

Socio-economic and demographic factors
influencing immunisation access in
children of self-settled Mozambican refugees
and South African children in the Agincourt
sub-district, Mpumalanga, South Africa

by

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Abstract

Immunisations are one of the most important interventions to decrease mortality and provide a foundation for a successful health system. Eliminating disparities in immunisation access is needed to meet immunisation coverage goals. Although migrants have been identified as influencing recent measles outbreaks in South Africa, research on access to immunisations is lacking for migrants in the country. Numerous barriers to accessing health care have been reported for international migrants in South Africa despite official policies of equal access. Children of Mozambican refugees may be a vulnerable group and not being immunised because of their migration status or other socio-economic and demographic factors.

This study aims to determine immunisation rates in rural South Africa and identify socio-economic and demographic factors influencing immunisation access including being a child of a refugee. All children under 5 years during 2003 and 2006 censuses in the Agincourt sub-district, Mpumalanga, South Africa (N=17,532) are included in this retrospective, nested cross-sectional multivariate analysis of immunisation access community level data.

Immunisation rates are approximately 85% for the first immunisation but rates for subsequent dosing decreased and only 5% of children of appropriate age obtained all immunisations on the South African immunisation schedule. Children of former Mozambican refugees were significantly more likely to be immunised than South African children (OR=1.59, p=0.018) controlling for other socio-economic and demographic characteristics. Children who lived in a village with a clinic (OR=1.43, p=0.015), children with older mothers (OR=1.02, p=0.028), and children in households with higher wealth (OR=1.13, p=0.033) were also more likely to be immunised. Strategies for increasing immunisation access should focus on delivery of services to villages without health care facilities, providing support and outreach to poorer and younger mothers, and ensuring continuing engagement with the immunisation programme.

This study adds to the sparse existing research on predictors of immunisation access in South Africa as well as health care access for refugees in South Africa. This research shows that health care access can be higher for international migrants than the host population. Policymakers can use this research to target vulnerable groups to decrease disparities.

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Declaration

Submitted in partial fulfilment of the requirements for the degree of
Masters of Development Studies, in the Graduate Programme in
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Durban, South Africa.

I declare that this dissertation is my own unaided work. All citations, references and borrowed ideas have been duly acknowledged. It is being submitted for the degree of
Masters of Development Studies in the Faculty of Humanities,
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Africa. None of the present work has been submitted previously for any degree or
examination in any other University.

Student signature

Date

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List of acronyms

AHPU	Agincourt Health and Population Unit
AHSDSS	Agincourt Health and Socio-Demographic Surveillance System
BCG	Bacillus Calmette-Guérin
DHIS	District Health Information System
DTP	Diphtheria, Tetanus, Pertussis
FRELIMO	Frente de Libertação de Moçambique (Liberation Front of Mozambique)
HepA	Hepatitis A
HepB	Hepatitis B
Hib	Haemophilus influenzae B
HIV	Human Immunodeficiency Virus
HPV	Human Papilloma Virus
PCV	Pneumococcal conjugate vaccine
RENAMO	Resistência Nacional Moçambicana (Mozambique National Resistance)
RTHC	Road to Health Card
RV	Rotavirus
SADC	South African Development Community
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
WHO	World Health Organisation

Chapter 1: Introduction

1.1: Importance of immunisation

Immunisations were first developed in the scientific community during the second half of the 18th century. Immunisation protects against infectious diseases by inducing the body's natural defences to develop a protection against a disease. Worldwide, immunisations have been important in reducing the burden of infectious diseases. Immunisations are responsible for the eradication of smallpox and nearly eliminating polio. In addition, an estimated two million deaths and 600,000 cases of liver cirrhosis were averted globally in the year 2003 alone because of vaccinations (World Health Organization and UNICEF 2005). Immunisations are currently available against the following diseases¹:

- anthrax
- cholera
- diphtheria
- haemophilus influenzae type B (Hib)
- hepatitis A (HepA)
- hepatitis B (HepB)
- human papilloma virus (HPV)
- influenza
- Japanese encephalitis
- measles
- meningococcus
- mumps
- pertussis
- pneumococcus (PCV for conjugate)
- polio
- rabies
- respiratory syncytial virus (RSV)
- rotavirus (RV)
- rubella
- smallpox
- tetanus
- tuberculosis (Bacillus Calmette-Guérin, BCG)
- typhoid fever
- varicella and herpes zoster
- yellow fever

The World Health Organization (WHO) recommends all children receive routine immunisations of diphtheria, tetanus, pertussis (DTP), BGG, measles, polio, HepB, Hib, PCV, RV, and HPV. When developing their immunisation schedule, nations weigh the WHO recommendations against the epidemiology of their country, national priorities, and resource

¹ This list does not include vaccinations currently undergoing clinical trials, and those no longer in use.

constraints (World Health Organization 2010). South Africa was one of the first developing countries to self-finance and introduce newer vaccines like Hib, PCV, and RV to its routine immunisation schedule and currently spends more than R80 million annually on immunisations (South African Department of Health 2009; Baker 2010). In 2009 South Africa's immunisation programme was expanded to include all WHO recommended routine immunisations except for HPV (South African Department of Health 2009).

1.1.1: Benefits of immunisations

Although controversy has surrounded immunisations since their inception, it is widely accepted that the benefits of immunisations outweigh the rare side effects at both individual and population levels. After providing clean water and sanitation, immunisation is the most important intervention to decrease mortality (World Health Organization, UNICEF, and World Bank 2009). Most immunisations are cost saving, in that it is cheaper to immunise the population than to provide health services to those who would get the disease if there were no immunisation. For every R1 spent on vaccinations, R7 is saved in direct medical costs and R25 is saved in overall costs (South African Department of Health 2010). Benefits of immunisations are both economic and social. Lower morbidity and mortality general cost savings comprise the narrow benefits of immunisations. More broadly, immunisation can lead to increases in the productivity of society and alters household dynamics in ways that advances society (Bloom 2008).

These benefits of immunisation are felt not only by people in the community who are vaccinated but also to others who may be unvaccinated. When immunisation rates reach a particular level, those unvaccinated become protected from the infectious disease because of low levels of the disease and its inability to spread in the community. This is termed herd immunity. To prevent an outbreak of polio and measles in the population, immunisation coverage of 85% and 95% is needed, respectively (Anderson and May 1985).

Achieving high immunisation levels to prevent population outbreaks is particularly important in a country like South Africa which has a very high rate of human immunodeficiency virus (HIV) infection. Children with HIV are more susceptible to severe complications of vaccine preventable diseases (e.g. neurologic morbidity or death). Decreased immunogenic responses and waning immunity have been observed in HIV positive children, related to the HIV

clinical stage (World Health Organization 2009b). Only high population levels of immunisation will protect both HIV positive and HIV negative children from vaccine preventable diseases (Scott et al. 2008). This is especially important in a country like South Africa with high HIV rates.

Immunisations are also considered a vital foundation for a successful health system (World Health Organization and UNICEF 2005). As opposed to focusing on mass immunisation days, South Africa provides immunisations in the primary care setting. Therefore, immunisation can be used as a proxy for health care access in children. Immunisations are linked to other preventative strategies targeting children including physical exams, anthropometry, and vitamin A distribution (South African Department of Health, Medical Research Council, and OrcMacro 2007). Thus, studying immunisations in a particular South African population is equivalent to studying general health care access for that particular population.

1.1.2: Immunisation rates

Immunisation rates vary widely throughout the world and in African nations: from 39% in Somalia to 97% in Eritrea (World Health Organization 2009a). Even in Southern Africa, significant variation exists. South Africa's neighbour, Mozambique, had significantly different immunisation rates from South Africa. Before the Mozambican civil war ended in 1992, immunisation rates in Mozambique were over 20% lower than the rates in South Africa (World Health Organization and UNICEF 2010). Table 1.1 shows the immunisation levels for a representative vaccine (in this case a measles containing vaccine) for both South Africa and Mozambique. In 1985, immunisation rates against measles were 75% in South Africa and much lower at 37% in Mozambique (World Health Organization and UNICEF 2010). Mozambican immunisation rates remained lower than South Africa until the Mozambican civil war ended in the early 1990s. During the civil war, fighting between the Mozambique National Resistance (RENAMO) and the Liberation Front of Mozambique (FRELIMO) had vast effects on Mozambican society. It has been noted that RENAMO forces targeted health and education facilities (Cliff and Noormahomed 1993). Outside of the large government controlled cities like Maputo, health officials could not make mass immunisation publicity campaigns for fear they would entice a RENAMO attack during immunisation times (Cutts 1998). This may account for the lower immunisation rates in Mozambique during the civil war. Mozambique continues to expand its immunisation programme (Mozambican Ministry

of Health, World Health Organization, and UNICEF 2006); however, many Mozambicans migrated to South Africa as refugees during the civil war before these improvements in the immunisation infrastructure in Mozambique were initiated.

Table 1.1: South African and Mozambican measles immunisation rates, 1989-2009

Year	South Africa		Mozambique	
	Country estimates	WHO estimates	Country estimates	WHO estimates
2009	99	62	67	77
2007	83	62	75	77
2005	84	62	75	77
2003	83	62	96	77
2001	72	69	92	74
1999	82	75	90	67
1997	-	82	70	61
1995	76	76	71	71
1993	77	85	62	62
1991	85	85	55	55
1989	84	84	58	48
1987	75	75	37	37
1985	70	70	39	39
1983	74	74	51	51
1981	-	-	32	32

Source: World Health Organization and UNICEF 2010

Table 1.1 presents both South African and Mozambican national rates, as reported by the official government agency, and the estimated rates by the WHO. Country estimates and WHO estimates can be different because of data quality concerns in the country estimates². These discrepancies have increased recently and therefore rigorous studies are needed to assess immunisation rates rather than relying on data reported by the health system. For example, in 2009 South Africa reported its immunisation rate as 99% while the WHO estimates the rate to be 62% (World Health Organization and UNICEF 2010).

² South African immunisation rates reported to the WHO are derived from the District Health Information System (DHIS) that is published in the South Africa Health Review series (Shaw 2005; Mhlanga 2008; Williamson and Stoops 2002). The DHIS compiles immunisation data that health administrators report from their district (King 2009). However, community surveys in South Africa that look at the Road to Health Card or use maternal interview as a backup, these rates have been considerably lower (South African Department of Health, Medical Research Council, and OrcMacro 2007). This discrepancy is also present internationally. True rates are in between the overestimated district health system and the underestimated community survey rates (Murray et al. 2003). Mozambique has also had significant problems with data quality. Researchers comparing provider tally sheets, facility reports, and district reports found that the data varied considerably and overestimated rates as much as 325% in certain areas (Mavimbe, Braa, and BJune 2005).

Table 1.1 also shows that South Africa's immunisation campaign has not met its goals of immunisation rates of 95% to prevent population outbreaks. The 2003-2005 measles outbreak in South Africa has been attributed to insufficient coverage to prevent an outbreak after measles was imported from neighbouring Mozambique (McMorrow et al. 2009). Following control measures, South Africa again became measles-free, however, another measles outbreak occurred in 2009-2010. One Department of Health report linked the most recent outbreak to foreigners with lower immunisation rates living in South Africa coupled with overestimation of true immunisation rates within South Africa in areas where a high number of foreigners who are underrepresented in census surveys (Harrison 2009).

1.2: Gaps in existing literature

Despite assertions that international migration, particularly from Mozambique, contributed to these measles outbreaks in South Africa, little research has been conducted to assess vaccination levels of short- or long-term migrants living in the country. No study thus far has published immunisation rates for any migrant group within South Africa. In addition to migrants being more connected to communities with lower immunisation rates in their home country, they may represent a vulnerable group with lower immunisation rates because of poor health care access within South Africa. Structural issues may be inhibiting migrants from getting their children immunised in South Africa, e.g. language barriers, xenophobia, and poverty.

In order for South Africa's vaccination campaign to be successful, it must target all children living in the country, including children of migrants. This study will fill the void of scarce research into immunisation access for children of migrants in South Africa. This study chose to investigate a particular migrant group: children of former Mozambican refugees. This population is preferable to study because it is a large group of long-term migrants in South Africa whose children have lived in South Africa for their entire life and would therefore have received their immunisations and health care within South Africa. In contrast, migrants who recently arrived in South Africa may have received their immunisations in their country of origin, over which the South African Department of Health has little control. While Mozambicans live throughout country, a subpopulation have resided in the Agincourt sub-district since the Mozambican civil war and share cultural and language ties with South

Africans. Studying this population makes it possible to obtain community level immunisation data for children of former Mozambican refugees and compare this to data for South Africans from the same catchment area.

1.3: Overview of study

This study is a retrospective, nested cross-sectional analysis of immunisation access in the Agincourt sub-district, Mpumalanga (formerly in the Limpopo province before 2006), South Africa. It is a rural sub-district adjacent to the Mozambican border and approximately a third of its residents are former refugees from Mozambique. As these refugees did not live in refugee camps but immediately settled within the host community, they are referred to as self-settled refugees. A regular household survey is conducted by the Agincourt Health and Population Unit (AHPU) on every person in the Agincourt sub-district. This study will investigate socio-economic and demographic determinants (including history of migration) of immunisation access for children in this sub-district.

1.4: Objectives of study

The primary objectives of this study are:

- to determine immunisation rates (including partial, complete, and timely immunisation) of children in the Agincourt district of South Africa
- to determine whether immunisation rates of children of former Mozambican refugees are different from those of South African children

Data will demonstrate whether this population has adequate immunisation coverage and whether disparities in coverage exist according to the country of origin. This researcher hypothesises that immunisation rates in this research population will be lower than the 95% targets and that the children of self-settled Mozambican refugees will have a lower immunisation rate than South African children.

Investigating the immunisation rates are necessary to conclude whether concerted interventions are needed to target this population. For example, if immunisation rates have achieved the 95% targets, then public health officials should be commended for their achievements thus far and further interventions would not be warranted. Conversely, low rates

of immunisation would be an alert for policymakers in the area. Identifying a disparity of immunisation access between children of former Mozambican refugees and South African children is important to determine if migrant children should be considered a vulnerable group in terms of immunisation access. This would augment the literature by providing evidence of immunisation access among children of migrants within South Africa.

The secondary objectives of this study are:

- to identify other socio-economic and demographic factors that are positively and negatively associated with immunisation access of children in the Agincourt sub-district of South Africa

By controlling for a number of factors, the most important determinants of immunisation access in the Agincourt sub-district will be identified. This would allow for priorities to be made that target the most vulnerable groups to reduce disparities, whether or not related to migration. Socio-economic and demographic factors being investigated in this study include parental education, maternal age, household assets, household food security, sex of the child, residence in a village with a health care facility, general length of stay in South Africa, possessing identity documents, residence in a predominantly refugee village, and membership of a medical aid. These above variables were identified because of associations with immunisation previously recognised in the literature presented in Chapter 2. In addition, associations between immunisation and other benefit utilisation including antenatal clinic attendance and delivery attendant use, child admissions to hospital or use of curative health care services when ill, and utilisation of the child support grant will be investigated.

1.5: Organisation of dissertation

This first chapter has provided an introduction on the importance of immunisations and the status of immunisations in South Africa. I have proposed that although migrants have been identified as influencing the two most recent measles outbreaks in South Africa, there is a lack of research on access to immunisations for migrants in South Africa. This study aims to establish rates of immunisation in the Agincourt sub-district of South Africa and identify socio-economic and demographic determinants of immunisation in this area.

Chapter 2 provides a background on migration in South Africa and health care access for international migrants within South Africa. Special attention will be given to Mozambicans

and the sparse data on health access for children. A literature review of the international studies of immunisation access by immigrants will be presented along with an exploration of other socio-economic and demographic determinants of immunisation. The Health Belief Model provides the theoretical framework for this study and will be described in detail.

The methodology of the study will be detailed in Chapter 3 including an overview of the population area, the methods of the Agincourt Health and Socio-Demographic Surveillance Survey (AHSDSS), and the analytical methods. Chapter 4 presents the study results which show that children of former Mozambican refugees are more likely to be immunised than South African children when controlling for other socio-economic and demographic variables. This is in contrast to the a priori hypothesis of this study. This and all the other study findings will be discussed in Chapter 5. Suggestions for interventions to target vulnerable groups will be emphasised in the discussion. Summary points, calls for further research, and concluding remarks will be provided in Chapter 6.

Chapter 2: Background and literature review

A background of the literature of migration and its relationship to health and health care access in South Africa and internationally is presented below. Special emphasis is given to immunisation access and health of children. The existing literature on socio-economic and demographic indicators predictors of immunisation access is also presented along with the theoretical framework of this study. This chapter argues that, based on the existing literature, children of Mozambican refugees should be considered a vulnerable population in terms of health care access.

2.1: Migration in South Africa

2.1.1: Classification of migrants

A list of the definitions of different types of migrants living in South Africa according to the reason for migration is presented in Table 2.1.

Table 2.1: Classification of types of migrants in South Africa

Classification	Explanation
Refugees	Migrating to a different country because of individual persecution for political views. Can also apply to individuals who are part of a group that are persecuted against.
Refugees in camps	Refugees who reside in designated areas administered by the host government and the United Nations High Commissioner for Refugees (UNHCR).
Self-settled refugees	Refugees who settled freely amongst the host population without official (international or governmental) assistance but often have support from locals in the host community.
Humanitarian migrant	Migrating out of dire circumstances that threaten their survival (starvation, disasters, etc., but not political persecution).
Forced migrant	Refugees and humanitarian migrants.
Economic migrant	Migrating for economic opportunities.
International migrant	Any person who temporarily or permanently moves from their nation of origin.
Internal migrant	Any person who temporarily or permanently within their nation.

Source: Pophiwa 2009; Harris 2001; K Jacobsen 2001

In contrast to many other nations within Africa that host refugees, South Africa has not hosted refugee camps. Much research has been done on the public health consequences in refugee

camp situations but fewer studies have looked at refugees who have self-settled within the greater population³. This study looks at self-settled Mozambican refugees in the South African sub-district of Agincourt.

For this paper, former Mozambican refugees and their children are defined as people who originated from Mozambique and fled from the civil war into South Africa, even though many of them may not have personally applied for and/or received refugee status from the Department of Home Affairs. Also, some migrants have acquired South African identity documents through various means and this paper does not make reference to their citizenship or that of their children. A further classification of the children of former Mozambican refugees in this study will be provided in the next chapter.

This study investigates immunisation in children of refugees who migrated to South Africa to avoid persecution in the Mozambican civil war. It is worth noting that South Africa has a number of other migrants within its borders. The literature on health care access of all migrants will be presented with particular attention to refugees and other forced migrants, since circumstances necessitating their migration are likely to make them the most vulnerable. Many migrants have and continue to come to South Africa unofficially. To claim official refugee status in South Africa, migrants can claim upon entry into South Africa that they are an asylum seeker and then apply for refugee status from the Department of Home Affairs. However, not all migrants arrive in South Africa officially and many outstay visa periods in the country.

2.1.2: Migrants in South Africa

South Africa has a population of just under 50 million people (Statistics South Africa 2010) but it is not known because of inadequate data how many noncitizens live in South Africa.

³ It is standard to immunise all refugees in camps against vaccine preventable diseases that may occur in that area. Thus the success of the public health response in the refugee camp dictates the immunisation rates of the camp inhabitants. Rapid public health and medical response is required and extensive recommendations are written on best practices in managing refugee camps (Centers for Disease Control 1992; Toole and Waldman 1990). Self-settled refugees are considered a vulnerable population in the host community and are very different from the situation of refugees in refugee camps (Gregg 1950). Therefore in this literature review aspects of immunisation programmes in refugee camps is not further discussed.

According to UNHCR, over 320,000 people are registered as refugees or asylum seekers in South Africa (2010). However, many refugees and forced migrants do not apply for official recognition or their status is denied so true estimations of the numbers of these migrants is not known. Also, not known is the number of all international migrants in South Africa since many economic migrants do not register their status. Many noncitizens stay in South Africa with either expired or no documentation because they fear they will be deported. One source estimates five million international migrants living within South Africa, approximately a tenth of the population (New York Times 2008).

Various push and pull factors have made South Africa an attractive destination for migrants. These migrants in South Africa are not a homogeneous population. Throughout South Africa's history, numerous forced migrants have come to the country from different parts of Africa. South Africa has large numbers of refugees specifically from the Great Lakes region, the Horn of Africa, and southern African nations of Angola, Mozambique, and Zimbabwe. Economic migrants are common from nations throughout the Southern African region (Harris 2001).

People from some African nations with higher education and more resources may be more able to seek refuge in South Africa. A study by the Forced Migration Programme at the University of Witwatersrand with a sample of forced migrants from Democratic Republic of Congo, Angola, Ethiopia, Somalia, Republic of Congo, and Burundi found they had high levels of educational achievement and more work skills than the average South African (Landau and K Jacobsen 2004). Conversely, Mozambicans and some other migrants groups have less education and fewer skills.

