

**THE PREVALENCE OF IMMUNIZATION  
AND THE FACTORS ASSOCIATED WITH  
LOW IMMUNIZATION PREVALENCE IN AN URBAN COMMUNITY  
IN THE WESTERN CAPE**

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Mini-thesis submitted in partial fulfilment of the requirements for the degree of  
Master of Public Health at the School of Public Health, University of the Western Cape



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## **KEYWORDS**

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Practices

Drop-out rate

Fully immunized child

South Africa



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## ABSTRACT

**Introduction:** In 2013/2014 the fully immunized child immunization prevalence in South Africa was 80% is below the national target of 90%. A review of Western Cape Government (WCG): Health immunization data indicated that 87.7% of children received their vaccines consistently up to the age of 14 weeks but this figure dropped to 86% when children are reported as fully immunized is recorded at the 9 months immunization visit. In the 2014/15 financial year the immunization prevalence in the Tygerberg sub-district was 78% at 9 months and 71.9% at 18 months and this low immunization prevalence could lead to an outbreak of childhood communicable diseases such as measles and diphtheria. Limited information is known about the accuracy of the immunization prevalence data or the influence of caregivers' knowledge, attitudes, beliefs and practices and health service factors on immunization in this community.

**Aim:** To assess the immunization prevalence and to determine the factors associated with low immunization prevalence in children aged 12 to 24 months in Delft, Cape Town.

**Methods:** A cross sectional survey was conducted in Delft, a mixed low and middle-income socio-demographic community in the Tygerberg sub-district in the Cape Town Metropolitan District using an interviewer administered questionnaire in English, Afrikaans or Xhosa. A sample size of 384 children aged between 12 and 24 months was calculated using Epi-Info 7 Statcalc based on an estimated study population number of 3914, with an 80% confidence level and an assumed immunization prevalence of 80% based on routinely available immunization data was used. Furthermore an allowed margin of error of 3% was factored in. This yielded a household sample size of 490 in an attempt to realize the sample size and every 80<sup>th</sup> household was selected. A sample size of 316 children was realized. Additional criterion used was that the child had to reside in Delft during the 12 months of their life. Data was collected by trained community care workers (CCWs) who were also taught to extract immunization data from the Road to Health Booklet (RtHB). Data was transcribed

into a Microsoft Excel Spreadsheet and then exported to Epi-Info7 for analysis. Statcalc statistical software was used to conduct univariate and bivariate analysis.

**Ethics:** Ethical approval was obtained from the University of Western Cape's Senate Research Committee and permission obtained from the Western Cape Government: Health. Informed written consent was obtained from the caregivers of children and confidentiality is maintained through the coding of personal information. All original transcripts of the interviews conducted are stored in a locked cupboard and the computer generated information is stored on a password protected computer.

**Results:** A sample size of 316 children was realized which yielded a response a rate of 64%.

Immunization prevalence in the survey data indicated that 61.4% of children were fully immunized at 12 months of age with a slight variance in the Western Cape Government: Health data which was 67.1% for the same period. Furthermore the fully immunized study prevalence increased to 71.5% by 24 months. The drop-out rate between 6 weeks and 12 months of age was 27.2% and when afforded the opportunity for catch-up before turning 24 months the drop-out rate declined to 17.1%.

Immunization stock-outs resulted that 13.6% of caregivers were turned away from health care facilities without a follow-up date being provided. Most caregivers were knowledgeable about immunizations and caregiver religious or cultural practices did not affect immunization practices. Additional information on immunization was provided by CCWs who conduct household assessments and encourage caregivers to have their children immunized, and this in turn appeared to assist in reducing the number of under-immunized children.

**Conclusions and recommendations:** Immunization prevalence is far below the national set target of 90%. Immunization prevalence per vaccine antigen was measured in both the study data and the WCG: Health data and it was found that the immunization prevalence data was similar. The limitation of Bacille Calmette Guerin (BCG) immunization only being administered at birthing units is challenging.


Caregivers had a positive outlook to immunization despite the low immunization prevalence. Health system issues mentioned included immunization stock-outs and the lack of an appointment system may have influenced immunization prevalence. It is recommended that an appointment system should be implemented for immunization sessions at health care facilities; CCW's should follow-up children who are un-immunized or under-immunized at their homes; a review of current practice that limits BCG administration to birthing units; and further investigation into the high immunization drop-out rate is required.



## DECLARATION

I, Michelle Kay Williams (nee Carolissen), hereby declare that “the prevalence of immunization and the factors associated with low immunization prevalence in an urban community in the Western Cape” is a true reflection of my own research, and that this work, or part thereof has not been submitted for a degree or examination at any other institution of higher education. All sources I have used or quoted have been indicated and acknowledged as complete references.

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Signed: 

Date: 11 October 2017



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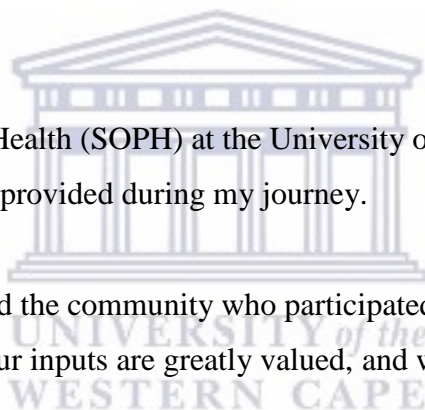
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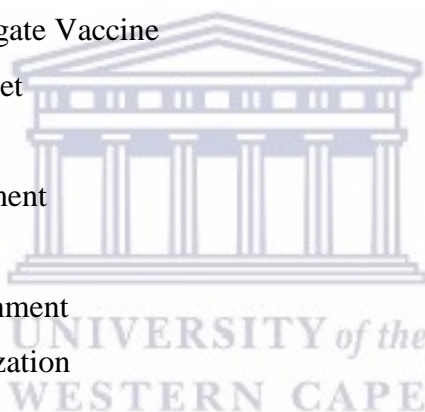
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## ABBREVIATIONS

|        |   |
|--------|---|
| BCG    | Bacille Calmette Guerin                           |
| CoCT   | City of Cape Town                                 |
| CCW    | Community Care Worker                             |
| DOH    | Department of Health                              |
| DTaP   | Diphtheria Tetanus Pertussis                      |
| EPI-SA | Expanded Programme on Immunization – South Africa |
| Hib    | Haemophilus Influenza type b combined             |
| Hep B  | Hepatitis B                                       |
| HPV    | Human Papilloma Virus                             |
| IPV    | Inactivated Polio Vaccine                         |
| MDHS   | Metro District Health Services                    |
| NICD   | National Institute for Communicable Diseases      |
| OPV    | Oral Polio Vaccine                                |
| PCV    | Pneumococcal Conjugate Vaccine                    |
| RtHB   | Road to Health Booklet                            |
| RV     | Rotavirus Vaccine                                 |
| SLA    | Service Level Agreement                           |
| TB     | Tuberculosis                                      |
| WCG    | Western Cape Government                           |
| WHO    | World Health Organization                         |





## DEFINITION OF TERMS

|                                |  |
|--------------------------------|--|
| Antigen                        | A substance which is introduced into the body to stimulate the production of an antibody.  |
| City of Cape Town              | The name of the local authority that renders primary health care services within the Cape Metropole district based on a Service Level Agreement (SLA) with the Metro District Health Services.                                   |
| Drop-out rate                  | Measures the strength of a health and immunization system—it indicates the ability of the system to retain children until they have received a third dose in an immunization series.   |
| Fully Immunized child          | It is a child who had received all relevant immunizations at the appropriate time periods, namely, birth, 6 weeks, 10 weeks, 14 weeks and 9 months.  |
| Immunization                   | It is a process whereby a person is made immune to an infectious disease through the administration of a vaccine.  |
| Immunization prevalence        | It is a measurement which determines immunization coverage.  |
| Metro District Health Services | This is one of six districts within the Western Cape that is governed by The Western Cape Government: Health which renders health care services within the Cape Metropole ranging from primary health to tertiary level of care. |
| Private provider               | A service provider who renders health care services and accesses consumable stock such as immunizations from the Metro District Health Services as part of the SLA to improve access to health care by the public.               |
| Sub-district                   | A part of the Cape Metropole that has been marked off for administrative purposes.   |
| Sub-structure                  | Two sub-districts which are combined to form sub-structures under the jurisdiction of the Metro District Health Services (MDHS) for administrative purposes. Four sub-structures form MDHS.                                      |
| Vaccine/s                      | It is a substance which stimulates the body's immune system to protect the person against subsequent infection or disease.   |
| Vaccine Preventable Diseases   | Vaccines are administered to prevent and reduce the spread of infectious diseases.   |

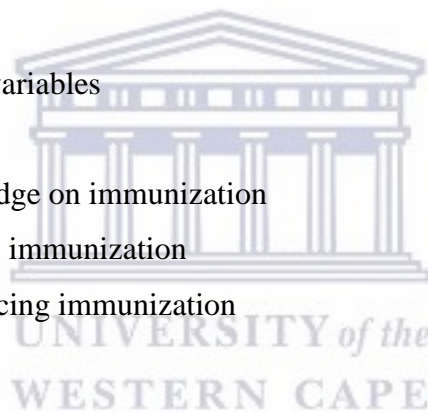
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## CHAPTER 1: INTRODUCTION

### 1.1. Background

Childhood immunization has been introduced to reduce vaccine preventable diseases in early childhood as it is attributed to childhood morbidity and mortality. Immunization has evolved through the years. In 1974 World Health Organization (WHO) introduced the Expanded Programme on Immunization (EPI) that covered six diseases, namely, tuberculosis, polio, pertussis, diphtheria, tetanus and measles (WHO, 2013).

