did not generally report age groups by conditions and so the prevalence of disease for children is not known. The report was tabled in a study published by Regional Public Health, *Refugee Health Needs Assessment (2005)* and is included below.

Table 2. Summary physical health data from Mangere Refugee Resettlement Centre 1995-1998*

Condition	No. tested	Time period	No. +ve
Tuberculosis	1405	July 1995-July 1998	28 (2%º)
Latent Tuberculosis	1405	July 1995-July 1998	183 (13%)
HIV	2823	July 1995-1999	57 (2%)
Schistosomiasis	2825	July 1995-1999	620 (21%)
Chronic Hepatitis B	2923	July 1995-1999	136 (5%)
Giardia	2992	July 1995-1999	449 (15%)

*Source: Regional Public Health (2005). *Refugee Health Needs Assessment*. Lower Hutt: Regional Public Health

This Regional Public Health report also provided information to enable health care planning from a public health perspective for the refugees who settle in the Wellington area. The report included a literature review, the collection of demographic data and qualitative research. This report found that the most common health issues raised by refugees were dental problems, women's health and mental health. Also mentioned were isolation and discrimination, cost of health services, transport and low use of interpreters. There was no focused information on child health in this report.

There is some evidence from information collected by the Refugee and Migrant Service that poor health presents problems for refugees in New Zealand early in resettlement. Their annual report for 2007-2008 states that in the first year of resettlement health issues are the number one request for help to the service, and in the second year, health is the second concern (after immigration issues) with mental health the third most likely reason that refugees seek help (Refugee Services, 2008).

In New Zealand, all quota and family reunification refugees become permanent residents on arrival for resettlement. They have the same rights as New Zealand citizens regarding health, education, social welfare services and employment. The Ministry of Health (2001b) is concerned about the health of refugees on resettlement and there is a stated health goal for refugee and asylum seekers "To improve, promote and protect the health of refugees, asylum seekers and their families, and the wider community". This includes comprehensive health screening on arrival for all quota refugees through the refugee reception centre in Mangere, South Auckland where they live for the first six weeks after arrival. Health screening for newly arrived refugees is necessary for both the personal health of the refugee as well as from a public health perspective for the identification and control of infectious illness such as tuberculosis (McLeod & Reeve, 2005). After six weeks at the refugee reception centre, the child and family relocate to their new home and the Regional Public Health Service is contracted by the Ministry of Health to provide extra health service support. This Regional Public Health Service programme allocates a public health nurse to a family for up to one year. During this year the nurse assesses health needs and supports the family to meet these health needs and integrate into the community.

The presumption that a refugee child who arrives in New Zealand has, by definition of refugee status and their living conditions before resettlement, less than optimal health in the early

months of resettlement is also to imply that a change in health can occur over time. The process of resettlement can improve the health outcomes for the child, if health determinants improve on resettlement and of course that is the anticipation and hope for the child and family. An ecological view of resettlement could articulate this as a "critical transition" for the child that involves many changes. These changes can "affect health by pushing people onto a more or less advantaged path. Because people who have been disadvantaged in the past are at the greatest risk in each subsequent transition, welfare policies need to provide not only safety nets but also springboards to offset earlier disadvantage" (World Health Organisation, 2003, p. 10). An ecological theory as a framework to understand primary health care and population health is discussed next.

Primary health care and nurse practice

An ecological theory of health

Primary health care nursing practice in the community requires an overarching theoretical and practical framework that articulates health as more than personal choice or personal action, but as a complex interrelationship between many things. It is strongly grounded by an ecological understanding of health where health is seen as a complex interaction between many factors (McMurray & Clendon, 2011).

An ecological model of health was originally theorised by Bronfenbrenner (2005) in the 1940s as a way to understand child growth and development. His model of an ecological theory of child development consists of a nested system of layers of environmental influences, the child in the centre, family and community in the middle and social/political influences around the outside, that in an interactive process, dynamically shape human development and health. An ecological model frames the conditions needed for health as much more than personal choice or good medical care but because of many interrelated environmental factors.

Research published in the last few decades found particular environmental factors have a powerful influence on health. The World Health Organisation (WHO) calls these determinants of health. Health determinants are articulated by WHO in *Social Determinants of Health the Solid Facts* (2003) as social and economic determinants, the physical environment and peoples individual characteristics and behaviours. Knowledge of health determinants has informed health policy and practice worldwide with the articulation of concepts such as socio-economic

determinants of health, social justice, inequality in health and population health. New Zealand's health policy document the *Social, Cultural and Economic Determinants of Health* (National Advisory Committe on Health and Disability, 1998) reported that social, cultural and economic factors are the main determinants of health in New Zealand and that inequalities in health outcomes are likely to worsen as socio-economic factors widen the gap between the rich and poor.

Knowledge of health determinants is critical when examining child health, as a child's growth and development occur in the context of the family environment. Research published in 2010 in New Zealand noted that, as is shown worldwide, child health is strongly associated with socio-economic factors such as family income, quality of housing, social support and education (Public Health Advisory Committee, 2010). The unequal distribution of resources across society means that particular groups of children have poorer health than others.

Being able to measure and compare different populations of children is important in identifying health inequalities. Currently in New Zealand, it is difficult to identify refugee children as a population after immediate arrival. There is no identifier for previous refugee status in the New Zealand statistics and often their ethnicity will simply be categorised as "other" in any kind of data collection regarding health or socio-economic indicators. The New Zealand Child and Youth Epidemiology service (personal communication, Liz Craig, 23/7/2010) does not have a specific identifier for refugee children. This makes it difficult to identify and thus address any health outcome differences in this population of children.

Evidenced based practice

As part of the culture of professional nursing today, nurses have a responsibility to make informed clinical decisions using an evidence based practice (EBP) framework. EBP encourages nurses to think about clinical decisions by locating and considering the best available external evidence about a clinical issue as well as patient preferences, personal clinical skills and available resources to inform clinical decisions (DiCenso, et al., 2005; Melnyk, Fineout-Overholt, Stillwell, & Williamson, 2010). The debate about the definitions, vocabulary, validity and application of EBP in nursing decision making is widely written about in nursing and medical literature as the mere existence of the concept of EBP calls into question the nature of knowledge and how clinical decisions are made (Jutel, 2008; Lambert, 2006; Scott & McSherry, 2008). For example, many nurses are the practical users of knowledge not generators of

knowledge (Reed & Lawrence, 2008). That is, the nurse relies on personal experience combined with others' authoritative knowledge to make decisions for nursing practice. This creates a clinical decision making dilemma when practice-based knowledge is limited, the usual authoritative sources of information are lacking and the work environment does not support knowledge generation by the nurse. The clinical scenario described in Chapter 1 is exactly that circumstance when personal nursing knowledge is limited because of the complexity and "unusualness" of the situation, and the best evidence or theory that would be useful to guide practice in an unfamiliar circumstance is lacking.

Health promotion

Part of primary health care is health promotion. Health promotion is defined as a process of empowerment that enables people to have increasing control over their health (McMurray & Clendon, 2010; Ministry of Health, 1996). Health promotion occurs across all ecological levels and includes personal information sharing and health education, community initiatives such as planning a safe environment for children to play and social policy that promotes health, for example healthy eating or healthy housing standards. Health promotion is a fundamental part of primary health care nursing and requires the nurse to be able to assess individual health as well as look wider to the specific factors in the community that influence health of the local people, that is to see what health determinants are operating. Health promotion is used to build personal capacity for health, direct healthy community development and build healthy public policy.

The health document that frames primary health care Well Child nursing in New Zealand is the *Well Child/Tamariki Ora National Schedule* (Ministry of Health, June 2010). This document sets out a schedule of health education and health promotion, health protection and clinical assessment and whanau care and support for all children in New Zealand aged 0-5 years. The schedule requires that the nurse provide both population information (e.g., safe sleep practice for all babies) by stating specific health education topics for each visit, as well as individualised nursing care which is informed by the nurse's clinical assessment of the child and family. As part of the Well Child Health Service, a *Well Child Tamariki Ora Health Book* (Ministry of Health, 2010b) is given to each New Zealand child at birth. This serves as the child's record of growth and development and is filled out by the nurse and other health workers as well as the family. These books are often kept for life and have been found to be a useful tool in the relationship building between the nurse and the family (Clendon & Dignam, 2010). Refugee children are given a *Well Child Tamariki Ora Health Book* when they are first seen by a nurse

and this book also serves as a link between the nurse and the refugee family as even with language barriers a graph with a child's growth curve on it is universally recognised health document.

Lastly, understanding that times of change (transition) will be transformative as well as stressful can inform nurses working with refugee families during this transition time. A study by Samarasinghe, Fridlund and Arvidsson (2006) looked at the role of primary health care nurses in the resettlement transition of refugee family health. They state that nurses can have a role in promoting health in new refugee families by understanding the emotional and physical impact of the transition process on wellness and working with the family with identified issues.

Summary

There is currently limited knowledge about refugee children who resettle in New Zealand. The children are visible in the arrival statistics and are the largest age group of refugees to enter New Zealand. Very little is known about them as a population after this.

Medical research from New Zealand indicates that new refugees as a whole population have higher disease prevalence than the New Zealand population for some infectious illnesses. Other New Zealand research on resettlement has limited articulation of health but reports that refugee families can live in areas of deprivation, in low quality housing and have employment and money issues and that health is one of the main concerns for refugees in the first couple of years in resettlement.

The New Zealand health system is committed to providing health services for resettled refugees. Initial health services are comprehensive health screening and treatment on arrival for all quota refugees who resettle here. Further health services are provided by Regional Public Health services in the first year of resettlement. Well child health services are available to any child in New Zealand aged 0-5 years and provide population based health education as well as individual child and family assessment and nursing support.

These findings are the research rationale for this literature review that aims to find health research about resettled refugee children. The next chapter discusses in detail the methodology and method used by this literature review.

Chapter 3: Methodology

Introduction

The methodology chosen for this research is a systematic review of the literature. A systematic review methodology provides a structure to find, critically appraise and extract data from a collection of literature to answer a research question (JBIEBNM, 2001). The systematic nature of the process and the positivist words used to describe a systematic review (trustworthy, reproducible, objective, transparent) locate the methodology firmly in the scientific paradigm of knowing and this is congruent with evidenced based practice. A step-by-step process renders the review open to replication and scrutiny by interested parties such as clinicians, health consumers, managers or researchers. This open and thorough systematisation of the review process with the ability for duplication is a key feature of the methodology and has endured as the methodology has evolved from a narrow application to quantitative data and intervention studies only, to many different types of research questions and study design.

This chapter describes and discusses the historical and current methodology of a systematic review of literature and then describes in detail the application of the systematic review protocol undertaken for this research. The chapter commences with a discussion on the role of the literature review in research.

A literature review, as a vehicle for collecting and assessing past research to inform future research is an essential component of the research process (Aveyard, 2007; Boote & Beile, 2005). However, the application of EBP and the need to manage the volume of information available today is a key driver for the growth in the literature review as a research methodology in its own right (Kaczorowski, 2009). A focused literature review can provide evidence for clinical practice by gathering together individual studies that have the same or a related focus in order to answer a clinical question. This broadening of the role of the literature review in research has fuelled the development of ways to manage the process of a literature review. There are different review methods and there is methodological choice (as well as confusion) as to which type is used for what type of question, the scope and purpose of the review and the type of literature to be reviewed (Arkey & O'Malley, 2005; Aveyard, 2007; Lomas, 2005; Pope, Mays, & Popay, 2006).

In planning this research I attempted to locate the gold standard of how to undertake a systematic review to guide the study design. A detailed reading of the systematic processes published by Greenhalgh (1997b), the JBI (2001), the EPPI-centre (March 2007) and the Cochrane Handbook (Higgins & Green, 2011) revealed some similarities and differences between the four processes. While each outlined a systematic process, they varied in the number of steps required, the comprehensiveness of the search, the number of reviewers required and how the reviewers worked together. Appendix 1 provides a summary of the four systematic review processes.

The evolution of a systematic review methodology

A journalistic approach

It has only been relatively recently that it was seen to be important how a literature review process was carried out. Previously a journalistic approach to a review of the literature enabled diverse primary research findings to be used in an indiscriminate and possibly unbalanced way, to support an argument (Greenhalgh, 1997). An example of a journalistic approach that was later re-examined in the light of knowledge about the risk of bias is the work done by Professor Pauling (1986) about the role of Vitamin C in promoting health. Pauling reported previous studies as supporting his claims of the health benefits of high dose Vitamin C for the common cold, but this evidence was later questioned as being obtained in a non systematic way and thus as biased and less credible (Knipschild, 1994). The journalistic approach was for many years the unquestioned way of dealing with previous research findings and it was noted by Greenhalgh (1997a, p. 672) that "many if not most medical review articles are still written in journalistic or narrative form". Aveyard (2007) summarises the narrative (journalistic) review as having no clear question, search strategy, critical appraisal or method of synthesis and therefore not easily repeatable. These problems of bias in or rigor a literature review have been addressed by looking towards the scientific paradigm and the evolution of a systematic review methodology.

A systematic review

The evolution of a systematic review as a methodology is associated with the evolution of evidence based medicine when collecting and synthesising empirical evidence was needed in order to support clinical decision making (Kaczorowski, 2009; Scott & McSherry, 2008). The early systematic reviews of literature were used to provide the evidence base for an intervention in medicine by answering a question about what is effective or "what works". The systematic

review process was able to generate knowledge by locating primary studies with the same intervention, analysing them for methodological strengths and limits and then combining the individual study findings in a quantitative statistical meta-analysis. This type of review, of a specialist type of research design, most commonly randomised controlled trials (RCTs) is possibly the most widely known type of literature review. The Cochrane Collaboration data base contains a collection of systematic reviews of interventions that provide summaries of primary research (Jadad, et al., 2000).

It is worth noting here that the terminology that describes a systematic review of literature continues to develop. For example, Arkey and O'Malley (2005) in their exploration of a scoping literature review state that there is not one ideal type of review and that reviews can be systematic reviews, meta-analyses, rapid reviews, research synthesises and structured reviews.

Methodological issues and challenges of a systematic review

The research question

The increase in systematic reviews of literature has occurred as the type of question that a literature review can address has widened to include more than a clinical effectiveness or "what works" focus (Pope, et al., 2006). Increasingly, research questions are posed not just by clinicians but also by policy makers, economists and managers. Lomas (2005) in his paper on the possible breadth of questions that a health care manager might want a literature review to answer, found many types of questions including, what is the value of, what is the role of, what do we know about and what are the issues?

This broadening of the research question and audience has been a significant step for a systematic review and has demanded new methods of critique and synthesis for methodological coherence. Lomas (2005) states it is critical for research integrity when designing research, that the aims and objectives of the research control the methods used and not the other way around. Lomas describes this as "methods must be driven by function, role and objective. The dog (function, role and objective) should wag the tail (methods) not vice versa" (p. 59). So the widening brief and audience for the research question have, and no doubt will, continue to be the impetus for the methodological evolution of the systematic review process. Research questions that go beyond a simple ontological "does this work" will often retrieve a varied range of

research design and this has added considerably in the challenges of how to critically appraise the data.

Critical appraisal

The critical appraisal of research literature for methodological quality and applicability to the research question is a fundamental part of a systematic review (EPPI-Centre, March 2007; Greenhalgh, 1997a; Higgins & Green, 2011; JBIEBNM, 2001). Issues in critical appraisal relevant to this research are discussed next.

Firstly the critical appraisal of empirical research and health literature such as expert opinion or clinical guidelines is part of evidence based practice (Melnyk, et al., 2010). Being able to state how reliable the evidence presented in a research paper is, is essential when making the decision on whether or not to use evidence for practice. An example of what can happen if research findings are not critically appraised before dissemination and possible application to clinical practice, is the study by Wakefield et al. (1998) which linked the measles, mumps and rubella (MMR) vaccine to autism. This study was published in the *Lancet,* a prestigious medical journal, and the rates of immunisation with MMR dropped dramatically and an increase in measles occurred (McIntyre & Leask, 2008). The study when critically appraised for its level of evidence, was found to contain weak evidence that was not sufficiently robust to indicate changing clinical practice of vaccination with the MMR at that time (Aveyard, 2007). A framework of placing a value on the evidence found in research is now well known and is called variously a hierarchy of evidence, levels of evidence and grades of recommendation. The levels of evidence published by the JBI and used in this review are in Table 3 below.

Table 3. Levels of evidence

Level	JBI levels of evidence*
1	A systematic review of all relevant RCTs
2	At least one properly designed randomised control trial
3.1	Well controlled trials without randomisation
3.2	Well designed cohort or case control analytic studies ideally from more than one researcher
3.3	Multiple time series with or without the intervention or dramatic results from uncontrolled experiments
4	Respected opinion based on clinical experience descriptive studies or reports of expert committees

*Source: JBIEBNM (2000). Appraising systematic reviews changing practice. *Supplement 1*, 1- 6. Retrieved from http://www.joannabriggs.edu.au/CP.pdf

It is necessary to critically appraise all research used in a literature review, but the type of research will indicate whether a level of evidence measure can be a useful marker in the critical appraisal process. Often the research design is unclear or the levels of evidence are not comprehensive enough to include research driven by questions that relate to more than clinical effectiveness such as qualitative research.

The second issue is how to critically appraise different sorts of research design obtained for one review. The issue then becomes the critical appraisal of individual pieces of research that may be very different methodologically and not able to be analysed with the same tool. The framework for critical appraisal of any research design is stated by Young and Solomon (2009) as a "systematic process used to identify the strengths and weaknesses of a research article in order to assess the usefulness and validity of research findings (p.1). Even though a critical appraisal framework can be applied to any research design finding one appraisal tool that can be used for different sorts of research design is challenging. There are many critical appraisal tools to be used and yet no "gold standard" (Young & Solomon, 2009). The Rapid Appraisal Protocol Internet Database (RAPid) from the Joanna Briggs Institute was selected as the critical appraisal tool for its ability to be used for different sorts of research design (Joanna Briggs Institute, 2005). The Joanna Briggs Institute is a leading centre through which nurse led systematic reviews are completed.

The expansion of the type of research question with the resulting increased variety in research design obtained from a search of the literature can be seen to have consequences across the systematic review process, not just for critical appraisal and the challenges of synthesis are discussed next.

Synthesis

Synthesis has been described as a way to "move beyond a summary of the research literature to generate new insights or knowledge" (Pope, et al., 2006, p. 28). Synthesis is widely discussed in the research literature and the methods of synthesis used in a systematic review methodology have evolved to cope with the expanding audience and type of research question. There is not just one way to synthesise and for the integrity of the research, the method of synthesis is driven by the research aims and objectives and not dictated by the type of research obtained from the review. This process of accommodating new data demands is part of scientific progress and

illustrated by the evolution of the ways that a systematic review process has demanded a method of synthesising data that is not purely quantitative (Aveyard, 2007).

Noblitt and Hare (1988) describe a process called meta-ethnography as a way to synthesise the findings of qualitative studies. Pawson and Bellamy (2006) describe as the two traditional ways of synthesising research findings of reviews as the quantitative meta-analysis and the qualitative narrative review. In contrast, Pope and colleagues say that narrative synthesis can be done for both qualitative and quantitative work. They do not propose that qualitative and quantitative studies are combined however, and state that " there is no single unifying framework for synthesising qualitative and quantitative evidence for health care managers and policy makers and in this sense the rules of how to do synthesis are less well developed" (Pope, et al., 2006, p. 30). Aveyard (2007) describes meta-analysis for quantitative data, meta-ethnography for qualitative data and a third way called meta-study which can be used for heterogeneous collections and that examines the data collected as well as the theoretical framework for each study.

An evolution of narrative synthesis called meta-narrative that uses a mapping and storytelling process to understand a complex body of knowledge was developed by Greenhalgh et al. (2005) to work with diverse research found by a literature review. It requires individual disciplinary or speciality analysis that is then synthesised by the following four questions (which can be seen as in the genre of the type of question asked by narrative reviews and which are used to frame up the synthesis of this review).

- What is the range of the research questions and can they be grouped across traditions?
- What do the research findings have in common and what is different?
- What are the key findings and what are the implications for practice?
- What are the main gaps and where could further (primary) research be directed?

Review quality

Just as the individual studies in a review are appraised for quality, so too are completed reviews (DiCenso, et al., 2005). The level of quality in a systematic review essentially captures the level at which the application of the systematic process has minimised the risk of bias or error. Whittemore (2005) details 11 quality criteria for assessing a literature review. These encapsulate a clear communication and documentation process of the review including why the review was needed, how the review was done, what was found and a reflection on the review process.

Quality is variable in published systematic reviews. The systematic review process outlined by a group of Danish nurses (Holopainen, Hakulinen-Viitanen, & Tossavainen, 2008) uses four stages of review and these authors argue that providing the process is rigorously documented for each stage so that the reader can decide for themselves on validity, then the systematic nature of the methodology is intact. In comparison, MacLure (2005) is critical of the quality of many systematic reviews for not completing exhaustive searches and for narrowing the literature actually reviewed to, in her opinion, an absurd degree. MacLure lists six systematic reviews published by the EPPI-centre that document literature searches limited by time, resources and volume. However, there is some tension in her argument as it maybe that quality in those terms necessarily means a tight control on quantity. The JBI has an eight point guideline which addresses the critical appraisal of a systematic review which is included below in Table 4. This framework was used in this review to guide methodological quality.

Table 4. The JBI critical appraisal framework*

Review stage	Questions for critical appraisal
Research question	Is the purpose of the review stated? Is the review question clearly and explicitly stated?
Literature search	Were comprehensive search methods used to locate studies? Was a thorough search done of appropriate data bases and were other potentially important databases explored?
Study selection	How were the studies selected? Are the inclusion criteria reported?
Critical appraisal	Was the validity of the included studies assessed? Was the validity assessed appropriately? Are the validity criteria reported?
Similarity of groups and treatments	Are treatments similar enough to combine? Were reasons for any differences between studies explored?
Data synthesis	Were findings from individual studies combined appropriately? Are the methods used to combine studies reported?
Methods documented	Are the review methods clearly reported?
Summary of findings	Is a summary of findings provided? Are specific directive for new research proposed? Were the conclusions supported by the reported data?

*Source: JBIEBNM (2000). Appraising systematic reviews changing practice. *Supplement 1*, 1- 6. Retrieved from http://www.joannabriggs.edu.au/CP.pdf

In summary, a systematic review methodology can be seen as evolving from the systematic review of an intervention that was formulated in response to the clinical need to collate and manage collections of research in order to provide evidence for clinical practice. A systematic

review process was firstly applied to primary quantitative data and latterly can be applied to diverse types of research. This review modified this methodology to find and manage a collection of research related to EBP for resettled refugee children.

Methods

The review protocol (Appendix 2) was finalised in consultation with the research supervisor. The JBI systematic review framework as outlined in Table 4 informed the methods used for this review. As this review addressed a broad question to inform practice for a population generally, several steps in the review process were modified. The review question was kept broad despite the need for the systematic process modifications in order to meet the review objectives as to narrow the question would not have provided the possible range of research that is necessary to inform nurse practice generally. These modifications are discussed in the methodological challenges at the end of this chapter.

Research question

The purpose of this review was to find out what is known about health issues facing resettled refugee children from empirical research published 2001-2009 in order to inform primary health care nurse practice with this population of children.

The research question that directed this literature review was:

What does the published research report about the health of resettled refugee children?

This review had four objectives:

- To find health literature published between 2001-2009 relevant to the refugee children who resettle in New Zealand.
- To critically assess the literature using the RAPid critical appraisal tool, to extract individual study results and to synthesise the findings to update the information available about the health of refugee children in resettlement.
- To compare review findings with what is known about children's health in New Zealand.
- To discuss the implications of the review findings for primary health care nurse practice.