2.1.3: Mozambicans in South Africa

Many Mozambicans came to South Africa during the height of the civil war and more recently smaller amounts of migrants have come to South Africa in search of better economic opportunities as economic migrants. During the civil war, RENAMO forces targeted schools and in non-government controlled areas schooling programmes shrunk. In contrast to the findings in other populations of migrants, a study in 1996 of Mozambican refugees showed that 58.5% of household heads had less than four years of formal education (Chimere-Dan 1996). The data reported in this paper shows that Mozambicans have been adversely affected

by the educational problems in Mozambique and are not as well educated as their South African counterparts.

An unknown number of Mozambicans crossed the border into South Africa fleeing the civil war. When South Africa was supporting RENAMO forces they did not initially recognise the Mozambicans as refugees. Some Bantustans welcomed the Mozambicans to varying extents including the Gazankulu homeland where the Agincourt area is located (De Jongh 1994). The Tsonga people of South Africa in the Gazankulu homeland share the same language and culture of the Shaangan people from the Gaza province of Mozambique. These cultural and historical ties created a sense of solidarity. Some tribal authorities provided the Mozambicans with land, blankets, etc. (Muanamoha 2008) while others severely curtailed the opportunities available for Mozambicans (De Jongh 1994).

Mozambicans in South Africa have high rates of poverty and poorer access to services, but still some choose to stay in the country for better opportunities than in Mozambique coupled with the complex psychosocial associations with the tragedies of war they witnessed or experienced in Mozambique (Muanamoha 2008). Between 1990 and 1999, over 820,000 Mozambicans were deported back to Mozambique from South Africa by South African authorities (Mattes et al. 1999). South African support of RENAMO ended once majority rule began in South Africa and there were changes in official policies towards Mozambican refugees. The 1996 South African Development Community (SADC) amnesty encouraged Mozambicans to apply for permanent South African citizenship. However, strict requirements of the application and poor outreach resulted in low uptake, especially in rural areas (Handmaker and Schneider 2002).

Official status as a refugee or permanent resident in South Africa is crucial for Mozambicans and other migrants living in the country. A South African Identity Document gives Mozambicans the freedom to not fear authorities (Muanamoha 2008). Many Mozambicans were able to obtain South African Identity Documents through various means during their time in South Africa, which helps them incorporate into society. Some Mozambicans were easily able to apply for documentation during the initial identity document outreach campaigns before the first democratic election in South Africa with little trouble. However, others have obtained documents through South African friends posing as family members and others resorted to bribing officials (Polzer 2007).

During interviews, Mozambicans noted that when they first arrived they felt welcomed by South Africans but now xenophobia predominates. They told interviewers that South Africans compared Mozambicans to dogs, resented Mozambicans for taking what they considered to be their jobs, and blamed Mozambicans for crime (Muanamoha 2008). These recent feelings of animosity towards Mozambicans could prevent them from seeking public services. However, in South Africa, xenophobia is not limited to Mozambicans and has been experienced by many African immigrants living in the country. The xenophobia experienced by migrants may make them an especially vulnerable population.

2.2: Health and health access of international migrants

2.2.1: Health access of international migrants in South Africa

Migration status is likely to be a factor in accessing health care in South Africa. According to the South African Constitution (1996), Refugee Act (1998), and directives from the South African Department of Health (2007), health care services are supposed to be available to all persons in South Africa regardless of citizenship. However, multiple reports describe barriers to access for refugees and other forced migrants in South Africa. Predominant barriers include rejection based on lack of appropriate documentation, fear of xenophobic prejudices described from experiences by nurses, administrators, and South Africans in general, longer waits, unlawfully being charged high user fees, language barriers, and feeling that South African doctors knew little about issues in their community (particularly of tropical diseases common in their home countries). In addition to popular perception driving these comments, many migrants described in detail negative personal experiences when accessing health care in South Africa (Pursell 2005; Veary and Richter 2008; Seleka 2009; Human Rights Watch 2009; Médecins Sans Frontières 2009; Kollapen 2009; Apalata et al. 2007; Higson-Smith and Flemming 2007; Amisi 2006; South African Human Rights Commission and Parliamentary Portfolio Committee in Foreign Affairs 2004).

Identity documents in South Africa are viewed by many migrant groups including Mozambicans as key to receiving social services provided by the South African government. Even though identity documents are not required to access health care, administrators commonly ask for them during registration (South African Human Rights Commission and Parliamentary Portfolio Committee in Foreign Affairs 2004). For migrants who do not have

documents this might be an additional barrier. Depending on their confidence about their rights in South Africa this barrier might affect the degree to which lack of documents act as a barrier to receiving services. Those who do not think they can receive care without documents may not even try to access it at all. Others may fear they will be turned into authorities or deported if found in South Africa. To a lesser extent, many are discouraged from accessing health services because they are unsuccessful in getting care from officials who are unaware of or unwilling to comply with regulations (South African Human Rights Commission and Parliamentary Portfolio Committee in Foreign Affairs 2004).

Numerous examples of denial of services or blatant maltreatment of migrants in the South African health system have been noted in the literature by researchers and advocacy groups. Xenophobia was consistently identified or implied as underlying these poor experiences. A Zimbabwean man explains:

I went to Joburg Hospital because I felt like I had TB. I went to be tested. They told me to go to Hillbrow. At Hillbrow they said, “we don't like foreigners, you are thieves”...At Hillbrow I heard some of the nurses saying “we don't like them here, this hospital is for South Africans.” I was very sick. I had been sick for three weeks. (Human Rights Watch 2009, 57)

Although no specific incidents were reported of overt xenophobia in the Agincourt area, general xenophobia has been identified by migrants groups throughout South Africa, including Mozambicans (Muanamoha 2008). Migrants may perceive greater barriers to accessing immunisations because of xenophobia. Fear of xenophobic prejudices at South African public facilities may influence low access to immunisation by Mozambican refugees. An article in *The Lancet* reviewing health and human rights of refugees internationally noted the difficulties of xenophobia for refugees: “Xenophobic attitudes in much of South African society further hinder urban refugees from attaining basic human rights” (Spiegel and Qassim 2003).

Few studies mention health care access for migrant's children or immunisations. However, in one report, a medical student described observing "immunisation clinic staff shouting at [foreign] mothers who bring their babies for immunisation" (Veary and Richter 2008, 64). Mothers who brought their children to services the health department encourages were berated. This account of discrimination against foreign mothers is an example of reasons why particularly children of refugees and other migrants may not be getting immunised sufficiently.

One report highlighted an asylum seeker who was required to pay R1800 before her sick child could be seen at the public hospital. This is specifically against the official policies, which allow refugees and asylum seekers to receive health care at the same costs as South Africans. This includes free primary care for children and pregnant women and means tested hospital fees (Human Rights Watch 2005). In another example, a woman whose child developed hydrocephalus and cerebral palsy after the mother was denied a caesarean section by nurses at the public hospital after the doctor ordered the caesarean. They instead told her “you Africans can just give birth outside” (Human Rights Watch 2009, 58). She concluded her experience with the health care system by stating: “They destroyed my child because I am a foreigner” (Human Rights Watch 2009, 58). There are numerous emotion evoking stories of migrants experiencing maltreatment at public health care facilities in South Africa. Fearing such experiences, mothers may not take their children to health facilities for immunisations. However, these experiences may not be unique to migrants.

Issues of maltreatment have also been reported by South Africans. The prominent South African paediatrician Coovadia notes that “rudeness, arbitrary acts of unkindness, physical assault, and neglect by nurses have been widely reported” when describing the status of health and the health care system in South Africa (2009, 829). Nurses were trained as an elite group with authority over their patients during apartheid and that status continues to this day (Coovadia et al. 2009). A study that did qualitative interviews with patients at two Western Cape health facilities describes systematic and ritualised neglect, verbal abuse, and physical abuse (for example slapping) of patients by nurses. Teenagers seemed to be consistently targeted. Nurses at the clinic confirmed and justified their actions as necessary in order to gain control and improve the patients’ outcomes (Jewkes, Abrahams, and Mvo 1998). Attitudes of health care workers may be barriers to accessing health care for all people in South Africa, not just migrants. With this in mind, when studying health care access, a control group is necessary to conclude that migrants have poorer access to health care.

It should be noted that none of the above studies in migrants included random sampling and few purposefully explored positive experiences with the South African health care system. In a study of internal and international migrants in Johannesburg, migrants consider themselves healthy and the majority have never needed to seek health care in South Africa. Of those who did seek health care, they most commonly went to government facilities (and none noted

being rejected from a facility because of citizenship). Most rated services they received as “good” or “very good” (Pophiwa 2009). This study demonstrates the important additional information a representative community sample of migrants can show to provide a better picture of health utilisation in communities. It is necessary to understand if barriers actually lead to differences in health care utilisation that causes preventable ill health in a vulnerable migrant population. Although patients may identify barriers and dissatisfactions, the aforementioned study shows that many overcame those perceived barriers to receive health care when they became sick and it is not known whether those barriers are problems for all persons in South Africa – not just migrants. A community level study that uses a South African control group is needed to adequately understand access to health care for migrants.

Health care systems do more than simply provide treatment for those who are acutely ill. Preventative health care is important and was overlooked in the aforementioned studies cited above of migrants in South Africa. Limited community level data is available to determine health care access or health care outcomes of refugees in South Africa. One particular research group has examined health outcomes of Mozambican refugees in South Africa.

2.2.2: Health of Mozambicans in South Africa

A community level survey of health outcomes for children of Mozambican refugees shows that they have poorer health outcomes than their South African hosts. Research conducted in the Agincourt sub-district by the AHPU found children of former Mozambican refugees had higher mortality in the one to five years group, but not higher infant mortality. The researchers attribute this difference to lower assets and the tenuous legal situation of the self-settled Mozambicans in South Africa but were not able to test these theories. Mothers of children of former Mozambican refugees in this study were less likely to deliver their child in a health care facility (Hargreaves et al. 2004). They did not investigate health care or immunisation access for children. Other studies have shown that disparities in immunisation can account for disparities in child mortality. In Ghana, a research group with a similar structure as the AHPU found that immunisation status was related to mortality in a time-series analysis. When immunisation status was introduced into multivariate models it eliminated the influence of income on mortality and decreased the effect of parental education on child mortality (Bawah et al. 2010).

Lack of services in Mozambique can have long-term effects on the refugees. In agreement with the prior mentioned research that Mozambicans had poor access to education, Mozambican women in the Agincourt area were much less likely than South African women to have received any formal education (Hargreaves et al. 2004). It will be presented in the next section of this chapter that maternal education is an important predictor of immunisation access, so it will be necessary to control for this and other socio-economic and demographic factors in this study. However, as described in the previous section, there are many other barriers to health care and immunisation access for migrants in South Africa.

Other research from the AHPU has found that despite being more likely to qualify for benefits, Mozambicans were less likely to have applied for the child support grant. The most common reason cited for both Mozambican and South Africans for not applying was lack of documentation (Twine et al. 2007). The AHPU group showed that being Mozambican was both associated with poorer health outcomes and government benefit utilisation. This study will build on existing research to see if children of former Mozambican refugees are less likely to access free immunisation services from the South African government's public sector.

2.2.3: The healthy migrant effect

Internationally, these findings that show worse health outcomes for Mozambicans (migrants) are not the norm. Many times migrants are found to be healthier than their hosts. The "healthy migrant effect" describes the observation that migrants from less developed countries are healthier than the general population both in their nation of origin and in the nation to which they immigrate to. This has been observed in numerous populations living in the United States (Fennelley 2007), United Kingdom, Germany (Razum et al. 1998), Australia (Strong, Trickett, and Bhatia 1998), and East Asia (Okamoto 2008). Internal migrants within the United States (Kelaher and Jessop 2002; Wingate and Alexander 2006; Wingate, Swaminathan, and Alexander 2009), Indonesia (Lu 2008), and Croatia (Kolčić and Polasek 2009) have better health outcomes which supports the explanation that healthier people are most likely to migrate. Other studies also point to cultural practices as important (Franzini and Fernandez-Esquer 2004).

In a number of the above studies the healthy migrant effect extended into the second generation; children of migrants were observed to be healthier than their host population and those from their country of origin. A number of the studies use the percentage of low birthweight newborns as the health outcome, which can be thought of as both an indicator of maternal health and a contributing factor to the health of the newborn child. The literature on the healthy migrant effect is important for its indication that migration in and of itself does not always lead to ill health. Conversely, migrants can be healthier.

Although the AHPU study findings of child mortality did not support the healthy migrant effect, some evidence from South Africa does support this observation. One study found that migrants considered themselves quite healthy and did not need to seek health care (Pophiwa 2009). However these findings are of limited value because they were not compared to a reference population. A well controlled study of disability in South Africa found that children of migrants from SADC countries were less likely to be disabled as compared to international migrants from other areas as well as internal migrant and non-migrant South African children (Thomas 2004).

Although migrants can be healthier than non-migrants, many noted in the above studies that migrants may have lower health care utilisation in that they do not attend health services because they are not sick. However, they similarly do not seek preventative care. Immunisations are the pinnacle of preventative care: vaccinations are given to all children to prevent illness. So although internationally migrants are in generally healthier, this will not necessarily translate into increased immunisation rates. As immunisation is an important intervention that affects child health, specific investigation on the association between immunisation and migration is needed. The next section presents a theoretical model of how socio-economic and demographic characteristics such as migration influence health care access and describes the international literature on determinants of immunisation access based on the same model.

2.3: Determinants of immunisation access

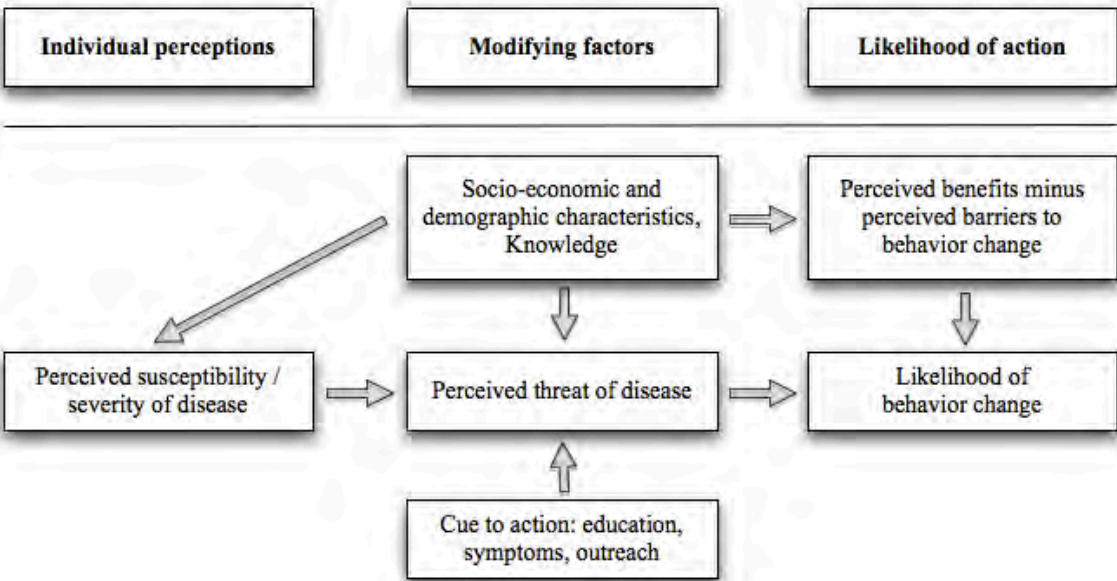
This study uses the Health Belief Model as the theoretical basis of the study along with the information available from other studies that investigate socio-economic and demographic determinants of immunisation access. First, the Health Belief Model will be explained, and

then the international literature on determinants of immunisation access will be presented including what is known for immunisation access of migrants.

2.3.1: Theoretical framework

This study draws on the Health Belief Model originally presented by Rosenstock and Hochbaum⁴ (Strecher and Rosenstock 1997). The Health Belief Model is a psychosocial theory explaining health-seeking behaviour including preventative health care services like immunisations. Availability of health care services does not in itself translate into utilisation. This psychological theory explains individual factors that translate into accessing available health services. Figure 2.1 shows the inter-relationship of the determinants of health seeking behaviour and the importance of demographic characteristics, socio-economic characteristics, and knowledge contributing to perceptions that translate into health care utilisation.

Figure 2.1: The Health Belief Model



Source: adapted from Strecher and Rosenstock 1997, 114

⁴ The analytical framework of child survival in developing countries proposed by Mosley and Chen also highlights the importance of socio-economic and demographic in determining child survival. This theory proposes five comprehensive proximate determinants of morbidity and mortality that are all influenced by socio-economic determinants (Mosley and Chen 2003). As the analytical framework for child survival is an explanatory model of mortality and morbidity – not health care access – it is not suitable as a theoretical framework behind this study investigating immunisation access.

The model argues that health seeking behaviour is based on individual perceptions and modifying factors, which change the likelihood of action. Individual perceptions include the perceived susceptibility to and severity of a disease. Modifying factors include demographic factors, socio-economic factors, education, perceived threat of disease, and cues to action including symptom recognition and outreach. The likelihood of action then also depends on the perceived risk benefit ratio of the health access behaviour (Becker et al. 1977).

One of Rosenstock's first works on health care access while he was developing the Health Belief Model was based on studying uptake of the polio vaccine in the United States. In his early work he noted that socio-economic factors, particularly income and education were important predictors of polio vaccination. The United States Public Health Service used his research to target vulnerable parts of the population who were not being sufficiently immunised (Rosenstock, Derryberry, and Carriger 1959). Rosenstock's work emphasises that socio-economic and demographic factors shape people. By determining their schema, socio-economic and demographic factors shape the way benefits and barriers to accessing health care are perceived.

Numerous studies investigating immunisation access have used the theoretical framework of the Health Belief Model as a basis for their research (Markland and Durand 1976; Cutts et al. 1989; Riddiough et al. 1981; Hanlon et al. 1988; Lochhead 1991; Rosenstock, Derryberry, and Carriger 1959). These studies have validated the use of this model for the theoretical framework of this study.

The Health Belief Model explains the importance of demographic and socio-economic characteristics contributing to health care access. This study will focus on identifying the modifying factors that are key to immunisation seeking behaviours in the Agincourt sub-district of South Africa. This study will determine which socio-economic and demographic factors are independently associated with immunisation uptake. As mentioned in Rosenstock's 1959 study, identifying factors that are associated with poor access are required for policymakers to target these populations adequately to increase uptake and eliminate disparities.

This study relies on the Health Belief Model to explain how demographic and socio-economic factors are associated with immunisation access and does not attempt to and is not designed to explain *how* these factors influence health care access. In contrast, this study aims to determine which demographic and socio-economic factors influence immunisation access in this population through a large cross-sectional analysis. Further studies will then be needed to understand the mechanistic link. Based on the theory of the Health Belief Model, this study hypothesises that socio-economic and demographic characteristics will predict immunisation access. If this study finds that there are socio-economic and demographic determinants of immunisation access, this study will support that aspect of the Health Belief Model.

2.3.2: Immunisation access determinants

Numerous studies have investigated socio-economic and demographic determinants of immunisation access in various populations and found connections consistent with the Health Belief Model. Some studies support specific variables while others do not support the same conclusion. For example, I will describe in detail how some studies have shown that immigrants have different immunisation rates from the host population while other studies have observed that being an immigrant is not correlated with immunisation levels. Contradicting trends are noted between countries, between studies within a particular country, and even within single studies of a particular country. This study will control for many of these variables in order to identify determinants that independently predict immunisation access.

2.3.2.1: Migrants and immunisation access

In developed countries where data is available, there are cases of children of international migrants with both higher and lower immunisation rates than the children in the host population, depending on whether or not children of migrants were directly targeted with interventions to improve immunisations and health care access. In many developed nations, upon arrival children of immigrants or refugees are required to have health exams and immunisations in the host country. Each country has different requirements, even within the European Union (Norredam, Mygind, and Krasnik 2006). South Africa has no official requirements for the many migrants who come through its borders.

In the United States, a large national study found that children of foreign-born parents had lower immunisation rates than United States born parents. These findings were seen especially when parents were non-citizens and had been in the United States for less than five years (Buelow and Van Hook 2008). However, in the same study, racially/ethnically Mexicans had higher immunisation rates (more on this in the next section). Another United States study found that children from Cambodia and Laos had quite low HepB immunisation rates of between 30% and 50%. However other Asian (Hmong, Vietnamese, Chinese), Kurdish, and Somali refugees had much higher levels, although no reference American population was investigated (Vryheid 2001). Another United States study that did not have a comparison group found antibody rates of over 80% for measles and rubella (Barnett, Christiansen, and Figueira 2002).

Despite these findings in North America that many refugee and immigrant groups had lower immunisation rates, studies with opposite findings also exist. In Minnesota, United States both Hispanic and Somali children were as likely to receive immunisations as the native born children in the area (Sauver et al. 2002). A number of the above studies tested for antibodies in the blood because documentation of immunisation was a problem and many studies compared both immunisation history and blood tests. One study noted that refugees lacked documentation over 80% of the time (Lifson, Thai, and Hang 2001). In Canada, immigrants as a whole were actually more likely to be up to date than non-immigrants, although among immigrants, refugees had the poorest rates. Findings from this study were not significant in the multivariate analysis, except for the immigrants from Asia. The Canadian study also showed that the period of time immigrants had lived in Canada was important for immunisation access (Guttmann et al. 2008).