Globally and in South Africa, pockets of outbreaks still occur in under vaccinated communities. In South Africa in 2014, 63 laboratory-confirmed measles cases were reported by the National Institute for Communicable Diseases (NICD). This was based on the number of confirmed measles cases from Northern Cape and Gauteng Provinces where outbreaks had occurred in September 2014. In January 2015, a further 3 cases of confirmed measles were reported in South Africa. The incidence of measles was highest amongst children older than 15 years of age, and in children younger than 9 months who had not yet received the measles vaccine. This outbreak was of a national concern as a previous outbreak that occurred in 2009-2010 had several case fatalities (NICD, 2015a).

#### Immunization target

WHO has set the immunization target of diphtheria, tetanus and pertussis third dose (DTP3) at 90% for all countries (WHO, 2015). South Africa followed suit, and set the national target for the fully immunized child at 90%. During the 2013/14 financial year the national prevalence for the fully immunized child was only 80% with the Department of Health (DoH) indicating considerable fluctuations in immunization prevalence between provinces (DoH, 2014).

The fully immunized child is defined as a child who has received all relevant immunizations at the appropriate ages, namely, birth, 6 weeks, 10 weeks, 14 weeks and 9 months before their first birthday (National DoH, 2010). In 2014 the DoH compiled a national plan to address low immunization in the country. However, each province and district was responsible for implementing the plan to achieve the national set target of 90% for the fully immunized child (DoH, 2014).

A review of 2015 Western Cape Government (WCG): Health immunization data indicated that 87.7% children received their vaccines consistently up to the age of 14 weeks (WCG: Health, 2015). This figure dropped to 86% when children were recorded as fully immunized which is recorded at the 9 months immunization visit and is slightly lower than the expected national immunization prevalence of 90%. In the 2014/15 financial year the immunization prevalence in the Western Cape at 18 months was 71.9%. (WCG: Health, 2015). An immunization prevalence of 90% is necessary to reduce

morbidity and mortality caused by vaccine preventable diseases and to ensure that herd immunity is achieved (WHO, 2008).

### **Vaccine preventable diseases**

Not all vaccine preventable diseases are classified as notifiable medical conditions therefore under reporting often occurs. In the WCG: Health's Circular H161/2013, based on recommendations from WHO, measles and diphtheria are amongst the diseases classified as notifiable (WCG: Health, 2013).

Vaccine preventable diseases declined in Europe during the 20<sup>th</sup> century due to the introduction of immunizations (Wicker and Maltezou, 2014). Pertussis was found to be the most common disease (n=56 941) reported in Europe in 2012, with 38141 reported cases of mumps and 30 509 cases of rubella. The pertussis vaccine is administered as a combination vaccine with diphtheria, tetanus and haemophilus influenza type b. Despite the diphtheria, tetanus and pertussis vaccine (DTP) being administered as a combination immunization, the number of cases reported for diphtheria (n=32) and tetanus (n=194) are far lower the number of pertussis cases (n=56 941). Globally, in 2012 it was reported that 84% of children had been vaccinated with one dose of a vaccine containing the measles antigen (Wicker and Maltezou, 2014).

Diphtheria cases are rare in instances where there is high prevalence of childhood immunization. The diphtheria antigen forms part of the pentavalent vaccine in South Africa. Kwa-Zulu Natal reported 13 cases of diphtheria for three consecutive months during the period April to June 2015. Five case fatalities were reported during this period. Persons who had contracted the disease varied from 20 months to 41 years of age with children younger than 15 years accounting for 77% of the cases. It was determined that all the persons suffering from the infection had been under-immunized (NICD, 2015b).

### **Evolution of immunization through the years**

Polio was initially seen as the biggest threat in the 1950's which lead to the development and testing of the first polio vaccine during this period. Smallpox case fatalities proved to be another challenge to the health care fraternity in the 1960's which lead to the successful development of the smallpox vaccine. Thus with the aid of researchers, in 1974 the World Health Organization (WHO) was able to introduce the Expanded Programme on Immunization (EPI) which covered five diseases (WHO, 2013).

South Africa, as many other countries globally, initially administered vaccines as separate antigens, however, now with technology and research, most vaccines are administered as combinations. This has reduced the number of times a child is injected per visit for the age appropriate vaccine. In 1995,

haemophilus influenza type b (Hib) combined vaccine, and hepatitis B vaccines were added to the EPI-SA immunization schedule when Hib was combined with DTP to form the vaccine DTP-Hib (DoH, 2010).

In South Africa in 2009, additional vaccines were introduced, namely, the pneumococcal conjugate vaccine (PCV) and the rotavirus vaccine (RV). Five antigens, namely diphtheria, tetanus, acellular pertussis, inactivated polio vaccine and haemophilus influenza type b, were merged into the pentavalent vaccine, resulting in the EPI-SA immunization schedule being amended accordingly (DoH, 2009). The immunization guidelines were once again updated in 2015 to include the new vaccines, i.e. human papilloma virus (HPV) vaccine and the new six valent vaccine which comprises of diphtheria, tetanus, acellular pertussis, inactivated polio vaccine, haemophilus influenza type b and hepatitis B antigens. Currently South Africa provides ten antigens as part of its immunization schedule as per EPI-SA immunization schedule. This has had a positive impact on childhood morbidity and mortality (DoH, 2015).

The current South African Expanded Programme on Immunization (EPI-SA) schedule within the public sector recommends that children be vaccinated at birth, 6 weeks, 10 weeks, 14 weeks, 9 months, 18 months, 6 years, 9 years and 12 years as depicted in Annexure 1, which indicates the changes to the EPI-SA immunization schedule since 1974 to 2015 (DoH, 2015).

#### **Utilization of the Road to Health Booklet (RtHB)**

The administration of immunizations are recorded in the Road to Health Booklet (RtHB) which was introduced in South Africa in June 2011 and replaced the former Road to Health Card (RtHC). The RtHB is issued at birth, in both the private and public sector in South Africa. These records make provision for the recording of the child's vital statistics at birth, immunizations administered to the child, subsequent visits to health care facilities and health care practitioners for child health visits, recording of weight and height, the administration of vitamin A and deworming medication, and allow the caregiver to monitor age appropriate developmental milestones. The RtHB can be replaced if a caregiver indicates that the document has been lost. However, health care facilities can only record immunizations that they have on record in the child's file in the duplicate RtHB. The RtHB may not be used as a means to complete a birth registration at the Department of Home Affairs or to apply for a child care social grant. At each clinic visit, irrespective of the child's health status including hospitalization, caregivers are expected to produce the RtHB to minimise the risk of missed opportunities for immunization and to record the purpose of the visit to the health care facility (Western Cape Department of Health, 2011).

In South Africa, registered nurses and medical practitioners are the only individuals who may administer immunizations both in the public and private sector. As part of the community care workers (CCW) duties they check the child's RtHB during home-visits for the completeness of the immunization schedule and refer the child who is un-immunized or under-immunized to the nearest public health care facility that offers immunization (Western Cape Department of Health, 2011).

## **1.2. Research Problem**

A review of Western Cape Province immunization data for the 2014/ 15 financial year indicated that 87.7% of children received their vaccines consistently up to the age of 14 weeks (WCG: Health, 2015). This figure drops to 86% when children are recorded as fully immunized which is recorded at the 9 months immunization visit, which is below the expected national target of 90%. In the 2014/15 financial year the immunization prevalence in the Tygerberg sub-district was 78% at 9 months and 71.9% at 18 months which is far lower than the national set target (WCG: Health, 2015). The low immunization prevalence may lead to an outbreak of childhood communicable diseases such as measles and diphtheria. The Delft community is one of several suburbs that form the Tygerberg health sub-district.

Whilst immunization prevalence data is readily available at sub-district level, information on factors associated with low immunization prevalence is lacking. Furthermore, although immunization programmes make provision for immunization to be conducted on a daily basis at primary health care facilities with limited community immunization outreach activities occurring, the accuracy of the information system data and the effect of cross border visits and attending private practitioners for immunizations on the prevalence of immunization in the Delft community is not known. Neither has the influence of health service delivery issues, such as vaccine shortages, nor caregivers' knowledge about the importance of vaccination, attitudes towards immunization, and religious and cultural practices which could have an effect on immunization, been explored in the Delft community.

## **1.3. Aims**

The aim of the study was to assess the immunization prevalence and to determine the factors associated with low immunization prevalence in children aged 12 to 24 months in Delft, Cape Town.

## **1.4. Objectives**

1. To assess the prevalence of the fully immunized child at 12 months of age.
2. To assess the prevalence of immunization per vaccine antigen, such as measles, pneumococcal conjugate vaccine, rotavirus vaccine, and the pentavalent vaccines at 12 months of age.



3. To compare survey immunization prevalence with that reported in routine Health Information System.
4. To determine health service factors affecting immunization such as vaccine availability, access to the clinic for immunization services, and the effect of information on immunization imparted by health care personnel.
5. To assess caregiver knowledge, attitudes, beliefs and practices towards immunization.
6. To assess socio-economic, cultural and religious factors associated with immunization.



## CHAPTER 2: LITERATURE REVIEW

The World Health Organization (WHO) stated that immunizations are one of two public health interventions that have resulted in a decrease in childhood morbidity and mortality (WHO, 2014). A global search of literature was conducted on the prevalence of immunization and the known factors associated with low immunization prevalence in which the following key sub-categories were identified: prevalence of immunization, immunization drop-out rates were reviewed, caregiver knowledge on immunization, caregiver attitude towards immunization and caregiver practices influencing immunization prevalence. The sub-categories were used to structure this literature review chapter.