Literature Search

Key words

The selection and use of key words is a way of directing a search of the literature in order to retrieve relevant research to answer a specific research question. Determining search terms for a review is made easier if the research question has been formulated using the PICOT (Population, Intervention, Control, Outcome, Time) format. A PICOT helps identify key words that when entered and combined in a database search, can locate literature relevant to the research question (DiCenso, et al., 2005; Melnyk, et al., 2010).

The PICOT format for this review only used the P (population), O (outcome) and T (time) as there was no intervention or control. Population captures refugee children, the outcome is health and the time is resettlement. The key words used were refugee, child, infant, baby, resettlement and health. The word refugee captures a unique population of children, distinct from migrant children and for this reason was the only word used to capture this aspect of the population. The word resettle also has a specific meaning in the context of a refugee and was the single word used to capture the research context. These key words, or derivations of them, were used in the electronic database searches. Boolean logic was used to manage the key word combinations. Limits to capture the type of research content and the date of publication were set for each search and were entered if possible into the search terms for each database as show in Table 6.

Electronic databases

Six electronic bibliographic databases [MEDLINE, Australasian Medical Index (AMI), Academic Onefile, The Cumulative Index to Nursing and Allied Health Literature (CINAHL), Health Source Nursing/Academic Edition and ProQuest Health and Medical Complete] were chosen for the potential scope of retrieval while being relevant to the practice of a nurse or other health professional working in New Zealand with resettled refugee children. A two-phase search strategy using keywords was used to search these databases and is detailed below.

Phase 1 search

The initial search used the key words refugee* + health* + (child* or infant* or baby) + resettle* to search MEDLINE to test the specificity of the key words to retrieve relevant research. Boolean logic AND was used to combine the words and OR to expand the age range to include

both babies and children. Variant endings were added to capture key word derivatives. Table 5 summarises the Phase 1 search strategy.

Table 5. Phase 1 search summary

Key word	No. of retrievals
1. refugee	882
2. refugee*	11,536
3. health	346,925
4. health*	550,452
5. resettled	114
6. resettle*	329
7. refugee + health + resettled	38
8. refugee* + health* + resettle*	108
9. child or infant or baby	97,077
10. child* or infant* or baby	311,710
11. refugee* + (child* or infant* or baby)	477
12. refugee* + (child* or infant* or baby) + health*	201
13. refugee* + (child* or infant* or baby) + health* + resettle*	21

Analysis of the search results for MEDLINE indicated that the word resettle was limiting the retrievals as the search without the key word resettle* located 20 other papers which from a first reading of the abstract were suitable for inclusion by topic. The researcher made the decision to widen the Phase 2 search by excluding the key word resettle in order to capture potentially relevant studies.

Phase 2 search

The second search omitted the key word resettle and used the key words refugee* + health* + (child* or infant* or baby). Boolean logic AND was used to combine the words and OR to expand the age range to include both babies and children. Variant endings were added to capture key word derivatives. The inclusion of the Boolean NOT and the use of further key words camp, displace and detention and the expander OR with variant endings to capture key word derivations was used to increase specificity of the context of the search, that is research which occurred in resettlement and not prior, in camps or when displaced, in the larger retrievals. All six electronic databases were systematically searched in this way and the results for each database are detailed in Table 6. Phase 1 and 2 searches were done by one researcher with oversight from the thesis supervisor.

Table 6. Phase 2 search by individual database

Database	CINAHL
Key words	refugee* and health* and (child* or infant* or baby)
Search in	Abstract
Limits	1/2001-12/2009, peer reviewed, exclude MEDLINE
Retrievals	19
Database	AMI
Key words	refugee* and health* and (child* or infant* or baby)
Search in	Abstract
Limits	2001-2009
Retrievals	18
Database	AcademicOneFile
Key words	refugee* and health* and child* or infant* or baby not (camp* or displace* or detention)
Search in	Abstract
Limits	1/1/2001-31/12/2009, peer reviewed
Retrievals	42
Database	HealthSource Nursing
Key words	refugee* and health* and (child* or infant* or baby) not (camp* or displace* or detention)
Search in	Abstract or author supplied abstract
Limits	1/2001-12/2009, scholarly (peer reviewed,) journals
Retrievals	58
Database	MEDLINE (via CSA)
Key words	refugee* and health* and (child* or infant* or baby) not (camp* or displace* or detention)
Search in	Abstract
Limits	1/2001-12/2009
Retrievals	122
Database	Proquest
Key words	refugee* and health* and (child* or infant* or baby) not (camp* or displace* or detention)
Search in	Abstract
Limits	1/1/2001-31/12/2009, peer reviewed
Retrievals	19

Study selection

The inclusion and exclusion criteria for this review (set out in Table 7) were selected to focus and contain the literature obtained from the database searches to be expressly relevant to the population and context of the research question. Criteria about research design were needed for two reasons. Firstly, peer reviewed or scholarly research was included so the findings of the review would be sufficiently robust that the level of evidence would potentially be credible

enough to inform nurse practice. Secondly, primary research was required in order to use the selected RAPid critical appraisal tool. Study selection was done initially by the first researcher by reading the study abstract and comparing the information with the inclusion and exclusion criteria, with the second researcher then being involved in the decisions regarding the studies inclusion in the review as necessary.

Table 7. Inclusion and exclusion criteria

	Inclusion criteria	Exclusion criteria
Population	A refugee as defined by the UNHCR definition	
	A refugee child who resettles under a family reunification programme	
	A refugee child who is asylum seeking or part of an asylum seeking family	
	An unaccompanied minor refugee	
	All ages child 0-12 years	Youth or adolescent exclusively
	Older aged child if that age is included with younger children in the research population	
Context	Resettlement at any time from arrival in resettlement country	Not resettled, that is displaced, in camps or in immigration detention
Research design	Published in a peer reviewed journal (defined as review of published material by a dedicated review panel before publication in a journal)	
	Scholarly	News articles Editorials Anonymous research
	Primary research	Literature reviews Discussion Expert Opinion

The Phase 2 search obtained 278 studies across the six databases. Duplication of 84 studies was found within and across the six databases, which left 194 studies. The first researcher read the abstracts of the 194 studies retrieved. If there was uncertainty about the reason for exclusion from the review, the full text was obtained and read and the second researcher was involved in the decision regarding the studies inclusion or exclusion in the review. One hundred and forty five studies were excluded from the review at first reading of the abstract. The full text was obtained for the remaining 49 studies and all studies read and assessed against the inclusion/exclusion criteria. Twenty five further studies were excluded as not meeting the inclusion criteria for study design at second reading. Table 8 shows the reasons for exclusion for

all the studies read by abstract or full text and rejected at first or second reading. Further information about excluded studies is in Appendix 3 & 4.

Table 8. Summary table of reasons for exclusion from the study

Reason	Number
Population	88
Context	31
Study design	35
Other	16
Total	170

Twenty four studies were assessed as meeting the inclusion criteria and suitable for critical appraisal using the RAPid critical appraisal tool. The process of this critical appraisal is detailed below.

Critical appraisal

The Tool

The literature retrieved was of varying study designs. A critical appraisal tool that was able to assess different methodologies and research designs was chosen from the Joanna Briggs Institute (JBI) based at the University of Adelaide. The JBI supports the generation, synthesis, transfer and use of evidence evidence-based health care (Pearson, Field, & Jordan, 2007). The JBI has varied critical appraisal tools specifically for the use of an external reviewer and the Rapid Appraisal Protocol Internet Database (RAPid) was selected for this review. This tool enables a reviewer to critically appraise seven types of studies with online standardised data sheets (Joanna Briggs Institute, 2005). The seven study types are:

1. Prognostic that includes predicting the cause, outcomes and frequency of a disease or illness.
2. Risk that is defined as the likelihood of harm.
3. Intervention that is defined as something that is undertaken to address a specified problem or to change a health outcome.
4. Cost that is defined as the effect of cost related to benefit or use of an intervention.
5. Experience that is defined as a study that is qualitative in design.
6. Diagnosis that is, a study that sets out to describe the cause of a problem and the effectiveness of the diagnosis tool is compared to a gold standard.

7. Systematic review of an Intervention that is defined as bringing together numbers of individual research papers on the same topic in a thorough unbiased way.

RAPid is set up specifically to allow novice researchers to critically appraise research articles online, and then submit to the JBI for a second review. When the first and second reviewers agree with the critical content of the analysis, the RAPid is uploaded into RAP library and is available online for anyone to access.

The critical appraisal process

Appraising a study with RAPid involves entering the Joanna Briggs' website, going to the RAPid review section, logging on, and then step by step following the critical appraisal process. The critical appraisal process has three parts. The first part is entering the study details (authors, title, demographic details of the study participants) and then entering a research question, based on the contents of the study, that will direct what study data is extracted in part three (data extraction). The question is important because it needs to be congruent with the RAPid data sheet chosen for the appraisal or the type of data requested will not be appropriate to answer the research question. The second part is completing an assessment of the overall methodological quality of the study. The third part involves answering specific questions about the study data and findings in order to answer the research question entered in part one. Once the appraisal has been done to the initiating reviewer's satisfaction the completed appraisal is submitted electronically to the JBI. The second reviewer at the JBI locates the study then carries out the same process of critical appraisal. If the second reviewer agrees the appraisal is sound, the first reviewer is notified of the satisfactory critical appraisal and the completed critical appraisal (called a RAP sheet) is up loaded into the electronic RAPid library. If the second reviewer does not agree with the first reviewer's appraisal, then feedback is given to the first reviewer about whether to resubmit or explanations given why the study should be excluded from the appraisal.

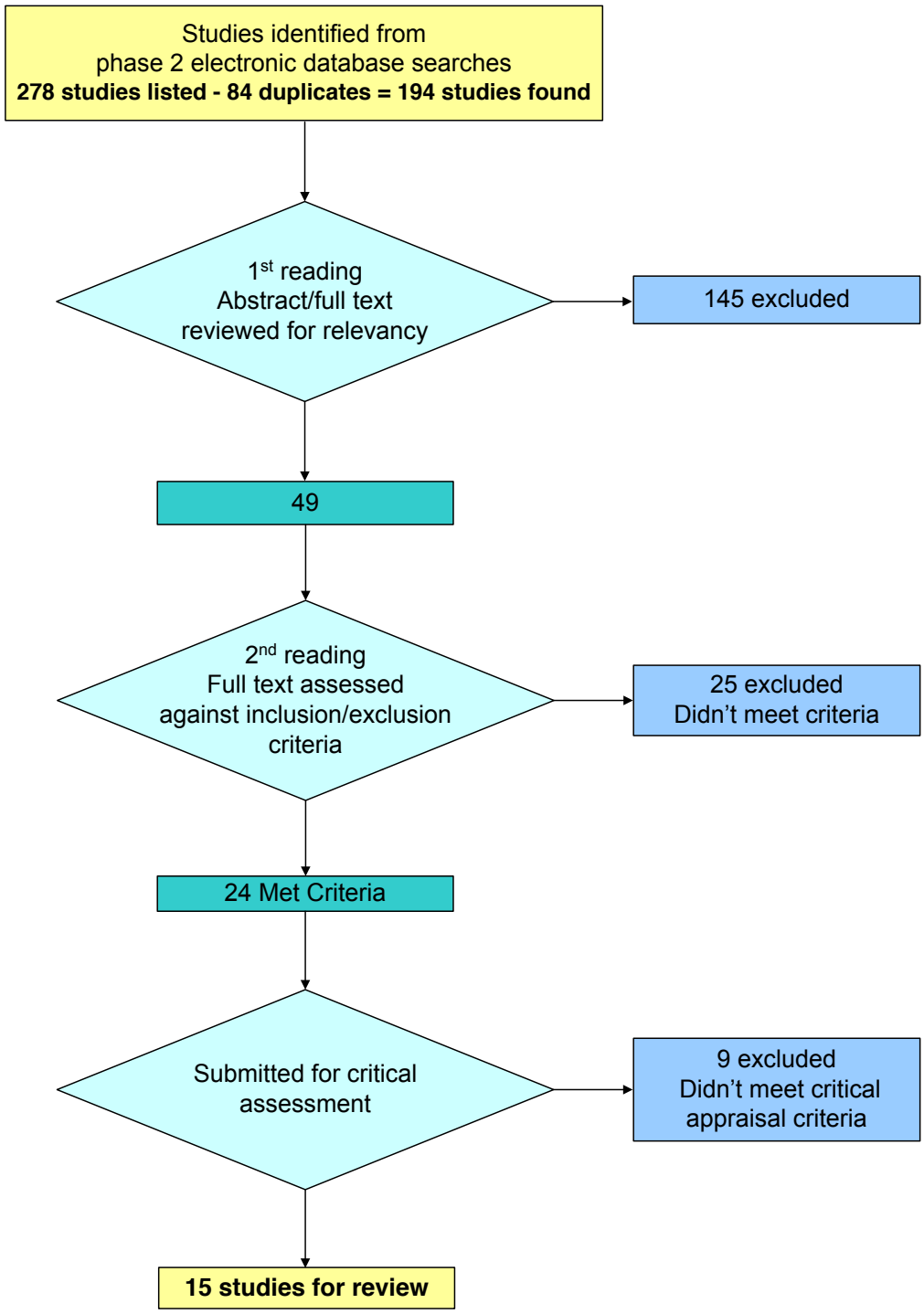
It took 14 months to complete the RAPid critical appraisal process for the 24 studies. They were critically reviewed by the first reviewer and submitted to the JBI and three different reviewers at the JBI worked as the second reviewer. The time for second appraisal was variable from days to months passing between submission by the first reviewer and feedback from the second reviewer. At times the JBI used a third reviewer to support their decision making about a submitted study. At the completion of the critical appraisal process for all the submitted papers, one first reviewer (the first researcher), three second reviewers at the JBI and an unknown

number of third reviewers at the JBI were involved in the critical appraisal process. Of the 24 submitted RAPs, 11 were accepted on first submission and a further three accepted on second submission and one on third submission. Fourteen of the accepted RAPs were submitted using the prognostic RAP and one using the intervention RAP. Nine submitted studies were ultimately declined critical appraisal by JBI reviewers because of issues with study design and RAPid. Eight were declined appraisal due to study type and one, despite being submitted first in February 2010 and subsequently twice more in early 2011, was not reviewed by the second reviewer in time for inclusion in the review pending successful appraisal. The eight studies declined for study design were cross sectional (n=2), prevalence/screening (n=2), intervention (n=2), comparative (n=1), retrospective cohort (n=1). Using RAPid was an iterative process and one of the learning curves was that the research question was very important in the success of the RAPid critical appraisal and the need to reflect the RAPid design chosen. The nine studies are listed in Appendix 2. The difficulties in assessing study design are discussed further at the end of this chapter.

One further point about using RAPid is during appraisal the study can be allocated a "use with caution" by the reviewers to alert others to a methodological issue which may have influenced the findings. Five studies were tagged in this way in this review and this caution is noted in the individual study summary tables.

On completion of the systematic search of the six electronic databases with key words and data limits, the application of the inclusion and exclusion criteria to the retrieved research and the critical appraisal of the included research by at least two reviewers, 15 studies were found to be suitable for this literature review. Figure 2 summarises this process.

Figure 2. Phase 2 search and study selection summary



Analysis and synthesis

In keeping with a systematic review process, the 15 individual studies were summarised in tables to enable clear data extraction from each study and the results analysed for content and meaning. Analysis and synthesis were informed in the narrative tradition and guided by the range of research, comparing and contrasting the key findings, identifying implications for practice and future research. The individual study results could not be combined because of differences in

outcome measurements but where possible individual study results were compared to look for similarities and differences. A level of evidence measure was applied to the findings if possible during synthesis. Following the individual appraisal of each study, it was apparent that, as a whole body of work the studies were clustered in three areas, physical health, psychological health and health services.

Methodological challenges and review modifications

Several methodological challenges evolved for the researchers and are discussed here using the framework offered by the JBI for appraising systematic reviews that was presented in Table 3 (JBIEBNM, 2000, 2001).

Research question

The broad focus of the research question of this review meant the classic PICO format was modified and did not include an intervention or control field. The decision to use a broad question was because of the need for information to guide practice generally.

Literature search

The JBI recommends a three phase search strategy, phase three being a search of the reference lists of the main search. Time and resource constraints as well as the type of research question limited this review to a two phase search of literature published in the six electronic databases.

Critical appraisal

Two main issues evolved in the critical appraisal process. The first was that categorising study design for RAPid was a challenge. Ultimately eight studies met the inclusion criteria as primary research studies but were not included in the review because of the difficulty in accommodating the design to the RAPid format. Study design was often not stated clearly on the individual studies or the methodology was confused. This problem has been articulated previously by Greenhalgh et al. (2005) who found that less than 20% of the 1024 primary studies found for their systematic review were clear about their theoretical base or were very inconsistent in their approach to research design. The prognosis RAP was the most used study type and 14 of the studies were critically assessed using the prognosis RAP and one using an intervention. The JBI reviewers commented during critical appraisal that they were aware of the limits of the JBI RAPid system to easily accommodate some study designs such as prevalence and screening which do not fit easily into any of the current RAP configurations.

The second issue was that five studies had results designated as "use with caution" after RAPid critical assessment. The main reasons for this recommendation were very small sample sizes (n=2), measurement tool difference (n=1) and confounding factors (n=2). The studies met all inclusion criteria for the review (as listed in Table 7 Inclusion and Exclusion Criteria), however, after discussion between the researcher and supervisor and as the research question had a broad focus the studies were not excluded as they each contributed to what can be known as a whole about the health of resettled refugee children. This is a modification of a systematic review process that recommends only robust studies with reliable findings are included in a systematic review of literature.

Synthesis

The 15 studies examined by this review contained substantial amounts of data. Five studies contained data on multiple health issues and the individual summary tables were structured to capture the main results of each study. Across all the literature, little uniformity was found in the variables used to describe the population or the health issues. As several studies covered the same health conditions, this lack of uniformity was problematic for synthesis. For example, there was little uniformity across the studies in measurement parameters and therefore the study results could not be combined. There was very limited uniformity in the way the children were described regarding their ethnic or geographical context before resettlement. The synthesis endeavoured to combine as much of the descriptive information about the children as possible from the study data available and used the category region of origin which, if not stated explicitly, was extrapolated from data describing the population. The way variables were combined during synthesis is explained in the text at the time.

And finally, the findings of this review are also compared and contrasted to New Zealand population data if available (Appendix 5) during synthesis and this is a modification of a standard systematic review process where only the findings of the review are available for comparison with each other. This was an objective of this review and was done to provide a useful contrast between the population health of resettled refugee children and other New Zealand children in order to inform primary health care nursing in New Zealand about the health needs of refugee children in resettlement.

The findings of the 15 RAP critically assessed and accepted papers of this modified systematic review of the literature are examined next.

Chapter 4: Findings

This chapter commences with an overview of the 15 studies describing the characteristics of the children studied, where the research was done, the range of research and then compares the study population with what is known about the refugee children who entered New Zealand 1999-2008. The chapter then presents a summary of each of the studies in table format. The table summaries are clustered in three areas of health: physical, psychological and health services. There were nine papers with a physical health focus, four with a psychological health focus and two with a health service focus. The findings from the three areas are initially presented in their order of publication date and synthesised separately. A summary list of the studies in the review by authors and year of publication in each area of health is tabled below.

Table 9. List of research studies reviewed

Area of health	Authors/year of publication
Physical health	Geltman, Radin, Zhang, Cochran, & Meyers, 2001 Cote, Geltman, Nunn, Lituri, Henshaw & Garcia, 2004 Shorter, Makone, & Elliott, 2006 Wishart, Reeve, & Grant, 2007 Cherian, Forbes, Sanfilippo, Cook, & Burgner, 2008 Plotinsky, Straetemans, Wong, Brown, Dignam, Flanders, et al., 2008 Cherian, Forbes, Cook, Sanfilippo, Kenna, Swinkels et al., 2008 Sheik, Pal, Wang, MacIntyre, Wood, Isaacs et al., 2009 Raman, Wood, Webber, Taylor, & Isaacs, 2009
Psychological health	Montgomery & Foldspang, 2001 Fazel & Stein, 2003 Heptinstall, Sethna, & Taylor, 2004 Fazel, Doll, & Stein, 2009
Health services	Cooke, Murray, Carapetis, Rice, Muholland, Skull, 2004 Birman, Frazier, Everson, Buwalda, & Cappella, 2008

Overview of the research

In presenting the research overview the individual studies are only specifically referred to in order to highlight where a study is different. Even though one study (Birman et al., 2008) included refugees aged up to 21 years old the study population is referred to generally as children for ease of understanding. The two studies lead by Cherian in 2008 have different co-authors and are referred to in the findings as Cherian et al. 2008a for the study by Cherian, Forbes, Sanfilippo, Cook and Burgner, 2008 and Cherian et al. 2008b for the study by Cherian, Forbes, Cook, Sanfilippo, Kemna, Swinkels and Burgner, 2008.

Study design

Eleven studies were designed to primarily describe the population for the prevalence [epidemiological measure of how commonly a condition occurs in a population (Roe & Doll, 2000)] of infectious or deficiency diseases by retrospective data collection or by screening. The four studies that were not mainly concerned with screening or prevalence were a single case report (Shorter et al., 2006), an epidemiological review with a qualitative component on health service use (Cooke et al., 2004), a longitudinal study (Birman et al., 2008), and an intervention study (Fazel et al., 2009).

The population

The 15 studies sampled a population of 4315 refugee children aged 0–21 years. The children were described by age in all studies, by sex in most (n=13) and all by at least one classification to capture something about the children's background or where they had come from, variously named as region of origin (n=9), country of origin (n=6), region of birth (n=2), country of birth (n=4), ethnicity (n=4), and race (n=1).

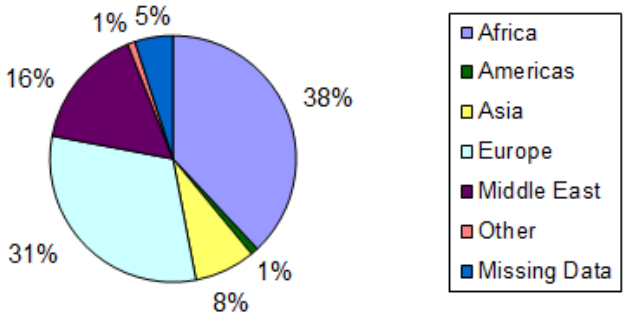
The actual number of children included in the population aged 12 years or below (≤ 12 years) is not known as individual study data was not specific enough to extract this information. However, by combining the data available from the eight studies that quantified ages in bands 12 years or below and the one case study, a minimum of 1748 children (41%) aged ≤ 12 years were included in the total study population.

In the 13 studies that articulated sex distribution, the inclusion of females in the sample populations ranged from 32%-53% but the median percentage of 48.5% for females indicates overall even distribution. Sex was not reported in two studies (Birman, et al., 2008; Cooke, et al., 2004) that looked at health service use and effectiveness.

Six classifications (region of origin, country of origin, region of birth, country of birth, ethnicity, and race) were used as variables to capture something of the culture and context of the child pre resettlement. Five studies used more than one category but in each of these studies not all categories had complete data sets. The most comprehensive were for region of origin or country of origin (n=9). This review combined the data from the six classifications into five regions already used in the studies. These were Africa, the Americas, Asia, Europe, and the Middle East. Ninety four percent of children could be combined in this way and the remaining 6% were either

specified as other or unknown numbers (as one study specified regions of origin but not the numbers of children in each region). Figure 3 shows the different proportions of refugee children from each region and that most children came from Africa, Europe or the Middle East.

Figure 3. Proportion of children in the review by region of origin



Resettlement

The research was conducted in five resettlement countries (Table 10). One study was conducted in New Zealand. All countries offer regular UNHCR mandated resettlement programmes. The countries are broadly comparable to New Zealand in that they have a predominately European population. The health services in each country differ in the level of publicly funded health services that are available for refugee children, for example New Zealand provides six weeks of comprehensive resettlement orientation on arrival for all quota refugees but Australia does not (Zwi, et al., 2007).