Contradictory findings have also been found in Europe and Australia. In Germany, immigrants had lower immunisation rates than native Germans, especially for the first generation after immigration. These findings were true for immigrants from Western Europe, United States, Canada, Arab countries, and other nations besides those from the former Soviet Union (Poethko-Müller et al. 2009). In Italy, low levels of diphtheria immunisation were found in refugees, especially in Kurdish refugees from Turkey (Chironna et al. 2003). However, another Italian study found very high immunisation rates, of over 99%, in Asian and African refugees (Tafari et al. 2010). Immigrants from the former Yugoslavia and other countries had lower immunisation rates than native Austrians (Waldhoer et al. 1997). Over

80% of East African refugees in Australia were incompletely immunised (Skull et al. 2008). The generalisability may be limited of studies conducted in developed countries to the South African context because the economic status of the North American, European, and Australian populations studied are quite different than in South Africa.

A few studies have been done on non-refugee camp international migrants in developing countries. A study in Sao Paulo, Brazil found that children of immigrants had lower immunisation levels and this persisted even nine years after migration. An immigrant was defined as someone who had moved to the Santo André area of Sao Paulo fewer than ten years ago. It is not known whether these immigrants were international in origin or from elsewhere in Brazil, although the latter is probably more likely (Barreto and Rodrigues 1992). This study has more relevance to the South African context since it was conducted in a country of similar economic status with high inequalities. However, unlike the rural South African forced migrants in the Agincourt district of South Africa, this study looked at urban, presumably economic, migrants.

A study in war-time Mozambique found that children who had migrated to the area recently from more war torn areas of Mozambique had lower immunisation rates than people who resided there for longer than one year (Cutts et al. 1989). It is unclear whether that was due to them not receiving the vaccinations in their place of origin (in areas noted to have poor access) or whether there was also poor access in the place they settled. In Angola, internal migrants who were fleeing the war were immunised less than non-war migrants and native Luandans, however this effect disappeared in the multivariate model (Avogo and Agadjanian 2010). Internal migrants in Cameroon were observed to have lower immunisation rates than those who had not migrated (Brown et al. 1982).

From this evidence, it seems that migration can be associated with lower immunisation utilisation, but both the magnitude of the effect and the consistency of this finding in all populations are unclear. In addition to potential difficulty accessing the South African health system and low immunisation rates from less stable countries in Africa, the migrants may represent a particularly vulnerable group because of their migration status and the sobering economic and political reasons that forced so many foreigners to migrate; all of these reasons would independently adversely affect immunisation rates of their children. Besides migration, numerous other socio-economic and demographic characteristics have been found to be

associated with immunisation uptake internationally. In this study we will attempt to control for these factors to investigate whether or not migration independently predicts immunisation access in a multivariate analysis.

2.3.2.2: Minority groups and immunisation access

Race and ethnicity have also been studied in reference to immunisation access, particularly in the United States where contradictory findings are common. A very large national sample observed that African Americans, non-Mexican Hispanic, and other ethnicities had lower immunisation rates than whites, while Mexicans had higher rates (Buelow and Van Hook 2008). Another national study and one in San Diego observed that Hispanics had higher immunisation access than non-Hispanics in the United States (Owen et al. 2005; McElligott and Darden 2010). Hispanics may have recently migrated to the country but the length of stay in the United States of the Hispanics investigated is not known. A multisite study observed that Hispanics had the highest rates in San Diego while they had lower rates in Colorado and New York. African Americans had lower immunisation rates than whites in New York but were not different in San Diego, Colorado, or Detroit. These findings did not hold in multivariate analysis (Rosenthal et al. 2004). A few studies observed that African Americans were less likely to be immunised than Caucasians (Markland and Durand 1976; Riddiough et al. 1981; McElligott and Darden 2010). However, one study found that African Americans in rural Georgia were more likely to access immunisations and attributed this to the greater involvement by African American community leaders in the immunisation campaign (Belcher 1958). In the District of Columbia, USA race was not significant in the analysis (Brenner et al. 2001). In Australia, aboriginal populations had lower immunisation rates than other Australians (Menziez et al. 2008).

Ethnicity has also been studied as a predictor of immunisation access in developing countries. In Cameroon the minority ethnic group had lower immunisation rates (Brown et al. 1982). In a multi-country study of numerous Sub-Saharan African countries, ethnicity was found to be an important predictor of immunisation access in all countries besides Zambia. The following ethnic groups were found to have higher immunisation access than other ethnic groups in their country: M'baka in the Central African Republic, Baoulé in Côte d'Ivoire, Ashanti in Ghana, Kikuyu in Kenya, Bambara in Mali, Ovambo in Namibia, Djerma-Songhai in Niger, Serer in Senegal, and Baganda in Uganda (Brockhoff and Hewett 2000).

Certain neighbourhoods were associated with improved immunisation access in Cameroon (Brown et al. 1982), Turkey (Altinkaynak 2004), Austria (Waldhoer et al. 1997), and Germany (Poethko-Müller et al. 2009). In the Agincourt area, there are refugee settlements (with greater than half of the population being Mozambican) that are separate from the other villages (Hargreaves et al. 2004). This clustering of Mozambican descendants in certain areas can create pockets where outreach and education could be more or less prevalent, depending on the health system outreach priorities. Mozambican descendants in Agincourt live in poorer areas, with poorer access to water, sanitation, and waste disposal (Dolan et al. 1997). These services may be a sign of broader poor access and marginalisation in the physical environment. A study in Burkina Faso found that children living in particular villages had poorer immunisation access related to the distance of the village to health care facilities that provide immunisations but the particular neighbourhood or location within villages did not matter (Sanou et al. 2009).

Distance to health care facilities that provide immunisations has also been found to be significantly related to immunisation access in the Philippines (Friede et al. 1985), Cameroon (Brown et al. 1982), India (Ughade et al. 2000), Pakistan (Waldhoer et al. 1997; Cockcroft et al. 2009), Kenya (Abuya et al. 2010), and South Africa (Ndirangu et al. 2009). The South African study also found distance to the nearest road to be associated with immunisation access (Ndirangu et al. 2009). In urban areas of Pakistan (Cockcroft et al. 2009) and in Mali (Koumare et al. 2009) distance to health care facilities were not associated with immunisation uptake.

2.3.2.3: Parental education and immunisation access

Internationally more education, especially of the mother, has been associated with better immunisation access and health outcomes of children. This has been found in the United States (Glasser 1958; Markland and Durand 1976; Buelow and Van Hook 2008; McElligott and Darden 2010), Turkey (Altinkaynak 2004), Indonesia (Streatfield, Singarimbun, and Diamond 1990), India (Kumar, Aggarwal, and Gumber 2010; Parashar 2005), Pakistan (Cockcroft et al. 2009), Bangladesh (Mushtaque et al. 2002), China (Xie and Dow 2005), the Gambia (Hanlon et al. 1988), Nigeria (Akesode 1982), Burkina Faso (Sanou et al. 2009), Kenya (Abuya et al. 2010), Zambia (Setse et al. 2006), and South Africa (Corrigall, Coetzee,

and Cameron 2008). While not significantly associated with immunisation access in some studies, maternal education has not been found to be negatively associated with immunisation access. Paternal education has been and has not been associated with immunisation access (Altinkaynak 2004; Ughade et al. 2000). Specifically in South Africa, mothers with secondary schooling had slightly higher immunisation rates (RR 1.04) than mothers who had only primary schooling (Corrigall, Coetzee, and Cameron 2008).

Education was not significantly associated with immunisation access in other studies in the United States (Rosenthal et al. 2004; Brenner et al. 2001; Riddiough et al. 1981), Austria (Waldhoer et al. 1997), Mali (Koumare et al. 2009), and Angola (Avogo and Agadjanian 2010). Some studies looked at literacy instead of formal education. A study in Guinea (Cutts et al. 1991) found literacy in French to be associated with immunisation access while a Brazilian study did not find a significant association between literacy of the mother and immunisation of the child (Barreto and Rodrigues 1992).

2.3.2.4: Economic status and immunisation access

Economic status has been noted to be associated with immunisation in a number of studies even though in many situations immunisations were offered to the population free of charge. Income has been positively associated with immunisation access in South Africa (Mfenyana et al. 2006), United States (Glasser 1958; Buelow and Van Hook 2008; Riddiough et al. 1981; McElligott and Darden 2010) and Pakistan (Usman et al. 2010), while the association was not found to be true in Brazil (Barreto and Rodrigues 1992), underserved cities in the United States (Brenner et al. 2001; Rosenthal et al. 2004), and in a different South African study (Corrigall, Coetzee, and Cameron 2008). Instead of measuring income, wealth (as measured by assets) can provide a longer term picture of the economic status of families. In a large 44 site multinational study by the World Bank, assets had large influence on immunisation access (Gwatkin and Deveshwar-Bahl 2001) as did a study in the Western Cape of South Africa (Mfenyana et al. 2006) and another in China (Xie and Dow 2005). In smaller studies in the United States (Rosenthal et al. 2004), Mali (Koumare et al. 2009), and in KwaZulu-Natal, South Africa (Ndirangu et al. 2009) assets were not significantly associated with immunisation access.

A few studies looked at a self-defined overall assessment of socio-economic status. In Cameroon (Brown et al. 1982), India (Ughade et al. 2000), and Pakistan (Cockcroft et al. 2009) socio-economic status was directly related to immunisation access while in Germany socio-economic status was inversely related to immunisation access (Poethko-Müller et al. 2009) and not associated with immunisation in Turkey (Altinkaynak 2004). The relationship between health insurance and receiving government benefits has only been studied in the United States and has not been found to be related to immunisation access (Buelow and Van Hook 2008; Brenner et al. 2001; Rosenthal et al. 2004). Evidence on the relationship between immunisation access and government benefit utilisation, including social grants, is lacking in developing countries.

At the extremes of low income and wealth is food shortage, also termed food insecurity. Food shortage was associated with poor immunisation rates in Burkina Faso (Sanou et al. 2009) and Bangladesh (Mushtaque et al. 2002) but not in Mali (Koumare et al. 2009). In situations where people are poor, parents may (perhaps righteously so) feel that their child is more vulnerable to ill health if they have less food available than vulnerable to vaccine preventable diseases. A father in Burkina Faso describes his dilemma between food and immunisation in a qualitative study:

“What I add...it's the problem we usually face during rainy season. In the household we often face difficulties, i.e. some crisis periods, when there is no food to eat. When we spend a bad night because we had no more supplies, each may try (in the morning) to find something for the children. So you are all in a hurry; the husband will go on his way and the wife will try to find some shea nuts (in the bush). Under the pressure of food shortage, as parents, you don't want children to wakeup and find you without a solution for their hunger; they will look so pitiful. These problems can be the reason for not respecting the appointment with the vaccination team.” (Sanou et al. 2009, para 39)

Economically, in the AHPU studies Mozambican households were noted to be poorer than South African households (Twine et al. 2007). Therefore, it is necessary to control for measures of socio-economic status when investigating immunisation access.

2.3.2.5: Paternal factors and immunisation access

Mothers age was mostly not a significant factor relating to immunisation access (Barreto and Rodrigues 1992; Cutts et al. 1989; Brenner et al. 2001; Waldhoer et al. 1997; Rosenthal et al. 2004; Ndirangu et al. 2009; Markland and Durand 1976; Buelow and Van Hook 2008; Cutts

et al. 1991). Maternal or paternal death could theoretically have strong impacts on immunisation access, however research on this topic is sparing.

Children whose mother gave birth in a health facility were more likely to be immunised in Burkina Faso (Sanou et al. 2009), Guinea (Cutts et al. 1991), and Mozambique (Cutts et al. 1989). Mothers who deliver at home may have made the choice to not access health care for themselves. Only 14.7% of mothers in the Agincourt area of Mozambican origin delivered in a health care facility compared to 43.8% of South African women (Hargreaves et al. 2004). Maternal use of primary preventative care services like antenatal clinic attendance may be more strongly correlated with immunisation access but has been poorly studied in the past. In one study a mother being vaccinated with tetanus was associated with child immunisation but not maternal antenatal clinic attendance in Mali (Koumare et al. 2009) however more data is needed to investigate this association and other aspects of health care utilisation in general. Mozambican women did not grow up in a community where immunisations and attending preventive care clinics were the norm because of RENAMO attacks on the health care system – this may be an underlying reason for poorer access.

Parental possession of an immunisation card is also associated with increased immunisation rates (Rosenthal et al. 2004; van Turenout et al. 2003). A study in the United States found that parental possession of immunisation records, which can function similarly to the Road to Health card (RTHC) used in South Africa, was associated with increased immunisation uptake (McElligott and Darden 2010). Research on interventions from the health care sector to improve uptake and document immunisations like the RTHC needs to be further investigated, especially in developing country settings.

2.3.2.6: Sex of the child and immunisation access

Sex of the child has only been found to be a significant predictor in South Asian countries where boys were more likely to be immunised than girls (Gwatkin and Deveshwar-Bahl 2001; Ughade et al. 2000). Studies from other regions did not find sex to be significantly associated with immunisation (Gwatkin and Deveshwar-Bahl 2001; Avogo and Agadjanian 2010; Barreto and Rodrigues 1992; Koumare et al. 2009; Guttmann et al. 2008; Poethko-Müller et al. 2009; Mfenyana et al. 2006; Altinkaynak 2004). This study will control for sex, but like

the international literature, it is expected than no differential will be observed based on sex of the child.

2.3.2.7: Summary of immunisation access determinants

Some studies find certain factors – like migration, income, education, or distance to health care facilities – predict immunisation access while other studies do not. This may be due to chance, or more likely in certain populations, different factors influencing immunisation access prevail. In summary, general predictors of immunisation utilisation can include migration, race, ethnicity, maternal age, parental education (maternal and paternal), economic factors (income, wealth, and food shortage), sex of the child (girls with poorer access only in South Asian countries), delivery of the mother in a health centre, and distance to health care facilities. Controlling for these factors is needed to conclude migrants have lower immunisation rates irrespective of other factors (instead of lower education or poverty explaining lower immunisation rates of migrants alone). This study will be able to control for the majority of these variables in a multivariate analysis and discern which are the most important factors predicting immunisation access in this population.

2.4: Summary

There are numerous international migrants in South Africa, including self-settled Mozambican refugees who came during the civil war in Mozambique. Although international migrants are supposed to receive the same health care as South Africans, numerous barriers have been reported. Children of former Mozambican refugees in the Agincourt sub-district have higher mortality than South Africans in contradiction to findings that the healthy migrant effect can cross generations. Determinants of health care access can vary between populations. There are numerous predictors of immunisation access including educational, economic, language, and distance to facilities to name a few. Although migrants have been found to be associated with lower immunisation access in developing countries, this effect is inadequately studied, especially for international migrants.

There are no current published community level studies on immunisation rates of immigrant or refugee children in South Africa. Children of former Mozambican refugees are a particularly vulnerable group and may not be getting immunised because of issues related to

their migration status itself and other factors. This study will add to the sparse existing research on health care access for refugees in South Africa. It is hoped that South African health departments and nongovernmental organisations will use this information to adequately target vulnerable populations to ensure South Africa can have a successful immunisation programme.

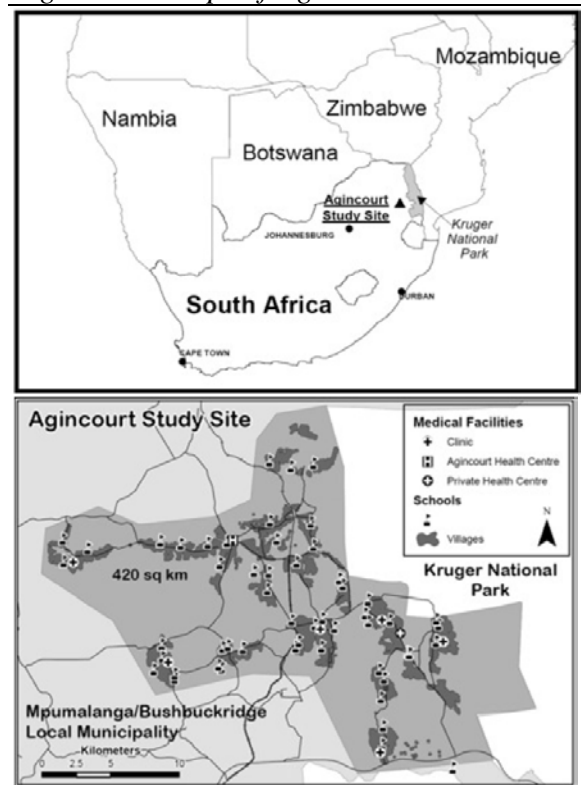
Chapter 3: Methods

This chapter will provide details on the methodology of this study including the study setting, data collection methods, and statistical plan. The study was designed to be able calculate immunisation rates and identify socio-economic and demographic factors influencing immunisation of children (including whether the child’s parents are former refugees) in the study area.

3.1: Study setting

The Agincourt sub-district is in the Bushbuckridge district of South Africa. The district is now in the Mpumalanga province but was formerly part of the Limpopo province before 2006. The area is approximately 40km west of South Africa’s border with Mozambique, just adjacent to Kruger National Park. The study population includes all of the approximately 82,000 people and 14,000 households in the sub-district’s 26 villages of which approximately a third are of Mozambican origin (Tollman 2009). Most of the Mozambicans self-settled in this area in the 1980s during the Mozambican civil war (Kahn et al. 2007). Figure 3.1 shows a map of the location of the study site within South Africa and a more detailed view of the study site including locations of roads, villages, schools, and health facilities (these pictures are included in a larger size in Appendix 1).

Figure 3.1: Maps of Agincourt area



Source: Tollman 2009, 1

The area is rural in terms of service delivery and its location relative to urban centres. It has a population density of around 200 people per km². The sub-district is part of the local “poverty node” with little employment opportunities and has instead been a source of migrant labour throughout the area (Tollman 2009). The climate is semi-arid and vulnerable to frequent

droughts making the land less suitable for agriculture. Piped water to communal faucets is “erratic,” there is no formal sanitation system, and although electricity was recently introduced to the area, most cannot afford it. Roads are largely unpaved. In terms of health care delivery, there is one health centre for the sub-district with five satellite clinics providing care for smaller villages which are all staffed by nurses. There are three district level hospitals situated between 25km and 60km from the Agincourt area (Kahn et al. 2007).

3.2: AHSDSS data collection methods

The AHPU has conducted yearly censuses for the AHSDSS since 1992 and includes information on births, migration, deaths (including verbal autopsy information) on all people living in the Agincourt area. The population includes all residents in the study site thus requiring no sampling. Individual and household level information are both collected. Census information is collected yearly in the dry season and additional topic specific modules are also completed in certain years (for example assets, health care utilisation, government benefit utilisation, etc.). Trained field workers visit households and interview the most knowledgeable respondent available and collect information on multiple topics. A random sample of observations is checked for accuracy by revisiting the household for data quality purposes (Agincourt Health & Population Unit 2009). Data is collected and entered into a Microsoft Access relational database by the AHPU. All data forms that were used to collect the data for this study are included in Appendix 2.

Immunisation access data was collected in the 2003 and 2006 waves of the survey through the Health Care Utilisation Form (included in Appendix 2). Specific dates the child was vaccinated were not collected. Interviewers visited each household and recorded the number of doses of immunisations received from each child’s RTHC for each vaccine on the national immunisation schedule. If no RTHC was available, then the most knowledgeable person available in the household was asked if the child had ever received any vaccinations. This person was also asked if the child was a member in a medical aid, or if they have had any illness in the past 2 weeks, and if so, what actions did they take. Information about hospital admission in the last year and chronic medical conditions and disability were also asked (Agincourt Health & Population Unit 2009). The South African immunisation schedule at the time of data collection is shown in Table 3.1.

Table 3.1: South African immunisation schedule

Vaccination	Time of vaccination
BCG	Birth
Polio	Birth, 6 weeks, 10 weeks, 14 weeks, 18 months, 5 years
HepB	6 weeks, 10 weeks, 14 weeks
Hib	6 weeks, 10 weeks, 14 weeks
DTP	6 weeks, 10 weeks, 14 weeks, 18 months
DT	5 years
Measles	9 months, 18 months

Source: UNICEF and World Health Organization 2006; Baker 2010

The definition of who are considered children of former Mozambican refugees in this study is also important to discuss. Polzer conducted an anthropological assessment of what it means to be Mozambican in the Bushbuckridge district. She compares and contrasts the AHPU's academic definition, everyday people's social definition of what it meant to be a Mozambican in the area, and the South African government's bureaucratic definition. The academic definition from the AHPU, which will be followed in this study is as follows:

REFUGEE/MOZAMBICAN. To know the citizen status of a resident in the study area follow the definitions below

- Refugee (Y) = persons from Mozambique who entered SA before 1993 (true refugee).
- Mozambican (M) = persons from Mozambique who entered SA during or after 1993.
- South African citizen (N)
- Other (O) = persons from a country other than Mozambique or SA.