### 2.1. Prevalence of immunization

According to the literature review conducted, prevalence of immunization is measured through immunization coverage. The prevalence of immunization indicates the number immunization doses administered to the target population. Several articles by WHO, UNICEF and Centers for Diseases Control reported that immunization reduce childhood morbidity and disease caused by vaccine preventable diseases. WHO reports that globally immunization results in a reduction of childhood diseases caused by diphtheria, tetanus, pertussis and measles, by an estimated two to three million annually.

In 2013, 84% (112 million) children globally were vaccinated with at least three doses of Diphtheria, Tetanus and Pertussis (DTP3) containing vaccine. At least three regions, namely, the Americas, Europe and Western Pacific, maintained over 90% DTP3 immunization prevalence. Europe and the Western Pacific had reached 96%. A total of 160 countries achieved 80% or more immunization prevalence in 2013. Only a 129 countries managed to reach the international immunization target of 90% and over in immunization prevalence during 2013, with a further 119 countries managing to maintain the 90% immunization prevalence (WHO, 2014).

Torun and Bakirci, 2006, conducted a study in a district in Istanbul on vaccination coverage and its associated reasons for not immunizing. Their findings concluded that 84.5% of the participants were fully immunized. According to a study conducted by Hamid *et al*, 2012 in India on immunization coverage, knowledge, attitude and practice of caregivers' of children, found 98% of children aged 1-2 years were completely immunized against vaccine preventable diseases (Hamid, *et al*, 2012).

In 2012, it was reported that Nigeria had the lowest national immunization coverage of 13% in comparison to other African countries. This national immunization coverage average is noted to be low, as immunization coverage has only reached 1% and reached 4% respectively in certain districts (Omotara *et al*, 2012).

Subaiya *et al*, 2015, reviewed global routine prevalence data in 2014. According to their findings DTP3 prevalence in 2014 was 86% globally, yet ranging from 77% African Regions to 96% in Western Pacific Region. For improved immunity, 3 doses are administered yet only 82% of countries globally administer Hepatitis B as part of their immunization schedule, 56% of countries administer Hib type b and PCV in 60%. Vaccine stock-outs were reported in 26% of countries at a national level, yet only 86% of these countries experienced stock-outs at district level. The Global Vaccine Action Plan developed for 2011-2020 and endorsed by the World Health Assembly in 2012, set a framework to provide equitable access to vaccines, which encouraged countries to reach 90% immunization prevalence for all vaccines (Subaiya *et al*, 2015).

Mohamud *et al*, 2014, conducted a cross-sectional survey with children aged 12-23 months in 6 wards of Ethiopia. Questionnaires were administered and immunization records of these children were reviewed. The findings concluded that 74.6% of children were vaccinated, however only 36.6% were fully immunized, similar to the findings of Subaiya *et al*, 2015. Factors associated with the low immunization coverage are low access to immunization services, lack of knowledge on immunizations by mothers/ caregivers, high drop-out rates, and missed opportunities by health care providers.

Several articles by authors such as Madhi *et al*, 2014; Health Systems Trust, 2014; Mohamud *et al*, 2014; Subaiya *et al*, 2015; UNICEF, 2016, all indicate that immunization prevalence varies, and that the number of children who are reported to be fully immunized are low. Rammohan and Awofeso, 2015, reviewed data from the Indian District Household Survey conducted in 2008 focusing on children 12-60 months on immunization history. Data indicated that only 71% in 1992 to 80% in 2005/2006 of children are fully immunized. There are large discrepancies in immunization across different districts as noted in 2009 where one district achieved only 21% immunization prevalence and others achieved an immunization prevalence of 81%. Socio-economic factors influence immunization prevalence such as maternal education, economic differences between states, and health infrastructure. Despite that children are recorded as fully immunized, it was noted that immunizations were not administered timeously in 35% of children. India has the highest number of unimmunized children which in turn is linked with high vaccine preventable disease burden (Rammohan and Awofeso, 2015).

In the UNICEF immunization coverage evaluation report, 2009, and in the research conducted by Mathew, 2012, who reviewed immunization coverage in India, indicated that like South Africa, immunization coverage differs between the different states and is below the national target of 80%. In 2012, India's average immunization coverage was 61% however, only 31.6% of children aged 12-23 months in the state of Nagaland were fully immunized (UNICEF, 2009). Yet, Mathew, 2012, indicated that the immunization coverage for Nagaland state had dropped further to 21% and Uttar Pradesh had immunization coverage of 23% (Mathew, 2012).

UNICEF, 2016, has indicated that South Africa's immunization prevalence for the pentavalent first dose vaccine administered at 6 weeks of age is 73%, the third dose pentavalent vaccine administered at 14 weeks of age is 70%, and the measles 1st dose vaccine administered at 9 months of age is 70%. Thus one can deduce that although the drop-out rate is decreasing (n=3%), the immunization prevalence is well below the national target of 95%. Sub-Saharan Africa immunization prevalence for the first dose pentavalent vaccine administered at 6 weeks is 85%, the third dose pentavalent vaccine administered at 14 weeks is 77%, and the measles 1st dose vaccine administered is 72%. Internationally the immunization prevalence at of the pentavalent first dose vaccine 6 weeks is 91%, the third dose pentavalent vaccine is 14 weeks 86%, and measles 1st dose vaccine is 85% (UNICEF, 2016). Thus one can note that South Africa is clearly lagging behind its Sub-Saharan African states and international counterparts (UNICEF, 2016). Globally the measles first dose prevalence is 84%, with the African countries reporting 74% prevalence immunization prevalence (Harris *et al*, 2013).

In 2007 a study was conducted to ascertain the immunization prevalence in the Western Cape indicated that the immunization coverage was 76.8% at 9 months and 53.2% by 18 months and to determine whether an outbreak of vaccine preventable immunizations could be prevented (Corrigal *et al*, 2008). The increasing number of antigens to the EPI-SA schedule has resulted in a decrease in childhood morbidity in South Africa. The addition of the pneumococcal conjugate vaccine (PCV) in 2009, which originally covered seven strains, now covers thirteen strains of the pneumococcus in 2011. Immunization coverage of PCV in the Western Cape increased from 7.3% (vaccine stock-outs during the introduction phase resulted in low immunization coverage), to 89% in 2012. The national coverage in 2009 was 10.9% and has increased to 99% in 2012. With the addition of PCV to the EPI-SA schedule the prevalence of pneumonia amongst children has decreased by 69% with a likelihood of only 46% of children being hospitalized due to pneumonia (Madhi *et al*, 2014).

The measles first dose vaccine is seen as a proxy to determine the fully immunized child at one year of age. According to the District Health Barometer 2013/14, South Africa's national immunization coverage was 84.4% in comparison to the 2012/13 coverage of 94%. Immunization coverage differs between provinces with Limpopo reporting 70.3%, Gauteng 109%, and the Western Cape reporting 84.9% fully immunized coverage. Cape Town district reported 89% fully immunized coverage (Health Systems Trust, 2014). The study conducted by Hamid *et al*, 2012, indicates that India's immunization coverage is far better than its South African counterpart where the national average fluctuates at 80% to 84% (DoH, 2014).

## 2.2. Determining immunization numerators and denominators

The prevalence of immunization indicates the number immunization doses administered to the target

population. Target population groups differ from country to country and are dependent on the immunization schedule of that country. Thus reported immunization prevalence might be inaccurately reported. Challenges in deriving numerators might be underestimated due to incorrect reporting practices from various reporting units or the exclusion of certain sectors in the health sector, such as private hospitals or pharmacies; or it might be overestimated due to two sources reporting the same information to two different reporting units. Challenges with denominators might be due to population migration, e.g. seasonal farm workers or new housing developments; or denominator is obtained from a variety of sources resulting in reporting units choosing their own denominators (WHO, 2018).

The Western Cape Government: Health has reported that immunization prevalence data quality is scrutinized on a monthly basis at the different levels of management, i.e. facility level, district level and provincial level. Thus problems identified with numerators are questioned at district level, facilities are required to verify the numerator and respond to the query posed (Botha, 2017). Similarly, denominator challenges are experienced in the Western Cape, as two different denominator data sources are used to determine immunization prevalence, i.e. national census data collected by StatsSA and denominators collected from other sources such as live births (Botha, 2017).

### 2.3. Immunization drop-out rate

The drop-out rate indicates the number of children who missed their age appropriate immunizations. Immunization drop-out rates are calculated to determine the continuity of the immunization service within a community. This is most often defined as the difference in the number of children vaccinated at nine months of age compared to those vaccinated at 6 weeks of age. However, it can also be measured between measles first dose administered at 9 months and measles second dose administered at 18 months of age (Health Systems Trust, 2014).

According to WHO, 2014, the immunization drop-out rate globally is decreasing as the number of children reported having received immunizations under the age of one year has decreased from 22.8 million in 2012, to 21.8 million in 2013. The children who have contributed to the drop-out rate reside mainly in low and middle income countries such as Ethiopia, India, Kenya and South Africa (WHO, 2014). A study amongst parents in Toronto, Canada indicated that the fear of needles may result in the low immunization coverage amongst both children and adults as per findings of a study conducted. Fear of needles and pain at the injection site is cited amongst 7% children who are under immunized. Additional challenges reported by parents during immunization sessions is the child crying, screaming and flailing about which results in non-compliance of immunization (Taddio *et al*, 2012).