Table 10. Number of studies in each resettlement country

Resettlement country	No. of studies
Australia	6
USA	4
England	3
New Zealand	1
Denmark	1

Twelve studies reported the research timing in relationship to the time since arrival for resettlement. Of these seven were conducted on arrival or within the first six months. Two (Cherian et al., 2008a & Sheik et al., 2009) described the timing as newly arrived but did not specify further. One study (Raman et al., 2009) lacked data on the arrival dates of all children

but said that for the children who had dates, 90% were seen in the first year after arrival. Two (Cooke et al., 2004; Heptinstall et al., 2004) reported a range of time since arrival for resettlement, with a median time of 7.9 months for one and a mean time of 2.5 years for the other study. Three studies (Birman, et al., 2008; Fazel, et al., 2009; Fazel & Stein, 2003) did not report the research timing but clearly stated that the studies were done after arrival for resettlement.

Health area

The area of health was identified by looking at the research focus in relationship to the refugee child. This was clear in 13 of the studies but in two (Birman, et al., 2008; Raman, et al., 2009) more than one area was identified. The study by Raman et al. focused on physical health and health service use but the results mainly described physical health. This study is tabled and included in physical health while being noted in the synthesis of health services. The study by Birman et al. looked at psychological health in relationship to health service use. The focus for these authors was to investigate the functionality of the refugee mental health service rather than just quantify psychological illness and, after discussion between the researchers, was tabled in health service use as well as the psychological prevalence data being included in the synthesis of psychological health research. Nine studies focused in the area of physical health, four on psychological health and two on health services.

The number of children sampled in each area of health varied as a proportion of the total number of children sampled. The nine studies on physical health involved 82% of children sampled. The four studies on psychological health involved 11% of the children and the two on health services involved 7% of the total children sampled. The proportions of children from different regions included in each area of health also varied. Most children sampled in the physical health research were from Africa (39%) or Europe (36%). Most children sampled in the psychological health research were from the Middle East (65%) and most children sampled in the health service research were from Africa (83%).

Review population and New Zealand child refugee comparisons

A comparison of the study population with the refugee children who resettled in New Zealand shows similarities and differences in the children's regions of origin. Both populations were of diverse origins and contained a similar proportion of children from the Middle East. The main difference was in the proportion of refugee children from Asia and Europe in each population.

The most children came from Asia in the New Zealand population and the most children came from Africa and Europe in the study population (Table 11).

Table 11. Review population and New Zealand quota refugees 1999-2008

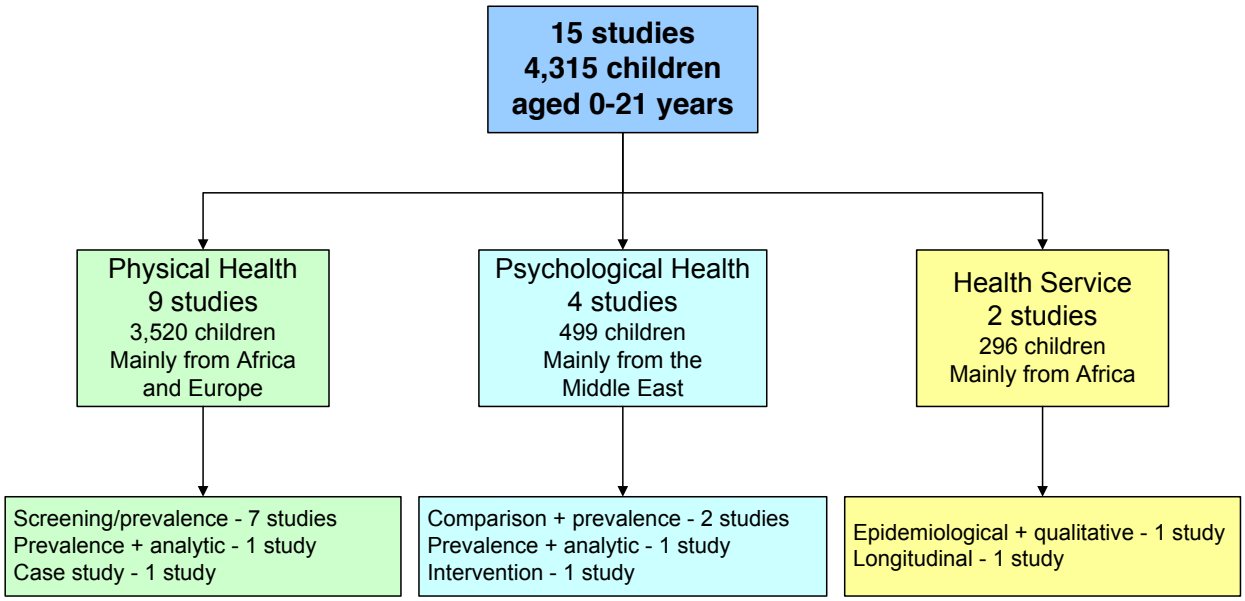
Region of origin	Study population (n=4315) Age 0-21 years	Quota refugee (n=2889)* Age 0-14 years
Africa	1652 (38%)	637 (22%)
Americas	53 (1%)	(0%)
Asia	355 (8%)	1014 (35%)
Europe	1357 (31%)	129 (4%)
Middle East	654 (16%)	481 (17%)
Other/stateless/missing data	244 (6%)	631 (22%)

*Source: Quazi A. (2009). *Quota refugees in NZ: Approvals and movements (1999-2008)* Wellington: Department of Labour

Age is more difficult to compare, as data was not available for the children who resettled in New Zealand except in the age band 0-14 years (Quazi, 2009). In the study population, a minimum of 1748 children aged ≤ 12 years were included. While the proportions of female and male children in the study population were about equal, more females (58%) were in the New Zealand population (Quazi). The significance of this is known only to a limited degree in that some prevalence rates varied according to sex by population.

A summary of the broad characteristics of the research of this review described above is illustrated in Figure 4.

Figure 4. Summary of research studies in review



The next section of this chapter presents the individual studies summarised in table format. The summaries are clustered in the three areas of health, physical, psychological and health service and are each analysed and synthesised separately starting with physical health (Table 12). Following the individual summaries of each area an overview of the research is given then each study is discussed. Where comparable the results are compared and contrasted followed by a discussion on the content and meaning of the research in relationship to the research question. The following fields are presented in each table to record the main study information.

- Author/date of publication/study title/research country
- Research design/research focus
- Population (number, age, sex, country of birth/country of origin/ethnicity/region of origin, comparison group (number, age, sex, country of birth/country of origin/ethnicity/region of origin)
- Location of research/ time of research/ when in resettlement the research was conducted
- Main findings
- Strengths and limits of the study

When reading the tables the following notes apply:

- nr = not reported
- all fractions are rounded and statistical symbols such as % for percentage are routinely used.
- Where the number of children sampled is not the whole population, the number of children is recorded as a proportion of the number sampled, e.g. the number of children sampled for anaemia was 1247 of which 153 were anaemic would be recorded as 153/1247, even though the study population is 1825.

Summary tables physical health

Table 12. Summary tables physical health research 2001-2009

Author/Date Title/Country	Research design/Focus	Population	Location/Date resettlement point	Main findings	Strengths Limits
Geltman et al. (2001) Growth status and related medical conditions among refugee children in Massachusetts USA	Screening Multiple Variables Anaemia Dental Intestinal Parasites Tb Weight Height	Number 1825 Age < 1yr 62 (3%) 1-5yrs 456 (25%) 6-9yrs 438 (24%) 10-17yrs 869 (48%) Sex Female 876 (48%) Country of Birth nr Country of Origin nr Ethnicity nr Region of Origin Africa 276 (15%) Americas 38 (2%) East Asia 261 (14%) Near East* 53 (3%) Russia 852 (47%) Yugoslavia 345 (19%)	Refugee and Immigrant Health Programme Dept Public Health Massachusetts USA 1995-1998 Screened within 90 days of arrival.	Anaemia (Hb < age/sex 5% cut off value)** Overall prevalence 153/1247 (12%) Africa 31% Overall prevalence < 2yrs 28% Africa < 2yrs 50% Overall prevalence boys 12-15yrs 21% Dental (mainly caries)*** Overall prevalence 1063/1702 (62%) Intestinal parasites (pathogenic)*** Overall prevalence 344/1642 (21%) Tb (PPD with induration ≥ 10 mm)*** Overall prevalence 440/1737 (25%) Aged <1yr 7/54 (13% Aged 1-5yrs 62/431 (14%) Aged 6-9yrs 98/427 (23%) Aged >9yrs 273/825 (33%) Near East 5/53 (9%) Overweight (weight for height) Overall prevalence 66/964 (7%) Underweight (weight for height) Overall prevalence 23/964 (2%)	*Authors define as Iraqi, Kurdish, Iranian children, (combined for this review in Middle East). ** Prevalence varied according to age band. *** All regions prevalence increased with age band. Large study. The population represents 81% of total cohort refugee children who arrived during the study period. 51% Somali children had 1/1/ as a birth date that may invalidate the age/growth data.

Author/Date Title/Country	Research design/Focus	Population	Location/Date resettlement point	Main findings	Strengths Limits
Cote et al. (2004) Dental caries of refugee children compared with US children USA	Screening Comparison Oral health assessment of the dental health of newly arrived refugee children compared to US children.	Number 224 Age < 6yrs 45 (20%) 6-12yrs 79 (35%) ≥ 12yrs 100 (45%) Sex Female 118 (53%) Country of Birth nr Country of Origin* Somalia 31 (13%) Liberia 26 (12%) Sudan 22 (9%) Afghanistan/Pakistan 17 (7%) Ethnicity nr Race White 87 (39%) Black 129 (57%) Other 8 (4%) Region of Origin Africa 121 (54%) Eastern Europe 59 (27%) Other** Middle East 8 (4%) Asia 17 (7%) Not specified 19 (8%) Comparison group 11,296 Age 2-16.9yrs Sex nr Country of Birth nr Country of Origin USA	Massachusetts USA Jan/2001-Sept/2002 Screened within 90 days of arrival	Untreated caries (Prevalence) Refugee 109 (49%) USA 5572 (23%) Africa 42 (35%) Eastern Europe 45 (76%) Other 22 (50%) No caries experience Africa 75 (62%) Eastern Europe 12 (20%) Other 22 (50%) ≥ 10 carious surfaces Africa 5 (4%) Eastern Europe 23 (39%) Other 5 (44%) Urgent treatment required Africa 6 (5%) Eastern Europe 19 (32%) Other 6 (14%)	*Data not complete. ** Mid East/Asia/Not specified combined by authors into Other category. Large difference in size of the comparison group of USA children. JBI RAPid assessment indicates use results with caution due to the difference in screening tool (USA visual + tactile, refugee visual only) although previous studies found them comparable.

Author/Date Title/Country	Research design/Focus	Population	Location/Date resettlement point	Main findings	Strengths Limits
Shorter et al. (2006) Fever and urticaria in an African refugee Australia	Individual Case report Discussion and diagnosis of illness after child presented to a Sydney Hospital with fever and rash	Number 1 Age 11yrs Sex boy Country of Birth Democratic Republic of Congo 1 (100%) Country of Origin Last eight years in a refugee camp in Tanzania 1(100%) Ethnicity nr Region Africa 1 (100%)	Sydney Australia nr Four months after resettlement arrival	Family were screened soon after arrival. Both parents and 4/5 children were diagnosed with schistosomiasis and prescribed praziquantel. The boy's symptoms started 2 hours after his first dose. Presumptive diagnosis of an acute reaction to the praziquantel made. A discussion on schistosomiasis compared to acute reaction to treatment with praziquantel that are common if the parasite infestation is marked in a person.	Personalised the high prevalence rates of schistosomiasis found in some groups of refugee children (39% in children from central Africa Sheik et al. 2009)

Author/Date Title/Country	Research design/Focus	Population	Location/Date resettlement point	Main findings	Strengths Limits
Wishart et al. (2007) Vitamin D deficiency in a multinational refugee population New Zealand	Screening Prevalence of Vitamin D blood levels as measured by serum 25-hydroxyvitamin D in refugees on arrival for resettlement.	Number 433 (aged < 17yrs total pop 875) Age 0-5yrs 102 (24%) 6-10yrs 148 (34%) 11-16yrs 183 (42%) Sex Female 194 (45%) Country of Birth nr Country of Origin nr Ethnicity Afghani 234 (63%) Burundian 40 (20%) Djiboutian 15 (40%) Ethiopian 26 (56%) Iranian 7 (86%) Iraqi 23 (78%) Kurdish 5 (40%) Somali 28 (46%) Sudanese 33 (3%) Yemeni 3 (33%) Unknown 19 (4%) Region of Origin nr	Mangere Refugee Reception Centre Auckland New Zealand May/2004 – May/2005 Screened within days of arrival	Prevalence/age* insufficient vit D (25-50 nmol/L) 0-5yrs 24/92 (26%) 6-10yrs 65/147 (44%) 11-16yrs 84/181 (46%) Prevalence/age* deficient vit D(<25 nmol/L) 0-5yrs 1/92 (1%) 6-10yrs 5/147 (3%) 11-16yrs 42/181 (23%) Prevalence/sex* insufficient vit D 0-16yrs female 88/188 (47%) 0-16yrs male 85/232 (37%) Prevalence/sex* deficient vit D 0-16yrs female 42/188 (22%) 0-16yrs male 5/232 (2%) Prevalence/ethnicity (insuff/def) 0-16yrs Afghani 148/234 (63%) Burundian 8/40 (20%) Djiboutian 6/15 (40%) Ethiopian 15/26 (56%) Iranian 6/7 (86%) Iraqi 18/23 (78%) Kurdish 2/5 (40%) Somali 13/28 (46%) Sudanese 1/33 (3%) Yemeni 1/3 (33%) Unknown 19 (4%)	*Missing data 13/433 (3%). New Zealand study Good age band analysis. Small number of babies and this an age group for which the vit D status of the mother is important. Variables such as sun exposure, clothing not accounted for.

Author/Date Title/Country	Research design/Focus	Population	Location/Date resettlement point	Main findings	Strengths Limits
Cherian et al. (2008a) The Epidemiology of Helicobacter pylori infection in African refugee children resettled in Australia Australia	Screening Prevalence of H Pylori by monoclonal faecal antigen enzyme immunoassay testing (MFAT) and epidemiological associations for infection.	Number 193 Age < 5yrs 51/182 (28%) 5-10yrs 67/182 (37%) > 10yrs 64 /182 (35%) Sex Female 89 (49%) Country of birth Burundi 14 (7%) Dem Rep Congo 13 (7%) Kenya 21 (11%) Sudan 54 (28%) Tanzania 40 (21%) Other 51 (26%) Country of origin (Transit)* Egypt 28 (15%) Guinea 26 (13%) Kenya 33 (17%) Sudan 19 (10%) Tanzania 64 (33%) Other 23 (12%) Ethnicity Burundian 55 (29%) Congolese 22 (11%) Eritrean 20 (10%) Liberian 23 (12%) Sudanese 66 (34%) Sierra Leonian 7 (4%) Region Africa 193 (100%)	Migrant Health Unit Perth Australia Feb-Nov 2006 Newly arrived exact time not reported	Total Prevalence (MFAT Positive) 182 children tested** 149 (82%) Prevalence /age < 5yrs 35/51 (69%) 5-10yrs 56/67 (84%) > 10yrs 58/64 (91%) The odds of infection with H Pylori increased 17% per year of age Prevalence/country of origin (Transit) Egypt 19/24 (79%) Guinea 23/26 (88%) Kenya 31/32 (97%) Sudan 16/19 (84%) Tanzania 45/61 (74%) Other 15/20 (75%) Prevalence/ethnicity Burundian 37/52 (71%) Congolese 61/19 (84%) Eritean 17/22 (85%) Liberian 19/23 (85%) Sierra Leonian 6/7 (86%) Sudanese 54/61 (89%) Premigration antimalaria Rx*** No/+H pylori 91/103(88%) Yes/+H pylori 58/79 (73%) (OR 0.31 95% CI (0.14-0.72) p 0.006)	* Time in transit country range 2 years-7 years. **Missing data on 11 children. *** Authors note this is an unexpected finding. Authors note that there is no gold standard for diagnosis for H Pylori.

Author/Date Title/Country	Research design/Focus	Population	Location/Date resettlement point	Main findings	Strengths Limits
Plotinsky et al. (2008) Risk factors for elevated blood lead levels among African refugee children in New Hampshire, 2004. USA	Screening Comparative Prevalence of elevated blood lead and to identify risk factors elevated blood lead in resettled refugee children	Number 93 Age < 2yrs 13 (14%) 2-5yrs 39 (42%) 6-15yrs 41 (44%) Sex Female 48 (52%) Country of Birth Burundi 5 (5%) Cote d'Ivoire 25 (25%) Dem Rep Congo 3 (3%) Egypt/Sierra Leone 4 (4%) Kenya 44 (44%) Somalia 3 (3%) Sudan 4 (4%) Tanzania 5 (5%) Country of Origin Burundi 9 (10%) Dem Rep Congo 3 (3%) Liberia 27 (29%) Somali 47 (51%) Sudan 6 (6%) Tanzania 1 (1%) Ethnicity nr Region nr Comparison group Number 2076 Age/sex nr Country of Origin USA	Manchester New Hampshire USA Oct 2003-Sept 2004 Screened twice: 1. on arrival (BBL1) 2. 3-6 months later (BLL2)	Prevalence of elevated blood lead level (BLL) refugee (≥ 10ug/dl) BLL1 22 (24%) BLL2 36 (39%) BLL1 & BLL2 14 (15%) BLL1 only 8 (9%) BLL2 only 22 (24%) BLL1 & BLL2 never elevated 56 (53%) Comparison refugee/non refugee (adjusted mean) < 2yrs refugee 1.8 higher p <0.0001 2-6yrs refugee 2.5 higher p <0.0001 > 6yrs refugee 3.6 higher p <0.05 Significant risk factors elevated BBL2 Liberian nationality p = 0.002 Born in refugee camp p = 0.013 Summer testing p = 0.0001	All African children. Pop described by both country of origin and country of birth. Authors note that of the children with Liberian nationality none were born in Liberia

Author/Date Title/Country	Research design/Focus	Population	Location/Date resettlement point	Main findings	Strengths Limits
Cherian et al. (2008b) An Insight into the relationships between hepcidin, anaemia, infections and inflammatory cytokines in paediatric refugees: A cross sectional study Australia	Cross-sectional Prevalence Analytic Measure anaemia, iron status, and analyse for a link between specific biochemical markers urinary hepcidin, inflammatory cytokines and infection.	Number 181 Age < 16yrs (mean 8 SD 4.3) Sex Female 89 49% Country of Birth nr Country of Origin nr Ethnicity Burundian 53 (29%) Liberian 23 (13%) Sudanese 61 (34%) Other 45 (25%) Region of origin nr	Perth Australia Feb –Nov 2006 Median time of 6 weeks since arrival	Prevalence Iron Deficiency Anaemia (Hb < age and gender norms) Overall prevalence 24 (13%) Prevalence Infectious Illness H Pylori (+ MFAT) 148 (82%) Helminths (+ serology or stool) 76 (42%) Significant association biochemical markers + anaemia/infection* Hepcidin + Iron deficiency (> 1 abnormal blood parameter) p 0.002 Hepcidin + Iron deficiency anaemia (> 1 abnormal blood parameter) p 0.001 No other significant association found between intestinal infections, H Pylori and the studied parameters	Same population as the other Cherian study. *Unclear of significance of this research which authors describe as formative in vivo.

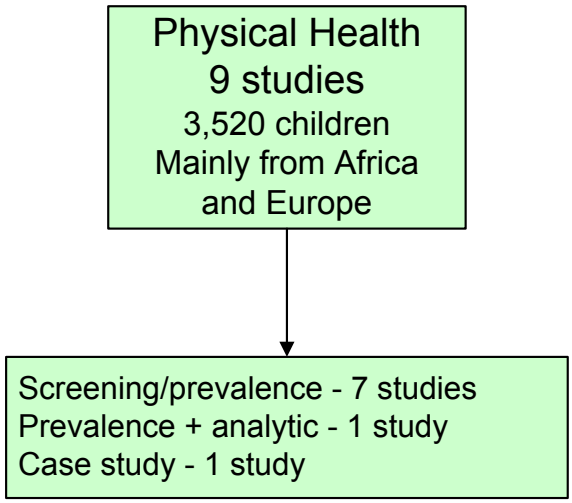
Author/Date Title/Country	Research design/Focus	Population	Location/Date resettlement point	Main findings	Strengths Limits
Raman et al. (2009) Matching health needs of refugee children with services: how big is the gap? Australia	Prevalence Epidemiological To collate epidemiological and clinical data on the health of child refugees who used three special refugee health clinics in NSW to assess health needs and models of health care Compared number of children seen at these 3 clinics to number of refugee children who arrived in NSW in 2005	Number 331 Age < 14 years Sex Female 162 (49%) Country of Birth nr Country of Origin nr Ethnicity nr Region of Origin* Africa (192) 58%	3 Refugee Health Clinics New South Wales Australia 2005 Authors report that of those with known dates of arrival, 90% were seen within 12 months of arrival. However not reported what % had known dates of arrival.	Overall disease prevalence* (in children screened) Anaemia (unknown parameters) 62/250 (25%) Schistosomiasis (serology) 64/239 (27%) Low Vit D (unknown parameters) 28/139 (20%) Tb (mantoux induration >10mm)** 25/98 (25%) Active Tb (mantoux induration >10mm) & CXR positive) 5/98 (5%) No. refugee children arrived NSW aged < 14yrs in 2005 (n = 1557) No. refugee children aged < 14yrs seen at 3 special refugee clinics in 2005 (n = 331) Proportion children seen in special clinics compared to total number of arrivals 331/1557 (21%) Authors conclude that 1/5 children seen in a special refugee clinic were asymptomatic. Routine comprehensive screening was not done in the 3 clinics yet high rates of health issues found.	*Able to be collated from data available for 192/331 children only. ** Only children from one clinic tested for Tb. Limited generalisability from incomplete data sets.

Author/Date Title/Country	Research design/Focus	Population	Location/Date resettlement point	Main findings	Strengths Limits
Sheik et al. (2009) The epidemiology of health conditions of newly arrived refugee children: A review of patients attending a specialist health clinic in Sydney Australia	Prevalence Epidemiological Prevalence of common diseases found in refugee children by region of birth to identify health needs	Number 239 Age 0-7yrs 87 (36%) 8-12yrs 107 (45%) 13-17yrs 45 (19%) Sex Female 127 (53%) Country of Birth nr Country of Origin nr Ethnicity nr Region of Birth Asia 37 (16%) Central Africa 46 (19%) East Africa 91 (38%) West Africa 45 (19%) Middle East 20 (8%)	Sydney Australia May/2005 – Dec/2006 Described as newly arrived. All children arrived in Australia 2003-2006 therefore time in resettlement Unknown range.	Prevalence by Region of Birth* Anaemia (not defined) Asia 2/37 (5%) Africa 33/182 (18%) Middle East 2/20 (10%) Low Ferritin (< 15ug/L) Asia 3/28 (11%) Africa 33/168 (20%) Middle East 0/20 (0%) Tb (mantoux induration > 10mm)** Overall prevalence 72/219 (33%) Tb (mantoux induration ≥ 15mm) Overall prevalence 51/219 (24%) Middle East*** 10/15 (67%) Active Tb (unknown criteria)**** (n=4) Schistosomiasis (antibody +) Asia 0/22 (0%) Central Africa 17/44 (39%) East Africa 5/82 (6%) West Africa 15/42(36%) Middle East 0/17 (0%) Vitamin D deficiency (< 50 nmol/L) Asia 5/10 (50%) Central Africa 13/26 (50%) East Africa 70/97***(72%) West Africa 14/36 (39%) Middle East 27/41***(66%)	*Not all children screened. ** No further data given. *** Highest prevalence reported. **** Authors state lymphadenitis n =2, pulmonary n=1, gastric n=1. No further data. **** Number above original study population number. Sample 10% of possible refugee children/year. Small numbers in sub groups.