For children, if both parents are Mozambican then the child is Mozambican. If the child has mixed parentage, then a patriarchal system will be followed where the child takes on the status of his/her father:

- If both parents are M then the child is M
- If the father is Y or M and the mother N then the child is M
- If the father is N and the mother is M then the child is N
- If both parents are Y and a child came with them the child is also Y; but, if both parents are Y and the child was born in South Africa, the child is an M

(Polzer 2008, 485-486)

Polzer describes the academic definition as “in many ways a best-practice example for making self-settled refugees academically visible” (2008, 485). However, it is not without its drawbacks.

The most integrated in society, especially those who came to the area before 1985, are likely underrepresented. There were no incentives for participants to identify themselves as Mozambicans and there may be disadvantages due to negative social perceptions of being a

Mozambican (see next definition). Therefore the wealthy, most educated, and most integrated into South African society may instead identify themselves as South Africans, especially at the beginning of the cohort study when the AHSDSS was not well known in the area. Respondents self-identified as South African or Mozambicans, but fieldworkers were described to be culturally competent in the community and would confirm the self-identification based on stereotypes of Mozambicans (accent, dress, culture, wealth, etc.) in the community. Therefore, the more integrated could have been systematically underrepresented. In contrast to the government definition, the academic definition of Mozambicans is permanent. If a person is identified as Mozambican, then they are always considered as Mozambican. While this assists in studying the country of origin as a social determinant within a cohort study, as this study does, it does not account for change in “Mozambicanness” over time. No specific question asked when they moved to South Africa to account for acculturation / time in the country, which would be especially relevant to people who moved elsewhere in South Africa initially before settling in the Bushbuckridge area (Polzer 2008).

Community perceptions of what defines a Mozambican in the Bushbuckridge district are striking. Although many in the community said there were no differences between Mozambicans and South Africa, some people (both Mozambicans and South Africans) categorised Mozambicans as traditional people and South Africans as modern people. None identified ethnicity, nationality, or ancestry as defining characteristics of difference. This is likely because of the historical ties between South Africans and Mozambicans in the area. Differences in culture prevailed in the discussion. The more modern the Mozambicans are, the more they are accepted and considered as South Africans. People who are poorer, live in more rudimentary dwellings, are less educated, and live in certain areas, are considered as Mozambican by the community categorisation (Polzer 2008).

The government defined refugees as those who came to certain areas of South Africa near the Mozambican border between 1980 and 1992 who were not South African permanent residents or citizens. Many people fleeing the civil war did not meet these strict temporal and location restrictions, and many of those who did meet the restrictions could not prove it. This definition became problematic as many people did not have proof of Mozambican citizenship and fewer still had proof of the date and location they entered South Africa. Also over 80% of those who came from Mozambique have obtained South African citizenship or permanent residency status (Polzer 2008). With the government definition of a Mozambican refugee,

those who are now residents of South Africa are not considered a refugee or Mozambican. The people themselves do not intrinsically change overnight once they receive recognition as a South African citizen. When studying determinants, one would lose vital pieces of information by using the government definition. Understanding what the definition of being Mozambican used in the study is important in order to acknowledge the benefits and shortcomings of this definition for this analysis.

Due to the cultural ties of the community, this study does not have to deal with the intricately linked and difficult to separate effects of language and country origin of migrants. These effects can be difficult to decipher, especially if the proficiency in the host language is very poor for all migrants being studied. An advantage of studying this population is that language barriers may play less of a role than in other populations, as Tsonga is the language spoken by both South African and Mozambicans in the area.

Information on parental education was collected at the same time as immunisation information. The highest grade level of schooling of mothers was collected (as well as paternal education, if available). Paternal education is less complete as many times paternal information was not recorded if the father was not involved in caring for the child. Information about any pregnancies in the past year is collected annually during the census from the mother so that information will be used from the time of birth. Questions about antenatal clinic attendance, birth history, and outcome were obtained from the mother.

Information on whether the family applied, awarded, received, or were refused the South African government's child support grant was collected for all households with children in 2002 and 2005. The child support grant will be included in this analysis in the previous year for 2003 and 2006. Identity document information of the child's parents was collected in the 2005 census. Field workers asked if they could see the identity book or birth certificate of the resident but no information was collected from the document itself.

The location of the household where the child lived at the time of the census will be used in this analysis. Classification was made whether or not the household lives in a refugee settlement, which was defined as a village with more Mozambican than South African residents. A new derived variable that categorises people as living in a village that has health care services (the health centre or a clinic) or one without health care services is also utilised.

Household asset information was obtained during the 2003 and 2005 census by getting detailed information on the assets possessed by a household. Information on assets included type of housing structure, how water is obtained, type of sanitation used, access to electricity, cell phones, televisions, refrigerators, and the quantity and types of livestock owned. This information is aggregated by the AHPU to obtain an asset index. Quintiles of the asset status are calculated by the AHPU for a measure of relative poverty. Food security information was collected in 2004 on the households the child lived in during the 2003 census and 2007 on the households the child lived in during the 2006 census by asking the family their experiences in the past month/year and a typical month/year. It should be noted that census information is collected yearly during the dry season when food insecurity is presumably the highest.

3.3: Ethical considerations

All data was previously collected by the AHPU. The AHPU received clearance from the University of Witwatersrand Medical Ethics Committee for the AHSDSS. Yearly informed consent is obtained and no information is available about what, if any, proportion of residents refuse consent and are not included in the panel. Ethical clearance for this secondary analysis was obtained from the University of KwaZulu-Natal Humanities & Social Sciences Ethics Committee. The data analysed in this study has been anonymised by the AHPU in the provided datasets. All data has been aggregated for this report; no micro-level data is presented that could identify an individual or household.

Determining predictors of health care access are useful to be able to target and diminish disparities, however discussing ethical considerations of implications of potential findings is important. This study does not suggest that those vulnerable to not receiving immunisation should be blamed. Some argue that purposefully differentiating people based on if they are Mozambican or South African can be counterproductive and would agree with advancing the sentiment: “We are all South Africans now” (Polzer 2004). However, ignoring determinants that exist is not the solution. Disparities are multifactorial in nature and no group is responsible for low immunisation rates and disease spread. Conversely, this study emphasises that structural barriers of the entire population are responsible for these disparities.

3.4: Study design/analytical plan

This is a retrospective, nested cross-sectional study of the AHSDSS cohort data from the Agincourt sub-district. Data is analysed by the Stata statistical package. Rates are calculated for each separate required vaccination and complete immunisation with all the vaccines required by the South African immunisation schedule. These rates will be calculated in two ways: 1) for all children and 2) for children who received the immunisations in a timely manner. The WHO defines international standards for nine month vaccinations to be attained in children aged 12 to 23 months (World Health Organization n.d.). This researcher further defines timely immunisations: for immunisation given at birth a reference range of less than one month, six week immunisations at two to four months, ten week immunisations at three to six months, fourteen week immunisations at five to eight months, and eighteen month immunisations at 21 to 32 months. Multivariate logistic regression was conducted to test the relationship between different socio-economic and demographic variables and immunisation as the dependent variable⁵. The aim is to determine the factors that most predict immunisation. The analysis controls for and investigates the interaction with the following socio-economic and demographic independent variables:

- History of refugee status (classified as Mozambican or South African)
- Possession of an identity document
- Maternal education and paternal education if available
- Maternal age⁶
- Maternal death
- Sex of the child
- Economic status (based on assets in quintiles and presence of food insecurity)

⁵ In general logistic regression can be used to determine predictors of binary outcomes like accessing health care services. Below are general equations for a logit and its conversion and relationship to odds. In the example of investigating immunisation, p represents the probability of being immunised where $1 - p$ represents the probability of not being immunised, making odds useful for discussing impact of the presence of a predictor on the dependent variable.

$$\text{logit}(p) = \ln\left(\frac{p}{1-p}\right) = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_7X_7$$

$$\text{odds} = \left(\frac{p}{1-p}\right) = e^{b_0} * e^{b_1X_1} * e^{b_2X_2} * e^{b_3X_3} * \dots * e^{b_7X_7}$$

The X terms would represent different factors in the multivariate analysis including refugee status, age, sex, etc. with b their corresponding coefficients.

⁶ Will perform the analysis with maternal age as a continuous variable as there is no clear-cut change in the distribution by age that would suggest a cut off to categorize age into discrete categories.

- Membership in a medical aid
- Residence in a refugee settlement
- Residence in a village with a health care facility

After a combined analysis, separate analyses for children of former Mozambican refugees and South Africans are done to investigate if different predictors predominate if looking at each group separately. Length of stay of Mozambicans parents in South Africa (came before or after 1993) will be included in the analysis of children of former Mozambican refugees. Multivariate analysis allows investigation of a number of socio-economic and demographic factors influencing immunisation access through the theoretical framework to discern the strongest correlates.

After predictors of immunisation access are investigated, indicators of other government benefit utilisation are compared with immunisation access. This includes:

- Child support grant recipient
- Utilisation of health care services during pregnancy (antenatal clinics or having a delivery attendant) of the mother
- Utilisation of health services in the event of child sickness
- Admission to hospital in past year
- Possessing a RTHC

A two-tailed approach is used in the statistical analysis because directionality in this particular population has not been concretely established. Sample size estimates are calculated with a two-sided alpha=0.05 and beta=0.20. A sample of 536 is needed total South African children and children of former Mozambican refugees (in a percentage of 35% Mozambican children and 65% South African children) and 579 children with the continuity correction to calculate a 10% difference between the groups of children of former Mozambican refugees and South African children ⁷. These findings are based on preliminary data in the sample 1 in 10 dataset available from the AHPU.

⁷ The equation used for sample size calculations is as follows where n is sample size, n_{cont} is sample size with continuity correction, p is the proportion immunised in the respective groups, and q is the size of each group out of a total 1 (Hulley et al. 2006):

$$n = \frac{\left(z_{\alpha} \sqrt{p(1-p) \left(\frac{1}{q_1} + \frac{1}{q_2} \right)} + z_{\beta} \sqrt{p_1(1-p_1) \left(\frac{1}{q_1} \right) + p_2(1-p_2) \left(\frac{1}{q_2} \right)} \right)^2}{(p_1 - p_2)^2} \quad n_{cont} = n \left(\frac{2}{|p_1 - p_2|} + 1 \right)$$

The sample size available for analysis in this study includes 17,532 under-five year old children during the 2003 and 2006 data collection periods. The larger sample size available allows more degrees of freedom for appropriate power in the multivariate analysis. The large sample size also allows for analyses on subpopulations.

3.5: Summary

This study investigates immunisation access for the rural Agincourt sub-district of South Africa that has a high proportion of former Mozambican refugees. All data analysed in this study was collected by the AHPU previously. This study is a retrospective, nested cross-sectional analysis of the AHSDSS that will determine immunisation rates and uses multivariate logistic regression to identify socio-economic and demographic predictors of immunisation access.

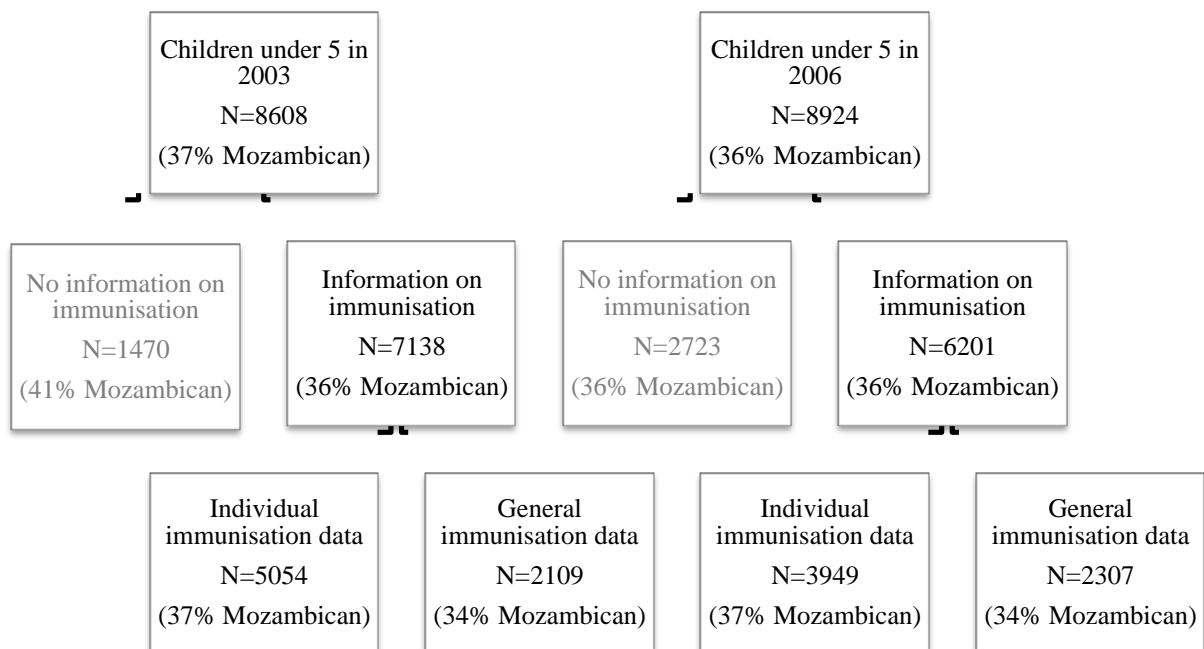
Chapter 4: Results

This chapter presents and discusses the results of the study. First, the descriptive analysis of population characteristics and immunisation levels will be presented. Then, results for the inferential analysis of predictors of immunisation access will be shown and discussed.

4.1: Population characteristics

The Agincourt sub-district is a rural area of South Africa and is home to a substantial number of Mozambican descendants. Data for all children under five years in the Agincourt area during 2003 and 2006 is included, with a population size of 17,532 children. However, 4193 of these children have no information collected about immunisation or other health care access.

Figure 4.1: Population and sample sizes in analysis



Source: Own calculations of data from AHSDSS 2010

Note: Categories without immunisation data are in grey.

Figure 4.1 demonstrates population sizes for all children, those with and without immunisation access information, and those with immunisation access information if they had specific information on each individual immunisation in the immunisation schedule or if general questions were asked because there was no RTHC available. The proportion of those

children who are Mozambican is also included in the figure. Overall about 36% of the sampled population of children under five years is of Mozambican origin and there seems to be little sampling bias based on nation of origin of the children (i.e. similar proportions of children of former Mozambican refugees have immunisation data available).

Socio-economic and demographic characteristics are presented in Table 4.1 and split based on nation of origin. Factors noted with an asterisk are significantly different between South African children and children of former Mozambican refugees. South African mothers have an average of 9.23 years of schooling while Mozambican mothers have an average of 5.26 years of schooling. Paternal education shows a similar discrepancy. As many children did not have paternal education information available, this variable is excluded from the multivariate analysis (in the next section). Less than a quarter of a percent of children have mothers who are dead, and these low numbers precludes use in the further analyses. Over a quarter of the population experience food insecurity. This demonstrates the high degree of poverty in the area. Children of former Mozambican refugees are more likely to have food insecurity and be in a lower asset quintile. Over 97% of the population possess identity documents with Mozambicans less likely to possess identity documents at 93%.

Table 4.1: Socio-economic and demographic characteristics

	South African	Mozambican Origin	Total
Average age (years)	2.37	2.40	2.38
Female children (%)	49.87	51.19	50.35
*Average schooling of mother (years)	9.23	5.26	7.78
Maternal death (%)	0.25	0.23	0.25
*Average schooling of father (years)	8.55	4.25	6.64
*Paternal death (%)	1.13	1.53	1.28
*Food insecurity in past month (%)	26.42	30.26	27.81
*Assets (quintiles)	3.48	2.35	3.08
*Possession of ID documents (%)	98.27	93.49	97.12
*Living in refugee village (%)	14.30	58.99	30.58
*Living in a village with a clinic (%)	52.85	41.01	48.51

Source: Own calculations of data from AHSDSS 2010

*: difference between South Africans and Mozambicans significant to > 95% confidence

Government benefit and non-immunisation health care utilisation characteristics are presented in Table 4.2. Over 99% of mothers attend some antenatal care clinic while about 65% have at least four visits. Mozambicans are slightly more likely to attend at least four antenatal care visits. Conversely South African mothers are much more likely to have a skilled attendant at

delivery with approximately 90% of mothers having a skilled attendant. Less than 75% of Mozambican mothers had a skilled attendant. Information was also collected about delivering in a health care facility, which is similar to delivery with a skilled attendant (data not shown). This likely represents that skilled home-based attendants are not available in this area.

About half of the children in this sample live in a household that receive the child support grant, with South Africans more likely to be recipients. This is in agreement with findings from other studies by the AHPU observing that although being more likely to qualify, children of former Mozambican refugees are less likely to receive the child support grant (Twine et al. 2007). Medical aid membership levels were low in this community with only about 4% of South African children being a member and significantly less children of former Mozambican refugees (less than half a percent). Having private medical aid implies both that the children live in a family that is in a high income bracket and that they have better access to private health providers.

If children were sick in the preceding two weeks prior to interview they were asked if they accessed health care during that sickness. Over 65% of children who were sick are seen by a health professional with no difference based on nation of origin. Thus, access to health care services for acute illnesses seems accessible in this community. Despite the equal utilisation of clinics, South African children were more likely to be admitted to hospital in the past year than children of former Mozambican refugees (3.74% versus 1.39%). It is unknown whether this was due to different rates of sicknesses, different severities of sicknesses, or differentials in admission criteria from health care providers based on nation of origin.

Table 4.2: Government and health care utilisation levels

	South African	Mozambican Origin	Total
Mother attended any antenatal care (%)	98.68	98.80	98.73
*At least 4 antenatal visits of mother (%)	64.30	66.68	65.15
*Mother with skilled attendant at delivery (%)	90.30	73.83	84.31
*Child support grant recipient (%)	51.71	48.95	50.53
Had RTHC (%)	60.98	63.37	61.83
*Membership in medical aid (%)	4.19	0.44	2.82
Accessed health care if sick in last 2 weeks (%)	65.89	67.36	66.44
*Admitted to hospital in past year (%)	3.74	1.39	2.88

Source: Own calculations of data from AHSDSS 2010

*: difference between South Africans and Mozambicans significant to > 95% confidence

4.2: Immunisation rates

Table 4.3 presents immunisation rates of all immunisations recorded in the sample. General immunisation rates are given for all children in the sample (all children under 5 years), which may include children who are too young to receive a particular immunisation. Subsequently information is presented for timely immunisation in particular age groups that should have received that immunisation. Over 99% of children have received at least one immunisation. Of those that have a RTHC, detailed information on specific immunisations is presented.

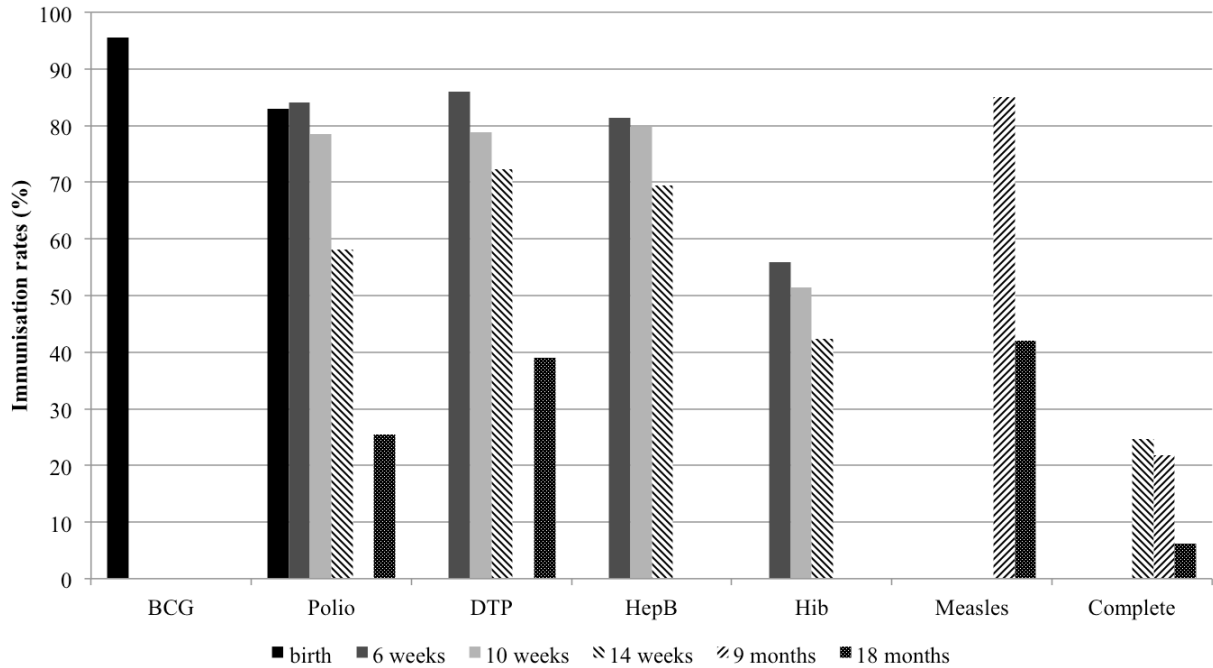
Table 4.3: Immunisation rates

	Age group	Population	South African rate (%)	Mozambican Origin rate (%)	Total rate (%)
Any immunisation	all	13,348	99.06	99.04	99.06
Immunised (no RTHC)	all	4421	97.32	97.00	97.22
Measles vaccination	all	8980	70.68	71.43	70.95
Measles 1	12-23 m	1889	83.95	86.87	84.97
Measles 2	21-32 m	1801	42.17	41.69	41.98
BCG vaccination	all	8823	97.99	98.22	98.08
BCG	<1 m	199	93.94	98.51	95.48
Polio vaccination	all	9000	98.66	98.61	98.64
Polio 1	<1 m	199	81.82	85.07	82.91
Polio 2	2-4 m	567	85.31	82.16	84.13
Polio 3	3-6 m	732	79.48	76.95	78.55
Polio 4	5-8 m	720	61.66	51.92	58.06
Polio 5	21-32 m	1803	26.15	24.12	25.40
HepB vaccination	all	9000	86.37	87.50	86.77
HepB 1	2-4 m	567	80.79	82.16	81.31
HepB 2	3-6 m	732	79.05	81.04	79.78
HepB 3	5-8 m	720	69.50	69.62	69.44
Hib vaccination	all	8920	51.55	51.25	51.41
Hib 1	2-4 m	562	57.22	53.59	55.87
Hib 2	3-6 m	728	53.25	48.12	51.37
Hib 3	5-8 m	718	42.79	41.70	42.34
DTP vaccination	all	9002	90.87	90.88	90.87
DTP 1	2-4 m	567	85.88	86.38	86.07
DTP 2	3-6 m	732	77.75	80.67	78.83
DTP 3	5-8 m	720	71.46	73.85	72.22
DTP 4	21-32 m	1804	39.79	37.73	39.02
Complete all vaccinations up to 14 weeks	5-8 m	719	26.58	21.24	24.62
Complete all vaccinations up to 9 months	12-23 m	1886	22.80	20.06	21.79
Complete all vaccinations up to 18 months	21-32 m	1799	7.16	4.45	6.17

Source: Own calculations of data from AHSDSS 2010

Figure 4.2 uses the data in Table 4.3 to show the rates of BCG, polio, DTP, HepB, Hib, measles, and complete immunisation with all doses required by the immunisation schedule for initial and subsequent doses for all children in the study. To ease interpretation, vaccines required at each age are shown in the same shading. Higher percentages of children are vaccinated with the first doses and fewer children are immunised with the needed follow up doses of vaccines. This is observed regardless of the age at first dose.