Grant *et al*, 2011, conducted a survey from 2005 to 2006 in New Zealand to determine the effect of primary health care practice and the influence of health professional's knowledge attitude and practice on the immunization coverage. They found that in practices where health care professionals were knowledgeable about immunization (72%), immunization prevalence was higher (Grant *et al*, 2011).

Borno State in Nigeria has recorded a Diphtheria-Tetanus-Pertussis (DTP) third dose coverage of 57% which is administered at 14 weeks of age and a measles immunization coverage of 68% which indicates a drop-out rate of 43% at 14 weeks and a 32% drop-out rate at 9 months of age. Despite the 32% drop-out rate at 9 months, more children are vaccinated in that age group than those in the 14 weeks category as parents do not believe in the efficacy of the DPT vaccine (Omotara *et al*, 2012). Ibnouf *et al*, 2007, conducted a study in Sudan, where they determined that 74.4% of children were vaccinated with the Measles vaccine, and 88.7% were vaccinated with BCG indicating a drop-out rate of 14.3%.

According to Hamid *et al*, 2012, in India immunization occurred as per the immunization schedule with only 7% of children being recorded as drop-out. The mothers in India clearly understand the importance of immunizing their children against vaccine preventable diseases, whereas in South Africa parental knowledge about the importance of immunization which inevitably affects immunization prevalence is unknown. The South African drop-out rate is bigger than it sounds as India's immunization target is 100% and South Africa's is 90%.

The Department of Health has indicated that immunization drop-out fluctuates between provinces and has a drop-out rate on average of 11% based on data collected during the 2014 financial year, with a national immunization target of 90% (DoH, 2014). According to the District Health Barometer of 2013/14, the national drop-out rate was 6.3% based on data obtained from the District Health Information System. Provincial and district immunization drop-out rates vary, Limpopo reported the highest drop-out rate at 18.9% and Gauteng 3.5%. The Western Cape reported a -1.9% drop-out rate, which indicated more children were immunized compared to the projected population residing in the Western Cape (Health Systems Trust, 2014). Several articles have indicated that immunization drop-out occurs due to various reasons, such as, vaccine stock-outs, parents' lack of knowledge about the importance of immunization and their attitude towards having their children immunized.

## **2.4. Factors influencing immunization uptake**

### **2.4.1. Caregiver knowledge on immunization**

Poor caregiver knowledge about the importance of immunization prevents children from being

immunized against childhood vaccine preventable diseases. Articles have indicated that knowledge imparted by nurses during immunization sessions affect parental decisions to have their child immunized. Media reports focusing on the importance of immunization also assist in leading to high immunization prevalence. In 2009 an American national immunization survey conducted with parents indicated that they were knowledgeable about immunizations however, not all parents believe in the safety of immunizations' (Smith *et al*, 2011). In Khartoum state, Sudan, 78% of mothers indicated that they were aware of the importance of immunizations (Ibnouf *et al*, 2007).

Torun and Bakirci, 2006, conducted a study in Istanbul, indicated that 43.6% of parents lacked knowledge about immunization. However, this study was conducted mostly amongst illiterate mothers, therefore one cannot conclude whether written information that was distributed to these mothers on childhood immunizations at previous contact with health care professionals were understood. In a study conducted in India by Hamid *et al*, 2012, indicated that in general there was good knowledge about the importance of immunization, yet parents were not clear on the reasons for the vaccinating.

Knowledge of health care workers on immunization affect the knowledge of the parent as immunization sessions are seen as information sharing sessions, thus if health care workers do not impart reasons for administering the immunization, parents generally accept it as part of routine childhood treatment without understanding the benefits of the immunization (Hamid *et al*, 2012). Vaccine preventable diseases are the most common form of diseases which children in Borno State, Nigeria suffer from, thus the research determined that immunization knowledge is high amongst parents and health care workers in an attempt to reduce childhood illnesses (Omotara *et al*, 2012).

During the 2007 immunization survey in the Western Cape, parents indicated that a lack of knowledge regarding the importance of immunization was the second most stated reason for not immunizing their children (Corrigal *et al*, 2011). According to Corrigal *et al*, 2011, lack of knowledge about immunization was reported at 27% but the literacy level of the parent was not indicated. In New Zealand it was found that negative information received on immunization during the antenatal period resulted in parents refusing immunization for their child and immunization coverage was low in communities with poor socio-economic status (Grant *et al*, 2011).

#### **2.4.2. Caregiver attitude towards immunization**

Caregiver attitude towards immunization affects childhood immunization as caregivers are the guardians and decision-makers in their child's care. Corrigal *et al*, 2008, conducted a study in the Western Cape found that 13.5% parents indicated a lack of motivation to attend the clinic for childhood immunization.

McKee and Bohannon, 2016, reviewed literature relating to vaccine hesitancy amongst parents in the United States, looking at religious beliefs, personal beliefs and safety concerns. The findings revealed that if health professionals were fully versed in immunizations, its related safety issue and possible adverse events, then this information will be translated when addressing the parental concerns, resulting in more parents who are then open to immunizing their child. In America, 4 states give exemption to parents who do not believe in immunization. These parents believe that vaccine preventable diseases are easily treated, and that healthy lifestyles and healthy diets reduce the chance of contracting these aforementioned diseases (McKee and Bohannon, 2016). The deductions made in this article is reflected in several articles, where it is indicated that educating parents regarding vaccine safety, and the danger of not having their child immunized against vaccine preventable diseases, affects caregiver attitude in immunizing their child.

A Times editor, Jeffrey Kluger, 2015, is a strong advocate for immunizations and often write articles criticising anti-vaccine lobbyist. In a strong worded article written in 2015 he focused on the outbreak of measles at Disneyland in United States of America, which was caused by an unvaccinated child attending the amusement park. Kluger also mentioned that in a subsequent poll conducted by doctors at the University of Michigan's C.S. Mott Children's Hospital, found that parents' views on immunization are improving, with more parents agreeing to have their children immunized (Kluger, 2015). The poll revealed parents' beliefs on vaccines compared to their views about vaccines the previous year. According to 34% of parents, they thought that vaccines have improved significantly in the past year and were now more beneficial for their children's health. A further 25% of parents indicated that vaccines were safer than a year ago and 35% of parents were in support of vaccines part of entry requirements for day-care and school entry (C.S. Mott Children Hospital, 2015).

A questionnaire was administered during a study conducted by Kaaijk *et al*, 2014, in the Netherlands between September 2012 and May 2013 on parents of children aged 0 – 12 years which investigated the different methods of vaccine delivery that parents would prefer when having their child/ children immunized. 76% of parents indicated that they objected to their child having more than two immunizations per scheduled visit. Parents felt that the immunization schedule should be extended to cover more infectious diseases. An alternative immunization delivery method, such as patches would be more acceptable as it would be easier to administer, this would hopefully increase the acceptability of immunizations by parents (Kaaijk *et al*, 2014).

Of these respondents in the Netherlands, 95% of parents reported that their children were fully immunized. The reasons parents stated that children were not immunized were that 15% of they were unclear of the benefits of immunizations to the child's health. A further 9.4% indicated that the child



was too young to be immunized. Another 8.5% of parents felt that the child had a low risk of acquiring the infection, and only a small portion of parents, 4.5% parents indicated that religion prohibited them from immunizing their children with an additional, 4% indicating that their beliefs or lifestyle influenced their decision to immunize their child. A total of 69% parents indicated that 3 or more immunizations per immunization session was way too much, they preferred an additional visit to cover the extra immunizations (Kaaijk *et al*, 2014).

Most of the messages are based on adverse events following immunization, such as those explained on the Smartvax.com website citing that that the higher the percentage of children receiving recommended immunizations, the higher the prevalence of autism or speech/ language impairment. The article further deduces that as most vaccines have not been fully studied as a causal effect of autism, another vaccine study indicated there is three times the increased risk of developing post immunization autism, thus vaccine-induced autism is scientifically plausible (Smartvax, not dated).

In the 2006 study conducted in Istanbul, 18.85% of fathers' indicated that they would not allow their children to be vaccinated (Torun and Bakirici, 2006). Poor parental attitude towards immunization impedes on the child's immunization status against vaccine preventable diseases. Many mothers in India reported having a positive attitude towards immunization, which clearly reflects in their high immunization prevalence (Hamid *et al*, 2012).

The attitudes reported in the American survey (C.S. Mott Children's Hospital, 2015) results depicted parents' concerns regarding vaccine safety whereas in the Borno State, Nigeria study, cultural and religious beliefs served as the stumbling blocks in accessing immunization services. In Borno State, immunization was linked with causing sterility. The lack of information on immunization was seen as a reason for not immunizing children, yet others in the community view it as an effective way in reducing childhood deaths. Most people believe in the use of traditional medication as first level of care, which is seen as the alternative to immunizations. Attitudes of health care personnel were also disconcerting to parents as they do not actively encourage routine immunization (Omotara *et al*, 2012).

The 2009 American national immunization survey indicated that only 78% of parents agreed that vaccines are safe and may be administered to their children. Most parents preferred to delay their child's immunization as they were concerned with the possible side-effects of the immunization (Smith *et al*, 2011). Several social media sites such as Facebook and WhatsApp, has anti-vaccine messages circulating based on information acquired from the United States of America and The United Kingdom. No published scientific articles could be found focusing on anti-vaccine lobbyist messages.