Synthesised findings of physical health

Nine studies focused on aspects of the physical health of refugee children (Figure 5). A total of 3520 children were included. The age range was 0-17 years. By combining the numbers of children from the six studies that quantified age in bands and the one case report, 1695 children (48%) were aged ≤ 12 years.

Figure 5. Summary of physical health research



In the eight studies that reported sex distribution, female and male children were balanced overall with the range of females between 45%-53%. The backgrounds of origin of the children were mainly African or European. Most studies had the majority or exclusively African populations and few children from Asia were sampled. The research was conducted in Australia (n=5), USA (n=3) and New Zealand (n=1). The most common time in resettlement the research was conducted was within three months of arrival (n=5) or between 4-12 months after arrival (n=3). One study (Sheik et al., 2009) reported children as newly arrived. However, comparing the arrival dates of these refugee children to Australia (2003-2006) to the study period (May 2005 –December 2006) there was a possible range of three years.

Eight studies focused on describing and quantifying disease prevalence in refugee children in the first year of resettlement. Two studies (Cherian et al., 20008a, 2008b) sampled the same population but the focus and reporting of the two studies was different with one (Cherian et al., 2008a) focusing on H pylori prevalence and the other (Cherian et al., 2008b) analysed

biochemical markers for associations with disease. The other study (Shorter et al., 2006) included in physical health was an individual case report.

The study results of the prevalence of vitamin D deficiency could be combined but generally, study results could not be combined. The individual studies measured and described health outcomes differently or did not define the measurement parameters. However, it is useful to compare results despite this, as the measures used are common and understood by clinicians.

Eight health outcomes identified by data extracted from individual summary tables are presented and synthesised next in alphabetical order and the relevant studies presented in order of publication. Where a study is referred to more than once, it is discussed in detail the first time and subsequently the relevant outcomes are described only. Where possible the findings are contextualised by comparison with what is known about the health outcome from a population perspective in New Zealand. The studies cited for the comparison are described by population and measurement in the text as part of the synthesis of the relevant outcome. This comparison was done at this point to emphasise the similarities and differences with the New Zealand population. These comparisons are tabled in Appendix 5.

Anaemia

Four studies reported prevalence for anaemia and one of these (Sheik et al., 2009) also for low ferritin in 1917 refugee children from a variety of regions and ages. The measurement parameters and definitions varied across the studies and precluded combining individual study results.

Geltman et al. (2001) screened 1247 refugee children from diverse regions aged 0-17 years resettled in the USA. The screening was conducted within 90 days of arrival. The outcome was anaemia defined as an Hb < age/sex 5% cut off value. The total prevalence for anaemia was 12%. The children were described by age and region of origin and there was considerable difference in subgroups of children. However, the size of the subgroups was not stated and this limits the results. For example, children from Africa had a rate of 31% (n = not stated) and of those, children under two years had a rate of 50% (n = not stated). A limitation of the study is that 151 (51%) of the Somali children had a birth date of 1 January. This date is commonly given to refugee children who do not have a definite birth date (Benson & Williams, 2008). This limits the validity of the age specific prevalence for African children.

Cherian et al. (2008b) screened 181 African refugee children aged < 16 years after arrival in Australia. The screening was conducted a median of 6 weeks after arrival. The outcome was iron deficiency anaemia defined as haemoglobin less than age and gender norms. A prevalence rate of 13% was found. The study was mainly focused on describing the relationship between serological markers and no further analysis was done on anaemia.

Raman et al. (2009) collected epidemiological data on the screening of 250 refugee children (of which at least 58% were African) aged < 14 years in Australia. The screening was conducted mostly within 12 months of arrival. The outcome tested was anaemia and a prevalence rate of 25% was found. Study limits were that measurement parameters were not stated and as the population was not fully described the applicability of the results to other groups of refugee children is not known.

Sheik et al. (2009) collected epidemiological data on the screening of 239 mainly African (76%) refugee children aged 0-17 years in Australia. The refugees were described as newly arrived but the range of time is not stated. One outcome was anaemia but the measurement parameter was not defined. The rate of anaemia was 15% in the whole population but 5% (n=37) in children born in Asia compared with 18% (n=182) for children born in Africa. A second outcome was low iron stores defined as a blood ferritin of < 15ug/L. An overall prevalence rate of 17% was found in 216 children with variation between 20% (n=168) for African children and 0% (n=20) for Middle Eastern children. Small numbers in subgroups of children indicates the subgroups results must be used with caution.

The universality of increased prevalence rates for anaemia (range 12-25%) across the four studies, lends weight to a finding of prevalence of anaemia in refugee children as a population in early resettlement. The one finding of 17% low ferritin had a clear measurement parameter that enables comparisons to be made by clinicians. These results are particularly applicable to children from Africa as they were the main population of three studies. Comparisons of the total prevalence rates with subgroups of children show that children from Africa were more likely to be anaemic or low in ferritin than children from other regions.

The New Zealand comparative data is taken from the 2002 *National Children's Nutritional Survey* (Ministry of Health, 2003), a cross-sectional population survey that sampled 3276

children aged 5-14 years using dietary recall, anthropometric measurements and blood and urine samples to ascertain dietary intake and nutritional status. A comparison between the New Zealand data and the review findings is limited by the measurement and definition uncertainties and differences in the review. The rates reported by the survey note that New Zealand children aged 5-14 years had a rate of 5.6% for anaemia (defined as Hb < 115 for 5-9 years and Hb < 119 for 8-11 years). However this rate of 5.6% is 2-4 times lower than the 12-25% found in this review and indicates that refugee children as a population are at least twice as likely to be anaemic in early resettlement than their New Zealand counterparts. The prevalence of low ferritin in the New Zealand child population was not found so a comparison of the study finding of low ferritin with New Zealand data was not done.

JBI level of evidence of the prevalence of anaemia in 1917 refugee children is Level 3.2 evidence from three cohort studies. JBI level of evidence for low ferritin in refugee children is Level 3.3 evidence from 1 cohort study.

Dental health

Two studies reported on the prevalence of dental disease in 1926 refugee children. There was a measurement tool and size difference between the refugee children and the comparison group in one study which limits the comparisons made between refugee and non-refugee children.

Geltman et al. (2001) screened 1702 refugee children within 90 days of arrival in the USA. The outcome was dental health problems and the measurement tool was visual inspection. A prevalence of 62% for a dental problem, mainly caries was found.

Cotes et al. (2004) screened 224 refugee children mainly African aged 0-18 years within 90 days of arrival in the USA and compared their dental health with 11296 children resident in the USA. The study found a total prevalence for untreated caries of 49% in refugee children compared to 23% in the USA cohort sample. Within the subset of refugee children, African children had less caries with a rate of 38% for any experience of caries, compared to refugee children from Eastern Europe for whom the rate was 80%. The study findings were limited by the difference in size in the comparison group compared to the sample group and the difference in screening tool (USA visual & tactile, refugee visual only) although previous studies found them comparable. For this reason RAPid assessment indicated to use the results with caution. However, both

studies found at least double the rate of untreated dental problems than the USA comparison group.

The New Zealand comparative data on the prevalence of caries in New Zealand children was reported by the *New Zealand Oral Health Survey* (Ministry of Health, 2010a). This survey sampled 4241 people including 2620 children aged 0-14 years firstly with a survey and then an oral dental examination. The actual number of children who had an oral examination is not stated but the authors report a response rate of between 52-61% for ages 0-17 years. Of the children aged 2-17 years who had an oral dental examination, 50% had experience of caries. A comparison between the two populations is limited due to unknown measurement differences. That is, both the studies included in the review had as the outcome measure untreated dental problems, while the New Zealand study does not say if the caries reported on is caries experience overall or untreated caries alone.

The level of evidence of the prevalence of dental disease generally in refugee children from the screening of 1926 children is JBI Level 3.2, two cohort studies.

Growth

One study (Geltman et al., 2001) measured growth in 964 refugee children within 90 days of arrival in the USA. Weight for height measurements found an overall prevalence of 7% overweight and 2% underweight. There were variations depending on the age and region of origin of the child. The trend was for children from Europe towards being at risk of overweight with children from the former Yugoslavia and Russia 15% (n=345) and 14% (n=261) respectively at risk of overweight while only 8% (n=531) of the children from developing countries were at risk of being overweight.

The New Zealand comparative data on growth is taken from the 2002 *National Children's Nutritional Survey* (Ministry of Health, 2003). A limited comparison about body size generally, can be made from New Zealand data about growth of New Zealand children aged 5-14 years. However, the definitions are different to the ones used in the review findings. Overweight and obese (defined as international standards) were 21.3% of children overweight and 9.8% obese. Therefore the comparisons between the two populations for rates of children who are overweight are very limited due to unknown definition differences. No data were found on underweight children in New Zealand.

The level of evidence for growth outside normal parameters in this group of 964 refugee children is JBI Level 4, 1 cohort study.

Helicobacter pylori

Two studies (Cherian et al., 2008a, 2008b) looked at the prevalence of Helicobacter pylori (H pylori) but used the same study population. The original study (Cherian et al., 2008a) only is examined here because the results of that study on the prevalence of H pylori are used by the second study. Cherian et al. (2008a) reports on the prevalence of a positive stool sample for H. pylori in 182 African children aged < 16 years in Australia and tested when newly arrived but not defined further. The total prevalence rate was 82% across all age bands. The rates increased with age, with 69% of < 5 year olds infected, 84% of 5-10 year olds and 91% of > 10 year olds. As a study limitation, the author's note that there are many tests for H. Pylori and no single diagnostic test has been defined as gold standard. The significance of this prevalence for these refugee children is unclear from this study. The possibility of the long-term chronic complications is raised and the authors recommend longitudinal studies of this population. This study population was exclusively African children and the rates cannot be generalised.

The New Zealand comparative data are taken from a cross-sectional survey by Fraser, Scragg, Metcalf, McCullough and Yeates (1996). The population sampled was 324 school children aged 11-12 years of European, Maori and Pacific Island ethnicity. The number of children of each ethnicity is not reported. H Pylori was diagnosed by positive serology. The prevalence of H pylori varied by ethnicity, with Pacific children having the highest rate of 48%, Maori next at 21% and European 7%. A comparison of these New Zealand rates for H pylori infection is reasonable, as both had credible diagnostic measurements, but limited as the measurement tool was different between the groups. This small group of African refugees had a prevalence rate of nearly 12 times that of New Zealand European children and almost double that of the highest group reported on, Pacific Island children. This is discussed further in Chapter 5.

The level of evidence of the prevalence of H pylori in a population of African refugee children from this study is JBI Level 3.2, one cohort study with clear measurement parameters and a marked result.

Lead

One study (Plotinsky et al., 2008) screened for elevated blood lead levels in 93 African refugee children aged 0-15 years in the USA. The testing occurred twice, the first time on arrival for resettlement and the second 3–6 months later. A blood lead level ≥ 10ug/dl was defined as elevated. A comparison of blood lead levels in 2076 children resident in the USA found the refugee children had higher blood lead levels than non-refugee children in the same city, 1.8 times higher in children aged < 2 years and 2.5 times higher in children aged 2-6 years. Also that the percentage of refugee children with an elevated blood lead level increased after arrival from 9% to 39%, 3-6 months later. The author's note that the finding of an elevated blood lead level in refugee children in comparison to non-refugee children has been found previously but the finding of an increase in blood lead levels after arrival is new. A study limitation was the size of the comparison group was much larger than the sample of refugee children. The applicability of the results to other groups of refugee children is not known.

The study also tested possible environmental risk factors for association with blood lead levels. Two of the three significant factors found may relate to pre-migration environmental exposure, being in a refugee camp and having Liberian nationality. The third, that summer testing is much more likely to reveal an elevated blood lead. A comparison of the finding of this review with elevated blood lead levels in New Zealand children levels was not done as comparable data was not found.

The level of evidence provided by this study about the risk of an elevated blood lead level in refugee children is JBI Level 3.3, one small study on African refugee children.

Parasitic disease

Five studies reported on parasitic disease in 2270 children. Four studies provide the prevalence data for a range of parasitic diseases (defined as pathogenic, intestinal helminths and schistosomiasis). One is a case report.

Geltman et al. (2001) screened 1642 refugee children of diverse origins within 90 days of arrival in the USA for pathogenic parasites by a stool sample and reported a total prevalence of 21%. The type of parasitic infection was not specified. A comparison of the infection rates between regions of origin of the children showed that children from Europe were least likely to be

infected (12% n=129) and that children from the Americas (50% n=26) or Africa (50% n=116) most likely to be infected.

Cherian et al. (2008a) screened 181 refugee children, all from Africa, a median of 6 weeks after arrival in Australia for intestinal helminths (parasitic worm) diagnosed by serology and/or stool sample, and reported a rate of 42%.

Raman et al. (2009) screened 239 refugee children in Australia mostly within the first year of resettlement by serology for schistosomiasis (a water born parasite) and found a rate of 27%. Comparisons between the subgroups of children were not done as backgrounds were not reported for all children and therefore a comparison between regions of origin is not possible.

Sheik et al. (2009) screened 207 refugee children mainly from Africa (81%), for schistosomiasis using serology. The children were described as newly arrived but the timing of the research was potentially 0-3 years in resettlement. The total prevalence of infection across the whole cohort was 18%. However, this rate is misleading, as only children from Africa were positive for schistosomiasis. The children from the Middle East and Asia had a 0% (n=39). The prevalence rate for children from Africa was 22% (n=168). This rate varied according to the region of Africa a child came from with children from central Africa (Tanzania, Burundi, Uganda) having 39% (n=44), west (Sierra Leone, Guinea-Bissau, Liberia, Ivory coast, Guinea) 36% (n=42) and east (Sudan, Ethiopia, Kenya, Egypt) 6% (n=82). As the largest subgroup tested (East Africa) had the least number of children with schistosomiasis this finding indicates that the geographical region of origin of the child maybe of significance predicting the likelihood of infection with schistosomiasis that is, infection is more likely in children from central or west Africa than east Africa. The case report below on a child from a country in central Africa, Tanzania, provides an example of this.

Shorter, Makone and Elliot (2006) presented a case report of an 11-year-old refugee boy from Tanzania who four months after arrival in Australia was diagnosed with an acute reaction to treatment for schistosomiasis. This study was the only case study for this literature review and was useful to personalise the high prevalence rate of schistosomiasis in some refugee populations, as detailed above and the response and clinical challenge to the medical team in the country of resettlement.

The four screening studies had universally high total prevalence rates for a range of parasitic diseases found early in resettlement in refugee children with rates between 18-42%. Differences in definitions and measurement parameters mean that the individual study results were not combined. Comparisons between the rates show that the study that had an exclusive African population had the highest rate at 42% and that the one study that analysed the prevalence according to geographical regions, showed a higher incidence in children from Africa than others. The general direction of the five studies adds weight to what was known previously, that parasitic disease is found commonly in refugees from Africa (Ministry of Health, 2001a). A comparison of the findings of this review about parasitic infection in New Zealand children was not done as comparable data was not found.

The level of evidence of the prevalence of parasitic infection in general in refugee children is JBI Level 3.2, four cohort studies.

Tuberculosis

Three studies reported on tuberculosis (Tb) infection in 2054 children. All three studies screened for tuberculosis by mantoux testing, also referred to as purified protein derivative (PPD) but the results could not be combined as the populations were not fully described.

Geltman et al. (2001) screened 1737 refugee children from a variety of regions and ages, arrived in the USA for resettlement and tested within 90 days, using a measurement of PPD ≥ 10mm induration and found a total prevalence of 440/1737 (25%). The incidence of positive PPD increased with each age band with children aged < 1 year 13% (n=54), 1-5 years 14% (n=431), 6-9 years 23% (n=427) and > 9 years 33% (n=825). No active Tb was reported.

Raman et al. (2009) screened 98 refugee children, mainly African, newly arrived in Australia, using mantoux testing of > 10 mm induration and found a total prevalence of 25/98 (25%). Active Tb was found in 5/98 (5%). The author's state that all five children with active Tb were aged under 11 years. Of note in this study is that over two thirds (n=233) of children who attended the three refugee health clinics were not tested for Tb.

Sheik et al (2009) screened 219 refugee children, mainly African described as newly arrived in Australia using mantoux testing > 10mm induration and found 72/219 (33%) of children tested positive. There is no breakdown of this prevalence but the study also reported 51/219 (24%)

positive rate when the measurement was an induration ≥ 15mm. This rate was reported for region of birth and the highest incidence was 10/15 (67%) children born in the Middle East. This high rate must be used with caution, as the subgroup was very small and it is possible they were a family group and the rates cannot be generalised.

Tuberculosis both latent and active is known to be more common in people who live in certain countries and rates above the general population have been reported previously in refugees (Regional Public Health, 2005). No New Zealand data was found on the rates of Tb infection as indicated by a positive mantoux test as no routine screening is done. New Zealand prevalence rates for active Tb in children aged 0-14 were reported generally as 3.2/100000 and for children of "other" ethnicity as 78.1/100000 in 2004 (Ministry of Health, 2006).

The number of children involved in the three studies and the similar results add weight the prevalence rates found. These findings of the prevalence of Tb in refugee children are JBI Level 3.2, evidence from three cohort studies.

Vitamin D

Three studies reported vitamin D levels in 772 refugee children. Two studies used serum 25-hydroxy vitamin D to measure vitamin D levels but used different definitions to describe low levels. However, overall prevalence rates for these two studies could be combined, as the upper limit measurement was the same of serum 25-hydroxy vitamin D < 50nmol/L.

Wishart et al. (2007) screened 433 children but reported data for only 420 children, mainly Middle Eastern aged 0-17 years on arrival for resettlement in New Zealand. The measurements used were serum 25-hydroxy vitamin D, 25-50nmol/L defined as insufficient in vitamin D and < 25nmol/L defined as deficient in vitamin D. Total prevalence of insufficient in vitamin D was 41% and deficient in vitamin D was 11%. Rates for both insufficient and deficient levels increased with each age band and for both sexes. Total prevalence for girls aged 0-16 years for an insufficient level was 47% (n=188) and 22% (n=188) as deficient and for boys 0-16 years of 37% (n=232) insufficient and 2% (n=232) deficient. This population included 102 children aged 0-5 years. The prevalence in this younger age group was 24% (n=102) for insufficient and 1% (n=102) for deficient. The study found an association between ethnicity with the highest rates (86% n=6) in 0-16 year old Iranians and the lowest (3% n=5) in Sudanese children. All the groups of children from the Middle East had the high prevalence rates for insufficient and

deficient vitamin D levels, with Afghani children 63% (n=148), Iraqi children 78% (n=18) and Kurdish children 40% (n=2). A study limit however was the small size of some of the sub groups.

Raman et al. (2009) reported the prevalence of low vitamin D in 139 refugee children recently arrived in Australia in 2005 as 20%. No further analysis was done and the measurement criteria are not stated so limited comparisons only can be made with the other two study results.

Sheik et al. (2009) screened for vitamin D levels in 210 refugee children, mainly African, aged 0-17 years in Australia. The children are described as newly arrived, but the time in resettlement may range from 0-3 years. The measurement and definition used to describe vitamin D deficiency was serum 25-hydroxy vitamin D level of < 50nmol/L. The total prevalence was 61% of children for vitamin D deficiency. Children from the three main regions of birth all had similar prevalence rates for vitamin D deficiency, Asian children 50%, African children 61% and Middle Eastern children 66%. These studies had small subsets of children in which prevalence was enumerated so the results cannot be generalised.

The study by Raman et al. (2009) had limited data available for analysis, as the measurement parameters for Vitamin D were not stated. The authors reported that 28 (20% n=139)) of the children had low vitamin D. The findings are limited because of this lack of measurement criteria. The other two studies measured levels in 620 children, nearly all children were from the Middle East or Africa, only 10/620 (2%) were from Asia. The populations had the same age range and were able to be combined. The overall rate of vitamin D deficiency defined as serum 25-hydroxy vitamin D level of < 50nmol/L was 350/620 (56%).

The level of evidence provided by these two studies on the prevalence of low vitamin D levels in refugee children is JBI Level 3.2, two cohort studies.

The New Zealand comparative data are taken from a study by Rockell and colleagues (2005) that reported the serum levels of 25-hydroxy vitamin D in 1535 children aged 5-14 years who were sampled as part of the *2002 National Children's Nutritional Survey* (Ministry of Health 2003). The study reported that of the total sample population of children aged 5-14 years, 31% had insufficient vitamin D (serum 25-hydroxy vitamin D <37.5nmol/L). And 4% were deficient in vitamin D (defined as serum 25-hydroxy vitamin D <17.5nmol/L). A comparison between

these rates of low vitamin D and the review findings is limited by different definitions of insufficient and deficient vitamin D levels. Therefore the comparison can only be made, bearing in mind the threshold for insufficient is set lower in the New Zealand children, with the definition of insufficient vitamin D level of 31% compared to the 56% in refugee children. Both have high rates but the refugee children almost double that of New Zealand children and this is discussed further in Chapter 5.

Summary of physical health findings

This review uncovered a body of epidemiologically focused studies, conducted early in resettlement, that establish prevalence rates for health conditions that were likely to have been acquired before resettlement. At least 1695 children aged ≤ 12 years were included in the study population and this indicates the findings can be applied generally but not exclusively, to the population of interest.

The prevalence rates for subgroups of children varied with age, sex and where the child came from before resettlement. Prevalence if reported in relationship to age increased as the child got older, such as for tuberculosis and H pylori. This finding of variation in the prevalence in health outcomes is discussed further in Chapter 5.

These findings provide consistent evidence that refugee children as a population when screened for health conditions in early resettlement have high rates of specific infectious diseases and deficiency states. The JBI levels of evidence that were applied to all eight groups of findings for each health outcome after synthesis were Level 3.2 or Level 3.3 with the exception of growth. This health outcome had one study (Geltman et al., 2001) and was classified as Level 4 a descriptive study. All the groups of findings are robust considering the numbers of children sampled in each area and the level of evidence able to be applied despite the variations in measurement and definition across the studies. The largest number of children were sampled for parasitic disease (n=2270), tuberculosis (n=2054), dental disease (n=1926) and anaemia (n=1917) and the least for lead (n=93) and H pylori (n=182) and vitamin D (n=772).

Of significance is that the three health outcomes with the least number of children studied are the three new findings. These were the increase in blood lead levels in refugee children after 3–6 months in resettlement in the USA, the very high rate (82%) of infection with H pylori in a group of African refugee children and the prevalence rate of 56% for vitamin D deficiency in a

refugee population of 620 children. The significance of these is not known and is discussed further in Chapter 5.

The four studies that focused on the psychological health of refugee children are summarised next in Table 13 and then the results are analysed and synthesised.

Summary tables psychological health

Table 13. Summary tables psychological health research 2001-2009

Author/Date Title/Country	Research design Focus	Population	Location/Date Resettlement point	Main findings	Strengths Limits
Montgomery & Foldspang (2001) Traumatic experience and sleep disturbance in refugee children from the Middle East Denmark	Prevalence Analytic Assess previous traumatic experience and sleep disturbance in a child with a structured parental interview.	Number 311 Age 3-15 yrs (mean 7.5yrs) Sex Female (151) 48% Country of Birth nr Country of Origin Iran 32 (10%) Iraq 168 (54%) Lebanon 22 (7%) Palestine 75 (24%) Syria 13 (4%) Turkey 1 (3%) Ethnicity* Palestinian 88 (28%) Kurdish 103 (33%) Region nr	Denmark Feb/1992- April/1993 The study was done a median of 7 days after resettlement arrival	Prevalence/frequent sleep disturbance Frequent nightmares 59 (19%) Frequent problem falling asleep 62 (20%) Frequent problem staying asleep 56 (18%) Prevalence/occasional sleep disturbance Occasional nightmares 194 (62%) Occasional problem falling asleep 225 (72%) Occasional problem staying asleep 203 (65%) Strongest predictor of sleep disturbance Grandparents violent death before the child was born 23/311 (7%) p <0.01	* Partially reported. Population refugee children as part of asylum seeking family. JBI RAPid use results with caution as many possible confounders when trying to predict what would cause sleep disturbance and possible bias measurement difficulties with parental reporting.