Figure 4.2: Immunisation rates for individual and complete timely immunisation



Source: Own calculations of data from AHSDSS 2010

Over 98% of children in the sample have received their BCG immunisation with over 95% immunised in the first month of life. This value is slightly higher for children of former Mozambican refugees than for South African children (98.51% versus 93.93%, respectively). Nearly 80% of children receive the first three polio doses, however less than 60% receive the fourth and less than 25% receive the fifth dose. DTP and HepB have similar initial immunisation rates and similar drop off of subsequent dosing.

Hib immunisation rates were substantially lower, with between about 55% for the first dose to 40% for the third dose despite that Hib should be given at the same time as doses of polio, DTP, and HepB. Children of former Mozambican refugees seem to be particularly less likely

to receive follow up doses of Hib. Measles vaccination rate is approximately 85% for the first dose and drops to 42% for the second dose.

Complete immunisation rates were much lower with less than 25% having on time immunisations at 14 weeks and 9 months. Complete immunisation for the entire South African immunisation schedule is about 6%. So although almost all children (>99%) have some interaction with the South African immunisation programme and have received an immunisation, few acquire all the recommended immunisations.

4.3: Immunisation determinants

The analysis investigates socio-economic and demographic determinants of immunisation access and observes that there are significant associations with immunisation access. The results support that socio-economic and demographic characteristics influence health-seeking behaviour, which is one of the tenets of the Health Belief Model. Univariate and multivariate analyses will be presented for all children first. Next, separate analyses with only South African children will be presented and then the same multivariate analysis with only children of former Mozambican refugees will be presented. Doing separate analyses based on country of origin is done to see if some predictors of immunisation access predominate in separate analyses.

The first dose of measles immunisation in 12-23 month olds is chosen as the dependent variable in this analysis because there are international standards on the age range of measurement and the implications with preventing measles outbreaks as compared to the other immunisation indicators. This standard will be used for the subsequent analyses on immunisation determinants in this paper. Similar results were found with other immunisation dependent variables (data not shown).

4.3.1: Univariate analysis

Table 4.4 presents multiple univariate logistic regression of determinants of measles immunisation access. Each variable predicts measles immunisation separately in the univariate analysis.

Table 4.4: Univariate analysis of measles immunisation determinants

	Odds Ratio (95% CI)	p-value
Refugee status (Mozambican)	1.26 (0.96-1.66)	0.089
Year collected (2006 census)	1.09 (0.85-1.40)	0.510
Sex (female)	0.98 (0.76-1.26)	0.845
Age of child (in years)	1.75 (1.13-2.72)	0.013*
Age of mother (in years)	1.02 (1.00-1.03)	0.023*
Maternal education (in years)	0.99 (0.96-1.03)	0.736
Paternal education (in years)	1.00 (0.96-1.04)	0.960
Food insecurity in past month (insecure)	0.85 (0.64-1.13)	0.273
Assets (in quintiles)	1.11 (1.01-1.21)	0.031*
Membership in a medical aid (member)	2.67 (0.83-8.66)	0.101
Residence in predominantly refugee village (resident)	1.07 (0.81-1.40)	0.632
Residence in village with a health care facility (resident)	1.54 (1.19-1.99)	0.001*
Paternal death	1.12 (0.33-3.81)	0.854

Source: Own calculations of data from AHSDSS 2010

Note: Confidence intervals are in parentheses, *denotes significant to > 95% confidence

There is a trend for children of former Mozambican refugees to be more likely to be immunised with measles than South African children that is significant only within >90% confidence (OR=1.26, p=0.089). Older children (OR=1.75, p=0.013), children with older mothers (OR=1.00, p=0.023), children who live in household in a higher asset quintile (OR=1.11, p=0.031), and children who resided in a village with a health care facility (OR=1.54, p=0.001) are statistically significantly more likely to be immunised. Child sex, maternal education, paternal education, food insecurity, medical aid membership, residence in a refugee village, and paternal death are not significantly associated with measles immunisation access. There was only one child whose mother died in the subpopulation so associations between maternal death and immunisation access cannot be properly investigated.

Next these variables will be combined into a multivariate analysis to control for the effects of confounders between specific variables and measles immunisation access. It is important to determine which specific variables are independently associated with differences in immunisation access.

4.3.2: Combined multivariate analysis

Table 4.5 presents the results of the multivariate logistic regression for determinants of immunisation access.

Table 4.5: Multivariate analysis of measles immunisation determinants, n=1575

	Odds Ratio (95% CI)	p-value
Refugee status (Mozambican)	1.59 (1.08-2.33)	0.018*
Year collected (2006 census)	1.06 (0.79-1.41)	0.709
Sex (female)	0.83 (0.63-1.11)	0.206
Age of child (in years)	1.50 (0.92-2.50)	0.106
Age of mother (in years)	1.02 (1.00-1.04)	0.028*
Maternal education (in years)	1.01 (0.96-1.06)	0.714
Food insecurity in past month (insecure)	0.85 (0.61-1.17)	0.325
Assets (in quintiles)	1.13 (1.01-1.27)	0.033*
Membership in a medical aid (member)	1.76 (0.52-5.93)	0.362
Residence in predominantly refugee village (resident)	1.00 (0.70-1.42)	0.989
Residence in village with a health care facility (resident)	1.43 (1.07-1.92)	0.015*

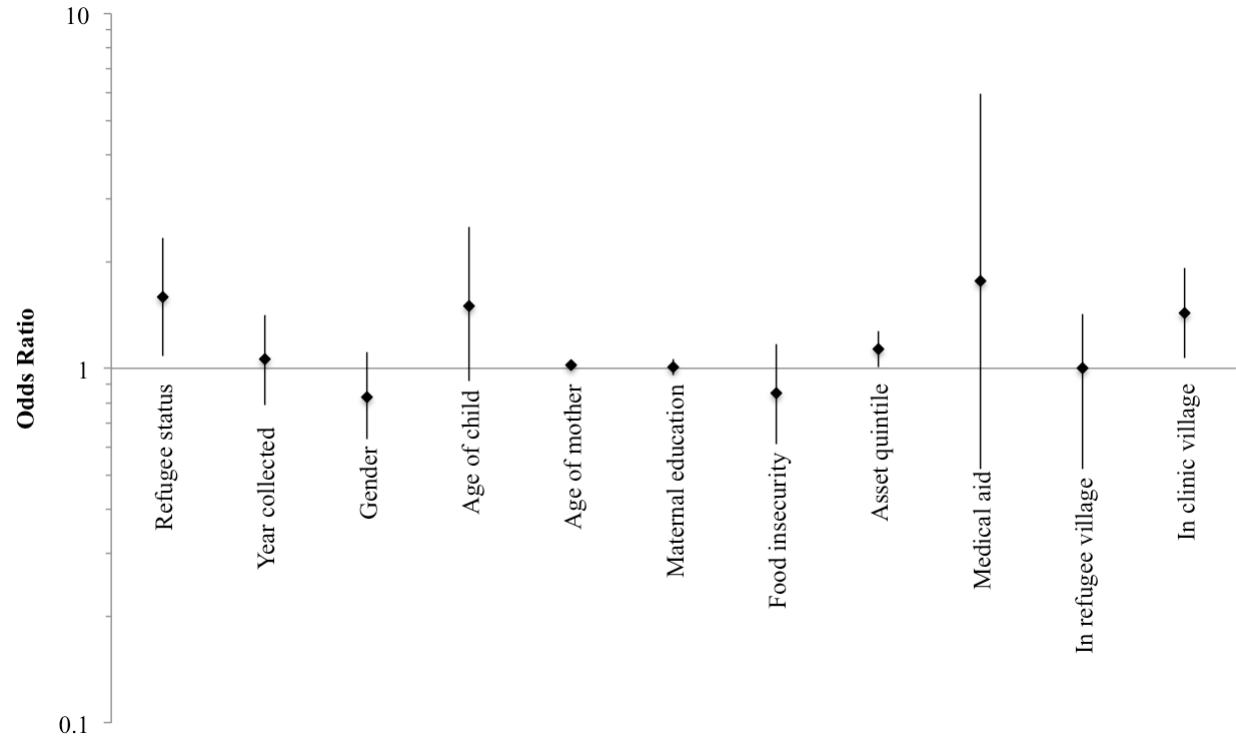
Source: Own calculations of data from AHSDSS 2010

Note: Confidence intervals are in parentheses, *denotes significant to > 95% confidence

Figure 4.3 shows the same immunisation determinants odds ratios and their confidence intervals as Table 4.5 graphically. The odds ratio is shown with the diamond, and the vertical error bars demonstrate the confidence intervals. Variables where the confidence interval does not cross one are statistically significant with at least 95% confidence, whereas variables

whose confidence intervals cross one are not statistically significant. Children of former Mozambican refugees have 1.59 times higher odds of being immunised against measles than children of South Africans. This finding is statistically significant with a p-value of 0.018. Children with older mothers have 1.02 times higher odds of being immunised per year of age (p=0.028). Children with higher assets have 1.14 times higher odds of being immunised for each asset quintile (p=0.33). Children who live in a village with a health care facility have 1.43 higher odds of being immunised than children who do not (p=0.015). The year health care utilisation data was collected, sex of the child, age of the child, maternal education, presence of food insecurity, membership in a medical aid, and living in a predominantly refugee village are not significantly associated with measles immunisation in the multivariate analysis.

Figure 4.3: Measles immunisation determinants from multivariate analysis



Source: Own calculations of data from AHSDSS 2010

Many children do not have information available for possessing identity documents. Therefore a separate regression of measles immunisation access is performed with only the other variables that are significant in the larger multivariate analysis. This analysis is shown in Table 4.6. This is done to ensure appropriate sample size and degrees of freedom necessary for the analysis to avoid wide confidence intervals. Logistic regression with the same

variables and an expanded age range (for children between one and five years) reveals similar results with a sample size of 1566, therefore data from the 12-23 month age group is presented to remain consistent.

Table 4.6: Measles immunisation determinants with document status, n=455

	Odds Ratio (95% CI)	p-value
Refugee status (Mozambican)	1.14 (0.58-2.25)	0.696
Age of mother (in years)	1.06 (1.01-1.09)	0.007*
Assets (in quintiles)	1.15 (0.92-1.43)	0.216
Residence in village with a health care facility (resident)	2.32 (1.34-4.02)	0.003*
Document status (has documents)	1.29 (0.39-4.39)	0.685

Source: Own calculations of data from AHSDSS 2010

Note: Confidence intervals are in parentheses, *denotes significant to > 95% confidence

This analysis is interesting in light of the previous regression. With document status in the regression, asset quintiles and refugee status are no longer statistically significantly associated with measles immunisation. Age of the mother (OR=1.06, p=0.007) and residence in a village with a health care facility (OR=2.32, p=0.003) remain significantly associated with immunisation access. When adding the variable of possessing an identity document to the multivariate logistic regression, the effects of being a refugee and assets influencing immunisation access are diminished. However, possessing identity documents is not statistically significantly associated with immunisation itself when controlling for other factors.

4.3.3: Separate South African children analysis

Table 4.7 presents determinants of measles immunisation for 12-23 month old South African children only. Similar predictors of measles immunisation access as the combined analysis are observed. Age of the mother (OR=1.02, p=0.028), asset quintile (OR=1.13, p=0.033), and residence in a village with a health care facility (OR=1.43, p=0.015) are positively associated with immunisation access. Year the data was collected, sex and age of the child, maternal education, food insecurity, membership in a medical aid, and living in a predominantly

refugee village are not statistically significantly associated with immunisation access. These determinants of measles immunisation access for South African children are the same as in the combined analysis.

Table 4.7: Measles immunisation determinants of South African children, n=1005

	Odds Ratio (95% CI)	p-value
Year collected (2006 census)	1.06 (0.79-1.41)	0.709
Sex (female)	0.83 (0.63-1.11)	0.206
Age of child (in years)	1.50 (0.92-2.50)	0.106
Age of mother (in years)	1.02 (1.00-1.04)	0.028*
Maternal education (in years)	1.01 (1.01-1.27)	0.714
Food insecurity in past month (insecure)	0.85 (0.61-1.17)	0.325
Assets (in quintiles)	1.13 (1.01-1.27)	0.033*
Membership in a medical aid (member)	1.76 (0.52-5.93)	0.362
Residence in predominantly refugee village (resident)	1.00 (0.70-1.42)	0.989
Residence in village with a health care facility (resident)	1.43 (1.07-1.92)	0.015*

Source: Own calculations of data from AHSDSS 2010

Note: Confidence intervals are in parentheses, *denotes significant to > 95% confidence

4.3.4: Separate children of former Mozambican refugees analysis

Table 4.8 presents determinants of measles immunisation for children of former Mozambican refugees only. Originally, it was planned to include a variable about pre or post 1993 arrival of Mozambican refugees, however there are less than 20 children whose parents came post 1993, so the limited variation precludes the use of that variable. Almost all children's parents came to live in South Africa prior to 1993 and there are few recent immigrants. There are also no children of former Mozambican refugees who were members of a medical aid in this subpopulation of 12-23 month olds so membership in a medical aid is not included in this analysis.

Table 4.8: Measles immunisation determinants of children of Mozambican refugees, n=568

	Odds Ratio (95% CI)	p-value
Year collected (2006 census)	0.95 (0.57-1.590)	0.841
Sex (female)	0.95 (0.57-1.57)	0.834
Age of child (in years)	1.66 (0.70-3.94)	0.249
Age of mother (in years)	0.98 (0.94-1.02)	0.243
Maternal education (in years)	0.90 (0.82-0.98)	0.012*
Food insecurity in past month (insecure)	0.79 (0.45-1.37)	0.404
Assets (in quintile)	1.09 (0.88-1.34)	0.422
Residence in predominantly refugee village (resident)	1.08 (0.64-1.84)	0.773
Residence in village with a health care facility (resident)	2.09 (1.19-3.69)	0.011*

Source: Own calculations of data from AHSDSS 2010

Note: Confidence intervals are in parentheses, *denotes significant to > 95% confidence

The only factors that are statistically significantly associated with measles immunisation access for children of former Mozambican refugees are maternal education (OR=0.90, p=0.012) and residing in a village with a health care facility (OR=2.09, p=0.011). Mozambican mothers with lower educational achievement are more likely to have their child immunised, and again children living in a village with a health care facility are more likely to be vaccinated. The year immunisation data was collected, sex and age of the child, age of the mother, food insecurity, assets, and residing in a predominantly refugee village are also not statistically significantly associated with immunisation access.

4.4: Associations with other aspects of benefit utilisation

While identifying socio-economic and demographic factors associated with health care access is useful, it may also be relevant to identify other ways to target vulnerable populations. Looking within the primary care government health care system and government social grant utilisation for children (the child support grant) may be able to identify areas to focus outreach within the health and benefit sectors. Univariate logistic regression was done against immunisation access and other aspects of health care access and is shown in Table 4.9. Each

logistic regression is performed separately because these interventions are likely to be interlinked and we hope to find areas that officials could target mothers, irrespective of other benefit utilisation. Individual logistic regression is equivalent to performing separate chi-square tests but is shown instead to utilise odds.

Table 4.9: Measles immunisation and other aspects of benefit utilisation

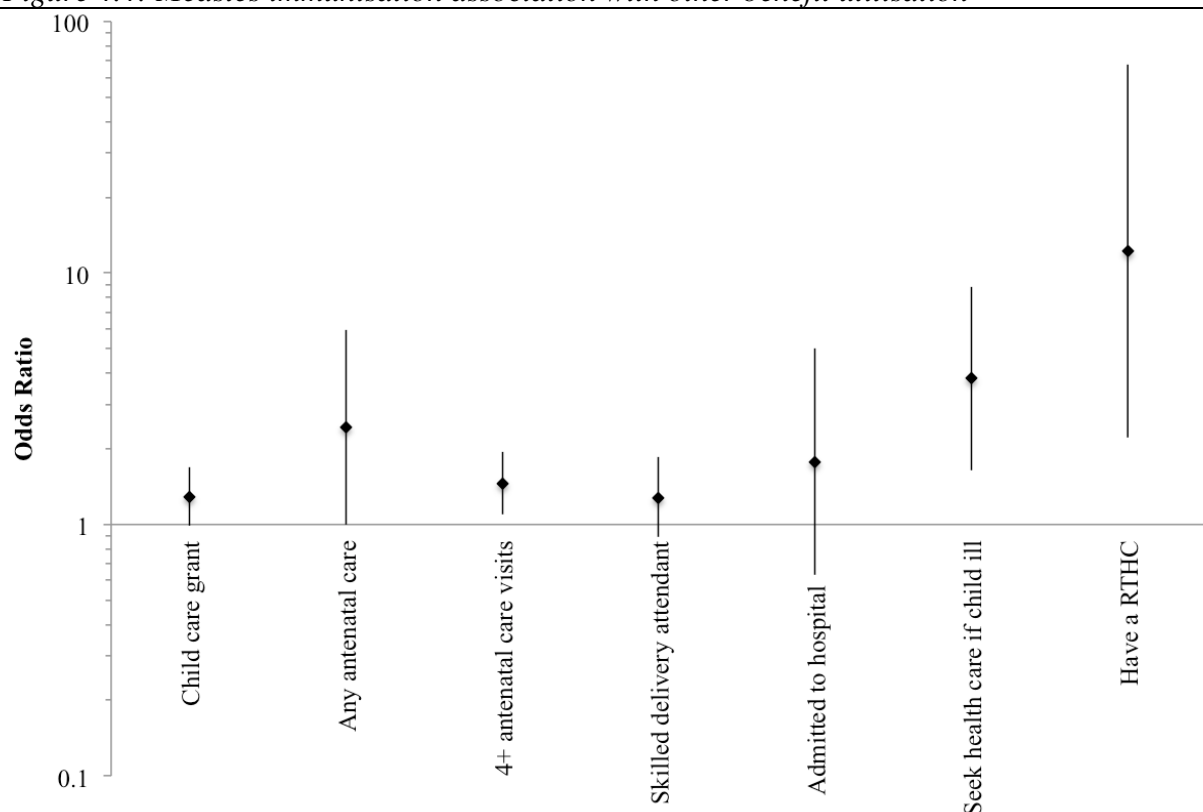
	Odds Ratio (95% CI)	p-value
Child support grant recipient	1.29 (0.99-1.69)	0.056
Attended any antenatal care	2.44 (1.00-5.96)	0.049*
At least four antenatal care visits	1.46 (1.10-1.95)	0.010*
Skilled attendant at delivery	1.28 (0.89-1.85)	0.187
Admitted to hospital in past year	1.77 (0.63-5.00)	0.278
Child taken to health provider if sick in last two weeks	3.81 (1.65-8.82)	0.002*
Have a RTHC	12.23 (2.22-67.45)	0.004*

Source: Own calculations of data from AHSDSS 2010

Note: Confidence intervals are in parentheses, *denotes significant to > 95% confidence

Children are more likely to be immunised if their mother has attended any antenatal care (OR=2.44, p=0.049) or at least the four recommended antenatal care visits (OR=1.46, p=0.010), the child is taken to a health provider if the child was sick in the two weeks preceding the interview (OR=3.81, p=0.02), and if they have a RTHC (OR=12.23, p=0.004). There is a trend that just missed statistical significance for children to be more likely to be immunised if they are in a household that receives the child support grant (OR=1.29, p=0.056). Having a skilled attendant at delivery and the child being admitted to the hospital in the past year are not statistically significantly associated with immunisation access. Figure 4.4 shows the odds ratios and confidence intervals of immunisation access and its association with the child support grant and other aspects of health care access graphically. Again, statistically significant associations have confidence intervals that do not cross the value of one.