#### **2.4.3. Caregiver practices influencing immunization prevalence**

DeStefano *et al*, 2013, conducted research in America focusing on the association between vaccines and autism and the effect of polysaccharides as vaccine preservatives. This study was undertaken to uphold or dispute the research conducted in 1998 by Dr. A. Wakefield which alleged that the measles, mumps and rubella vaccine caused autism in children. However, subsequent research and analysis of his research findings discredited his findings as the cause of autism is still unknown (DeStefano *et al*, 2013). DeStefano *et al*, 2013 found no link between anti-body stimulating proteins and polysaccharides contained in vaccines that are routinely administered to children younger than 24 months of age (DeStefano *et al*, 2013). Children with long term health conditions have successfully been vaccinated with limited adverse events following immunizations (Public Health, 2015).

Gust *et al*, 2006, conducted a household survey in America with parents of children aged 19 to 35 months who had participated in the National Immunization Survey in 2001 with the focus on parental concerns and medical seeking behaviour after immunization especially adverse events following immunizations (AEFI), immunization attitudes, beliefs and behaviour. Alternative medication is being considered as being better than immunizations in preventing communicable disease. Parental experience with AEFI's does deter parents from taking their children for subsequent immunizations. The study indicated that African-American and Hispanic parents would not report AEFI's, similarly parents aged 35 years and older did not seek medical care unlike parents in the 25 to 35 years' age group. African-American parents responded that they would treat their children with home remedies following an AEFI. A further 38.4% of parents reported that at least of their children experienced an AEFI, 6.9% of parents reported having sort medical treatment to deal with the AEFI and a further 31.5% of parents reported an AEFI but did not seek medical advice (Gust *et al*, 2006).

Grant *et al*, 2010, conducted a random sampling survey in New Zealand focusing on primary health care practices measuring the practice characteristics, and measuring the knowledge and attitudes of doctors, nurses and caregivers. They referred to the 2005 national survey which found that only 77% of 2 year olds were considered to be fully immunized, which was slightly higher than the findings of the 1992 and 1996 surveys where immunization coverage was found to be 60% to 70%. Children from a low socio-economic state and from the Maori population (56% coverage) were amongst those with the low immunization coverage; 29% of caregivers received negative information regarding immunization, and only 62% of caregivers received information on childhood immunization antenatally. Information on immunization antenatally resulted in 67% of mothers deciding to immunize their child (Grant *et al*, 2010).

Missed opportunities by health care providers were cited as 18.8% of reasons for children being un-immunized in Istanbul (Torun and Bakirici, 2006). The people of Borno State, Nigeria, agreed that immunization was important however only with the buy-in of the traditional leaders has immunization

practices improved in the community. In 2004 the safety of the Oral Polio Vaccine (OPV) was questioned which caused the immunization programme to suffer negatively, as the community was under the impression that the administration of OPV results in sterility in later life (Omotara *et al*, 2012).

Fonn *et al*, 2006, conducted a cluster sampling survey in 2003 in the Gauteng province focusing on the 12-24 month age group. According to data reviewed the immunization coverage for children in South Africa in 2000 was 63.7%, in 2002 it was 71.6%, and in 2003 it was 67.5%. Gauteng achieved similar coverage, in 2000 63.9%, in 2002 68%, and 2003 60.7%. Most respondents were mothers or grandmothers who were interviewed. According to the findings, 73% of children accessed immunization at a public health care facility, as 95% indicated these health care facilities were closest to home and according to perceptions had to be good to provide the service, 90% of children were in possession of Road to Health Cards, and according to this data 79%, were fully immunized with 59% of children being immunized timeously as per the immunization schedule (Fonn *et al*, 2006).

Corrigan *et al*, 2008, conducted a study in the Western Cape cited 19.2% of clinic factors were due to missed opportunities by health care providers. A further 47.1% of clinic factors cited for not attending the clinic for childhood immunization were being asked to return on another date, incorrect vaccination return dates given and the distance between clinic and home being too great (Corrigan *et al*, 2008). The study findings of Fonn *et al*, 2006, were similar to those of Corrigan *et al*, 2011, Grant *et al*, 2011, and Gust *et al*, 2006, who determined that health care settings and health care provider interactions with patients influence patient's returning to the health care facility for follow-up care. Similarly, Grant *et al*, 2011, found that poor staffing norms at health care facilities impact on the parent returning for immunization.

As noted in the aforementioned articles, immunization prevalence varies between countries as well as between districts within these countries and in instances where immunization prevalence was low, vaccine preventable disease outbreaks still occur in pockets. Immunization drop-out rates vary yet WHO has indicated that there is a steady decline at a global level, yet the drop-out rate remain highest at the low and middle income countries. Immunization prevalence is furthermore affected by caregiver knowledge as most caregivers' have indicated that they are aware that their child should be immunized yet had low knowledge on the reason for the immunizations. Attitude towards immunization varied, depending on information imparted on immunization through social media or negative immunization information imparted by non-health care personnel. Religious and cultural beliefs and practices had a limited impact on immunization.



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## **CHAPTER 3: STUDY METHODOLOGY**

### **3.1. Study design**

A cross sectional analytical study was undertaken using systematic sampling methods. The cross sectional study design was deemed the most appropriate as the prevalence of immunization was determined for a specific period by evaluating data and conducting a community survey (Hennekens and Buring, 1987).

The cross-sectional study was used to describe factors associated with immunization prevalence, and measuring caregiver knowledge, attitudes and practices which may have influenced immunization prevalence in the Delft community, through the administration of a structured questionnaire. The researcher was then able to objectively determine which factors and whether knowledge, attitudes and practices influence low immunization prevalence.

### **3.2. Study population**

The study eligibility criteria stated that children aged 12 – 24 months who had resided in the Delft community during the first 12 months of life and had a valid Road to Health Booklet (RtHB), which is the official document used by all health facilities in South Africa to record immunizations, could participate in the study. This study population was chosen as most childhood immunizations are administered within the first 12 months of life, as this is the time period during which children are most vulnerable to developing vaccine preventable diseases such as diarrhoea, pneumonia and measles.

The review of the RtHB was essential to reduce caregiver recall bias on the child's immunization prevalence and its presence was essential, therefore no caregiver was asked to recall immunization in the absence of a RtHB. The RtHB was used in order to assess the various types of immunization the child had received as the immunization schedule is far too complicated for any caregiver to remember what vaccines were received if the child was not fully vaccinated. However, conversely and ironically some selection bias would have been introduced by excluding children who did not possess a RtHB, as those without a RtHB are less likely to have received several (or all) of the vaccines offered in the first year of life.

According to the 2011 census data, Delft, which is a suburb located in the Tygerberg sub-district, had a total number of 39 576 households registered with an average of 3 people per household (City of Cape Town, 2013).

### **3.3 Study site**

The study was conducted in Delft, which is a mixed low and middle socio-economic status community and is the largest suburb within in the Tygerberg sub-district, in the Cape Town Metropolitan District. It is a culturally diverse community with mixed aged groups which continuously expands as more homes are being built as part of the Department of Human Settlements Reconstruction and Development Plan which provides basic housing for the low income group. The community was established in 1989, with the older homes being owned by the middle income group and the newer homes, both formal and informal, owned by the lower socio-economic group. The area is further subdivided into ten sub-areas, namely, The Hague, Voorbrug, Leiden, Delft South, Blikkiesdorp, Temporalis (Temporary Relocation Area), Roosendal, Delft SP, Eindhoven, and N2 Gateway (City of Cape Town, 2013).

The clinic drainage areas are defined by Hindle Road as a main entry point from the R300, with Stellenbosch Arterial Road, Symphony Way and Lansdowne Road which serves as its borders. The community has one community health centre (which operates a 24 hour emergency unit and a Midwife Obstetric Unit), one community day centre and one primary health care clinic, all of which provide immunization services. There are several private providers rendering primary health care services within the community however, only one renders immunization services.

Immunization prevalence within the community may be influenced by cross-border visits, as the community is not compelled to access immunization services in their own community. Some caregivers may prefer to take their child to be immunized at a health care facility outside of the community's borders. Thus the findings' on the fully immunized child which was recorded during the study from their RtHB was compared to the local health care facilities immunization data to note immunization data discrepancies and to determine the variance in immunization prevalence.

Most childhood vaccines are administered before 12 months of age as children of age as this age group are most susceptible in acquiring vaccine preventable such as diarrhoea and pneumonia. The study therefore focused on the prevalence of immunization in the age group of 12 to 24 months of age.

### **3.4. Study sampling**

#### **3.4.1. Sample size**

A sample size of 384 children aged between 12 months and 24 months was calculated using Epi-Info 7 Statcalc based on an estimated study population number of 3914, based on an 80% confidence level, and an assumed immunization prevalence of 80% based on routinely available immunization information (Western Cape Government: Health, 2015) and furthermore an allowed margin of error of 3% was factored in. Logistically in order to access these children one had to first access households

(see below) and since several households for various reasons might not yield children in the target population, the household sample was inflated to compensate for this.

To mitigate against households that did not have children within the target group an additional 10% was added to the sample size. Similarly an extra 6% of households were added to cater for caregivers who chose not to participate in the study. An additional 6% was calculated to account for those children who did not have a RtHB. This yielded a household sample size of 490 from which it was hoped to obtain a sample size of  $\geq 384$  target population children. Replacement sampling of households was also done if caregivers were not home after the second attempt to visit the household.

### **3.4.2. Sampling type**

Convenience sampling in each of the ten sub-areas in Delft was utilized. The base from which the CCW's work on a daily within these ten sub-areas was used as a sampling unit to identify the household, thereafter using the sampling interval of (39 576 households/490 sample of households) every 80<sup>th</sup> household was selected by the data collectors to participate in the study. As the sampling interval was the same for each sub-area irrespective of its size, an effective proportional to size sampling was achieved for each sub-area.