Author/Date Title/Country	Research design Focus	Population	Location/Date Resettlement point	Main findings	Strengths Limits
Fazel & Stein (2003) Mental health of refugee children: comparative study England	Prevalence Comparison Measurement of the mental health of refugee children using the Strengths Difficulties Questionnaire (SDQ) compared to other children in a school setting.	Number 101 Age 5-9yrs 32 (32%) 10-13yrs 35 (35%) 14-18yrs 34 (34%) Sex Female 40 (40%) Country of Birth nr Country of Origin nr Ethnicity nr Region of Origin Afghanistan 10 (10%) Balkans 48 (48%) Kashmir 16 (16%) Other 27 (27%) Comparison group 1. Number 101 Age matched to refugee Sex matched to refugee Ethnicity Ethnic minority 101 Comparison group 2. Number 101 Age matched to refugee Sex matched to refugee Ethnicity Indigenous white 101	Six schools Oxford England nr nr	Caseness* (95% CI) Refugee group 27% (19-36) Comparison Group 1 (ethnic minority) 9% (5-16) Comparison Group 2 (indigenous white) 15% (9-23) Caseness* Refugee 27% (19-36) Ethnic minority 9% (5-16) Indigenous white 15% (9-23) Authors report that 27% of psychological disturbance in a population of children is 3 times the national average for the whole child population	* Caseness defined as SDQ ≥ 4 & Impact score ≥ 2. Measurement weakness, single measure with a teacher only assessment, lack of parental input in the SDQ, lack of a diagnostic interview with the child.

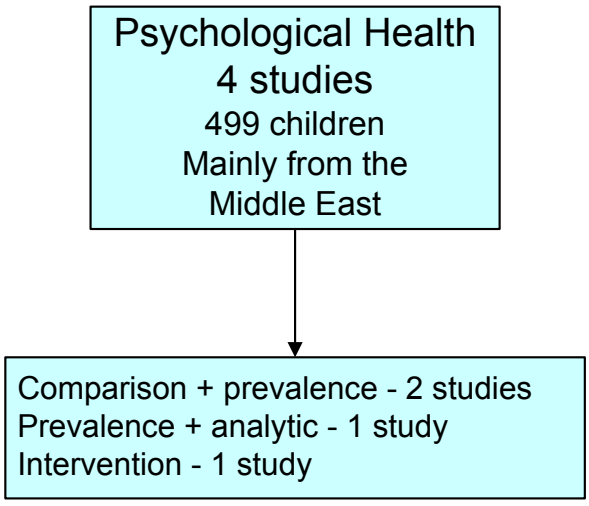
Author/Date Title/Country	Research design Focus	Population	Location/Date Resettlement point	Main findings	Strengths Limits
Heptinstall, Sethna & Taylor (2004) PTSD and depression in refugee children: Associations with pre- migration trauma and post-migration stress England	Prevalence Comparison Analytic To describe the frequency of traumatic events pre and post resettlement To measure and describe rates of PTSD and depression To compare referred children with non referred children.	Number 40 (13 refugee children referred to a mental health service, and 27 non-referred refugee children) Age 8-16yrs (mean 11.3) Sex Female 17 (42%) Country of Birth nr Country of Origin nr Ethnicity nr Region of Origin Africa nr Central Asia nr Europe nr Middle East nr South America nr	London England nr Unknown range, living in London for 5 years or less with mean time in Britain 2.5 years at research point.	Rate of PTSD* (Impact of Event Scale (IES) score> 16 indicates PTSD) Referred children 6/7 (85%) Non referred 9/20 (45%) Rate of depression* (self-rating scale > 16) Referred 3/9 (32%) Non referred 7/23 (30%) Rates of pre migration trauma Violent death family member Referred 8/13 (61%) Non referred 16/27 (59%) War/threats to life Referred 10/13 (77%) Non referred 11/27 (41%) Most significant worry post migration of parents Insecurity of Asylum application Referred 8/13 (61%) Non referred 10/27 (37%) Family welfare in home country Referred 7/13 (54%) Non referred 20/27 (74%)	*Not all children did the IES or depression scores due to literacy issues. Unknown number of refugee asylum children included in the sample. JBI RAPid indicates use results with caution due to very small sample size and the difference in the size of the comparison group.

Author/Date Title/Country	Research design Focus	Population	Location/Date Resettlement point	Main findings	Strengths Limits
Fazel, Doll & Stein 2009 A School-Based Mental Health Intervention for Refugee Children: An Exploratory study England	Intervention Exploratory To compare the effect a school-based mental health service on the health of refugee children to a group of ethnic minority children and a group of indigenous children who did not formally use the service. Follows on from a previous study by the authors in 2003. Measurement using the Strengths Difficulties Questionnaire (SDQ) 1. Baseline prior to the intervention. 2. Follow up (F/U) and at the end of the school year about 9 months later.	Number 47 Age 5-9yrs 21 (45%) 10-13yrs 10 (21%) 14-18yrs 16 (34%) Sex Female 32% (15) Country of Birth nr Country of Origin nr Ethnicity nr Region of Origin Africa 3 (6%) Asia 20 (43%) Europe 24 (51%) Comparison group 1. Number 47 Age/sex matched to refugee Ethnicity Ethnic minority 47 Comparison group 2. Number 47 Age/Sex matched to refugee Ethnicity Indigenous white	3 schools (1 junior school ages 4-8). 2 middle school ages 9-12, 1 secondary school ages 13-19) Oxford England nr nr	SDQ (group mean + SD) refugee group Baseline 12.3 (7.0) F/U 10.6 (6.0) Change -1.7 (5.5) Comparison group 1 (ethnic minority) Baseline 7.9 (5.7) F/U 6.6 (6.0) Change -1.3 (3.9) Comparison group 2 (indigenous white) Baseline 8.8 (8.1) F/U 8.6 (8.3) Change -0.2 (5.4) Caseness* refugee Baseline 32% F/U 23% Comparison group 1 (ethnic minority) Baseline 9% F/U 4% Comparison group 2 (indigenous white) Baseline 19% F/U 21%	* Caseness defined as SDQ ≥ 4 & Impact score ≥ 2. Unknown number of refugee asylum children included in the sample. JBI RAPID indicates use results with caution due to small sample size, a 32% initial dropout rate that influenced the size of the comparison groups.

Synthesised findings of psychological health

Four studies focused on aspects of the psychological health of refugee children (Figure 6). A total of 499 children were included. The age range was 3-18 years. The actual number of children aged ≤ 12 years could not be extracted from the data available as two studies used age ranges, one of 3-15 years (mean 7.5 years) and the other of 8-16 years (mean 11.3 years), and the other two used age bands. By combining the numbers of children from the age band 5-9 years, 53 (11%) children were aged ≤ 12 years.

Figure 6. Summary of psychological health research



In all four studies less females (n=223) than males (n=266) were included. The proportion of females in each study ranged from 32-48% with an average of 45% female in each sample. The backgrounds of origin of the children were not reported in two studies and in the other two, the majority were Middle Eastern. Of the total study population 3 (< 1%) were from Africa, 36 (7%) from Asia, 71 (14%) from Europe, 322 (65%) from the Middle East and 67 (13%) not known. The research was conducted in England (n=3) and Denmark (n=1). The research time in resettlement was not reported in two studies. Of the other two, one was done very early in resettlement, a median of 7 days after arrival and the other a mean time of 2.5 years in resettlement.

Three studies were primarily concerned with prevalence and comparing refugee health with others and one (Fazel et al., 2009) was an intervention study that also compared refugee child health with two control groups of children. Unique among the studies of this review one

(Heptinstall et al., 2004) compared the rates of psychological distress between two groups of refugee children, one referred to a mental health service and the other not. Two of the study settings were schools.

While all four studies focused on the psychological health of refugee children, the outcomes measured were variable. However, the studies by Fazel and Stein (2003) and Fazel et al. (2009) used the same measurement and outcome and these were combined. The study by Birman et al. (2008) that is tabled in health service use has results that are relevant to the psychological health of refugee children and these results are presented after the four studies.

The individual study findings are presented and synthesised next from data extracted from the summary tables, in order of year of publication. No comparable New Zealand data was found to make useful population comparisons between the outcomes of the children in these studies and the general New Zealand child population and so is not done for this area of health.

Montgomery and Foldspang (2001) sampled 311 Middle Eastern refugee children, aged 3-15 years. The children were all part of refugee asylum families seeking resettlement in Denmark. The research was done a median of seven days after arrival. The study looked for association with past trauma and current sleep functioning. The study had measurement difficulties with possible bias in parental reporting and many possible confounders when trying to predict what was associated with sleep disturbance. The strongest predictor of sleep disturbance was the violent death of a grandparent before the child was born. The authors hypothesised this finding was because the death of a grandparent had attachment implications for the child's own parent.

The findings from this study about the association between previous trauma and sleep were limited due to possible measurement bias and confounding factors and a JBI level of evidence could not be given. JBI RAPid assessment indicated to use results with caution as many possible confounders.

Fazel and Stein (2003) sampled 101 refugee children, 48% European, aged 5-18 years resettled in England. An unknown number of children were part of asylum seeking families. The research timing in resettlement is not stated. The research setting was six schools in Oxford, England. The outcome of interest was the psychological health of the refugee children compared to two comparison groups matched for age and sex. The measurement tool was the Strength and

Difficulties Questionnaire (SDQ) administered by the teacher. The finding was that refugee children had more psychological disturbance (27%) defined as "caseness" (SDQ > 4 and an Impact score of ≥ 2) than either of the comparison groups, ethnic minority (9%) and indigenous white children (15%). A measurement weakness was however noted by the authors that the lack of parental involvement in the assessment and the lack of a diagnostic interview might have limited the validity of the results.

The authors state that this study found that more than a quarter of the refugee children in this sample were psychologically disturbed when their psychological functioning was measured by the SDQ and that this rate of disturbance of > 25% was three times the national average. The small sample size and measurement difficulties limit the findings for this review. However this study provides some evidence about the mental health of refugee children compared to other school children matched for age and sex and is JBI level of evidence, Level 4, a small descriptive study.

Heptinstall et al. (2004) sampled 40 refugee children (13 referred to a mental health service and 27 not referred), age range 8-16 years, resettled in England. The countries of origin were reported as Africa, central Asia, Europe, the Middle East and South America but the numbers of children for each region were not reported. The children had been living in London for less than 5 years with a mean time of 2.5 years in resettlement. The outcome measures of interest were PTSD and depression and to analyse if there was an association between frequency or type of pre resettlement trauma and the development of PTSD or depression in resettlement. Measurement was done by self-reporting scales and ultimately not all children could be tested due to language and literacy issues. However, 6/7 (86%) of the referred children and 9/2 (45%) of the non-referred children, who were able to self-report, tested as highly likely to have PTSD. Depression was found in 3/9 (32%) of the referred children and 7/23 (30%) of the non-referred children. While the high rates of PTSD and depression are potentially very concerning, the level of evidence the findings provide is limited. The very small sample sizes and the possibility of bias in the selection of the non-referred refugee children as well as the difference in the size of the comparison group limited the validity of the findings of this study and a JBI level of evidence was not given. JBI RAPid assessment indicated to use results with caution due to very small sample sizes.

Fazel et al. (2009) sampled 47 refugee children aged 5-17 years who had resettled in England. An unknown number of children were part of asylum seeking families. The background or country origins of the children are not reported. The research timing in resettlement was not reported. This is an intervention study. The intervention was a school based mental health service where the teachers of refugee children worked in collaboration with mental health workers to support the children over one school year. The outcome of note was the psychological functioning of the refugee children compared to two control groups, one ethnic minority and one white indigenous, matched for age and sex. The measurement tool was the Strengths and Difficulties Questionnaire (SDQ), applied at the start and finish of the school year. The refugee children's SDQ score had a greater positive reduction overall than the two comparison groups. The caseness (defined as SDQ >4 and an Impact score of ≥ 2) in refugee children declined from 32% at the beginning of the school year to 23% at the end of the school year. The caseness of the comparison groups declined from 9% to 4% for ethnic minority children and but increased from 19% to 21% for the white indigenous children. The difference was not significant between the children at the end of the research. The comparison groups also had a reduction in their SDQ over the study period and the authors state that there could have been an effect on the comparison groups indirectly from the intervention due to for example increased teacher understanding of child behaviour. This intervention study provides some evidence about measuring and comparing the mental health of refugee children with two other groups of children in a school setting. As the study time was over one school year, it provides a longitudinal perspective into resettlement on the possibility of change overtime in the psychological functioning of refugee children in resettlement. However, a study limitation was the 32% initial dropout rate in the refugee children that limited the size of the comparison groups and this indicated that the results should be used with caution. The level of evidence this study provides is JBI Level 4, a descriptive study.

The studies by Fazel and Stein (2003) and Fazel et al. (2009) both measured psychological health with caseness criteria. The populations were comparable and combining the populations gave a total population of 148 children in each of the three groups, refugee, ethnic minority and white indigenous. The caseness that could be combined was the baseline caseness (before the intervention) in the 2009 study and the caseness in the 2003 study. This gave rates of 42/148 (28%) for the refugee children, 18/148 (12%) for the ethnic minority children and 34/148 (23%).

Finally, Birman et al. (2008) sampled 97 refugee children of diverse origins at an unknown time in resettlement in the USA. The study which looked at the effectiveness of a special mental health service for refugees and is included in the next section of this review on health service research, reported that 26% of the children had PTSD, 22% of children had an adjustment disorder and 14% of children had a major depressive disorder. While these rates are not as high as the rates reported by Heptinstall et al. (2004) they are still of major concern and are in line with the trends reported previously in Chapter 2 for an increase in psychological disturbance in refugee children in resettlement.

Summary of psychological health findings

The population sampled in this research was different from the population sampled in the studies on physical health. All four studies included refugee children who were part of asylum seeking families. This maybe because the two countries in which the research was done, Denmark and England, take refugees formally for resettlement as well as having a large number of refugees asylum seekers. There was a trend in all the study populations to include more males than females.

The findings of the four studies are limited as sample sizes were small and compromised by methodological issues. These studies add contextual detail to the experience of being a refugee child and the links between past and present experience and current psychological functioning. The refugee children had poorer mental health compared to other children. There was an indication that the mental health could improve over time and with intervention. Two of the studies were conducted in a school setting. This review did not look at the education literature but consideration must be given to the possible long-term effects of stress on a child's brain and health. The rates of PTSD and depression are alarming and even if to be used with caution due to the small sample size have implications for future research and they are discussed further in Chapter 5.

The two papers that looked at health service use are summarised next in Table 14 and then the findings are analysed and synthesised.

Summary tables health service

Table 14. Summary tables health service research 2001-2009

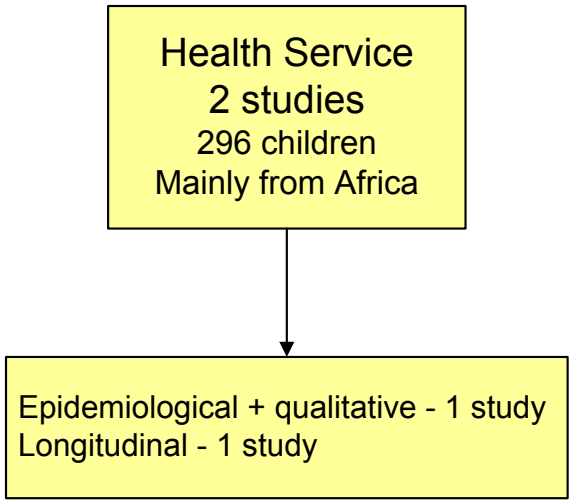
Author/Date Title/Country	Research design Focus	Population	Location/Date Resettlement point	Main findings	Strengths Limits
Cooke et al. (2004) Demographics and utilisation of health services by paediatric refugees from East Africa: Implications for service planning and provision Australia	Epidemiological review of health data Qualitative component Describe East African refugee families and their health service use to inform the service provision in the hospital immigrant clinic set up in 2001.	Number 199 Age 6mths-17yrs (mean 8.8 yrs) Sex nr Country of Birth Djibouti 3 (1%) Egypt 8 (4%) Eritrea 5 (2%) Ethiopia 17 (9%) Kenya 24 (12%) Somalia 88 (44%) Sudan 51 (26%) Other/missing 3 (1%) Country of Origin nr Ethnicity African 100% Region of Origin nr	Hospital Immigrant Health clinic Melbourne Australia Feb 2001-May 2002 Over half the children had been in Australia for less than 12 months (median 7.9 mths, range 0.4-43.8 mths).	Health Service use since arrival Seen a GP 128 (63%) Outstanding health issue 66 (34%) Seen Maternal/Child Nurse 15 (7%) Attended Hospital 81 (43%) No regular nurse/GP identified that parents were happy to use for their child 112 (57%) Parent identified factors to aid health service (HS) access Interpreter available 53(26%) Information on HS 47(23%) HS available closer to home 37 (19%) Better understanding by HS of cultural needs 35 (18%) HS providers who spoke refugees native language 27 (14%) Written information in native language 24 (12%) Competence in English for parent (self-report) (n=197) Speaks, reads, writes well 39 (20%) Speaks, reads, writes some 23(12%) Understands, speaks a bit 26 (13%) Understands only 40 (20%) No understanding 69 (35%)	Qualitative component. Sample cannot be seen as representative of all African refugee living in Victoria as possible selection bias as the families were selected on presentation at a health service.

Author/Date Title/Country	Research design Focus	Population	Location/Date Resettlement point	Main findings	Strengths Limits
Birman et al. (2008) International Family, Adult and Child Enhancement Services (FACES). A Community Based Comprehensive Services Model for Refugee Children in Resettlement USA	Longitudinal Cross sectional Incidence Analytic Evaluation of a mental health service that aimed to describe the refugee child, describe current use of FACES and assess service effectiveness by three monthly assessments of the child's psychological functioning using the Child and Adolescent Functional Assessment Score (CAFAS)	Number 97 Age 1.5-21yrs (average 11) Sex nr Country of Birth nr Country of Origin nr Ethnicity nr Region of Origin Africa 46 (47%) Europe 29 (30%) Latin America 15 (15%) Middle East/Central Asia 3 (3%) South Asia 4 (4%)	FACES services in the community Chicago USA Sept 2002-August 2005 nr	Total no. treatment hours over three years of study Individual Rx 1722 Group Rx 1782 Family Rx 1750 CAFAS improved an average of 3.96 reduction for each 3/12 assessment, overall total study duration 15.34 ($p < 0.001$) Interactions between covariates and time all non-significant and authors could not conclude that service delivery/dose was related to improvement in the CAFAS Frequency of main diagnoses* PTSD 26 (26%) Adjustment disorder 22 (22%) Major depressive disorder 14 (14%)	*Included in the summary of psychological research. The authors note the complexity of having such a diverse client base and providing mental health services for refugees who cover 34 ethnicities and 26 first languages. JBI RAPid indicates use results with caution, confounding factors

Synthesised findings of health service use

Two studies focused on aspects of the health service use (Figure 7). A total of 296 children were included. The age of the children was reported as a range of 6 months-17 years (mean 8.8 years) in one study and in the other 1.5-21 years (average 11 years). It is not known how many children were aged ≤12 years.

Figure 7. Summary of health service research



The sex of the children was not reported for either study. The majority of children came from Africa (83%). One study was conducted in the USA and the other in Australia. The research time in resettlement was not reported in one study and the other between 4-44 months. Research design focused on describing health service use and had a qualitative component in one study. The other was a longitudinal study over three years to assess the effectiveness and use of a mental health service. The studies are presented in order of year of publication. The study by Raman et al. (2009) which was tabled with the physical health research is synthesised here for the data the study provided on health service use. The studies were very different in focus and no data could be combined. Comparisons with the New Zealand context of health service delivery are made in the summary at the end of synthesis.

Cooke et al. (2004) sampled 199 African refugee children aged 6 months-17 years (mean 8.8 years) and their parents the first time they used a newly established health clinic in Melbourne. The sex of the children was not reported. The time into resettlement was a range of 4-44 months (median 8 months). The study concentrated on describing the family characteristics and service use. Most children lived in homes not fluent in English with 35% of parents self-reporting they had no

understanding of English. Thirty one percent of children lived in single parent homes. The study found that while 63% of children had seen a GP since arrival, 57% of parents said they did not have a nurse or doctor that they wanted to use regularly. Thirty four percent of parents reported an outstanding health issue. The study sample cannot be seen as representative of all African refugee children and their families as the sample is families who are already using the special health clinic. The study provides epidemiological data on the demographics of 199 African refugee families resettling in Australia. The responses to the parental questionnaire show significant barriers to accessing health services and unmet health needs.

The level of evidence provided by the study about the use of health services by the African refugee children and their families is JBI level of evidence Level 4, a descriptive study.

Birman et al. (2008) sampled 97 refugee children, age range 1.5-21 years (average 11 years) resettled in the USA. The population was described as very diverse with 34 ethnicities including 47% African and 30% European. Research time in resettlement was not reported. The research design was a longitudinal study over three years and the aim of the study was to support the use of evidenced based practice by measuring what was effective in a mental health service for refugee children. International Family, Adult, Child Enhancement Services (FACES) started in 1999 in response to increasing evidence about the mental health needs of refugee children. The children were diagnosed with various psychological disorders and the study assessed if service dose was related to improvement of mental health over time. The actual time frame is difficult to say exactly but the authors report that the measurement of psychological function was done initially and repeated three monthly with a minimum of two recordings of data for study inclusion and a maximum of five recordings of data. This would indicate that the time was between 6-15 months for an individual child. The psychological functioning of the children improved over the study period significantly ($p < 0.001$). The findings were inconclusive for a correlation between study dose and improvement in mental health however. However, as the study was trying to tease out the successful elements of the International Family, Adult, Child Enhancement Services, the range of variables used against service use is useful to inform further research.

This study was unique among the studies of this review as it framed difference as diversity with a positive assumption about the challenges of culture and language in a refugee population.

The level of evidence provided about this service model and its effectiveness for refugee children is JBI level of evidence Level 3.3, a longitudinal cohort study.

Raman et al. (2009) also contributes to the findings on health service use by comparing the number of children seen in three special refugee health clinics in 2005 in New South Wales with the number of children who arrived over that year. Only 1 in 5 (331/1557) new refugee children were seen at the clinics. Of the children seen 20% were asymptomatic but had health issues detected with screening. It is unknown why only 20% of new refugee children were seen at the clinics, the finding of a proportion of children being asymptomatic but then screening leading to a diagnosis with a health condition has implications for the provision of screening services.

Summary of health service finding

These studies are essentially explorations of health services that aim to provide appropriate and responsive health care, both physical and psychological for resettled refugee children. The overall findings uncovered issues of access to health care services and the suitability and effectiveness of health services. There appears to be a large gap between the number of refugee children in the community and the number of refugee children who access health care. This is discussed further in Chapter 5.

The focus was different from both the physical and psychological research as the measurement went wider than individual biology or functioning of the child and explored the relationship between the refugee child and family and the health services in the country of resettlement. None of the health services research was done in New Zealand. However, barriers to health care use and matters of cultural safety, as well as the clinical effectiveness of health service interventions are issues that cross country boundaries. While the findings have limited ability to inform on specific health service use here they are useful to inform on the wider context of providing a health service for people who are in the minority and who have unmet health needs. Barriers to health service use in New Zealand report people who live in poorer areas or have low incomes use GPs more frequently than others. A survey on GP utilisation in New Zealand reported that the most common reason for not seeing a GP was cost. Other reasons included a lack of transport and not being able to get suitable appointment time (Public Health Intelligence, 2004).