Figure 4.4: Measles immunisation association with other benefit utilisation



Source: Own calculations of data from AHSDSS 2010

4.5: Summary

Mozambicans mothers had less education, and children of Mozambican refugees had more food insecurity, less assets, and were less likely to have identity documents or live in a village with a clinic. Despite the findings of lower wealth, children of former Mozambican refugees were less likely to be a child support grant recipient. Almost all mothers received antenatal care while only about 65% received the recommended four antenatal visits. Mozambican mothers were less likely to have skilled attendants at delivery or have their child admitted to hospital in the past year. Over 99% of children had received at least one vaccination, but only about 6% of children were completely vaccinated through their 18-month immunisations.

In a univariate analysis, children who are older, have an older mother, who live in a wealthier household, and reside in a village with a health care facility had higher odds of being immunised. There was a trend for children of former Mozambican refugees to have higher odds of being immunised. Sex of the child, parental education, food insecurity, medical aid

membership, residence in a refugee village, and paternal death were not significantly associated with measles immunisation access.

In multivariate analysis, being a child of a former Mozambican refugee, having an older mother, wealth as measured by asset quintile, and living in a village with a clinic were also associated with increased immunisation access controlling for all other variables including sex and age of the child, year data was collected, maternal education, food insecurity, medical aid membership, and whether they lived in a predominantly refugee village in the combined analysis. Similar findings are observed for the separate analysis with just South African children, however low maternal education and residence in a village with a clinic were significant predictors of increased immunisation access in children of former Mozambican refugees controlling for other variables.

In separate analyses, immunisation is associated with the mother attending antenatal care, the child taken to a health provider if ill, possessing a RTHC, and a trend of being a child support grant recipient but not for delivery assistance for the mother or having the child admitted to hospital. These findings are useful to increase outreach within the health care and benefit system to target children with decreased immunisation access.

Chapter 5: Discussion

This chapter discusses the results of this study in detail. Rates of immunisation, determinants of measles immunisation access, correlation of measles immunisation with other aspects of benefit utilisation, and the limitations of this study will be discussed.

5.1: Immunisation rates

Although over 99% of children in the study have received at least one immunisation, continued engagement in the immunisation campaign is not occurring the majority of the time. Immunisation levels for the first dose of all vaccinations (except Hib) hover at near 85%. This is just at the level that will prevent population outbreaks of polio, but will be ineffective in preventing measles outbreaks, like the current South African measles outbreak in 2010. The Agincourt community has also not met goals of immunising 95% of children to prevent measles outbreaks. Subsequent immunisations rates are even lower.

BCG is given at birth, so it is unclear why South African children (whose mothers are more likely to have a skilled delivery attendant / deliver in a health care facility) are not more immunised than children of former Mozambican refugees. Based on utilisation of maternal services at the time of labour it would be expected for South Africans to have higher BCG rates. Improvements in the health care facilities to ensure all children receive their birth vaccinations is needed – this is a missed opportunity for immunisation promotion and dispersal.

Hib immunisation rates are consistently lower than other immunisations. Hib immunisation began in July 1999 in the public sector in South Africa (von Gottberg et al. 2006), so it is unclear why the immunisation rates for Hib are so much lower than the other vaccine preventable diseases. This may be due to lower knowledge and acceptance of this newer vaccine amongst health care workers and the general population or supply problems related to this particular vaccine.

It is also interesting that children are not receiving all the vaccinations in the immunisation schedule at particular times. For example, the fourth dose of polio and the third doses of DTP,

Hib, and HepB are all given at 14 weeks. HepB and DTP immunisation rates are approximately 70%, polio immunisation rates are around 60%, and Hib immunisation rates are about 40%. It is unclear if this is due to patient preferences to avoid some vaccines or more likely deficiencies on the provider or supply side causing this discrepancy. Improving the adherence to the overall immunisation schedule for those that are getting immunised is needed. Providing available combination vaccines in the public sector that combine multiple immunisations in one injection may improve adherence to the immunisation schedule. In the new immunisation schedule, a combination vaccine of DTP/polio/Hib is available that would seem to result in improved Hib immunisation rates (South African Department of Health 2009). However, with the introduction of PCV and RV the number of separate immunisations given has not decreased. Further cultivation of combination vaccines will be beneficial in the long term for the immunisation programme.

Even more disappointing is the high dropout rates of immunisations throughout childhood. When looking at complete immunisation, which is defined as receiving all scheduled immunisations from the immunisation schedule required up to that age, immunisation rates are low. Less than 25% of all children are completely immunised at 14 weeks; similarly 22% of children are completely immunised at 9 months. Only 6% of children are completely immunised at 18 months. Children of former Mozambican refugees seem less likely to be completely immunised although this was not tested. Thus, children receive some doses of immunisations; however most do not receive all the required immunisations. This represents a lack of engagement in the immunisation process. As children come to be immunised it should be a goal that mothers have positive experiences and bring their children back to be immunised at the next scheduled dose. This is currently not happening.

Although there are insufficient rates of immunisation in the Agincourt community, the immunisation rates in this area are higher than the estimated national rates. Even though the South African government reports rates as much higher, the last national survey of 12-23 month old children in 2003 had measles coverage at 62% (World Health Organization and UNICEF 2010). Thus, the Agincourt sub-district has over a 20% higher coverage than national survey estimates. The national study used similar data collection techniques by recording information from a RTHC. Higher immunisation levels in the Agincourt area may be explained in part by strong ties with public health researchers and this sub-district or other community dynamics.

5.2: Determinants of measles immunisation

Contrary to our a priori hypothesis, children of former Mozambican refugees have higher odds of being immunised than the control group of South African children⁸ when controlling for other socio-economic and demographic factors. This is in tune with the healthy migrant effect and the observation that children of Mexican born parents (and Hispanics of not specified immigration status) in the United States are more likely to be immunised than the host population and another study in Canada (Sauver et al. 2002; Guttmann et al. 2008), but contradicts much of the literature on immunisation access of refugees internationally and the notion that international migrants in South Africa have difficulty accessing health care from the numerous qualitative studies. This finding just missed statistical significance in a univariate analysis, thus, controlling for other socio-economic and demographic variables in the multivariate analysis strengthened the association between measles immunisation access and refugee status.

This study is not designed to determine what specific barriers are preventing children with certain socio-economic and demographic from getting immunised sufficiently. Speculation on the reasons for these observations will be discussed based on conjecture and prior studies but further research must be done to truly investigate the cause of this relationship.

Children of Mozambican refugees may have higher odds of access to immunisations for variety of reasons. Firstly, Mozambican refugees who choose to stay permanently in South Africa may be a select group. It is possible that the refugees who fled to the area from Mozambique did so in part because of the lack of services available in Mozambique during

⁸ The relationship between odds ratios (*OR*), relative risk (*RR*), and absolute risk (*AR*, the prevalence in the population) are as follows:

$$RR = \frac{OR}{1 - AR + (AR * OR)}$$

When outcomes are rare, the relative risk approximates the odds ratio. Measles immunisation is not a rare event so caution is used when expressing how the odds ratio. With an odds ratio of 1.59 and an absolute risk of 0.8497 (see Table 4.3 for overall prevalence of the first dose of measles immunisation) the relative risk is 1.06, inferring that children of former Mozambican refugees are 6% more likely than South African children to be immunised with measles controlling for other socio-economic and demographic factors. Although not presented on each regression throughout this paper, conversion to relative risk can be performed.

the war. With numerous attacks from RENAMO targeting people in the community and public infrastructure, those who fled may be the very people who were better equipped to seek refuge despite having low objective levels of education and money. This would likely be the case for all Mozambicans living in South Africa and therefore would not diminish the generalisability of this study to this population. The former Mozambican refugees may be more resilient and may be driven to take advantage of the infrastructure that was not available to them in Mozambique. This is similar to the argument of the healthy migrant effect that healthier people are those who are more able to migrate.

Another hypothesis for the “Hispanic Paradox,” or the healthy migrant effect for Hispanic immigrants in the United States, is of the importance of cultural values that are different from the host population (Franzini and Fernandez-Esquer 2004). This may also be occurring to some level in the Agincourt sub-district. Although there are similar ancestry and cultural ties of the Tsonga/Shangaan people of South Africa and Mozambique, the Mozambicans also lived through the difficult time of the Mozambican civil war where people’s physical health and livelihood were in danger. This experience may have resulted in different attitudes towards health care services that they feel are safe and could potentially save lives. Seeing and experiencing the ill effects of have a weak public health system during war-time Mozambique may have changed their cultural practices relating to health care access. Thus, living through the war would change how the Mozambicans perceive the benefits and barriers to immunisation access. This would explain their improved access through the Health Belief Model.

Alternatively, since Mozambican descendants are considered vulnerable in the community they may be successfully targeted by the health system for interventions to improve immunisation access although this researcher is not aware of any such interventions. The variable of residence in a refugee village is used to control for and investigate if there are community dynamics at a village level related to the proportion of former Mozambican refugees in particular villages that might be key in explaining findings of difference in immunisation access between South Africans and Mozambicans. Physical or community outreach (or lack thereof) may be important in effecting immunisation access. For example if there was significant outreach towards predominantly refugee villages to increase immunisation access, South African children in those areas may similarly benefit or vice versa. No such observations are found so it appears that outreach (or lack of outreach) to

villages that were predominantly comprised of people who were Mozambican descendants did not drive the results. The benefit of being a child of a former Mozambican refugee does not seem to be due to increased outreach in predominantly Mozambican communities. This is evidenced by the fact that residing in a predominantly refugee village was not significantly associated with differences in immunisation access. This is true in the combined analysis and in the separated analyses. Therefore, outreach, at least at a village level, is not driving the findings that children of former Mozambican refugees have higher odds of being immunised.

Similar to ethical issues raised with studying the Hispanic Paradox, advocates have expressed concern that results that describe that migrants have better health utilisation or outcomes mean that these migrants are either 1) migrating to reap benefits of improved health which would be considered an undesirable pull factor for migration and/or 2) need decreased outreach because of their current high levels of health care utilisation and this decreased outreach may negatively impact health care access in the future. Both of these points should be adequately considered given the repercussions of dissemination of findings of this study to policymakers. In contrast, this study can show that there are glimmers of hope: populations that researchers and community members see as vulnerable are overcoming perceived barriers and actually have higher odds of getting immunised than the rest of the population. Once the reasons for this effect are understood, strategies targeting parts of the population that are not being immunised sufficiently may be developed.

In light of the findings of this study it is interesting that Mozambicans and migrants in general were implicated as being in part responsible for the two most recent measles outbreaks in South Africa, including in a South African Department of Health report (Harrison 2009). These assertions were based on anecdotal accounts and unfounded conjecture and there are no published attempts to investigate these on a community level and the reports did not reference any controlled studies. With numerous qualitative studies describing barriers to accessing health care, it is natural to hypothesize that migrants will have poor immunisation uptake – that was this researcher's a priori hypothesis. Although the Department of Health remarks may have been based on the best evidence at the time (which was weak and flawed), there may also be political benefits to blaming migrants for the immunisation outbreaks instead of acknowledging shortcomings in the implementation and evaluation of the South African immunisation programme. This study's purpose is not to refute the Department of Health's claims but it does demonstrate that the determinants of immunisation access may be more

complicated than originally expected in terms of migration status. This is one study that has been able to investigate immunisation access with a control group and more studies are needed with these sorts of methods. Fully understanding these associations should be further explored and care should be taken to not blame certain groups based on weak evidence.

Living in a village with a health care facility also significantly predicts improved immunisation access. This is analogous to the findings of distance to health care facilities being associated with immunisation from prior research. Other research finds that intra-village distances are not significantly associated with immunisation access (Sanou et al. 2009). Convenience and the ease of outreach campaigns to villages from the local health care facility likely underlie this effect. It may also be due to the fact that villages that have a health care facility may be wealthier and better serviced above and beyond what is measured by other socio-economic variables. Although the multivariate logistic regression analysis controlled for other socio-economic and demographic characteristics there may be other underlying differences in people living in a village that has a health facility as compared to a village that does not. Targeting outreach campaigns to villages that do not have a health care facility and providing satellite immunisation posts could be important interventions to increase immunisation rates for children.

Older mothers are more likely to have their children immunised. This is not consistent with the majority of the international literature (Barreto and Rodrigues 1992; Cutts et al. 1989; Brenner et al. 2001; Waldhoer et al. 1997; Rosenthal et al. 2004; Ndirangu et al. 2009; Markland and Durand 1976; Buelow and Van Hook 2008; Cutts et al. 1991). Since younger mothers are less likely to bring their children to be immunised, targeting these girls before they become mothers in schools may be worthwhile. Alternatively making the immunisation clinics more welcoming to younger mothers may improve uptake.

The extremes of income – food insecurity on the lower extreme and being a member in a medical aid on the higher extreme – show no association with immunisation access. In addition to being in a medical aid as a proxy for higher household income, it is also presumed to have increased access to private health care providers (which may be considered as superior providers with more resources to provide comprehensive care) that may be providing primary care. Interestingly, children with a medical aid and access to private providers did not

have increased immunisation access. This is consistent with findings from the United States (Buelow and Van Hook 2008).

In contrast, assets measured in quintiles are significantly associated with immunisation access. This may be due to a sigmoidal, or dual plateauing association with wealth and immunisation access. Therefore at the extremes of low or high poverty wealth there is very little variation in the effect of immunisation access, however the middle rung – where most of the population lives – variation in wealth is associated with changes in immunisation access. The association of being in a higher asset quintile with increased immunisation access goes along with much of the international research but not the South African study in rural KwaZulu-Natal that utilises the same methods as the AHPU to ascertain assets (Ndirangu et al. 2009). Having more wealth may make it possible to shift priorities that value preventative health for children like immunisations. This is analogous to changing how the barriers and benefits are perceived leading to changes in the likelihood of action to access immunisations in the Health Belief Model.

The immunisation rates in 2003 and 2006 were not significantly different. So after low national immunisation rates were surveyed in 2003 and the measles outbreak that year which originated from neighbouring Mozambique, immunisation rates have remained stagnant. On a national level increased focus has been supposedly given to improve immunisation access (Harrison 2009), but data from the Agincourt area does not support that this effort has succeeded in the long term. These results show that continuing the status quo with immunisation access is insufficient. Concerted efforts to improve immunisation access are necessary.

As expected, there was not a significant difference in immunisation access based on the sex of the child. This data supports that there is not a difference in immunisation access based on sex in most of the world. In South Africa, sex preference does not seem strong enough to lead to differences in health care access. This may be because in addition to the value of male heirs, the use lobola received as a dowry for females and numerous other cultural factors makes no overall systematic sex preference on a societal level. Despite strong association with maternal education and immunisation access in the international literature, this analysis did not find maternal education to be significant with immunisation access for the combined analyses and the South African children only analysis.

Interestingly, maternal education is only associated with being immunised in the separate Mozambican analysis. In this study maternal education is negatively associated with immunisation access, meaning that as Mozambican mothers are more educated they immunised their children less. In contrast to this study's finding, maternal education has been found to be significantly positively associated in the international literature on immunisation access. Thus poorly educated of Mozambican descendants, which have lower education than South Africans overall, are the most likely to be immunised. Lacking education may be a proxy for decreased acculturation and therefore accentuating the effect of children of former Mozambican refugees having improved immunisation access. Lower education and lower acculturation of Hispanics in the United States is also observed in the Hispanic Paradox (Franzini, Ribble, and Kedde 2001).

In the wider analysis looking at the role of identity documents, a complex interaction between possessing identity documents, being a child of a former Mozambican refugee, and immunisation is observed. Since the association with age of the mother and residence in a village with a health care facility remained statistically significant in this analysis, targeting younger mothers and those who live in a village without a health care facility is likely to be the most fruitful in improving immunisation access.

5.3: Benefit utilisation

Possessing a childcare grant is nearly statistically significantly associated with increased immunisation access. This likely represents that children who are already utilising the government benefit system in the form of the child support grant are likely to also be utilising the public health care benefits of immunisation. Intense discussion has occurred regarding requiring children who receive the child support grant to show proof of immunisation prior to disbursement as a condition of the grant (Leatt and Budlender 2006). Although the sentiment to try and integrate multiple government systems should be applauded, it seems that this would not be targeting the appropriate children. Those who are already applying for the child support grant already are the people who have better immunisation rates. Therefore, increasing the administrative burden for both the government offices and the parents applying for the child support grant may be misdirected. Alternatively, focusing on parts of the

population less likely to be immunised would be better. Increasing outreach for the child support grant while promoting immunisations may be a more successful intervention.

With over 99% of women receiving some sort of antenatal care, their children were significantly more likely to be immunised. However, far from all of those 99% of children were immunised. Increased outreach at antenatal care clinics regarding the importance of immunisation is warranted. In addition with over 30% of women not returning to antenatal care for the recommended four appointments, education about the importance of continued engagement with primary care for the mother during delivery and the child in their first years should all be encouraged and emphasised in a positive matter at the first antenatal visit.

Having a skilled delivery attendant and the child being admitted to hospital during the last year are both not associated with differences in immunisation access. Again, this is a missed opportunity for education, outreach, and immunisations of children who are not up to date on immunisations while admitted in hospital. Engaging caregivers in immunisation during all interactions with the health care system is necessary for improved access. Children who saw a health provider if they were ill in the two weeks prior to interview being more likely to be immunised likely demonstrates this engagement with the health care system. Providers should ensure they target children at all interactions with the health care system – at the same time as maternal visits, during acute care visits, and during inpatient admissions.

Possessing a RTHC is the strongest predictor of immunisation access. The RTHC is given out at a health care facility, usually at birth, and the mother keeps the card and is to present it during any interaction with health care providers. Possessing this card implies organisation on the caregiver's part, but also is one of the few pieces of information that has the immunisation schedule on it for the caregiver to see. If the caregiver is to look at the card, the immunisation schedule is on the card in a combination of pictures and writing. This may be a cue for the mother to get her child immunised. Research in the United States has also observed that hand held immunisation records improved immunisation access (McElligott and Darden 2010). In addition, without the RTHC, health care providers may be wrongfully postponing immunisation of the child. Each interaction with the health care system should be considered an opportunity to immunise the child. Many mothers do not bring the RTHC for non-preventative care visits, and similarly many providers do not attempt to provide immunisations in non-preventative care visits (Tarwa and De Villiers 2007). If a child comes

into a clinic and the child had missed the last immunisations but did not have the RTHC, the health care worker may not immunise the child because they consider their immunisation status as unknown. RTHCs should not be necessary for immunisation. Since possessing a RTHC is one of the most important predictors of being immunised (whether the data was collected from the card or the mother was verbally asked if the child had ever received an immunisation), ensuring all mothers are given RTHCs at the birth of the child or any contact with the health care system could be instrumental in improving immunisation uptake.

5.4: Study limitations

The main limitation of this study is that this study is designed to identify predictors of immunisation access but cannot explain *how* these factors influence immunisation access. Any explanation of these factors is conjecture on the basis of the Health Belief Model and the previous studies investigating barriers of immunisation access presented in Chapter 2. Research integrating the psychological theory of the Health Belief Model with studies on health care access and outcomes of migrants may prove fruitful in explaining findings of this study and the healthy migrant effect - research is needed in this area. Future studies will be needed to describe these processes in this population and also identify best practices in order to reduce these disparities. However, this study provides the first step in this process to eliminating disparities in immunisation access: by determining what factors should be investigated. This research also does not, and cannot, infer causality. The cause behind the associations found in this research are currently unknown and any explanation provided in this discussion is conjecture.

There are various limitations of this study. In terms of data limitations, some children have missing data and although there did not seem to be obvious bias to the missing data based on nation of origin – it is possible that there are other biases that may influence the results. Also, not all information on the children was collected at the same time as the health care utilisation / immunisation information. For example, although immunisation information was collected in 2003 and 2006, information about identity documents was only collected in 2005 and childcare grant information was collected only in 2002 and 2005. This study took the nearest dates and treated the data as a cross-sectional study from 2003 and 2006. In addition, having specific dates of immunisation would allow a better picture of timely immunisation. This analysis instead has to follow WHO recommendations to get overall rates of immunisation on

a population level for 12 to 23 month old children instead of knowing the child's age at each particular dose. Knowledge of the child's age at each dose would allow for a more robust analysis.