### **3.4.3. Sampling logistics**

A total of 25 Community Care Workers (CCW) who works within the Delft area assisted with the data collection for the study. Each CCW was allocated a designated sub-area with 2 - 3 CCWs allocated per sub-area. In each of the sub-areas there is a work venue to which the CCWs report at the start of their regular working day. The house closest to each of the ten work venues was selected as the first household in that particular sub-area. Where a property had more than one household, then random sampling occurred by requesting caregivers to draw a number from a bag with a choice of numbers corresponding to the number of households on the property. The person with who drew number one, rather than any of the other numbers, was interviewed. The same random sampling procedure was used to select one child if a household had more than one child within the sample age group. Random sampling in this manner reduces homogeneity in the sample since the caregiver will have the same knowledge, attitude and practice towards immunization of all the children.

Thereafter every 80<sup>th</sup> household based on the number of the house was selected by the CCW as physical counting of every 80<sup>th</sup> household had proven difficult. Each house in Delft is numbered per street, therefore only one household on that premises was interviewed to participate in the study. At all households where children were found, the caregivers were interviewed if they agreed to participate in

the study. Households were visited over a weekend (Friday to Sunday) to ensure that caregivers would be easily accessible. Caregiver's that were not home at the time of the initial visit were followed up with a second visit over the weekend and if they were still not at home after the second visit, then the household next door to the initial household was selected as a replacement unless there was more than one household on the premises then one of these households was selected as a replacement.

### **3.5. Data collection methods**

The caregivers of children aged 12 – 24 months, who were born in between 1 May 2014 and 31 May 2015, and who had resided in Delft in their first 12 months of life, were interviewed using a structured questionnaire (Annexure 2). The children's RtHB was reviewed for their immunization prevalence and each date on which the immunization was administered was transcribed from the RtHB onto the questionnaire. Most of the persons interviewed were mothers and grandmothers.

The questionnaire (Annexure 2) had five focal areas, namely immunization prevalence based on the age appropriate immunizations; the education level of the caregiver; socio-economic status of the caregiver where dwelling type, water availability, toilet type and location are used as proxy variables; the knowledge of the caregiver on immunization; the caregivers attitude towards immunization; and the influence of caregiver and institutional practices on immunization. Caregivers were interviewed regarding issues that may influence their immunization practices, such as the proximity of the health care facility to their home, the preference of the caregiver for attending immunization sessions, the influence of immunization shortages on immunization prevalence; and the impact of religious and cultural practices on immunization prevalence as indicated in table 4.

The CCW's were trained by the researcher on the purpose of the study, how to conduct the interviews and how to pose questions using the standardized structured questionnaire (Annexure 2) without prompting for the most suitable answer; to impart information on the patient information leaflet (Annexure 3) regarding the survey; and to obtain informed consent using the standardized consent form (Annexure 4), with the caregiver of the child aged 12-24 months. Each CCW was handed 20 sets of questionnaires (Annexure 2), information leaflets (Annexure 3) and consent forms (Annexure 4) to conduct the study. The CCW's were also taught how to extract data from the Road to Health Booklet (RtHB) provided by the caregivers, then transcribe it onto the questionnaire, denoting each date of the immunizations that was administered to the child. Recall bias was excluded by only reviewing immunization data from the RtHB and not relying on caregiver recall bias. In-depth interviews were conducted with the caregivers to probe their knowledge, attitude towards immunization and practices that may influence the child not being fully immunized.



### **3.6. Data collection time frame**

All interviews were conducted the weekend of 10 to 12 June 2016. The interview was scheduled to last a maximum of 20 minutes however some interviews ran longer where caregivers requested additional information from the CCW on child health. The questionnaires (Annexure 2) were administered in English, Afrikaans or Xhosa as per the caregivers' preference.

In addition to immunization prevalence data obtained during the interviews, additional routine (primary) immunization data was obtained from the Western Cape Government: Health for the period May 2014 to May 2015, to determine the prevalence of immunization at the health care facilities in Delft. This data was analysed to determine whether immunization coverage reported at health care facility level is comparative to immunization data found recorded on the child's RtHB.

### **3.7. Pilot study**

The pilot study was conducted to establish the validity and the reliability of the study by piloting the questionnaire with caregivers with a similar socio-economic background who reside outside the research area and who have children aged 12 – 24 months of age. Caregivers in 16 households were interviewed. None of the caregivers interviewed during the pilot study reported having any problems in understanding the questions (Annexure 2) or with information on the patient information leaflet (Annexure 3) or the consent form (Annexure 4). The consent form (Annexure 4) was amended to include the address of the caregivers based on inputs from the CCW's and their NPO manager and coordinator. All study collection and information material was tested with CCW's from all three language groups to determine the clarity and ease of understanding of the questions to be posed.

### **3.8. Data analysis**

The prevalence ratio was used for the immunization data using the univariate analysis for the review of the demo-graphic data, socio-economic data and data collected on caregiver knowledge, attitude towards immunization, practices influencing immunization prevalence, and the influence of religious and cultural practices have on immunization. Bivariate analysis was used to determine the prevalence odds ratio which was used to interpret the prevalence of immunization. Multivariate regression analysis was considered to determine factors associated with immunization amongst children aged 12 to 24 months.

The total number of respondents interviewed was 490 of which 316 were eligible to participate in the research yielding a response rate of 62.6%. Caregivers (n=174) were excluded due to the child being younger or older than the target group of 12 to 24 months; and some caregivers did not have the child's RtHB available for review, as it was either lost or has been misplaced. In addition to this, 20 caregivers

indicated that they choose not to immunize their child therefore the child does not possess RtHB's. The mean age of the children was 18.4 months. The median age is 18 months. The interquartile age range was 15 to 22 months. The standard deviation was 3.68.

Initially data was inputted into an Excel spreadsheet, to review the data obtained from the questionnaires (Annexure 2) this allowed the researcher to conduct data clean-up and validation (eliminating incomplete data, children outside the target group and children not in possession of a RtHB). Data was then sorted, categorized and coded when captured into the Excel spreadsheet.

The prevalence ratio was used to determine the prevalence of immunization using the following criteria, namely, fully immunized, which means that the child had received all the age appropriate up to the age of 12 months. An under immunized child is one who had received one or more age appropriate immunizations up to the age of 9 months, thus having attained a reasonable level of immunity. An un-immunized, a child is one who had not received any immunizations at all therefore no immunity against vaccine preventable diseases have been attained.

### **3.9. Validity**

Content validity has been ensured through literature reviews based on known information on immunization prevalence, which assisted in the formulation of the study questionnaire (Annexure 2). Face validity assured that the questionnaire could measure the low immunization prevalence and could determine the caregiver's knowledge, attitude and practice towards immunization (Bruce *et al*, 2008). Validity will be strengthened by using CCW's who are knowledgeable on how to read and check the RtHB as they have been trained on checking the RtHB (both during their CCW orientation training and during the study training), thus completing this part of the questionnaire did not prove difficult.

For the purposes of this study the CCWs were trained on how to conduct the interview and pose the questions as per the questionnaire in a standardised manner without leading the caregiver to give an answer the CCW deemed suitable. No modifications were required to the questionnaire after the training or pilot study based on inputs received from the CCW's.

### **3.10. Reliability**

A standardised questionnaire was administered so that the same question was posed to all participants using the same format thus responses could be recorded in an identical manner. The reliability of the questionnaire was piloted with 16 caregivers in a neighbouring community with similar socio-economic circumstances. They did not form part of the research community but used to determine the precision of questionnaire in measuring knowledge, attitude and practices towards immunization.

The immunization data collection on the questionnaire was based on the RtHB. This was to enable ease of transcription of the recorded immunization history of the child, thus the immunization information on the questionnaire would be reliable and accurate. Health care facility data is collected in a standard manner using a daily child health services tally sheet which feeds into the routine monthly report, therefore it is assumed that the immunization coverage data obtained from the Western Cape Government: Health had been verified and found to be accurate by their management team.

### **3.11. Generalizability**

The results of the study will be generalizable to the Delft community, in the Tygerberg sub-district. Inference beyond this cannot be assumed.

### **3.12. Ethical considerations**

Ethical approval for the study was obtained from the University of the Western Cape Senate Research Committee (Annexure 5) in December 2015 (Registration no. 15/7/7). Permission was received from the Western Cape Government: Health (Annexure 6) in January 2016 to access immunization data per antigen for the financial year 2014 /15 for the Delft community (Reference no. WC\_2016RP35\_553).

Patient information pamphlets (Annexure 3) were handed to the caregivers by the research team for back referral or even to pose further questions from the researcher. The patient information sheet was read and explained to the caregivers to allow them to make an informed decision. The participant information sheet included the reason for conducting the study, the procedure that the interview would follow, maintaining participant confidentiality, potential risks, benefits and implication of the study was given. Caregivers were assured that their privacy would be respected and that confidentiality would be maintained. Caregivers were informed that they could stop the interview at any time, should they feel uncomfortable to answer any of the questions posed without any repercussions for non-participation in the study.

Written informed consent was obtained from each participant prior to participating into the study. The caregivers, who agreed to participate in the study, voluntarily signed an informed consent (Annexure 4). The questionnaire (Annexure 2) was read to each caregiver whereupon the CCW, who conducted the interviewed, transcribed the information from the RtHB as well as the response from the caregiver onto the questionnaire.

Participants were informed about the manner in which the data collected would be stored, recorded and reported. The raw data will be destroyed five years after the acceptance of the thesis to maintain confidentiality. No personal details of the caregivers or the child would be mentioned in the study

report. All personal information obtained was coded, through the use of identifiers instead of names. Only the researcher has access to the completed questionnaires (Annexure 2) and consent forms (Annexure 4), which are stored in a secure cupboard with only researcher having access to the cupboard and stored on a password protected computer. There was limited risk for the caregiver participating in the research as it did not affect service delivery from the local health care facilities. Caregivers of children who were found to be un-immunized or under-immunized were verbally requested to take the child for immunization at the nearest health care facility.