The final chapter provides an overview and discussion of the findings, a discussion on the three new findings, discusses the implications for nurse practice and future research and concludes with the strengths and limitations of the review.

Chapter 5: Discussion

What does the published research report about the health of resettled refugee children?

The review was based on 15 studies retrieved from six electronic databases by a modified systematic review in order to answer the research question. All 15 studies were critically appraised using the JBI RAPid framework then grouped and synthesised in three areas, physical health, psychological health and health services use. The appraised studies provide new information about the health of refugee children in early resettlement as well as extending what is already known. This chapter firstly provides an overview and a discussion of the findings. Then the implications of these findings for primary health care nursing practice are discussed, recommendations for future research are outlined, the strengths and limits of this review are noted and the review is concluded.

Overview and discussion of findings

The findings of this review provide evidence mainly on the physical health of refugee children in early resettlement. As a population, they have specific infectious diseases or nutritional deficiencies likely to have been acquired pre resettlement. A refugee child may have a complex migration history before their arrival in their resettlement country and revealing their geographical region of origin before resettlement can indicate likely health issues from what is known about infectious disease prevalence in the region. This review identified illness and disease as a measure of health of refugee children as opposed to identifying any measures of wellbeing as an indicator of health.

Comparisons between review findings on a refugee child population and other New Zealand child population data could not be made for all health outcomes as New Zealand data were not found. Limited comparisons could be made for five physical health outcomes, those of anaemia, dental health, growth, helicobactor pylori and vitamin D, but these comparisons were limited by measurement differences. However, the comparisons indicated that refugee children had higher rates of the illness than the general New Zealand population except for dental disease that was similar for both populations and this comparison was limited by measurement uncertainty.

The nine physical health studies focused on describing health issues that were mostly known to effect refugees previously as a population (Ministry of Health, 2001a). Prevalence rates were reported for anaemia, low ferritin, dental disease, being overweight and underweight, elevated blood lead levels, H pylori infection, parasitic infections, tuberculosis and low vitamin D levels. Prevalence varied in the child refugee population according to age, sex and ethnicity or country of

origin. The levels of evidence to support the findings of prevalence were solid with mostly large populations of children sampled. The total population included the least number of children from the Americas and from Asia and this needs to be taken into consideration if applying these rates to refugee populations that include large numbers of children from Asia. The review extended what is known about three health issues, the increase in blood lead levels in resettlement, H pylori infection rate in one subgroup and low vitamin D levels are discussed next.

Lead is a heavy metal that can cause significant health problems in children (Warniment, Tsang, & Galazka, 2010). Research has shown that young children are vulnerable to lead poisoning due to their exploration near the ground, hand to mouth behaviour and propensity to taste non-food substances such as dirt (O'Dwyer, 1998). The finding by Plotinsky et al. (2008) of an increase in blood lead levels in refugee children 3-6 months after arrival for resettlement in the USA was reported by the study authors. The blood lead levels of refugee children on arrival in New Zealand or later in resettlement are not known. Certain environmental factors in New Zealand are known to increase the risk of lead poisoning in children such as the lead paint used on houses built before 1970 (Ministry of Health, 2007). Refugee children in New Zealand often live areas of high socio-economic deprivation that may contain older houses. Refugee families may not be aware of the potential danger of lead based paint to their children. There are no health education resources about lead and lead poisoning available currently in New Zealand in languages other than English (Appendix 5).

H pylori bacterium infects about half the people in the world (Go, 2002). Mostly it is asymptomatic but if persistent it is linked to gastrointestinal disorders like ulcers and gastric cancer (A. Fraser, 2004). Prevalence varies widely and the risk of infection increases with poverty, young age, certain ethnicities, socio-economic status and geographical regions (A. Fraser, 2004; Go, 2002). Research has shown that it is usually acquired in childhood and probably does not resolve spontaneously (bpac, 2010). H pylori is classified as a class one carcinogen by WHO (bpac, 2010). The 82% prevalence rate for H Pylori infection in 182 African refugee children in Australia (Cherian et al., 2008a) is very high but may not be generalisable to other groups of children. A key word search in the AMI and MEDLINE databases using refugee* helicobacter pylori and child* or infant* or baby for research published 2005-2011 located no other primary studies. Medwire news gastroenterology section noted the study and concluded that “in line with current paediatric H pylori guidelines a test and treat policy is not recommended for African refugee children” (Wilkinson, 2010, p. 1). Why this approach is taken is not said. However, the significance of this finding for these children long

term is not known but information available would indicate that, while a person can be asymptomatic for many years, the infection has the potential to cause serious health consequences in a percentage of children long term. The age of the children on resettlement may be a factor for consideration in screening or treatment as while all age children had high rates, nearly all children aged over 10 were infected. Currently refugee children are not routinely screened for H pylori in New Zealand. This finding has implications for public health practice and health screening as well as for future research and the author's recommended longitudinal studies of refugee children in resettlement.

The role of an inadequate level of vitamin D is well known in the aetiology of diseases such as rickets (Holick, 2007). The significance of vitamin D in the aetiology of other diseases and its function in the immune system are topics for research currently (Edvardson, et al., 2011; Razzaque, 2011). A prevalence of 56% for serum 25-hydroxy vitamin D, < 50 nmol/L was found by combining the results of two studies (Wishart et al., 2007; Sheik et al 2009). Vitamin D deficiency has been re-emerging as a health issue in the last decade both for refugee and migrant children and a proportion of New Zealand children. The significance for refugee children is perhaps indicated by an increase in risk factors for vitamin D deficiency such as darker skin and a cultural imperative to not expose skin. Vitamin D levels may well get worse in resettlement due to the latitude and climate difference between the refugees country of origin and New Zealand. These studies on vitamin D were done on arrival or in early resettlement when arguably the children, who all came from more northern latitudes than New Zealand, would have had better levels of vitamin D than after a winter in New Zealand. Wishart et al. (2007) recommend screening and ongoing surveillance for vitamin D deficiency in the New Zealand refugee population.

The four studies on the psychological health of resettled refugee children had limited findings due to methodological issues but indicate that the population may have high levels of psychological distress. Particularly the finding by Heptinstall et al. (2004) of an 86% rate of PTSD and a rate of 32% of depression in refugee children was alarming. A limited comparison can be made with the findings of other research on refugee children. Crowley (2009) did a literature review on the mental health of refugee children in resettlement and reported rates of 20-70% for PTSD and 15-47% for depression. Lustig (2004) did a review of child and adolescent mental health and reported rates of 50-90% for PTSD. The psychological health of the refugee children who resettle in New Zealand is unknown.

The health service research found barriers to accessing health care and was the only research that began to explore social and economic determinants of health in relationship to a health outcome. The finding of a large gap in potential health service utilisation is significant for this population of children who may have high health needs. The ability to access appropriate health services is clearly defined as one social determinant of health (World Health Organisation, 2003). The New Zealand government has a clear commitment to provide health services for the refugee children who resettle here (Ministry of Health, 2001b) and it is unknown if the current health services are accessed by refugee children and if the services they do use are meeting their health needs.

Implications of findings for primary health care and nurse practice

Implications of the findings for primary health care and nurse practice are at a population level and at an individual child level. The implications of the findings of this review at a population level are discussed first.

Where comparable New Zealand population data were available, this review found that as a population resettled refugee children have been identified as having a higher incidence of specific health issues than other New Zealand child populations at least in early resettlement. These health issues, such as an increased incidence of tuberculosis, and low Vitamin D levels, have implications for health service provision both at the primary and secondary care level. While the regional public health service does provide additional care and surveillance for refugees in their first year of resettlement, it is unclear if this is adequate. A report by Solomon in 1999 (cited by McLeod & Reeve, 2005 p. 12) compared the cost of providing health services to refugees with other New Zealand-based populations and found the cost was between providing services for Pacific people (who incurred the greatest cost) and Maori. It is not clear what proportion of resources allocated to all refugee care are used for children and it may be reasonable to assume that most is allocated to adult services as the data on child refugee concerns is lacking. This may indicate that refugee children do need targeted primary health care to address the population health concerns at a health promotion level as well as with secondary health care.

This review found that the demographics of refugee children who arrive in New Zealand change over time and that the health issues identified on arrival for resettlement maybe dependent on pre-resettlement factors such as geographical region of origin and age. Because of this ability for the child refugee population to change, the health screening and support programme offered through the regional public health service in the first year of resettlement needs to be regularly reviewed in

order to be responsive to changing health issues in the child refugee population. For example, in light of findings of this review of the high prevalence of H pylori reported in African refugee children, the public health specialists in charge of the comprehensive health screening at Mangere and the Ministry of Health need to evaluate whether routine screening for all or subgroups of incoming refugee children is needed on arrival with long term follow up.

Primary health care practitioners need to be up to date with these changing trends in the child refugee population so that services offered in the community are appropriate to meet health needs that were present on arrival. Nurses will need to advocate for the population when trends are seen for unmet health needs for refugee children in the community. This may involve working with local general practice services or the Primary Health Organisations or within the nurses own work environment. For example, a collaborative annual health hui for primary health care providers could provide a forum for primary health care workers to articulate emerging health needs in the population of refugee children. Health service planning would then be indicated to meet these needs.

There are implications for health education resources for resettled refugee children as a population. For example, some of the health issues such as anaemia, lead poisoning and dental decay uncovered in the review are well known and have health education resources that are available for the general population. However, the appropriateness of these resources regarding language and culture would probably limit their usefulness for the refugee population. There are selected health education resources available from the Ministry of Health or the Regional Public Health service in several languages (Appendix 6) but there is scope for development as for example, there is no health education available in other languages about preventing lead poisoning in children.

This review found research in health service use that indicated a significant gap between the number of refugee children who require health services and the number who access health services. Also that refugee families need health services that are sensitive to their needs, such as providing interpreting services. These findings have implications for primary health care service delivery to be seen by the refugee community as appropriate and sensitive to their needs. The active participation and partnering between health services and refugee communities and families would be indicated to close the gap between health need and health service use for refugee children. Also referral to another health service or community organisation is often required after a clinical assessment of a child in primary health care. Currently Regional Public Health in Wellington

supply a community directory *Refugee Health and Related Services* (June 2010) and the pamphlet *Working with People from Refugee backgrounds* (2009) which list services that maybe appropriate to refer refugee children to. As the review findings indicate that the health needs of refugee children may be significantly unmet regarding health service access, future health service provision may need to consider further provision of specific health services as more children access primary health care services.

The review findings of the gap between health service use and health need for refugee children has implications for nurses to identify barriers that refugees may experience in accessing and using health services. Nurses need to facilitate the use of General Practice services to monitor and treat any diseases picked up by health screening on arrival at Mangere for quota refugees and to refer for comprehensive health assessment for children who resettle under the family reunification scheme as well as for ongoing medical and nursing support. Most refugee children who require specialist assessment such as paediatric or dietetic are referred to their local public hospital service. The nurse needs to identify and intervene to reduce the barriers to participation in such health services. There is written information available to help refugee families know about health services in New Zealand (Appendix 5).

The guiding principles of primary health care (McMurray & Clendon, 2011) of accessible health care, the use of relevant technology, health promotion, cultural sensitivity, intersectoral collaboration and community participation, all inform the planning that is required by the nurse who works with resettled refugee children. The nurse has a responsibility to plan, firstly within her own work load but also in the wider health arena, to ensure that these children can participate in culturally safe health care and have health services to meet their needs. Participation in a Well Child Health service will almost certainly require the service to go to the child (home visit) and use an interpreting service. These resource considerations have implications for nurse time and service allocation. Currently the Ministry of Health has some allowance in the Well Child framework for extra service delivery to any child who has high health needs but it is not known at this time if refugee children receive this extra service delivery or if the allocation meets the child's health needs.

The implications of the findings of this review for the individual child relate to the overall goal of primary health care nursing to build the capacity of the child and family to manage and improve their own health. This goal requires health needs to be clearly articulated. The review findings of

the prevalence of infectious and nutritional deficiencies in refugee children are useful to guide clinical assessment of a child seen early in resettlement so that likely health concerns can be uncovered, addressed and supported with relevant nursing interventions. Being able to capture a child's pre migration journey and health history is helpful to guide a thorough clinical assessment and indicate health needs. This could be done with a comprehensive health history of the child that incorporates a migration and health history including illnesses and previous health service use (Davidson, et al., 2004; Koh, et al., 2009; Zwi, et al., 2007). Assessment and documentation of health needs by primary health care nurses needs to accommodate a migration and health history for each refugee child and maybe an area for development for nursing documentation in primary health care.

Working in primary health care involves working with children who are essentially well, but sometimes not in optimal health. This is a complex balancing act of how best to support a family with the process of empowerment over their children's health. The nurse has a role as part of the individual refugee child's ecosystem, a support person who can identify strengths in the family as well as provide guidance and community linkages for the family as they adjust to life in New Zealand. This support role for the nurse working with refugee families was reported by Samarasinge et al. (2006). This role requires the nurse to work in partnership with the family. For example, a language barrier such as not being proficient in reading English may prevent the family from understanding an appointment letter from the hospital notifying the parent of an appointment for the child. The nurse can telephone the hospital service, check the appointment date, request a further appointment letter in another language if appropriate and discuss with the family whether they need an interpreter to accompany them. There can also be a role in coaching families with the kind of information that needs to be shared. Nursing support can also involve reminding the family about the appointment.

Future research

This review has implications for future research in three main areas - the type and format of data routinely collected when studying child refugees, the health focus of studies and using the RAPid critical appraisal system. This review found there was no standardised approach to the data routinely collected to describe the resettled refugee child. In particular the age of people in the studies was variable, limiting the ability to separate children from youth/adolescent. It is therefore important if we are to get a better understanding of the health needs of refugee children that some agreement about the age of a child and the age of youth to allow comparison and combining of

study findings. Studies that involve populations of both youth and children should present both subgroup findings by age. For New Zealand studies using the same age range as other organisations that collect population data would increase the depth of the information. The Department of Labour uses the range 0-14 years currently and that would fit in with what is recommended below. Age is also important because in several studies that described children by age, there was a clear increase in the prevalence of the health outcome with increasing age. Age must be defined by general developmental stages and I suggest bands of babies and toddlers aged less than 2 years, and children aged 2-4 years, 5-9 years, 10-14 years and 15-19 years. Then health promotion can take into account the age and developmental stage of the child.

Similarly there is a need to develop standardised time frames defining resettlement so that changes in health can be usefully seen in relationship to the resettlement process. Arrival for resettlement in New Zealand is defined by the six weeks that refugees spend in the reception centre in South Auckland. The sociological literature (Dunstan, et al., 2004; McMillan & Gray, 2009; Ward, 2006) and the *New Zealand Refugee Resettlement Strategy* (Department of Labour, 2010), discuss the parameters of resettlement and there is general consensus that settling (early resettlement) and being settled (integrated or established resettlement) are parts of the resettlement process. This review recommends that early resettlement can usefully be defined as the time the family spend getting linked in to services such as general practice and familiar enough that they no longer need support to do so and up to two years after arrival. Established resettlement is after two years when families no longer need extra support to link into basic services. However, at times even in established resettlement, especially at times of change such as starting pre-school or school or the presence of a new health issue that require new services, the family may again require extra support to transition smoothly.

Future quantitative research with refugee children, in order to be usefully applied by clinicians, needs to take into account what variables will be most useful to describe the children in relationship to the research question posed. The issue of previous experience having an effect on the health of the refugee child means the research must describe accurately the child's most influential life context. These will be different, depending on what is being measured. For physical health early in resettlement the pre resettlement context is important. Describing the child by nationality or ethnicity may not fully capture their pre resettlement context. Ethnicity has been found to be a very strong indicator of socio-economic status. Refugee status may trump that in early resettlement due to the massive dislocation the child will have undergone to be deemed a refugee. The important

context to record in early resettlement may well be their country of exile because that, along with refugee status will describe their influential geographical and possibly political context.

The finding of this review, on the importance of the pre resettlement context and age, in helping a clinician identify the likelihood of an individual child having acquired an infectious or deficiency disease is important. It highlights that future quantitative research about the physical health of refugee children that is done on arrival or in the first months of resettlement, needs to describe the pre resettlement context clearly, using country of exile rather than county of birth as well as age.

The findings of this review indicate that specific recommendations for future physical health research are as follows:

- All infectious and deficiency diseases related to pre resettlement conditions require longitudinal follow up to assess if the treatment given, such as health care and nutrition, enables the resolution of these issues.

- The effectiveness of treatments for the health conditions in this population need to be researched. Qualitative studies as well as intervention studies maybe needed here to incorporate issues of culture in treatment options.

- Dental health requires a New Zealand comparison, perhaps by checking children teeth on arrival here and then following up longitudinally with demographic data collected by the school dental service which is mandated to provide a free dental service to all children aged under 18 years.

- Research examining the growth characteristics of children from different resettled populations is needed. Such research would ideally be longitudinal to establish whether the weight and height profiles changes over time and in particular whether children who are identified as under or overweight or who have short stature have any change in weight or health status.

- H pylori needs epidemiological studies in children from other regions apart from Africa. The health impact of being infected with H pylori as a child needs longitudinal follow up in the African population with high prevalence.

- Lead levels in refugee children in New Zealand are unknown. Research first needs to screen children on arrival and assess the base line lead levels and prevalence of elevated blood lead levels and if further research or follow up is indicated.

- Vitamin D levels need epidemiological studies in refugee children from Asia and children aged <2 years, who were not well represented in the review findings, as well as longitudinal studies that take into account the known increased risks of being low in vitamin D of subgroups of children.

This review found that it is necessary from the public health perspective to be responsive to the changing demographics of the refugee population and that regular prevalence updates in the form of health status audits from mandatory screening on arrival would be recommended.

Recommendations for future psychological health research are indicated by the gap in psychological research found by this review. Epidemiological research is required to establish the prevalence of psychological illness in children in early resettlement and longitudinally to establish health outcomes in resettlement. The type of predictor in the pre resettlement context may be a little different from that recommended in the physical research as previous psychological research indicates the relationship between experience of the child and psychological distress occurred both in the county from which they fled and also in their country of exile. The family circumstances may also be important to record as all four studies in this review had children of asylum seeking families. The gap in the review on research on the psychological health of refugee children, particularly around the prevalence of PTSD relating to pre resettlement experience or the development of depression in resettlement due to the experience of resettlement is something that must be considered now in New Zealand. Particularly as refugee children aged 0-14 years make up, almost exclusively, the largest proportion by age group of refugees by nationality. Age of the child has to be considered in the impact of their experiences, both because possibly the older the child the more likely it is they will have experienced major damaging life events and with what is known about the very young child stress has the ability to shape the brain and affect the child's health physically and psychologically across their lifespan.

Recommendations for health service research are for research that takes into account the New Zealand context of health service delivery. The research needs to find out what services refugee children use, what issues they and their family encounters and what services they consider are

missing. The descriptions of the refugee child used in the research need to encapsulate the possible causal factors in the outcome being measured, be they language, information, financial or cultural.

Finally, any research that takes place after early arrival that addresses health issues that concern all New Zealand children, that is it is not concerned exclusively with refugee children as a population, is probably best to describe the child by ethnicity as would be the norm in New Zealand. However, being able to tease out children with previous refugee status in these whole population statistics would be very useful to understand how their health outcomes as a special population of children compare with other groups of New Zealand children. It is unclear if identifying them by ethnicity would be enough to identify them as a special population.

The final recommendations relate to the research process and critical appraisal. The RAPid system was used in this review to critically appraise a diverse group of studies. The diversity of the studies added richness and complexity to the critical appraisal process. However the need to use a new question for each study being appraised perhaps limited the ability of the research question to be fully answered. The feasibility of entering the research question for each study may helpfully standardise the process and really target the data extraction from each study.

For methodological rigor the critical review process needs to involve two reviewers before the studies are RAPid reviewed. The RAPid protocol may be usefully enhanced by clearly stating the process of review prior to critical assessment. That step ensures only studies that have met the inclusion and exclusion criteria are critically assessed using the RAPid format.

Strengths and limitations

This review located a body of research, published 2001-2009 that focused on the health of refugee children in resettlement. The population found was generally applicable to the refugee children who resettle in New Zealand and the findings have added child specific prevalence rates for specific infectious and deficiency conditions found in early resettlement as well as extending and updating knowledge regarding health conditions that may affect resettled refugee children.

The major limitation of this review is one of critical assessment. A number of studies (n=8) were not able to be included in the review process because the study design was ultimately not suitable for assessment by the RAPid system. A further 20 papers met inclusion by topic but were not primary studies but literature reviews and expert opinion or discussion papers. This has limited the

type of information utilised in the review and may mean that the evidence has not been fully explored.

The broad focus of the research question with the number of studies and diverse study design retrieved limited the rigour of the review process. The review covered the main results of each study only. In hindsight, an integrated or narrative literature review process rather than a systematic review process would have been a more suitable methodology. Using either an integrative or a narrative process would have still required a rigorous appraisal of the research but would have allowed for the inclusion of more studies that would have been more congruent with the broad focus of the research question.

Review Conclusions

Refugee children as a population have a specific health needs at least in early resettlement. The studies were mainly descriptive and concerned with establishing the population prevalence of infectious or deficiency diseases found in refugee children on arrival or in the first months of resettlement. In addition to providing information that confirmed what is known about the health of refugee children in regards to infectious diseases such as Tb and deficiency diseases such as anaemia, three new findings emerged. These were elevated blood lead levels that increased after arrival in the USA, an 82% rate of H pylori infection in African refugee children in Australia and the widespread prevalence of low vitamin D levels in refugee children in New Zealand and Australia. The levels of evidence were consistent and the large numbers of children sampled added weight to the evidence.

The standard systematic review process was modified for this review due to the broadness of the research question. The main review limitation was the exclusion from the review of nine studies following critical appraisal with RAPid.

The findings were able to inform primary health care nurse evidenced based practice from a population health and an individual care perspective. This review was not able to inform on the health of resettled refugee children except in early resettlement. The review findings had little to say about the socio-economic determinants of health of refugee children in resettlement.

New Zealand has a long standing policy of humanitarian acceptance of refugees for resettlement and will continue to offer refugee children like the little girl introduced in this review, a chance of a

new home and a new life by the process of resettlement. The findings of this review add to previous knowledge about the health of refugee children in resettlement and can be used to inform health policy as well as primary health care nursing practice.

Appendices

Appendix 1. Systematic review methodologies

Greenhalgh 1997* Exhaustive search yes No of reviewers not stated	JBI 2001** Exhaustive search yes 3 phase search No of reviewers not stated	EPPI centre (2006-2009)*** Exhaustive search not necessarily No of reviewers not stated/indicate team	Cochrane (March 2011) **** Exhaustive search detail how exhaustive search No of reviewers not stated/indicate team
1. Objectives & eligibility criteria	1. Identification of a clinical problem	1. Approaches to reviewing 2. (user involvement/different types of review/methodological and other challenges)	1. Plain language summary (for lay people)
2. Search for eligible trials	2. Develop a review protocol	3. Getting started 4. (team & advisory group/setting scope and methods/administrative systems/ assuring quality)	2. Structured abstract
3. Tabulate and critique each trial	3. Locate studies	5. Gathering/ describing research 6. (searching/screening describing/mapping/refining)	3. Background (introduction to the question)
4. Apply eligibility criteria 5. Justify exclusions	4. Select relevant studies	7. Appraising /synthesising the data 8. (quality/relevance/synthesis/conclusions/recommendations/developing the final report)	4. Objectives (short statement of the aims of the review
6. Assemble most complete dataset	5. Appraise the quality of the research	9. Making use of the review 10. (communication/ interpretation/application/updating)	5. Selection criteria (type of study/participant/intervention/outcome measures
7. Analyse by statistical synthesis 8. (Meta-analysis)	6. Collect data from individual studies		6. Search strategy (details of how exhaustive it was)
9. Compare alternative analyses if able	7. Synthesise and summarise the findings of the study		7. Methods of the review(how studies selected/quality assessed/data extracted/analysed etc.