Measles immunisation was used to investigate in-depth determinants of immunisation access as a representative immunisation for numerous reasons. Importantly, there are international standards on how to measure measles immunisation rates based on community data dictated by the WHO when specific dates of immunisation acquisition are not available (by determining rates of documented immunisations for 12-23 month old children). This author wanted to avoid arbitrarily choosing a dependent variable for the multivariate analysis or using a non-validated compilation dependent variable. Due to high population levels of measles immunisation necessary for herd immunity to prevent population outbreaks immunisation against measles also has important policy implications. Data analysis (not shown here) found similar results when using other immunisation variables as the dependent variable.

This study uses assets and food security as measures of economic wealth. There are problems with the various types of measurement of economic wealth with either direct measurements of income, expenditure, and consumption or proxy measurements by using an asset index. Each indicator has advantages and disadvantages. Income and employment have the disadvantages of being transient and may not provide a long-term measurement of wealth. Sudden loss or gain in employment will dramatically affect the measured wealth and may not be an appropriate long-term classification of that household. Since survey questions are asked at yearly intervals it is more important to get a long-term measure that would accurately reflect the situation of the household when the child was immunised instead of the current situation during the interview. Expenditure also has similar disadvantages. Consumption is considered to be the gold standard in measurement by economists however it is very difficult to measure accurately. Food security can be a very gross measure of consumption but lacks the precision needed. Assets is used as a proxy measure to economic wealth and has the advantage of being relatively easily obtainable and a more long term measure, however the use of assets has weak theoretical support and can be arbitrary and hard to generalise depending on the measurement used. Different measures can also be associated with different correlations to health care and immunisation access. In one study, the poorest quintile in terms of assets had only received 9.6% of all immunisations while the poorest quintile in terms of consumption received 21.4%

of all immunisations (O'Donnell et al. 2008). Ideally we would be able to combine multiple measures to better control for economic wealth in this study.

Language has also been seen to influence immunisation access in other studies. In a Mozambican study, having either non-Portuguese speaking mothers or community representatives was associated with increased immunisation in rural but not urban areas (Cutts et al. 1989). Although, in the Western Cape of South Africa, the language of the caregiver (Xhosa, Afrikaans, or English) was not found to influence immunisation (Corrigall, Coetzee, and Cameron 2008). Some of the migration studies previously described in the literature review may be flawed because they were unable to separate language barriers with being a migrant. Language barriers could compound the problems for migrants. Lack of interpreters may lead to poorer quality care:

[Health care workers] get annoyed with language problems, and they don't seem willing to assist. Most clinics don't have interpreters, so the doctors will just ask yes or no questions, and don't get to the bottom of things. They take advantage of foreigners' lack of knowledge of their rights, so they will tell them go somewhere else. (Human Rights Watch 2009, 62)

Not understanding the language is another barrier that may sway migrants away from getting needed immunisations. Not speaking the predominant language would also make migrants not able to understand or be subject to outreach campaigns that use the predominant language. For this study, the primary language spoken by both the Mozambicans and South Africans in the area is Tsonga, although it can be presumed (but could not been specifically looked at) that the English skills of former Mozambican refugees are weaker than South Africans. Since Tsonga is spoken at clinics and outreach materials will be in Tsonga for the area, the language barrier will be less of an issue in the Agincourt area. However, opposite to the above findings, Spanish speakers in the United States were more likely to be immunised and this association was stronger than found with ethnicity (Owen et al. 2005; McElligott and Darden 2010).

Data on language was not specifically collected, however, Tsonga is the primary language used by both the Mozambican descendants and South Africans in this area. It is unknown if there are a small minority of Mozambicans may have emigrated from a different part of Mozambique that did not speak Tsonga are outliers. Although Tsonga is prevalent in this area, Mozambicans may feel isolated at official agencies where English may be more commonly spoken, despite policies providing translation. Alternatively, non-Tsonga speaking South Africans may be driving the results observed. For example, Zulu speaking South Africans

may have poorer access in the Agincourt area because of language barriers. It would be preferable if data on language proficiency were recorded in this sample to further identify vulnerable groups in the population.

Having a large family with multiple children was associated with poorer immunisation access in the Gambia (Hanlon et al. 1988), Nigeria (Akesode 1982), Mozambique (Cutts et al. 1989), Zambia (Setse et al. 2006), India (Ughade et al. 2000), Germany (Poethko-Müller et al. 2009), with contradictory findings in the United States (Buelow and Van Hook 2008; Rosenthal et al. 2004; Markland and Durand 1976; McElligott and Darden 2010). Birth order has also had differing results in the two studies that investigated that factor (Barreto and Rodrigues 1992; Brenner et al. 2001). These family dynamics, along with maternal parity may also need to be taken into account in this study but that information was not available for this analysis. In addition, taking into account siblings would be important to accurately extrapolate these findings on an individual level to families.

Marital status of the mother and paternal presence were influential in immunisation access nationally in the United States (Buelow and Van Hook 2008) and Angola (Avogo and Agadjanian 2010) and not significant in South Africa (Corrigall, Coetzee, and Cameron 2008), Brazil (Barreto and Rodrigues 1992), and Washington DC, USA (Brenner et al. 2001). Maternal employment was important in the developed countries of the United States (Brenner et al. 2001) and Austria (Waldhoer et al. 1997) but not found to be associated with immunisation access in South Africa (Corrigall, Coetzee, and Cameron 2008). Another important variable not analysed is co-residence with the child's mother. This has not been investigated in prior research or this study but could potentially be an important confounder in the Agincourt area. This area is a source for migrant labour, including of women, and the Agincourt area has been affected by the HIV which may cause other changes in family dynamics where children are not taken care of by their mother. It was not possible to investigate any of these family dynamics, however, they may have been important to control for in this analysis.

There are other child health indicators have been associated with improved immunisation access in prior research that was not investigated here. Children who got their first immunisation at a younger age were more likely to complete their immunisation in Pakistan (Usman et al. 2010). Regarding indicators of child health, low birthweight was not found to

be significantly associated with immunisation access in Brazil (Barreto and Rodrigues 1992) and the United States (Brenner et al. 2001). In rural KwaZulu-Natal, researchers found that despite immunisations being critical for HIV positive infants because of their increased vulnerability to vaccine preventable diseases, children with HIV positive mothers were less likely to be immunised (Ndirangu et al. 2009). Poorer immunisation access for HIV positive children was also found in Zambia, but this association disappeared when adding education and family size to the multivariate model (Setse et al. 2006). Controlling for HIV status may have been useful to investigate since this community has high HIV rates. However, due to data limitations this was not possible. HIV status is also likely correlated with other socio-economic and demographic factors. The mother being vaccinated with tetanus was associated with child immunisation (Koumare et al. 2009). These health care benefits could be important for targeting interventions in this population also.

5.5: Summary

The analytical findings support the Health Belief Model by observing that socio-economic and demographic factors influence immunisation access. However, the results specific to the influence of being a refugee are in the opposite direction than the a priori hypothesis: children of Mozambican refugees have higher odds of being immunised than the control South African children controlling for other socio-economic and demographic variables. This is similar to the findings in a few North America studies (Sauver et al. 2002; Guttmann et al. 2008).

Despite the numerous study limitations, this study is large with highly controlled methods that has been able to investigate immunisation rates and ascertain determinants of immunisation access in a rural South African sub-district. The study's results provide groundwork for future research studies and policy interventions to improve immunisation access.

Chapter 6: Conclusions

Immunisations are important for child health. Immunisation access for migrants is an under-researched area in South Africa even though migrants have been implicated in the two most recent measles outbreaks. This study fills its aims to investigate immunisation rates in the Agincourt area of South Africa and to investigate determinants of childhood immunisation access for this sub-district with a high proportion of former Mozambican refugees. In addition to the information on health care access for migrants in South Africa, this study provides information on determinants of immunisation access in rural South Africa in general. This study investigates all children under age five years in the years of 2003 and 2006 in the Agincourt sub-district, Mpumalanga, South Africa with large numbers of participants and a highly controlled methodology (the AHSDSS).

6.1: Summary of findings

Key findings of this study include:

- There are insufficient levels of immunisation in the Agincourt sub-district of South Africa to prevent population outbreaks of measles. The immunisation rates in this community are higher than the estimated national rates however national immunisation goals have not been met.
- Continued engagement with immunisation schedules are lacking with subsequent immunisation rates at much lower levels than initial immunisation doses for all immunisations.
- Socio-economic and demographic predictors of higher measles immunisation access in this sub-district that are statistically significant in a multivariate analysis include: being a child of a former Mozambican refugee, living in a village with a health care facility, having an older mother, and having more wealth in the form of assets. Lower maternal education was associated with improved immunisation access only in children of Mozambican mothers.
- Socio-economic and demographic factors not significantly associated with measles immunisation access in a multivariate analysis include: living in a predominantly refugee village, sex of the child, age of the child, food insecurity, membership in a medical aid, and whether this information was collected in 2003 and 2006.

- Measles immunisation is also significantly associated with the following aspects of health and benefit utilisation: mother attending any antenatal care or at least four visits, the child is taken to a health provider if was sick in the last two weeks, and possessing a RTHC. Being a child support grant recipient nearly reached statistical significance also.
- Health utilisation aspects that are not significantly associated with measles immunisation access include: having a skilled attendant at delivery / delivering in a health care facility and the child being admitted to hospital in the past year.

6.2: Implications and recommendations

6.2.1: Generalisability

This paper is likely relevant to areas in similar situations where self-settled refugees with cultural/language similarities to their host communities are living, especially of Mozambicans who fled the civil war to South Africa. Furthermore, this is an important addition to the literature that perceived vulnerability of a population and barriers to health care access do not necessarily translate into decreased health care access for international migrants, those living in South Africa and throughout the globe. In contrast, it may be possible for migrants to have higher odds of health care access than their host population.

It is unknown whether other migrant populations in South Africa have the same experience as the Mozambican migrants in this study. The studies on barriers to health care access in South Africa were focused more on either humanitarian refugees from Zimbabwe or refugees from the Great Lakes region or the Horn of Africa. Each of these populations is distinct with different push and pull factors of migration and different living conditions upon their arrival in South Africa. However, this study should be taken as a caution to the non-controlled studies on health care access that was presented in Chapter 2. This study shows that it is necessary to take the next step to determine if barriers are translating into decreased access as compared to the host population.

Outside of South Africa this is also one of the first studies to look at community level data on access to health care for international migrants in a developing country. Other countries with

significant amounts of self-settled international migrants and refugees (e.g. Syria, India, and Guinea) may show similar results.

Besides focusing on the generalisability to areas with migrants, this study also sheds light on issues of immunisation determinants in South Africa. The inequities in immunisation access observed in the Agincourt sub-district can be generalised to other communities in South Africa, especially rural areas. The study findings are useful for both researchers and policymakers.

6.2.2: Policy implications

This research has a number of policy implications. Firstly, this research shows that immunisation rates need to be improved for all. Despite South Africa's inflated estimates of high immunisation coverage, South Africa is not achieving its immunisation goals. As immunisations are one of the most important interventions in child health and are highly cost effective, more attention should be focused on improving immunisation access in the country. The status quo is not sufficient. With lots of current attention and funding to HIV/AIDS, focus should be drawn on incorporating important complementary interventions like immunisations that are vital to the survival of HIV positive children and HIV negative children alike into the implementations of health campaigns.

This research also has identified a number of variables that are significantly associated with health care access. Specific interventions that this study would deem fruitful are targeting individuals that have decreased immunisation access in the multivariate model. Focusing on improving service delivery to villages with no health facility should be incorporated in national immunisation policies. This could include creating immunisation outreach posts to villages that do not have a health care facility. Targeting young mothers and those who are poorer would help eliminate disparities in immunisation access. Engaging young mothers by providing education and outreach in youth friendly ways may improve immunisation access. Being a Mozambican refugee is not associated with poorer immunisation access and therefore targeting interventions at this group in this population may not be a high priority. Current levels of outreach to this group should be continued as it is possible this finding is the result of current outreach interventions.

There are a lot of missed opportunities of immunisation uptake. Having a child admitted to hospital and having a skilled attendant at delivery are not associated with increased immunisation access. Although times during hospital admission for a child sickness and delivery are busy, it should not be overlooked to educate the mothers about immunisation. The children can be immunised while in the facility, upon discharge, or specific plans for immunisation follow up should be made. Over 99% of women attended some antenatal care, which may be an important opportunity to educate women about the importance of immunisations and health for their unborn child. Adequately explaining and ensuring mothers have a RTHC for their child may also improve immunisation uptake. If mothers do not have the RTHC, immunisations should still be given.

6.2.3: Call for further research

Importantly for the Agincourt community and for South African policymakers to use these results is to cultivate research that aims to find mechanistic causes to explain this study's findings. Other studies to specifically measure impact of proposed interventions to target vulnerable communities are needed to increase immunisation access. As the preventative and primary health care investigated in this paper are very cost effective, with interventions saving money in terms of overall health care costs, it is important to develop strategies to target vulnerable groups not utilising the services.

Further research on the topics of health care access for migrants in South Africa needs to be done. South Africa has a number of migrant groups which may have different levels of health care access. It is unknown if migrant groups in general in South Africa also have higher odds of immunisation access controlling for other socio-economic and demographic variables or if this study is specific to children of former Mozambican refugees in South Africa or specifically in the Agincourt area. In addition, health care access is not an all or nothing thing. Mozambican mothers were less likely to delivery in a health care facility but were more likely to have their children immunised controlling for other factors. This study solidifies the point that each domain of health care access should be investigated separately. Just because one group attends antenatal clinics, delivers in a health facility, gets immunised, goes to a clinic when they have a cough, or goes to the hospital after an accident doesn't mean they will have high levels in all these domains.

In addition to research on other populations in South Africa, research on other migrant and refugee populations throughout the world – especially in developing countries – is warranted. Is this effect of migrants having increased immunisation access specific to children of Mexican economic immigrants in the United States, various immigrant groups to Canada, and former Mozambican refugees in the Agincourt area of South Africa? With very different push and pull factors responsible for the migration in these groups this seems unlikely. Further exploration of different populations that immigrate and self-settle within host communities is necessary. Being able to compare health care access of migrants to a reference host population is necessary for these studies to be worthwhile to investigate disparities.

6.3: Concluding remarks

This study has important findings for both researchers and policymakers. This research is a well controlled, community level study on health care access for children in South Africa that investigates determinants of immunisation access in an area with a high proportion of former Mozambican refugees. This study finds that immunisation rates are insufficient. Contrary to perceptions and qualitative studies on barriers to health care access for international migrants in South Africa, children of Mozambican refugees are more likely to be immunised than the host population controlling for a number of other socio-economic and demographic factors.

This study is an important first step in research to diminish disparities in immunisation access within the Agincourt community, rural South Africa, and other areas with high proportions of self-settled refugees and immigrants. By identifying vulnerable groups to target, policymakers can make plans of outreach and improve immunisation rates.

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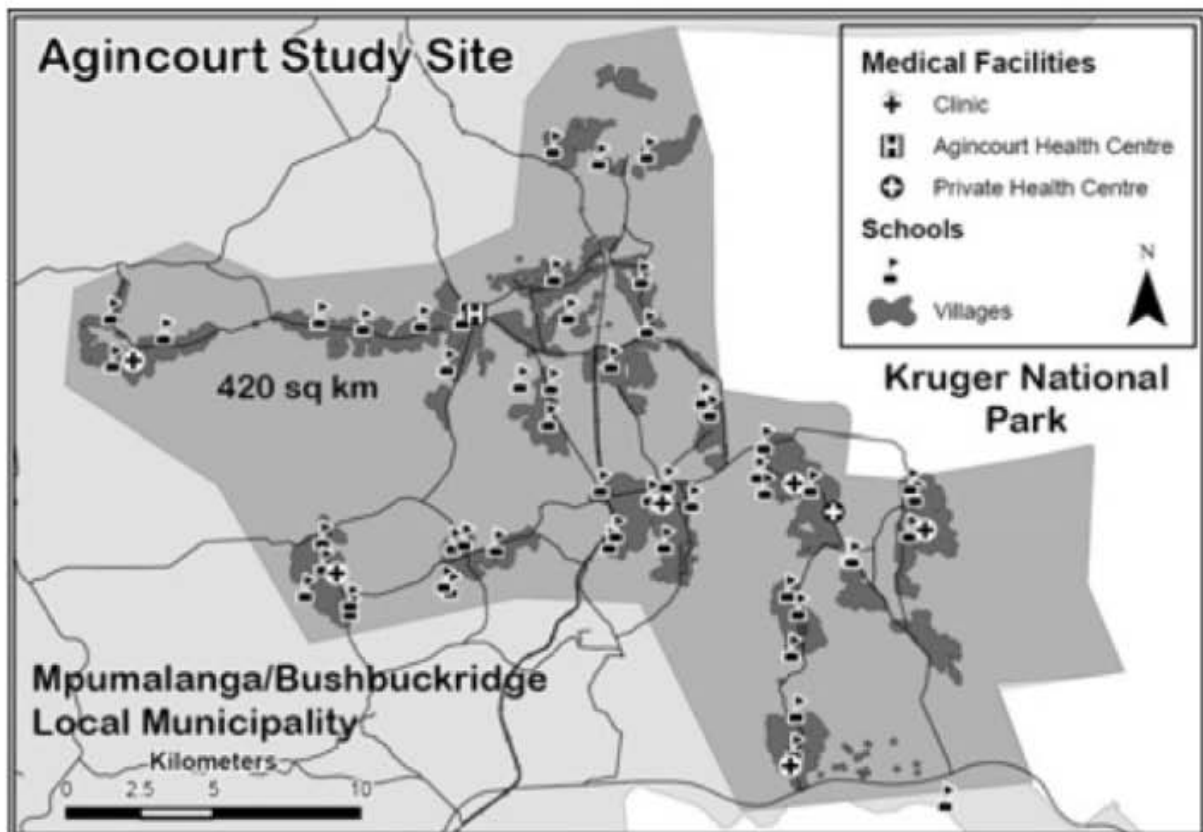
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Appendix 1: Maps of Agincourt




Code		General Comments	Checked
FW:	<input type="text"/>		<input type="checkbox"/>
Cross check			
Field check 1	Code	Comments	Checked
FW1:	<input type="text"/>		<input type="checkbox"/>
FW2:	<input type="text"/>		<input type="checkbox"/>
FW3:	<input type="text"/>		<input type="checkbox"/>
Supervisor:	<input type="text"/>		<input type="checkbox"/>
QC:	<input type="text"/>		<input type="checkbox"/>
Data room:	<input type="text"/>		<input type="checkbox"/>
Field check 2	Code	Comments	Checked
FW:	<input type="text"/>		<input type="checkbox"/>
Supervisor:	<input type="text"/>		<input type="checkbox"/>
QC:	<input type="text"/>		<input type="checkbox"/>
Field check 3	Code	Comments	Checked
FW:	<input type="text"/>		<input type="checkbox"/>
Supervisor:	<input type="text"/>		<input type="checkbox"/>
QC:	<input type="text"/>		<input type="checkbox"/>

VILLAGES:

00 = Unknown village; **01** = Agincourt; **02** = Croquetlawn; **03** = Cunningmore A; **04** = Cunningmore B; **05** = Huntington; **06** = Ireagh A; **07** = Ireagh B; **08** = Justicia A; **09** = Kildare A; **10** = Kildare B; **11** = Lillydale A; **12** = Lillydale B; **13** = Newington B; **14** = Newington C; **15** = Somerset A; **16** = Xanthia; **17** = Rholane; **18** = Kildare C; **19** = Justicia B; **20** = Somerset B; **21** = Khaya Lami; **23** = Belfast; **24** = Dumphries A; **25** = Dumphries B; **26** = Dumphries C

EDUCATION:

N = None; **C** = Creche; **R** = PreSchool; **A** = Sub-A/Grade 1; **B** = Sub-B/Grade 2; **1** = Std 1/Grade 3; **2** = Std 2/Grade 4; **3** = Std 3/Grade 5; **4** = Std 4/Grade 6; **5** = Std 5/Grade 7; **6** = Std 6/Grade 8; **7** = Std 7/Grade 9; **8** = Std 8/Grade 10; **9** = Std 9/Grade 11; **0** = Std 10/Matric; **H** = Higher; **L1** = College - Incomplete; **L2** = College-Incomplete; **T1** = Technician - Incomplete; **T2** = Technical-Incomplete; **U1** = University - Incomplete; **U2** = University complete; **A1** = Adult Basic Education and Training Level 1 (ABET 1); **A2** = ABET 2; **A3** = ABET 3; **A4** = ABET 4; **N1** = National Qualification Framework Level 1 (NQF 1); **N2** = NQF 2; **N3** = NQF 3; **N4** = NQF 4; **M1** = Mozambican Grade 1; **M2** = Mozambican Grade 2; **M3** = Mozambican Grade 3; **M4** = Mozambican Grade 4; **M5** = Mozambican Grade 5; **M6** = Mozambican Grade 6; **M7** = Mozambican Grade 8; **M8** = Mozambican Grade 8; **M9** = Mozambican Grade 9; **M10** = Mozambican Grade 10; **M11** = Mozambican Grade 11; **M12** = Mozambican Grade 12