On acceptance of the research report by the University of Western Cape's Senate Research Committee, the findings will be made known to the facility managers and the sub-district managers within the Tygerberg sub-district and the wider Metro District Health Services to assist in reducing immunization drop-out rates. The CCW's who have participated in the research will also receive a feedback session on the findings. The findings of the study will be published as journal articles however, the community in which the study was conducted will remain anonymous.



## CHAPTER 4: RESULTS

### 4.1. Introduction

The results section is divided into several sub-sections namely, sample realisation; immunization prevalence at 12 and 24 months; comparing the prevalence of specific types of immunization from the survey data with that extrapolated from routine health service data; univariate analysis of the variables caregivers knowledge on immunization, attitude towards immunization and practices influencing immunization; and bivariate analysis of potential factors associated with the prevalence of being fully immunized at 12 months and 24 months.

### 4.2. Sample realisation

The identified study sample size was 384 however, a sample of 316 children aged 12-24 months was realised. Oversampling by selecting 490 households was planned with the intention of obtaining 384 eligible children from this number of households was undertaken. Yet the eventual sample realised was less than the desired sample as 174 (36%) households for various reasons did not meet the criteria for participation. Table 1 below provides details of included households and the reasons why the households did not meet the study selection criteria. The response rate realised was 64%.

**Table 1: Participation in study**

| Category  | F (%)      |
|---|------------|
| Households visited  | 490 (100%) |
| Households included   | 316 (64%)  |
| Households excluded   | 174 (36%)  |
| • <i>Caregiver declined to participate in the study</i>             | 22 (5%)    |
| • <i>No children within the study population age range criteria</i> | 142 (29%)  |
| • <i>Eligible child did not have RtHB</i>                           | 9 (2%)     |
| • <i>Illegible recording in RtHB</i>                                | 1 (0%)     |

Two of the children for whom there was no RtHB were not immunized at all and hence their caregivers were not in possession of a RtHB. Both these caregivers indicated that they did not believe that immunization was important due to either a friend or a family member's child having had a severe reaction after immunization. The immunization status of the other seven children without a RtHB and the one with an illegible booklet was unknown, but it is likely to be sub-par.

Although caregivers were assured that they did not have to provide reasons for refusing to participate in the study, they were asked about this and most of them volunteered an answer. Amongst the 22 caregivers who declined to participate in the study reasons supplied ranged from that they were not interested in the study; that they did not want to disclose personal information; that their children were not fully immunized, and that they feared being reported to the Department of Social Development.

### 4.3. Prevalence of immunization

Table 2 depicts the completed immunization prevalence with 95% confidence intervals, at the age of 12 months and 24 months stratified according to the age at which the various scheduled immunizations were ideally due to be administered. Hence the prevalence of “immunizations scheduled to be given at birth” measures whether the set of immunizations prescribed to be given at birth had actually been received by the time the child was 12 months of age (and by the age of 24 months). Similarly, the prevalence of “immunizations scheduled to be given at 6 weeks” measures whether the set of immunizations prescribed to be given at 6 weeks had actually been received by the time the child was either 12 or 24 months of age. The specific types of immunizations that are scheduled to be provided at the various time periods are shown in Annexure 1.

**Table 2: Immunization prevalence and drop-out rates for various age schedules grouped by degree of timeousness.**

| Scheduled immunization time periods*  | Prevalence of All required immunizations for the listed time schedule having being provided on or before 12 months of age | Drop-out rate between the immunization scheduled at birth and the listed time schedule before 12 months of age | Prevalence of All required immunizations for the listed time schedule having being provided on or before 24 months of age | Drop-out rate between the immunization scheduled at birth and the listed time schedule before 24 months of age |
|---|---|--|---|--|
| Immunizations scheduled to be given at birth.   | 95.9%<br>[ 93.1% - 97.6% ]  | -----  | 95.9%<br>[ 93.1% - 97.6% ]  | -----  |
| Immunizations scheduled to be given at 6 weeks  | 88.6%<br>[84.6% - 91.2%]  | 7.3%   | 88.6%<br>[84.6% - 91.6%]  | 7.3%   |
| Immunizations scheduled to be given at 10 weeks   | 86.4%<br>[82.2% - 89.7%]  | 9.5%   | 88.3%<br>[84.3% - 91.4%]  | 7.6%   |
| Immunizations scheduled to be given at 14 weeks   | 79.4%<br>[74.6% - 83.5%]  | 16.5%  | 83.5%<br>[79.1% - 87.2%]  | 12.4%  |
| Immunizations scheduled to be given at 9 months   | 67.4%<br>[62.1% - 72.3%]  | 28.5%  | 80.1%<br>[75.3% - 84.1%]  | 15.8%  |
| ALL immunizations scheduled to be given before and up to 9 months of age. Also called “Fully Immunised” | 61.4%<br>[55.9% - 66.6%]  | 34.5%  | 71.5%<br>[66.3% - 76.2%]  | 24.4%  |

\*Different sets of immunizations are scheduled to be administered at various time periods of a child's life.

The drop-out rate between the numbers of children who received the immunizations scheduled at birth and having received the subsequent scheduled immunizations before 12 and 24 months is also shown. Drop-out rates are useful measures as they highlight the proportion of those who initially attended for the first immunizations and hence are known to the health services, but who then did not return for subsequent immunizations and hence reflect the proportion of children whom the health service failed to retain, and whom potentially they could trace and offer immunization.

Birth immunizations are usually provided in the postnatal wards of birthing units, before the mother and new-born are discharged, but can be provided at clinics if not administered in the immediate postnatal period. Immunizations provided from 6 weeks of age onwards, are provided by either private or public health care facilities offering child health services, such as clinics, health centres and hospitals. At birth, 4.1% of children were either not immunized with one or both birth immunizations and this proportion unimmunised remained the constant at 12 and 24 months. Although full immunization levels were high at birth (95.9%) only 61.4% of the children had received their full immunization schedule (for all time periods) before 12 months of age, rising to 71.5% who have received the full immunization schedule before 24 months of age.

The drop-out rate measured between birth and 6 weeks of age is affected by the different service delivery points, as within the birthing units, children are part of a captive audience, whereas at 6 weeks the caregiver is responsible to return with the child to the nearest health care facility providing childhood immunization services. Thus the drop-out rate of 7.3% is not unexpected. Yet the drop-out rate remained constant at 12 and 24 months of age, despite the child being able to catch-up on selected immunizations.

Similarly at 10 weeks of age, the immunization prevalence declines by a further 2.2% between 6 weeks and 10 weeks of age before 12 months of age. However, it is noted that some children managed to catch-up on immunizations before 24 months, thus reducing the drop-out rate to 0.3% between the 6 weeks and 10 weeks immunizations.

At 14 weeks, immunization prevalence declines further with an immunization drop-out rate between 10 weeks and 14 weeks of 7% at the 12 month age analysis. The drop-out rate at the 24 month age analysis indicates that 4.1% of children were able to catch-up with their immunization. The drop-out

rate between 6 weeks and 12 months of age is 27.2% and when afforded the opportunity for catch-up before turning 24 months the drop-out rate declines to 17.1%. Overall the immunization drop-out rate improves at 24 months of age as caregivers are afforded the opportunity for the child to receive immunizations which they have missed out on before 12 months of age.

#### **4.4. Comparing prevalence's of specific types of immunization from the survey with that extrapolated from routine health service data**

Table 3 below depicts the various immunization antigens due to be received by children at various time stages during their first year of life, as per the EPI-SA schedule. At health care facility level a process for collecting data on immunizations provided is in place, but data is not collected on all types of immunizations, since several of the immunizations are scheduled to be delivered at the same time and hence receipt of one of the immunizations delivered at that time serves as a reasonable proxy for having received all the others due at that time. Although this approach is pragmatic and reduces data collection costs it can give a skewed picture of immunization prevalence especially when one immunization antigen is out of stock yet the other immunization antigen is administered.

The immunizations indicated in table 3 are administered to the child at the appropriate age and the number attached to the immunization indicates which dose it is that the child would be receiving, e.g. OPV0 (oral polio vaccine) indicates the first dose of oral polio vaccine which is typically administered at birth, while OPV1 indicates the second dose of oral polio vaccine which should be administered at 6 weeks after birth.

Children are administered both OPV (oral polio vaccine) and IPV (inactivated polio vaccine) which forms part of the DTaP-IPV-Hib vaccine (pentavalent vaccine) at 6 weeks. OPV is administered to increase the ability of the child's immune system to develop antibodies to the poliovirus, which is not achieved with only the administration of IPV (Modlin *et al*, 1997). The OPV1 immunization data provided by the WCG: Health indicates an outlier in the immunization prevalence with only 38.9% immunization prevalence indicated compared to the survey data which indicated 89.8% immunization prevalence as depicted in Table 3. There is a strong suspicion that this might be due to data error as the 6 weeks -DTaP-IPV-Hib1 (pentavalent vaccine) immunization prevalence is at 86.9%, and although it could possibly be due to a stock-out of OPV1, no record of a stock-out of OPV1 could be found for the time period. At 6 weeks scheduled immunization visit the child is immunized with both OPV and IPV (inactivated polio vaccine) which forms part of the pentavalent vaccine. The WCG: Health indicates a higher immunization prevalence for the third dose of the pentavalent immunization (14 weeks -DTaP-IPV-Hib3), indicating that more children were afforded an opportunity to catch-up on their



immunization than that recorded in the survey data. All the other final dose immunizations for the various antigen types showed minimal variation in prevalence between that found in the survey and that reported via routinely collected data.