Greenhalgh 1997* Exhaustive search yes No of reviewers not stated	JBI 2001** Exhaustive search yes 3 phase search No of reviewers not stated	EPPI centre (2006-2009)*** Exhaustive search not necessarily No of reviewers not stated/indicate team	Cochrane (March 2011) **** Exhaustive search detail how exhaustive search No of reviewers not stated/indicate team
10. Do critical summary of the review	8. Document method in review report		8. Description of studies (how many/how big etc.
			9. Methodological quality
			10. Results
			11. Discussion
			12. Authors conclusions (implications for practice/Implications for research)

Source:
*Greenhalgh, T. (1997b). Papers that summarise other papers (systematic reviews and meta-analyses). *BMJ, 315*(n7109), 672-675.
**JBIEBNM (2001). An introduction to Systematic Reviews. *Changing Practice*. Sup 1, (Online accessed 17/4/2011) URL:http://www.joannabriggs.edu.au/GP2.pdf
***EPPI-Centre (March 2007). *EPPI-Centre methods for conducting systematic reviews.* London: EPPI-Centre, Social Science Research Unit. Institute of Education, University of London
****Higgins, J. P.T. & Green, S., (editors) *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.1.0 (updated march 2011). The Cochrane Collaboration,2011. Available from www.cochrane-handbook.org

Appendix 2. Review protocol

Research question

What does the published research report about the health of resettled refugee children?

Research objectives

- To find health literature published between 2001-2009 relevant to the refugee children who resettle in New Zealand.
- To critically assess the literature using the RAPid critical appraisal tool, to extract individual study results and to synthesise the findings to update the information available about the health of refugee children in resettlement.
- To compare the review findings with what is known about children's health in New Zealand.
- To discuss the implications of the review findings for primary health care nurse practice.

Search strategy

A two-phase search strategy was used:

Phase 1

- The MEDLINE database was searched by key words and variant endings, refugee* health* (child* or infant* or baby) resettle*
- Boolean logic AND was used to combine the words and OR to expand the age range to include both babies and children.
- Search limits were date range for research published 2001-2009.

Phase 2

- Six electronic bibliographic databases [MEDLINE, Australasian Medical Index (AMI), Academic Onefile, The Cumulative Index to Nursing and Allied Health Literature (CINAHL), Health Source Nursing/Academic Edition and ProQuest Health and Medical Complete] were searched by key words and variant endings, refugee* health* (child* or infant* or baby)
- Boolean logic AND was used to combine the words and OR to expand the age range to include both babies and children.
- Search limits were date range for research published 2001-2009.

- Boolean NOT and the use of further key words camp, displace and detention and the expander OR with variant endings to capture key word derivations was used to increase specificity of the context of the search.

Study selection

First selection

Abstract was reviewed by the first researcher for inclusion by population and context of resettlement.

Second selection

The full text was obtained and read and the content was assessed against the inclusion and exclusion criteria. If inclusion was unclear the second researcher assessed the study and agreement was reached between the researchers for study inclusion or exclusion.

Critical appraisal

- The online Rapid Appraisal Protocol Internet Database (RAPid) programme from the Joanna Briggs Institute was selected as the critical assessment tool.
- Critical appraisal using the RAPid involved the first researcher working through the RAPid critical appraisal process for each study, then submitting the completed RAP to the JBI. A researcher at the JBI then completed an independent critical appraisal of the submitted rap.
- The critical appraisal process using RAPid declined studies that, because of study design did not fit the RAPid appraisal tool. These studies that are declined RAPId assessment and are not included in the review.

Analysis and synthesis

- Analysis and synthesis were informed by the narrative tradition and guided by the range of research, comparing and contrasting the key findings, identifying implications for practice and future research.
- Individual study findings were tabled.
- The individual study results were combined where possible and compared to look for similarities and differences.
- A level of evidence measure was applied to the findings if possible during synthesis.
- The review findings were compared to New Zealand population data if available.

Appendix 3. Excluded research 2001-2009: listed by year/alphabetical

Study	Exclusion criteria
Assefa, F., Jabarkhil, M. Z., Salama, P., & Spiegel, P. (2001). Malnutrition and mortality in Kohistan District, Afghanistan, April 2001. *JAMA, 286*(21), 2723-2728.	Context
Clendon, J., & White, G. (2001). The feasibility of a nurse practitioner-led primary health care clinic in a school setting: A community needs analysis. *J Adv Nurs, 34*(2), 171-178.	Population
Lan, L. Y. (2001). Keynote address by Miss Lee Yoke Lan, 18 Nov 2000. *Singapore Nursing Journal, 28(1)*, 12-17.	Study design
Lifson, A. R., Thai, D., Hang, K. (2001). Lack of immunization documentation in Minnesota refugees: Challenges for refugee preventive health care. *Journal of Immigrant Health, January 2001, 3(1)*, 47-52.	Study design
Lynch, M. A., & Gough, A., (2001). Reaching all children. BMJ, 28 July 2001, 323(7306), 176.	Study design
Lynch, M. A. (2001). Providing health care for refugee children and unaccompanied minors. *Medicine, Conflict and Survival, 17*, 125-130.	Study design
Meddings, D. R. (2001). Civilians and war: A review and historical overview of the involvement of non-combatant populations in conflict situations. *Med Confl Surviv, 17*(1), 6-16.	Context
Mickenautsch, S., & Rudolph, M. J. (2001). Implementation of the ART approach in South Africa: An activity report. *SADJ, 56*(7), 327-329.	Other
Panic, E., & Panic, I. (2001). Chronic alcoholics' knowledge regarding tuberculosis. *Pneumologia, 50*(4), 232-235.	Other
Ratsch, I. M., & Catassi, C. (2001). Coeliac disease: A potentially treatable health problem of Saharawi refugee children. *Bull World Health Organ, 79*(6), 541-545.	Context
Releva, M., Boskovska, M., Apceva, A., Polazarevska, M., Novotni, A., Bonevski, D., et al. (2001). Child and adolescent mental health emergency services in Macedonia. *Int J Emerg Ment Health, 3*(2), 77-81.	Context
Tellep, T. L., Chim, M., Murphy, S., & Cureton, V. Y. (2001). Great suffering, great compassion: A transcultural opportunity for school nurses caring for Cambodian refugee children. *J Transcult Nurs, 12*(4), 261-274.	Population
Tomashek, K. M., Woodruff, B. A., Gotway, C. A., Bloland, P., & Mbaruku, G. (2001). Randomized intervention study comparing several regimens for the treatment of moderate anemia among refugee children in Kigoma Region, Tanzania. *Am J Trop Med Hyg, 64*(3-4), 164-171	Context
Vryheid, R. E. (2001). A survey of vaccinations of immigrants and refugees in San Diego County, California. *Asian Am Pac Isl J Health, 9*(2), 221-230.	Population
Webb, E., Shankleman, J., Evans, M. R., & Brooks, R. (2001). The health of children in refuges for women victims of domestic violence: Cross sectional descriptive survey. *BMJ, 323*(7306), 210-213.	Other
Bartlett, L. A., Jamieson, D., J., Kahn, T., Sultana, M., Wilson, H. G., & Duerr, A. (2002). Maternal mortality among Afghan refugees in Pakistan 1999-2000. *The Lancet, 359*(9307), 639-640.	Population

Study	Exclusion criteria
Bhatia, S., Dranyi, T., & Rowley, D. (2002). A social and demographic study of Tibetan refugees in India. *Social Science and Medicine, 54*(3), 411-423.	Context
Burton, A., & Breen, C. (2002). Older refugees in humanitarian emergencies. *Lancet, 360 Suppl*, s47-48.	Population
Culhane-Pera, K. A., Naftali, E. D., Jacobson, C., & Xiong, Z. B. (2002). Cultural feeding practices and child-raising philosophy contribute to iron-deficiency anemia in refugee Hmong children. *Ethn Dis, 12*(2), 199-205.	Population
Hodes, M. (2002). Three key issues for young refugees mental health. *Transcultural Psychiatry, 39*, 196-213.	Study design
Howden-Chapman, P., & Mackenbach, J. (2002). Poverty and painting: Representations in 19th century Europe. *BMJ, 325*(7378), 1502-1505.	Other
Jonsson, I. M., Wallin, A. M., Hallberg, L. R., & Gustafsson, I. B. (2002). Choice of food and food traditions in pre-war Bosnia-Herzegovina: Focus group interviews with immigrant women in Sweden. *Ethn Health, 7*(3), 149-161.	Population
Lapping, K., Schroeder, D., Marsh, D. R., Albalak, R., & Jabarkhil, M. Z. (2002). Comparison of a positive deviance inquiry with a case-control study to identify factors associated with nutritional status among Afghan refugee children in Pakistan. *Food Nutr Bull, 23*(4 Suppl), 28-35.	Context
Marsh, D. R., Sternin, M., Khadduri, R., Ihsan, T., Nazir, R., Bari, A., et al. (2002). Identification of model newborn care practices through a positive deviance inquiry to guide behavior-change interventions in Haripur, Pakistan. *Food Nutr Bull, 23*(4 Suppl), 109-118.	Context
Maxine, J. & De souza, M. (2002). We cannot fail the refugees. *Paediatric Nursing, October 2002, 14*(8), 3.	Study design
Minas, I. H., & Sawyer, S. M. (2002). The mental health of immigrant and refugee children and adolescents. *Medical Journal of Australia, 177(8)*, 404-405.	Study design
Murray, S., & Skull, S. (2002). Immigrant and refugee health. *Environmental Health, 2*(3), 47-52.	Population
Seal, A., McGrath, M., & Taylor, A. (2002). Infant feeding indicators for use in emergencies: An analysis of current recommendations and practice. *Public Health Nutr, 5*(3), 365-372.	Context
Stauffer, W. M., Kamat, D., & Walker, P. F. (2002). Screening of international immigrants, refugees, and adoptees. *Prim Care, 29*(4), 879-905.	Study design
Townsend, N., Madhavan, S., Tollman, S., Garenne, M., & Kahn, K. (2002). Children's residence patterns and educational attainment in rural South African. *Population Studies, 56*(2), 215-226.	Population
Ahmad, K., (2003) After years of war Kabul struggles to rebuild. *Lancet, 23 Aug 2003, 362*(9384), 622-623.	Context
Bradford, B.F. (2003). Health status of new Americans. *American Journal of Public Health, August 2003, 93*(8), 1200.	Other
Chironna, M., Germinario, C., Lopalco, P. L., Carrozzini, F., Barbuti, S., & Quarto, M. (2003). Immunity to diphtheria among refugees in southern Italy. *Vaccine, 21*(23), 3157-3161.	Context
Chironna, M., Germinario, C., Lopalco, P. L., Carrozzini, F., Barbuti, S., & Quarto, M. (2003). Prevalence rates of viral hepatitis infections in refugee Kurds from Iraq and Turkey. *Infection, 31*(2), 70-74.	Context

Study	Exclusion criteria
Duerr, A., Posner, S. F., & Gilbert, M. (2003). Evidence in support of foster care during acute refugee crises. *American Journal of Public Health, November 2003, 93*(11), 1904-1909.	Context
England, R., Doughty, K., Genc, S., & Putkeli, Z. (2003). Working with refugees: Health education and communication issues in a child health clinic. *Health Education Journal, 62*(4), 359-368.	Population
Guerin, P. B., Diiriye, R. O., Corrigan, C., & Guerin, B. (2003). Physical activity programs for refugee Somali women: Working out in a new country. *Women Health, 38*(1), 83-99.	Population
Ivankovic, A., Lukic, I. K., Ivankovic, Z., Radic, A., Vukic, I., & Simic, A. (2003). Dental caries in postwar Bosnia and Herzegovina. *Community Dent Oral Epidemiol, 31*(2), 100-104.	Population
Johnston, V., & Allotey, P. (2003). Mobilising the chattering classes for advocacy in Australia. *Development, 46*(3), 75-80.	Other
Luxemburger, C., White, N. J., ter Kuile, F., Singh, H. M., Allier-Frachon, I., Ohn, M., et al. (2003). Beri-beri: The major cause of infant mortality in Karen refugees. *Trans R Soc Trop Med Hyg, 97*(2), 251-255.	Context
Child refugee assessment (2003). *Paediatric Nursing, July 2003, 15*(6), 4.	Study design
European child health challenges debated. *Paediatric Nursing, November 2003*	Study design
Renzaho, A. M. N. (2004). Fat, rich and beautiful: chnaging socio-cultural paradigms associated with obesity risk, nutritional status and refugee children from sub-Saharan Africa *Health & Place, 2003*, 105-11	Study design
Podgore, J., Rene, A., Sandhu, R., & Marshall, M. (2003). A health assessment of refugee children from former Yugoslavia in Tarrant County. *Texas Medicine, 99*(6), 50-53.	Population
Renzaho, A., and Renzaho, C. (2003). In the shadow of the volcanoes: The impact of intervention on the nutrition and health status of Rwandan refugee children in Zaire two years on from the exodus. *Nutrition and Dietetics 60 (2)*, 85-91.	Context
Renzaho, A. M., & Burns, C. (2003). More, more, more: Food, fat and African refugee and migrant children. *Asia Pacific Journal of Clinical Nutrition; 12*(Suppl.), S26.	Other
Riddell-Heaney, J., & Allott, M. (2003). Safeguarding children: 4. Needs of refugees and asylum seekers. *Prof Nurse, 18*(9), 533-536.	Study design
Robertson, E., Iglesias, E., Johansson, S. E., & Sundquist, J. (2003). Migration status and limiting long-standing illness: A longitudinal study of women of childbearing age in Sweden. *Eur J Public Health, 13*(2), 99-104.	Population
Rousseau, C., Drapeau, A., & Rahimi, S. (2003). The complexity of trauma response: A 4-year follow-up of adolescent Cambodian refugees. *Child Abuse Negl, 27*(11), 1277-1290.	Population
Schmitz, C. L., Jacobus, M. V., Stakeman, C., Valenzuela, G. A., & Sprankel, J. (2003). Immigrant and refugee communities: Resiliency, trauma, policy and practice. *Practicing Social Justice*, 135-158.	Study design
Sourander, A. (2003). Refugee families during asylum seeking. *Nord J Psychiatry, 57*(3), 203-207.	Context

Study	Exclusion criteria
Stewart, D. E., & Nam Do, B. (2003). Health needs of migrant Vietnamese women in South-West Brisbane: An exploratory study. *Australian Journal of Social Issues, 38*(2), 247-262.	Population
Sunyoung, P. (2003). The growth status of North Korean refugee children in China. *Korea Journal, 43*(3 (Autumn 2003)), 165-190.	Context
Waterston, T. (2003). Inequity in child health as a global issue. *Pediatrics, 112*(3 Part 2), 739-741.	Context
Weine, S. M., Raina, D., Zhubi, M., Delesi, M., Huseni, D., Feetham, S., et al. (2003). The TAFES multi-family group intervention for Kosovar refugees: A feasibility study. *J Nerv Ment Dis, 191*(2), 100-107.	Population
Ahlberg, B. M., Krantz, I., Lindmark, G., & Warsame, M. (2004). "It's only tradition": Making sense of eradication interventions and the persistence of female "circumcision" within a Swedish context. *Critical Social Policy, 24*, 50-77.	Study design
Barton, A. J., Clark, L., & Baramee, J. (2004). Tracking outcomes in community-based care. *Home Health Care Management & Practice, 16*(3), 171-176.	Population
Bjorn, G. J., & Bjorn, A. (2004). Ethical aspects when treating traumatized refugee children and their families. *Nordic Journal of Psychiatry, 58*, 193-198.	Study design
Calvert, G. (2004). Childhood in detention. *Australian and New Zealand Journal of Family Therapy, 25(2)*, 113-114	Context
Cohen, M. M., & Maclean, H. (2004). Violence against Canadian Women. *BMC Womens Health, 4 Suppl 1*, S22.	Population
Cropley, L. (2004). Malaria treatment seeking practices among mothers in rural refugee villages in Belize, Central America, a qualitative study. *International Quarterly of Community Health Education, 22*(1&2), 3-16.	Population
Davidson, N., Skull, S., Burgner, D., Kelly, P., Raman, S., Silove, D., et al. (2004). An issue of access: Delivering equitable health care for newly arrived refugee children in Australia. *The Journal of Paediatrics and Child Health, 40(9-10)*, 569-575.	Study design
Davidson, N., Skull, S., Chaney, G., Frydenberg, A., Isaacs, D., Kelly, P., et al. (2004). Comprehensive health assessment for newly arrived refugee children in Australia. *The Journal of Paediatrics and Child Health, 40(9-10)*, 562-568.	Study design
Gagnon, A. J., Tuck, J., & Barkun, L. (2004). A systematic review of questionnaires measuring the health of resettling refugee women. *Health care for Women International, 25*(2), 111-149.	Population
Gracey, M. (2004). Caring for the health and medical and emotional needs of children of migrants and asylum seekers. *Acta Paediatricia, 93*, 1423-1426.	Study design
Herrel, N., Olevitch, L., DuBois, D. K., Terry, P., Thorp, D., Kind, E., et al. (2004). Somali refugee women speak out about their needs for care during pregnancy and delivery. *J Midwifery Womens Health, 49*(4), 345-349.	Population
Hogberg, U. (2004). An "American dilemma" in Scandinavian childbirth: Unmet needs in health care? *Scand J Public Health, 32*(1), 75-77.	Population
Leavey, G., Hollins, K., King, M., Barnes, J., Papadopoulos, C., & Grayson, K. (2004). Psychological disorder amongst refugee and migrant schoolchildren in London. *Soc Psychiatry Psychiatr Epidemiol, 39*(3), 191-195.	Population

Study	Exclusion criteria
Martijn, C., de Vries, N. K., Voorham, T., Brandsma, J., Meis, M., & Hospers, H. J. (2004). The effects of AIDS prevention programs by lay health advisors for migrants in the Netherlands. *Patient Educ Couns, 53*(2), 157-165.	Population
Prlic, L., Ebling, Z., Glavina, K., Gmajnic, R., Vuletic, G., Kovacic, L., et al. (2004). Health of returnees in Osijek Region and required special measures of health care and community organization. *Coll Antropol, 28 Suppl 2*, 345-356.	Population
Regmi, S. K., Pokharel, A., Ojha, S. P., Pradhan, S. N., & Chapagain, G. (2004). Nepal mental health country profile. *Int Rev Psychiatry, 16*(1-2), 142-149.	Other
Shaikh, I., Bharmal, F. Y., Omair, A., & Inam, S. N. (2004). Census survey for a primary health care programme. *J Pak Med Assoc, 54*(4), 192-195.	Other
Shields, L., Stathis, S., Mohay, H., van Haeringen, A., Williams, H., Wood, D., et al. (2004). The health of children in immigration detention: How does Australia compare? *Aust N Z J Public Health, 28*(6), 513-519.	Context
Singh, S. (2004). Tears from the land of snow: Health and human rights in Tibet. *Lancet, 364*(9438), 1009.	Other
Crockett, M. (2005). New faces from faraway places: Immigrant child health in Canada. *Paediatr Child Health, 10*(5), 277-281.	Study design
Daley, T. C. (2005). Beliefs about treatment of mental health problems among Cambodian American children and parents. *Social Science and Medicine, 61*(11), 2384-2396.	Population
Devi, S. (2005). Protecting the mental health of Gaza's inhabitants. *Lancet, 365*(9465), 1125-1126.	Context
Diel, R., Helle, J., & Gottschalk, R. (2005). Transmission of hepatitis B in Hamburg, Germany, 1998-2002: A prospective, population-based study. *Med Microbiol Immunol, 194(4)*, 193-199.	Population
Drennan, V. M., & Joseph, J. (2005). Health visiting and refugee families: Issues in professional practice. *J Adv Nurs, 49*(2), 155-163.	Population
Evans, S., & Preboth, M. (2005). Practice guideline briefs. *American Family Physician, 72*(12), 2553-2554.	Population
Han, M. (2005). Relationship among perceived parental trauma, parental attachment, and a sense of coherence in Southeast Asian American college students. *Journal of Family Social Work, 9*(2), 25-45.	Population
Hodes, M., & Tolmac, J. (2005). Severely impaired young refugees. *Clinical Child Psychology and Psychiatry, 10*(2), 251-261.	Study design
JAMA. (2005). This week in JAMA. *Journal of the American Medical Association, 294*(5), 523.	Context
Kaddour, A., Hafez, R., & Zurayk, H. (2005). Women's perceptions of reproductive health in three communities around Beirut, Lebanon. *Reprod Health Matters, 13*(25), 34-42.	Population
Kell, B., & Hawkins, F. (2005). Collaboration in eczema care: A case study. *Paediatric Nursing, 17*(4), 30-33.	Population
Kellenberg, J., Dipentima, R., Maruyama, M., Caron, R., Campbell, C., Alexakos, P., et al. (2005). Elevated blood lead levels in refugee children - New Hampshire, 2003-2004. *Morbidity and Mortality Weekly Report, 54*(2), 42-46.	Study design

Study	Exclusion criteria
Magnusson, M. B., Hulthen, L., & Kjellgren, K. I. (2005). Obesity, dietary pattern and physical activity among children in a suburb with a high proportion of immigrants. *J Hum Nutr Diet, 18(3)*, 187-194.	Population
McBrien, J. L. (2005). Educational needs and barriers for refugee students in the United States: A review of the literature. *Review of Educational Research, 75*(3), 329-365.	Context
Measham, T., Rousseau, C., & Nadeau, L. (2005). The development and therapeutic modalities of a transcultural child psychiatry service. *Can Child Adolesc Psychiatr Rev, 14*(3), 68-72.	Population
Minde, K. (2005). Transcultural child psychiatry: Its history, present status and future challenges. *Can Child Adolesc Psychiatr Rev, 14*(3), 81-84.	Population
Mjones, S. (2005). Refugee children - a concern for European paediatricians. *European Journal of Pediatrics, 164*(9), 535-538.	Study design
Nadeau, L., & Measham, T. (2005). Immigrants and mental health services: Increasing collaboration with other service providers. *Can Child Adolesc Psychiatr Rev, 14*(3), 73-76.	Population
Noji, E. K. (2005). Public health in the aftermath of disasters. *BMJ, 330*(7504), 1379-1381.	Context
Procter, N. (2005). "They first killed his heart (then) he took his own life" Part 1: A review of the context and literature on mental health issues for refugees and asylum seekers. *International Journal of Nursing Practice, 11*(6), 286-291.	Population
Ringel, S., Ronell, N., & Getahune, S. (2005). Factors in the integration process of adolescent immigrants: The case of Ethiopian Jews in Israel. *International Social Work, 48*(1), 63-66.	Population
Rossi, L., Mangasaryan, N., & Branda, F. (2005). Nutritional status and poverty assessment of vulnerable population groups in Armenia. *Social and Preventative Medicine, 50*(3), 166-177.	Context
Rousseau, C., Lacroix, L., Singh, A., Gauthier, M. F., & Benoit, M. (2005). Creative expression workshops in school: Prevention programs for immigrant and refugee children. *Can Child Adolesc Psychiatr Rev, 14*(3), 77-80.	Population
Stovall, C. E. (2005). "Good help" in St. Petersburg. *Health Prog, 86*(1), 30-34, 61.	Other
Walker, S. (2005). Towards culturally competent practice in child and adolescent mental health. *International Social Work, 48*, 49-62.	Study design
Avdibegovic, E., & Sinanovic, O. (2006). Consequences of domestic violence on women's mental health in Bosnia and Herzegovina. *Croat Med J, 47*(5), 730-741.	Population
Bean, T., Mooijart, A., Eurelings-Bontekoe, E., & Spinhoven, P. (2006) Validation of the child behavior checklist for guardians of unaccompanied refugee minors	Population
Caruana, S. R., Kelly, H. A., Ngeow, J. Y. Y., Ryan, N. J., Bennett, C. M., Chea, L., et al. (2006). Undiagnosed and potentially lethal parasite infections among immigrants and refugees in Australia. *Journal of Travel Medicine, 13*(4), 233-240.	Population
Centre for Disease Control (2006). Brief report: Imported case of congenital rubella syndrome, New Hampshire 2005. *JAMA, 295*(5), 492-495.	Context