		HEALTH CARE UTILIZATION MODULE FOR CHILDREN UNDER FIVE ROUND 12 - 2006	
FW Initials	<input type="text"/>	Date of interview	<input type="text"/>
1	Village		<input type="text"/>
2	Dwelling		<input type="text"/>
3	Child ID number		<input type="text"/>
4	Name and surname		<input type="text"/>
5	Residence status (from the Populated Census Form)		<input type="text"/>
6	If res. status M, has the child in-migrated more than 21 days ago?	Y = Yes, N = No	<input type="text"/>
IMMUNISATION AND BIRTH-WEIGHT			
7	Is the Road To Health (RTH) card available?	Y = Yes, N = No	<input type="text"/>
If Yes go to question 8, otherwise go to question 17			
8	What is the color of the RTH card?	Y = Yellow, W = White	<input type="text"/>
9	How many doses of BCG has the child received?	0, 1, 2, 3, 4	<input type="text"/>
10	How many doses of Polio has the child received?	0, 1, 2, 3, 4	<input type="text"/>
11	How many doses of DTP has the child received?	0, 1, 2, 3, 4	<input type="text"/>
12	How many doses of Hib has the child received?	0, 1, 2, 3, 4	<input type="text"/>
13	How many doses of Hepatitis B has the child received?	0, 1, 2, 3, 4	<input type="text"/>
14	How many doses of Measles has the child received?	0, 1, 2, 3, 4	<input type="text"/>
15	When was the most recent immunisation?	dd/mm/yyyy	<input type="text"/>
16	Birthweight from the RTH card (in kg with four digits)		<input type="text"/>
17	If no card, has the child ever been immunized	Y = Yes; N = No; X= Don't know	<input type="text"/>
MEDICAL AID			
18	Is the child health care currently covered by a medical aid or some form of employer support?	1=covered by a medical aid for whenever child needs to go to doctor etc. 2=is covered by health insurance for a specific disease(s) 3=is allowed to go to employer's clinic/hospital 4=access to free public HOSPITAL care 5=don't know	<input type="text"/>
RECENT ILLNESS OR INJURED			
19	Has any child been sick or injured in the last 14 days?	Y = Yes; N = No; X= Don't know	<input type="text"/>
If Yes go to question 20, otherwise go to question 27			
20	When did s/he become ill or injured?	dd/mm/yyyy	<input type="text"/>
21	Which was the first action taken		<input type="text"/>
22	Which was the second action taken		<input type="text"/>
23	Which was the third action taken		<input type="text"/>
24	Which was the fourth action taken		<input type="text"/>
25	Is there any more than 4 actions taken?	Y = Yes, - = Otherwise	<input type="text"/>
26	a If action codes 1, 2, 3, 4, 11 only, why not consult western care?		<input type="text"/>
	specify:		
	b If action codes 1, 2, 3, 4, 11 only, why not consult western care?		<input type="text"/>
	specify:		
	c If action codes 1, 2, 3, 4, 11 only, why not consult western care?		<input type="text"/>
	specify:		

Codes for question 26 1. Did not seem sick enough 2. Thought illness would get better on its own 3. Nothing could be done for illness 4. Did not know what to do 5. No time, too busy 6. Not enough money for consultation 7. Transport too expensive 8. Too far to travel 9. Needed permission of another person eg husband/father/mother etc, and not available/refused 10. Patient refused to go for care	11. Nobody to go with him/her 12. Nobody to care for children 13. No drugs at health care facility 14. Staff attitudes poor 15. Not enough privacy 16. Too little time with health worker 17. Queue too long, wait too long 18. Western care could do nothing for illness 19. Other (specify) 20. Don't know
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CHRONIC DISEASE

27 Has the child been chronically ill and requiring chronic treatment in the last year? Y = Yes; N = No; X= Don't know

If Yes go to question 28, otherwise go to question 33

28 Which was the first action taken

29 Which was the second action taken

30 Which was the third action taken

31 Which was the fourth action taken

32 Is there any more than 4 actions taken? Y = Yes; - = Otherwise

DISABILITY

33 Has the child had a disability requiring treatment or health care support in the last year? Y = Yes; N = No; X= Don't know

If Yes go to question 34, otherwise go to question 39

34 Which was the first action taken

35 Which was the second action taken

36 Which was the third action taken

37 Which was the fourth action taken

38 Is there any more than 4 actions taken? Y = Yes; - = Otherwise

HOSPITALISATION

39 Has the child been admitted to hospital in the past year? Y = Yes; N = No; X= Don't know

If Yes go to question 40, otherwise finish this questionnaire and read the final note

40 How many times was the child admitted to hospital in the past 12 months?

41 In which hospital was s/he admitted in the past 12 months?

1 = Mapulaneng
2 = Matikwane
3 = Tintswalo
4 = Rob Ferreira
5 = Nelspruit Private Hospital (Hospiplan)
6 = Pietersburg Mankweng
7 = Garankuwa
8 = Other (write name)
9 = Don't know

• If admitted to more than one hospital give the codes for each one.
• If admitted to one hospital and then referred to a second hospital, list both codes and bracket them together
If admitted to two hospitals but at different times, list both codes.

Action codes for questions 21 to 24 ; 28 to 31 ; 34 to 38:

1. None over entire illness period
2. Took natural home remedy (eg herbs, ash, roots etc)
3. Took left-over medication from doctor or clinic
4. Drugs from a shop
5. Private chemist
6. Public clinic / health center
7. Public doctor didn't have to pay for (district surgeon), not in a public hospital
8. Private doctor (had to pay or on medical aid)

9. Out-patient care by **private specialist** doctor (referred to by another doctor / specialises in certain illnesses) that had to pay for?
10. Out-patient care by **public specialist** doctor (referred to by another doctor / specialises in certain illnesses) that did not have to pay for?
11. Faith healer or Traditional healer (sangoma, inyanga)
12. Out-patient or casualty in public hospital
13. Out-patient or casualty in private hospital
14. Second public clinic / health centre
15. Don't know
16. Other (specify)

IF QUESTIONS 19, 27, 33 OR 39 ARE "YES", COMPLETE A MORBIDITY QUESTIONNAIRE

COMMENTS: _____



Pregnancy Outcome Form

CEN-PRGOC-R13-V2

Village:

Dwelling:

Fieldworker:

Visit Date:

Mother

1	Mother's Name and Surname	Name: 1a	
		Surname: 1b	
2	Mother's Census ID		2
3	Did you attend an antenatal clinic run by the Health Service while you were pregnant?	Y = Yes; N = No;	3
4	If "Y" in Q3, How many times did you visit an antenatal clinic while you were pregnant?		4
5	What was your last grade/standard completed? (Use Education codes from populated census form)		5
6	Were you a student at the time you became pregnant?	Y = Yes; N = No	6
7	If "Y" in Q6, Are you going back to school?	Y = Yes; N = No; I = Intend to	7
8	Was this pregnancy planned?	Y = Yes; N = No; O = Other factors involved	8
9	Did you use any type of contraceptive at any time prior to this pregnancy?	N = None; P = Pill; I = Injection; L = Loop; C = Condom; S = Sterilisation; T = Traditional; M = More than one;	9
10	Which kind of contraception are you using or intending to use after pregnancy?	N = None; P = Pill; I = Injection; L = Loop; C = Condom; S = Sterilisation; T = Traditional; M = More than one	10

Delivery

11	Date of delivery		11
12	Date of delivery estimated?	Y = Yes; N = No	12
13	Delivery in Agincourt area?	Y = Yes; N = No	13
14	Where did you deliver?	H = Home; C = Clinic; N = Health Centre; + = Hospital; O = Other	14
15	If "+" in Q14 which hospital?	T = Tlithwaio; MP = Mapulaneng; MT = Matikwane; RF = Rob Ferreira; PM = Pietersburg; Mankweng; O = Other	15
16	Who attended the delivery?	D = Doctor; N = Nurse; F = Family member; C = Community member; B = Nobody; O = Other	16
17	Was there any complication at delivery?	N = None; C = Caesarian section; O = Other	17
18	If "O" in Q17, Which other complication?		18

Outcome

19	Outcome:	L = Live birth; S = Stillbirth (28 weeks or more); A = Abortion (less than 28 weeks); ML = Multiple Live Births; MS = Multiple Still Births; MM = Multiple, some still	19
20	Number still births:		20a
	Number live births:		20b
21	How long did the pregnancy last? (Pregnancy duration type)	W = Weeks; M = Months	(21)

Baby's name and surname		Gender M = Male; F = Female	Birth weight (kilograms)	Road to Health Card? Y = Yes; N = No; E = Elsewhere	Ever breastfed Y = Yes; N = No	If Yes, how long? B = Still breastfeeding No (N) if < 1 month No (M) if > 1 month		Birth registered Y = Yes; N = No
22a (Name)	22b (Surname)	23	24	25	26	27a	27b	28

Comments:





Household Asset Status Form

CEN-HHAST-R13-V3

Village:

Dwelling:

Fieldworker:

Visit Date:

1	Is the structure still under construction?	Y = Yes; N = No	1
2	Are there plans to extend the structure in the near future?	Y = Yes; N = No	2
ASK Q3 ONLY IF Q1 = "Y"			
3	In what year was construction started?	9999 = the household moved into an existing structure	3
ASK Q4 ONLY IF Q1 = "N"			
4	In what year was the building completed?	9999 = the household moved into an existing structure	4
5	What is the construction material of the walls?	1 = Brick; 2 = Cement; 3 = Other modern; 4 = Stabilized mud; 5 = Traditional mud; 6 = Wood; 7 = Other informal	5
6	What is the construction material of the roof?	1 = Tiles; 2 = Corrugated iron; 3 = Other modern; 4 = Thatch; 5 = Other informal	6
7	What is the construction material of the floor?	1 = Tiles; 2 = Cement; 3 = Modern carpet; 4 = Wood; 5 = Other modern; 6 = Dirt; 7 = Mat; 8 = Other traditional	7
8	What is the total number of bedrooms in all structures?		8
9	What is the total number of bedrooms in the main structure?		9
10	Is there a separate kitchen?	Y = Yes; N = No	10
11	Is there a separate living/dining room?	Y = Yes; N = No	11
12	Where is the toilet facility?	1 = In house; 2 = In yard; 3 = Other house; 4 = Bush	12
13	What is the type of the toilet?	1 = Modern; 2 = VIP; 3 = Pit toilet; 4 = None	13
14	What is the main water supply?	1 = Tap in house; 2 = Tap in yard; 3 = Tap in street; 4 = Truck; 5 = Cement well; 6 = Traditional well; 7 = Pond; 8 = River; 9 = Dam; 10 = Rainwater tank; 11 = Other	14
15	What is the availability of the main water supply?	1 = Always; 2 = Most of the time; 3 = Few hours a day; 4 = Irregular, not every day; 5 = Very irregular	15
ASK Q16 ONLY IF Q14 IS NOT 1 OR 2			
16	What is the distance to the main water source?	1 = Immediate (< 50 meters); 2 = Nearby, but not immediate (50-200m); 3 = Far away (> 200m)	16
17	What is the primary source of power for light and appliances?	1 = Electricity; 2 = Battery/Generator; 3 = Solar power; 4 = Paraffin; 5 = Candles; 6 = Other	17
18	What is the primary source of power for cooking?	1 = Electricity; 2 = Gas bottle; 3 = Paraffin; 4 = Wood; 5 = Other	18
19	Is there a functioning stove in the household?	Y = Yes; N = No	19
20	Is there a functioning fridge in the household?	Y = Yes; N = No	20
21	Is there a functioning TV and/or HiFi/stereo in the household?	Y = Yes; N = No	21
22	Is there a functioning video machine or DVD player in the household?	Y = Yes; N = No	22
23	Is there a functioning satellite dish in the household?	Y = Yes; N = No	23
24	Is there a functioning radio (no tape or cd player) in the household?	Y = Yes; N = No	24
25	Is there a functioning landline phone in the household?	Y = Yes; N = No	25
26	Is there a functioning cell phone in the household?	Y = Yes; N = No	26
27	Is there a functioning car or truck in the household?	Y = Yes; N = No	27
28	Is there a functioning motor bike in the household?	Y = Yes; N = No	28
29	Is there a functioning bicycle in the household?	Y = Yes; N = No	29
30	Is there a functioning animal drawn cart or sled in the household?	Y = Yes; N = No	30
31	How many cattle are owned by the household?	1 = None; 2 = 1-3; 3 = 4-10; 4 = more than 10; 5 = Cattle owned, but number unknown	31
32	How many goats are owned by the household?	1 = None; 2 = 1-3; 3 = 4-10; 4 = more than 10; 5 = Goats owned, but number unknown	32
33	How many chickens are owned by the household?	1 = None; 2 = 1-10; 3 = 11-40; 4 = more than 40; 5 = Chickens owned, but number unknown	33





Food Security Status Form

CEN-FDSCY-R13-V2

Village:

Dwelling:

Fieldworker:

Visit Date:

		Grown in own garden or homestead plot	1.1
		Grown by household members outside of own garden or homestead plot	1.2
1	How has your household obtained Maize (Mealies / Mealie meal) over the last year? (Fill in all that apply)	Purchased	1.3
		Borrowed	1.4
		Get it free (Food Aid/Food Parcel)	1.5
		Other	1.6
		If Other specify: 1.7	
2	What staple foods other than Maize (Mealies / Mealie meal) does your household often consume? (Fill in all that apply)	Rice	2.1
		Bread	2.2
		Potatoes	2.3
		Other	2.4
		If other specify: 2b	
3	Has your household grown food crops other than mealies in a garden on your homestead plot over the last year?	Y = Yes; N = No	3
4	If Q3 = "Y" which crops? (Fill in all that apply)	Fruit	4.1
		Vegetables	4.2
		Other	4.3
	If other specify 4.4		
5	Has your household grown food crops other than mealies in a field outside of your homestead plot over the last year?	Y = Yes; N = No	5
6	If Q5 = "Y" which crops? (Fill in all that apply)	Fruit	6.1
		Vegetables	6.2
		Other	6.3
	If other specify 6.4		
7	Have your fields/gardens produced enough crops to feed all the members of your household over the whole of the last year?	Y = Yes; N = No	7
8	If Q7 = "N" Why do your fields/gardens not produce enough crops to feed all the members of your household? (Fill in all that apply)	Our fields/gardens are not large enough to produce enough food	8.1
		We do not have enough fertilizer	8.2
		We do not have enough water/rainfall	8.3
		No-one available to work on the field/garden	8.4
		Other	8.5
		If other specify 8.6	
9	If Q7 = "N" How do you supplement your food requirements? You may select more than one option. (Fill in all that apply)	Buy food from the market	9.1
		Relatives, friends or neighbours bring food	9.2
		Food aid from the government	9.3
		Gather food from the bush	9.4
		Gather wild foods from plot or field (e.g. guxe, mice, locusts)	9.5
		We manage with the food we have	9.6
		We sell household goods e.g. furniture to buy food	9.7
		We sell livestock to buy food	9.8
		Borrowed money to buy food	9.9
		Other	9.10
	If other specify 9.11		



If Q9.4 or Q9.5 marked What do you gather and how regularly in season?		Number of time (1, 2, 3, etc.)	W = Week; M = Month; Y = Year
10	Wild Herbs (e.g. Guxe)	10.1	<input type="checkbox"/>
	Wild Fruit e.g. (Marula)	10.2	<input type="checkbox"/>
	Wild insects etc. (e.g. locust, flying ant, mopani worm)	10.3	<input type="checkbox"/>
	Bush meat (e.g. Rabbits,mice, birds etc.)	10.4	<input type="checkbox"/>
	Other	10.5	<input type="checkbox"/>
If other specify 10.6			
11	Has your household not had enough food to eat in the last month? Y = Yes (hunger); N = No	11	<input type="checkbox"/>
12	If Q11 = "Y" How often in the last month did your household not have enough to eat? V = Very Often(15-30 days); O = Often(8-14 days; S = Sometimes(2-7 days); R = Rarely(1 day) ; N = Never	12	<input type="checkbox"/>
13	Has your household not had enough food to eat in the last year? Y = Yes (hunger); N = No	13	<input type="checkbox"/>
14	If Q13 = "Y" In which season (Fill in all that apply)	Summer	14.1 <input type="checkbox"/>
		Winter	14.2 <input type="checkbox"/>
15	If Q13 = "Y" For what reason(s) (Fill in all that apply)	No money available at home	15.1 <input type="checkbox"/>
		Did not receive pension / grant / food aid on time	15.2 <input type="checkbox"/>
		Did not receive expected money from other family members.	15.3 <input type="checkbox"/>
		Food did not grow in homestead / poor harvest	15.4 <input type="checkbox"/>
		Unexpected new household members	15.5 <input type="checkbox"/>
If other specify 15.7		Other	15.6 <input type="checkbox"/>
How regularly does your household eat the following?		Number of time (1,2,3, etc.)	W = Week; M = Month; Y = Year
16	Chicken	16.1	<input type="checkbox"/>
	Fish	16.2	<input type="checkbox"/>
	Red Meat	16.3	<input type="checkbox"/>
	Eggs	16.4	<input type="checkbox"/>
	Vegetables	16.5	<input type="checkbox"/>
	Maize(Mealies / Mealie meal)	16.6	<input type="checkbox"/>
	Bread	16.7	<input type="checkbox"/>
	Potatoes	16.8	<input type="checkbox"/>
	Edible wild herbs and fruits(e.g. guxe, marula)	16.9	<input type="checkbox"/>
	Rice	16.10	<input type="checkbox"/>
17	How many meals does your household normally take in a day?	Maximum number of meals for male adults	17.1 <input type="checkbox"/>
		Maximum number of meals for female adults	17.2 <input type="checkbox"/>
		Maximum number of meals for children	17.3 <input type="checkbox"/>
18	How many meals did your household take yesterday?	Maximum number of meals for male adults	18.1 <input type="checkbox"/>
		Maximum number of meals for female adults	18.2 <input type="checkbox"/>
		Maximum number of meals for children	18.3 <input type="checkbox"/>
19	How do you expect the amount of food available to your household to change in the coming year? Comments:	1 = We will have more food; 2 = Same amount of food; 3 = We will have less food;	19 <input type="checkbox"/>

20

CEN-FDSCY-R13-V1





Child Care Grant Form

CEN-CHCAG-R14-V2

Village:
 Dwelling:
 Fieldworker:
 Visit Date:

1a Respondent

H = HHHead → Q2

M = HMember → Q1b

1a

N = Neighbour → Q2

1b Agincourt DSS No. (PID)

1b

Introduction

Child care, foster and disability grants given by the department of Social Welfare can provide assistance to adults caring for children (<18 years). In this questionnaire we would like to ask you about grants that members of this household receive, are applying for or have been refused.

2	Have you heard of a child support grant, foster care grant or care dependency grant before?	Y = Yes → Q3 N = No → END	2	<input type="radio"/>
		Newspaper	3.1	<input type="radio"/>
		Radio	3.2	<input type="radio"/>
		TV	3.3	<input type="radio"/>
3	Where did you hear about this grant? (Fill in all that apply)	Welfare	3.4	<input type="radio"/>
		Clinics/Hospital	3.5	<input type="radio"/>
		Friends/Relative	3.6	<input type="radio"/>
		Pension Queue	3.7	<input type="radio"/>
		Community Rehabilitation Worker	3.8	<input type="radio"/>
		Other	3.9	<input type="radio"/>
	If other specify 3.10			
4	Since 2005 has anyone living in this household applied for a grant for any child?	Y = Yes → Questionnaire on back N = No	4	<input type="radio"/>
5	Since 2005 has anyone living outside this household applied for a grant for any child?	Y = Yes → Questionnaire on back N = No	5	<input type="radio"/>
		Didn't know about child care grants	6.1	<input type="radio"/>
		Didn't want a child care grant	6.2	<input type="radio"/>
		Not eligible, income	6.3	<input type="radio"/>
		No eligible child	6.4	<input type="radio"/>
		Cannot access service	6.5	<input type="radio"/>
6	If Q4 and Q5 "No", ask Why not? (Fill in all that apply)	Lack of RSA ID	6.6	<input type="radio"/>
		Lack of RTH card	6.7	<input type="radio"/>
		Lack of Birth certificate	6.8	<input type="radio"/>
		Lack of Death Certificate	6.9	<input type="radio"/>
		Other	6.10	<input type="radio"/>
	If other specify 6.11			

7 Comments:



Details of Child Care Grants

Details of Child Care Grants																
Identification							Type	Current Status of Grant								
Adults			Child				Type of Grant (D → Disability)	Disability	Made first visit to welfare	Application Submitted	Date of Submission	Awarded, but not yet paid	Receiving Payment	Date of payment received	Payment Stopped	Grant Refused
In DSS	ID		In DSS	ID	Age	Sex										
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																

Comments:

In DSS
Y = Yes
N = No

Sex
M = Male
F = Female

Relationship of Adult to Child
M = Mother
F = Father
B = Brother
Z = Sister
R = Related Indirectly by Marriage
U = Unrelated

Type of Grant
S = Child Support Grant
F = Foster Care Grant
D = Care Dependency
X = Don't Know

Type of Disability
M = Mental Disability
P = Physical Disability
B = Both Disabilities