Study	Exclusion criteria
Ehntholt, K. A., & Yule, W. (2006). Practitioner review: Assessment and treatment of refugee children and adolescents who have experienced war-related trauma. *Journal of Child Psychology and Psychiatry, 47*(12), 1197-1210.	Study design
Gagnon, A. J., Wahoush, O., Dougherty, G., Saucier, J. F., Dennis, C. L., Merry, L., et al. (2006). The childbearing health and related service needs of newcomers (CHARSNN) study protocol. *BMC Pregnancy Childbirth, 6*, 31.	Population
Hadley, C., & Sellen, D. (2006). Food security and child hunger among recently resettled Liberiaan refugees and asylum seekers: A pilot study. *Journal of Immigrant Health, 8, 369-375.*	Population
International Social Work (2006). Abstracts (English, French, Spanish, Chinese, Arabic). *International Social Work, 49*(1), 119-124.	Other
Kohli, R. K. S. (2006). The comfort of strangers: Social work practice with unaccompanied asylum-seeking children and young people in the Uk. *Child and Family Social Work, 11*(1), 1-11.	Population
Leask, J., Sheik-Mohammed, M., MacIntyre, C. R., Leask, A., & Wood, N. J. (2006). Community perceptions about infectious disease risk posed by new arrivals: A qualitative study. *Medical Journal of Australia, 185*(11/12), 591-593.	Population
Melvin, C. S. (2006). A collaborative community-based oral care program for school-age children. *Clin Nurse Spec, 20*(1), 18-22.	Population
Montgomery, E., Foldspang, A. (2006). Validity of PTSD in a sample of refugee children: can a separate diagnostic entity be justified? *International Journal of Methods in Psychiatric Research, 01 June 2006, 15(2)*, 64-74.	Other
Nadeau, L., & Measham, T. (2006). Caring for migrant and refugee children: Challenges associated with mental health care in pediatrics. *J Dev Behav Pediatr, 27*(2), 145-154.	Study design
Sheikh-Mohammed, M., MacIntyre, C. R., Wood, N. J., Leask, J., & Isaacs, D. (2006). Barriers to access to health care for newly resettled sub-Saharan refugees in Australia. *Med J Aust, 185*(11-12), 594-597.	Population
Sossou, M.-A. (2006). Mental health services for refugee women and children in Africa. *International Social Work, 49*(1), 9-16.	Context
Starnes, B. W. (2006). Peacekeeping and stability operations: A military surgeon's perspective. *Surg Clin North Am, 86*(3), 753-763.	Other
Tober, D. M., Taghdisi, M., & Jalali, M. (2006). "Fewer children, better life" or "as many as God wants"? Family planning among low-income Iranian and Afghan refugee families in Isfahan, Iran. *Medical Anthropology quarterly, 20*(1), 50-71.	Population
Wagget, J., & Robinson, H. (2006). Health drop-in for young asylum seekers. *Practice Nurse, 31*(1), 15-17.	Population
Warfa, N., Bhui, K., Craig, T., Curtis, S., Mohamud, S., Stansfeld, S., et al. (2006). Post-migration geographical mobility, mental health and health service utilisation among Somali refugees in the UK: A qualitative study. *Health Place, 12*(4), 503-515.	Population
Alavian, S. M., Fallahian, F., & Lankarani, K. B. (2007). The changing epidemiology of viral hepatitis B in Iran. *J Gastrointestin Liver Dis, 16*(4), 403-406.	Population

Study	Exclusion criteria
Barnett, L. (2007). Psychosocial effects of the Chernobyl nuclear disaster. *Med Confl Surviv, 23*(1), 46-57.	Population
Benson, J., & Donohue, W. (2007). Hepatitis in refugees who settle in Australia. *The Australian Family Physician, 36(9)*, 719.	Study design
Gagnon, A., Dougherty, G., Platt, R., Wahoush, O., George, A., Stanger, E., et al. (2007). Refugee and refugee-claimant women and infants post-birth: Migration histories as a predictor of Canadian health system response to needs. *Canadian Journal of Public Health, 98*(4), 287.	Population
Hadley, C., Zodhiates, A., & Sellen, D. W. (2007). Acculturation, economics and food insecurity among refugees resettled in the USA: A case study of West African refugees. *Public Health Nutr, 10*(4), 405-412.	Population
Leavey, G., Guvenir, T., Haase-Casanovas, S., & Dein, S. (2007). Finding Help: Turkish-speaking refugees and migrants with a history of psychosis. *Transcultural Psychiatry, 44*(2), 258-274.	Population
Madanat, H., Farrell, R., Merrill, R., & Cox, E. (2007). Breastfeeding education support and barriers among Iraqi refugee women in Jordan. *International Electronic Journal of Health Education, 10*, 138-149.	Population
Simich, L. P., Wu, F. M., & Nerad, S. M. (2007). Status and health security: An exploratory study of irregular immigrants in Toronto. *Canadian Journal of Public Health, 98*(5), 369.	Population
Sward, H., Borjeson, M., & Hjern, A. (2007). Groups 'in the margins'. *International Journal of Social Welfare, Volume*16, Issue Supplement s1, pages S219-S232, July 2007.	Study design
Ukoko, F. (2007). Childbearing women with no recourse to public funds: The health and social implications. *Midwifery Digest, 17*(4), 585-588.	Population
Vaage, A. B., Garlov, I., Hauff, E., & Thomsen, P. H. (2007). Psychiatric symptoms and service utilization among refugee children referred to a child psychiatry department: A retrospective comparative casenote study. *Transcult Psychiatry, 44*(3), 440-458.	Population
Zwi, K., Raman, S., Burgner, D., Faniran, S., Voss, L., Blick, B., et al. (2007). Towards better health for refugee children and young people in Australia and New Zealand. *Journal of Pediatrics and Child Health, 43(7-8)*, 522-526.	Study design
Achenbach, T. M., Becker, A., Dopfner, M., Heiervang, E., Roessner, V., Steinhausen, H. C., et al. (2008). Multicultural assessment of child and adolescent psychopathology with ASEBA and SDQ instruments: Research findings, applications, and future directions. *J Child Psychol Psychiatry, 49*(3), 251-275.	Population
Benson, J., & Williams, J. (2008). Age determination in refugee children. T*he Australian Family Physician, 37(10)*, 821.	Study design
Bradt, D. A., and Drummond, C. M. (2008). Delayed recognition of excess mortality in West Timor. *Emergency Medicine Australasia, 20(1)*, pages 70-77.	Context
Brown, M. J. (2008). Childhood lead poisoning prevention: Getting the job done by 2010. *J Environ Health, 70*(6), 56-57.	Population
Chang, J., Rhee, S., & Berthold, S. M. (2008). Child abuse and neglect in Cambodian refugee families: Characteristics and implications for practice.	Population

Study	Exclusion criteria
Daud, A., Klinteberg, B. A. F., & Rydelius, P.-A. (2008). Trauma, PTSD and personality: The relationship between prolonged traumatization and personality impairments. *Scandinavian Journal of Caring Sciences, 22*(3), 331-341.	Population
Geltman, P., Grant-knight, W., Ellis, H., & Landgraf, J. (Writer) (2008). The "Lost Boys" of Sudan: Use of health services and functional health outcomes of unaccompanied refugee minors resettled in the U.S.	Population
Goldin, S., Hagglof, B., Levin, L., & Persson, L. A. (2008). Mental health of Bosnian refugee children: A comparison of clinician appraisal with parent, child and teacher reports. *Nord J Psychiatry, 62*(3), 204-216.	Study design
Guttmann, A., Manuel, D., Stukel, T. A., DesMeules, M., Cernat, G., & Glazier, R. H. (2008). Immunization coverage among young children of urban immigrant mothers: Findings from a universal health care system. *Ambulatory Pediatrics, 8*(3), 205.	Population
Health & Social Care in the Community (2008). Books received for review. *Health & Social Care in the Community, 16*(2), 218.	Other
Iliadi, P. (2008). Refugee women in Greece: - A qualitative study of their attitudes and experience in antenatal care. *Health Science Journal, 2*(3), 173-180.	Population
Montgomery, E. (2008). Self- and parent assessment of mental health: disagreement on externalizing and internalizing behaviour in young refugees from the Middle East. *Clin Child Psychol Psychiatry, 13*(1), 49-63.	Population
Murray, L., Cohen, J. A., Ellis, B. H., & Mannarino, A. (2008). Cognitive behavioural therapy for symptoms of trauma and traumatic grief in refugee youth. *Child and Adolescent Psychiatric Clinics of North America 17*(3), 585-604.	Population
Raphael, B., Taylor, M., & McAndrew, V. (2008). Women, catastrophe and mental health. *Aust N Z J Psychiatry, 42*(1): 13-23.	Population
Rees, S. J., van de Pas, R., Silove, D., & Kareth, M. (2008). Health and human security in West Papua. *Medical Journal of Australia, 189(11-12)*, 641-643.	Context
Rousseau, C., ter Kuile, S., Munoz, M., Nadeau, L. M. D., Ouimet, M. M. D., Kirmayer, L., et al. (2008). Health care access for refugees and immigrants with precarious status: Public health and human right challenges. *Revue Canadienne De Sante Publique 99*(4), 290.	Population
Rousseau, C., & Guzder, J. (2008). School-based prevention programs for refugee children. *Child Adolesc Psychiatr Clin N Am, 17*(3), 533-549, viii.	Study design
Sanders, S., Barnett, A., Correa-Velez, I., Coulthard, M., & Doust, J. (2008). Systematic review of the diagnostic accuracy of C- reactive protein to detect bacterial infection in nonhospitalized infants and children with fever. *Journal of Pediatrics, 153*(4), 570-574.	Population
Skull, S. A., Ngeow, J. Y., Hogg, G., & Biggs, B. A. (2008). Incomplete immunity and missed vaccination opportunities in East African immigrants settling in Australia. *J Immigr Minor Health, 10*(3), 263-268.	Population
Tafuri, S., Prato, R., Martinelli, D., Calvario, A., Bozzi, A., Labianca, M., et al. (2008). Serological survey on immunity status against polioviruses in children and adolescents living in a border region, Apulia (Southern Italy). *BMC Infect Dis, 8*, 150.	Population

Study	Exclusion criteria
Vaiou, D., & Stratigaki, M. (2008). From settlement to integration: Informal practices and social services for women migrants in Athens. *European Urban and Regional Studies, 15*(2), 119-131.	Population
Vangen, S., Eskild, A., & Forsen, L. (2008). Termination of pregnancy according to immigration status: A population-based registry linkage study. *BJOG, 115*(10), 1309-1315.	Population
von Lersner, U., Wiens, U., Elbert, T., & Neuner, F. (2008). Mental health of returnees: Refugees in Germany prior to their state-sponsored repatriation. *BMC Int Health Hum Rights, 8*, 8.	Population
Allden, K., Jones, L., Weissbecker, I., Wessells, M., Bolton, P., Betancourt, T. S., et al. (2009). Mental health and psychosocial support in crisis and conflict: report of the Mental Health Working Group. *Prehosp Disaster Med, 24 Suppl 2*, s217-227.	Context
Atwell, R., Gifford, S. M., & McDonald-Wilmsen. B (2009). Resettled refugee families and their children's futures: Coherence, hope and support.(Report). *Journal of Comparative Family Studies, 40*(4), 677-701.	Population
Azarpazhooh, A., & Main, P. A. (2009). Fluoride varnish in the prevention of dental caries in children and adolescents: A systematic review. *Hawaii Dent J, 40*(1), 6-7, 10-13; quiz 17.	Population
Betancourt, T. S., Bass, J., Borisova, I., Neugebauer, R., Speelman, L., Onyango, G., et al. (2009). Assessing local instrument reliability and validity: A field-based example from northern Uganda. *Soc Psychiatry Psychiatr Epidemiol, 44*(8), 685-692.	Context
Cloitre, M. (2009). Effective psychotherapies for posttraumatic stress disorder: a review and critique. *CNS Spectr, 14*(1 Suppl 1), 32-43.	Population
Crowley, C. (2009). The mental health needs of refugee children: A review of the literature and implications for nurse practitioners. *Journal of the American Academy of Nurse Practitioners, 21*, 322-331.	Study design
de Anstiss, H., Ziaian, T., Proctor, N., Warland, J., & Baghurst, P. (2009). Help-seeking for mental health problems in young refugees: A review of the literature with implications for policy, practice, and research. *Transcultural Psychiatry, 46*, 584-607.	Study design
Gissler, M., Alexander, S., MacFarlane, A., Small, R., Stray-Pederson, B., Zeitlin, J., et al. (2009). Still births and infant deaths among migrants in industralized countries. *Acta obstetrica et gynecologica Scandinavica, 88* (2), 134-138.	Population
Koh, A., Zwi, K., & Walls, T. (2009). How to treat: Newly arrived refugee children. *Australian Doctor*(30 January 2009), 21-28.	Study design
Mental Health Weekly (2009). Minnesota studies surge in child autism rates in Somali refugees. *Mental Health Weekly*.	Other
Nightingale, S., Stormon, M. O., Day, A. S., Webber, M. T., Ward, K. A., & O'Loughlin, E. V. (2009). Chronic hepatitis B & C infection in children in NSW. *The Medical Journal of Australia, 15 June 2009, 190(12)*, 670-673.	Population
Nursing Ethics (2009). News. *Nursing Ethics, 16*(2), 253-254.	Study design

Study	Exclusion criteria
Patil, C., Hadley, C., & Nahayo, P. (2009). Unpacking dietary acculturation among new Americans: Results from formative research with African refugees. *Journal of Immigrant and Minority Health, 11*(5), 342-358.	Population
Rosa, K. C., & Suong, M. (2009). Recognizing health with pregnant Cambodian American women by finding meaning in relationship. ANS, 32(4), 322.	Population
Rousseau, C., Benoit, M., Lacroix, L., & Gauthier, M. (2009). Evaluation of a sandplay program for preschoolers in a multiethnic neighbourhood. *Journal of Child Psychology and Psychiatry, 50*(6), 743-750.	Population
Vaage, A. B., Tingvold, L., Hauff, E., Ta, T. V., Wentzel-Larsen, T., Clench-Aas, J., et al. (2009). Better mental health in children of Vietnamese refugees compared with their Norwegian peers - a matter of cultural difference? *Child Adolesc Psychiatry Ment Health, 3*(1), 34.	Population
Wahoush, E. O. (2009). Equitable health-care access: The experiences of refugee and refugee claimant mothers with an ill preschooler. *Can J Nurs Res, 41*(3), 186-206.	Population

Appendix 4. Unsuccessful RAPid assessment

Study	Reason for unsuccessful assessment
Brodine, S. K., Thomas, A., Huang, R., Harbertson, J., Mehta, S., Leake, J., et al. (2009). Community based parasitic screening and treatment of Sudanese refugees: Application and assessment of Centers for Disease Control guidelines. *Am J Trop Med Hyg, 80*(3), 425-430.	Prevalence study
Cherian, S., Forbes, D., Sanfilippo, F., Cook, A., & Burgner, D. (2009). Helicobacter pylori, helminth infections and growth: A cross-sectional study in a high prevalence population. *Acta Paediatricia, 98*, 860-864.	Cross sectional study
Christiansen, D., & Barnett, E. D. (2004). Comparison of varicella history with presence of varicella antibody in refugees. *Vaccine, 22*(31-32), 4233-4237.	Cross sectional study
Entzel, P. P., Fleming, L. E., Trepka, M. J., & Squicciarini, D. (2003). The health status of newly arrived refugee children in Miami-Dade County, Florida. *Am J Public Health, 93*(2), 286-288.	Screening study
Fox, P., Rosetti, J., Burns, K., & Popovich, J. (2005). Southeast asian refugee children: A school-based mental health intervention. *The International Journal of Psychiatric Nursing Research, 11*(1), 1127-1233.	Intervention study (no control group) not able to be critiqued at JBI
Michelson, D., & Sclare, I. (2009). Psychological needs, service utilization and provision of care in a specialist mental health clinic for young refugees: A comparative study. *Clinical Child Psychology and Psychiatry, 14*, 273-296.	Comparative study
Sheik, M., & MacIntyre, C. R. (2009). The inpact of intensive health promotion to a targeted refugee population on utilisation of a new refugee paediatric clinic at the children's hospital at Westmead. *Ethnicity and Health, 14*(4), 393-405.	Not reviewed by JBI in time for review inclusion
Wiese, E. B. P & Burhorst, I. (2007). The mental health of asylum-seeking and refugee children and adolescents attending a clinic in the Netherlands. *Transcultural Psychiatry, 44*, 596-613.	Descriptive retrospective cohort study
Zabel, E. P. M., Smith, M. R. P., & O'Fallon, A. R. M. (2008). Implementation of CDC refugee blood lead testing guidelines in Minnesota. *Public Health Reports, 123*(March- April), 111.	Longitudinal study

Appendix 5. Physical disease prevalence comparisons

Disease	Study	Measurement parameter	Refugee children Overall prevalence	Whole* Refugee population Prevalence	Other Population Prevalence
Anaemia	Geltman et al. 2001	Hb <age/sex 5% cut off value	12% (153/1247)		**NZ children 5-14 yrs Anaemia (hb<115 5-7 yrs, <119 8-11 yrs) 5.6%
	Cherian et al. 2008 (b)	Iron Deficiency Anaemia (age/gender norms)	13% (24/181)		
	Raman et al. 2009	nr	25% (62/250)		
	Sheik et al. 2009	Low ferritin (<15ug/L) Anaemia (not defined)	17% (36/216) 15% (x/239)	Iron therapy prescribed for ferritin below normal limits 22%(646/2894)	** NZ children 5-14 yrs iron def (≥2 abnormal blood measures) 1.6%
Growth	Geltman et al. 2001	Overweight (weight for height) Underweight (weight for height)	7% (66/964) 2% (23/964)		** NZ children 5-14 yrs Overweight 21.3% Obese (international standards) 9.8%
Dental Caries	Geltman et al 2001	Dental abnormalities (mainly caries)	62% (1063/1702)	nr	******NZ children 2-17 yrs No Caries 50%
	Cote et al. 2004	Untreated caries	49% (115/224)		USA Children (Cote et al.) 23%

Disease	Study	Measurement parameter	Refugee children Overall prevalence	Whole* Refugee population Prevalence	Other Population Prevalence
H pylori	Cherian et al 2008(a)	+MFAT	82% (149/182)	nr	***** NZ children 11-12 yrs (serology + H pylori) European 7% Maori 21% Pacific 48%
Parasitic disease	Geltman et al. 2001	Pathogenic parasites	21% (344/1642)		nr
	Cherian et al. 2008 (b)	Helminths	42% (76/181)		
	Raman et al. 2009	Schistosomiasis	27% (64/239)	21% (620/2825)	
	Sheik et al. 2009	Schistosomiasis	18% (37/207)		
Tb	Geltman et al. 2001	Positive PPD	25% (440/1737)	Latent13% (183/1405)	*******NZ children 0-14 yrs 2004 rate 3.2/100,100 "other" ethnicity 2004 78.1/100,000
	Raman et al. 2009	+Mantoux plus CXR	5% (5/106)	Active 2% (28/1405)	
	Sheik et al. 2009	Mantoux ≥ 15mm	23% (51/219)		
Vitamin D	Wishart et al. 2007	Serum 25-hydroxyvitamin D< 25nmol/L	11% (47/420)	nr	***NZ children 5-14 yrs deficient(<17.5nmol/L) 4% insufficient (<37.5nmol/L) 31%
		Serum 25-hydroxyvitamin D 25-50nmol/L	41% (173/420)		
	Raman et al. 2009	Low Vit D (parameters not defined)	20% (28/139)		

Disease	Study	Measurement parameter	Refugee children Overall prevalence	Whole* Refugee population Prevalence	Other Population Prevalence
	Sheik et al. 2009	Serum 25-hydroxyvitamin D< 50nmol/L	61% (129/210)		

Source

* McLeod, A., & Reeve, M. (2005). The health status of quota refugees screened by New Zealands's Auckland Public Health Service between 1995-2000. *The New Zealand Medical Journal, 118*(1224), 1-17

** Ministry of Health (2003b). *NZ Food NZ children: Key results of the 2002 National Children's Nutritional Survey.* . Wellington: Ministry of Health.

*** Rockell, J. E., Green, T. J., Skeaff, C. M., Whiting, S. J., Taylor, R. W., Williams, S. M., et al. (2005). Season and ethnicity are determinants of serum 25-hydroxyvitamin D concentrations in New Zealand children aged 5-14 y. *J Nutr, 135*(11), 2602-2608.

**** Ministry of Health (2007). *The Environmental Case Management of Lead-exposed Persons: Guidelines for Public Health Units; Revised edition.*

*****Fraser, A. G., Scragg, R., Metcalf, P., McCullough, S., & Yeates, N. J. (1996). Prevalence of Helicobacter pylori infection in different ethnic groups in New Zealand children and adults. *Aust N Z J Med, 26*(5), 646-651.

****** Ministry of Health (2010). *Our Oral Health: Key findings of the 2009 New Zealand Oral Health Survey*.

******* Ministry of Health (2006). *Immunisation Handbook*. Wellington: Ministry of Health

Appendix 6. Health education resources

Title	Languages	Source
Healthy family food	Amharic, Arabic, Bengali, Rohingya, Burmese, Chin, Dari, Dinka, English, Farsi, French, Kirundi, Lingala, Nepali, Pashtu, Somali, Spanish, Swahili, Tigrinya	Auckland Regional Public Health Service www.refugeehealth.govt.nz
Healthy food and drinks	English, Somali, Farsi, Arabic	Regional Public health www.healthed.govt.nz
First foods for South Asian babies	English	Auckland District Health Board
First foods for Chinese babies	Cantonese	Auckland Regional Public Health Service
Taking care of teeth	Amharic, Arabic, Dinka, English, French, Lingala. Somali, Swahili, Tigrinya	Auckland Regional Public Health www.refugeehealth.govt.nz
Caring for teeth	Pictures and short captions in English	Regional Public health www.healthed.govt.nz
Dental Services in New Zealand	Amharic, Arabic, Burmese, Dari, English, Farsi, Nepali, Pashtu, Spanish.	Auckland Regional Public Health www.refugeehealth.govt.nz
Latent Tuberculosis Infection	Amharic, Arabic, Chinese, English, Farsi. Somali	Auckland Regional Public Health www.refugeehealth.govt.nz Regional Public Health www.healthed.govt.nz
Sunsmart	Arabic, Tibetian, Burmese, Chin, Dari, French, Tugrinya)	Auckland Regional Public Health www.refugeehealth.govt.nz
Getting your medicines from the chemist (pharmacy)	Amharic, Arabic, Burmese, English, Farsi, Pastu. Somali	Auckland Regional Public Health www.refugeehealth.govt.nz
Maternity services in NZ	Arabic, Burmese, English, Farsi, Somali	As above
NZ Health Services	Arabic, Tibetian, Burmese, chin, Dari, English, French, Nepali, Spanish, Tigrinya	As above
Primary Health Care: PHOs	Amharic, Arabic, Dari, English, Farsi, Pashtu, Somali,	As above
Public Health Screening Clinic	Arabic, Bengali, Chinese, Czech, English, Farsi, Punjabi, Tamil	As above
Using St Johns Services to get hospital appointments	Amharic, Arabic, Farsi, Pashtu, Somali	As above

Title	Languages	Source
When your doctor refers you to a specialist at the hospital	Amharic, Arabic, Burmese, English, Farsi, Nepali, Pashtu, Somali, Spanish	As above

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