The survey data and the Western Cape Government: Health's (WCG) data are both for the period 1 May 2014 to 30 April 2015 and both are specific to the study area of Delft. Immunization data from the WCG: Health was collected from one community health centre, one primary health care facility and one private health care provider, as together they cover the Delft area, as the only providers of immunization services within the community.

**Table 3: Comparison of survey immunization data versus Western Cape Government: Health immunization data per age appropriate vaccine**

| IMMUNIZATION TYPE        | SURVEY DATA (n=316) |               |                                       | WCG: HEALTH DATA (n=3914) |               |                                       |
|--------------------------|---------------------|---------------|---------------------------------------|---------------------------|---------------|---------------------------------------|
|                          | Prevalence          | 95% CI        | Drop-out rate (immunization specific) | Prevalence                | 95% CI        | Drop-out rate (immunization specific) |
| Birth - BCG              | 96.5%               | 93.9% - 98.1% | -----                                 | Data not collected        | -----         | -----                                 |
| Birth - OPV 0            | 95.9%               | 93.1% - 97.6% | -----                                 | 84.8%                     | 83.6% - 85.9% | -----                                 |
| 6 weeks - OPV1           | 89.8%               | 86.1% - 92.7% | 6.1%                                  | 38.9%                     | 37.4% - 40.4% | 45.9%                                 |
| 6 weeks -RV1             | 90.2%               | 86.4% - 93%   | -----                                 | Data not collected        | -----         | -----                                 |
| 14 weeks - RV2           | 80.4%               | 75.7% - 84.4% | 9.8%                                  | 73.8%                     | 72.4% - 75.1% | -----                                 |
| 6 weeks - PCV1           | 90.2%               | 86.4% - 93%   | -----                                 | Data not collected        | -----         | -----                                 |
| 14 weeks - PCV2          | 82.9%               | 78.4% - 86.7% | 7.3%                                  | 67.3%                     | 65.8% - 68.7% | -----                                 |
| 9 months - PCV3          | 69.6%               | 64.3% - 74.4% | 20.6%                                 | 69%                       | 67.6% - 70.5% | 1.7%                                  |
| 6 weeks - Hep B1         | 89.9%               | 86.1% - 92.7% | -----                                 | Data not collected        | -----         | -----                                 |
| 10 weeks -Hep B2         | 87.7%               | 83.6% - 90.8% | 2.2%                                  | Data not collected        | -----         | -----                                 |
| 14 weeks - Hep B3        | 82.9%               | 78.4% - 86.7% | 7.0%                                  | 82.9%                     | 81.6% - 84%   | -----                                 |
| 6 weeks -DTaP-IPV-Hib1   | 89.6%               | 85.7% - 92.5% | -----                                 | 86.9%                     | 85.8% - 87.9% | -----                                 |
| 10 weeks -DTaP-IPV-Hib2  | 86.4%               | 82.2% - 89.7% | 3.2%                                  | Data not collected        | -----         | -----                                 |
| 14 weeks - DTaP-IPV-Hib3 | 83.5%               | 79.1% - 87.2% | 6.1%                                  | 92.3%                     | 91.6% - 93.3% | 5.4%                                  |
| 9 months - Measles1      | 71.5%               | 66.3% - 76.2% | -----                                 | 70.9%                     | 69.5% - 72.3% | -----                                 |
| Fully immunized          | 61.4%               | 55.9% - 66.6% | -----                                 | 67.1%                     | 65.6% - 68.6% | -----                                 |

#### 4.5. Univariate analysis

At this level of analysis, frequency tables with 95% confidence levels were prepared to show the prevalence of factors which are reasonably assumed to potentially influence immunization prevalence. These variables cover a broad domain including caregivers' education level, socio-economic factors, caregivers' knowledge on immunization, their attitude towards having their child immunized and the influence of personal, religious and cultural beliefs. Table 4 presents these results with the variables shown as discrete entities.

**Table 4: Univariate analysis – caregivers' knowledge on immunization, attitude towards immunization and practices influencing immunization**

| Variables   | Categories (n=316)   | Frequency | Percentage | 95% CI         |
|---|--|-----------|------------|----------------|
| <b>Caregiver education level</b>                    | Never attended school  | 2         | 0.6%       | 0.2% - 2.3%    |
|   | Primary school attendance  | 19        | 6%         | 3.9% - 9.2%    |
|   | Secondary/High school attendance   | 285       | 90.2%      | 86.4% - 93%    |
|   | Tertiary (College/University) attendance   | 10        | 3.2%       | 1.7% - 5.7%    |
| <b>Dwelling type</b>                                | House/ brick   | 230       | 72.8%      | 67.6% - 77.4%  |
|   | Informal/backyard dwelling   | 44        | 13.9%      | 10.5% - 18.2%  |
|   | Informal dwelling in settlement  | 42        | 13.3%      | 10% - 17.5%    |
| <b>Water source/ availability</b>                   | Inside house   | 256       | 81%        | 76.3% - 85%    |
|   | In backyard  | 30        | 9.5%       | 6.7% - 13.2%   |
|   | Communal tap   | 30        | 9.5%       | 6.7% - 13.2%   |
| <b>Toilet type</b>                                  | Flush toilet   | 290       | 91.7%      | 88.2% - 94.3%  |
|   | Portable chemical Toilet   | 16        | 5.1%       | 3.1% - 8.1%    |
|   | Bucket used  | 10        | 3.2%       | 1.7% - 5.7%    |
| <b>Toilet location</b>                              | Inside house   | 262       | 82.9%      | 78.4% - 86.7%  |
|   | In backyard  | 22        | 7%         | 4.6% - 10.3%   |
|   | Communal toilet  | 32        | 10.1%      | 7.3% - 14%     |
| <b>Adequacy of toilet facilities</b>                | Adequate: Inside house/backyard  | 284       | 89.9%      | 86.01% - 92.7% |
|   | Inadequate: Communal toilet  | 32        | 10.1%      | 7.3% - 14%     |
| <b>Caregiver acquired knowledge on immunization</b> | Caregiver was explained the importance of immunization by health care professional | 234       | 74.1%      | 69% - 78.6%    |
| <b>Caregivers knowledge on understanding RtHB</b>   | Caregiver can correctly indicate next immunization on RtHB                         | 271       | 85.8%      | 81.5% - 89.2%  |

| Variables  | Categories (n=316)   | Frequency | Percentage | 95% CI        |
|--|--|-----------|------------|---------------|
| <b>Caregiver knowledge on immunizations which prevent childhood diseases</b> | Measles disease  | 280       | 88.6%      | 84.6% - 91.7% |
|  | Diarrhoeal disease   | 107       | 33.9%      | 28.9% - 39.2% |
|  | Pneumonia disease  | 89        | 28.2%      | 23.5% - 33.4% |
|  | Tetanus disease  | 87        | 27.5%      | 22.9% - 32.7% |
|  | Tuberculosis (TB)  | 161       | 51%        | 45.5% - 56.4% |
| <b>Caregivers knowledge on understanding RtHB</b>                            | Caregiver can correctly indicate next immunization on RtHB                                 | 271       | 85.8%      | 81.5% - 89.2% |
| <b>Caregiver knowledge on lost/misplaced RtHB</b>                            | Request replacement RtHB from local immunization clinic                                    | 296       | 93.6%      | 90.4% - 95.9% |
|  | Wait until for referral by CCW before returning to clinic                                  | 10        | 3.2%       | 1.7% - 5.7%   |
|  | Didn't know RtHB could be replaced   | 10        | 3.2%       | 1.7% - 5.7%   |
| <b>Caregiver knowledge on late immunizations</b>                             | Return to clinic even if immunization is late  | 296       | 93.6%      | 90.4% - 95.9% |
|  | Wait until the next immunization is to be given.   | 10        | 3.2%       | 1.7% - 5.7%   |
|  | Didn't know immunizations can be given at a later date                                     | 10        | 3.2%       | 1.7% - 5.7%   |
| <b>Caregiver attitude towards the importance of immunization</b>             | Childhood immunization is very important   | 311       | 98.4%      | 96.4% - 99.3% |
|  | Not really important/ Not interested in immunizing his/her child                           | 4         | 1.3%       | 0.5% - 3.2%   |
|  | Don't know if immunization is important.   | 1         | 0.3%       | 0.1% - 1.8%   |
| <b>Caregivers' attitude towards immunization associated fever</b>            | Go straight back to the clinic if child has a fever after immunization                     | 168       | 53.2%      | 47.7% - 58.6% |
|  | Give "panado" syrup until the fever goes away  | 143       | 45.3%      | 39.9% - 50.8% |
|  | Never take child back for any immunizations again after developing fever from immunization | 1         | 0.3%       | 0.1% - 1.8%   |
|  | Don't know what to do if child has fever after immunization                                | 4         | 1.3%       | 0.5% - 3.2%   |
| <b>Caregivers attitude towards multiple immunization administration</b>      | Multiple immunizations are a good idea.  | 188       | 59.6%      | 54% - 64.8%   |
|  | Multiple immunizations are not such a good idea, too much for child's body at one time.    | 112       | 35.4%      | 30.4% - 40.9% |
|  | Don't mind/Don't know if child gets multiple immunization                                  | 16        | 5%         | 3.1% - 8.1%   |

| Variables   | Categories (n=316)   | Frequency | Percentage | 95% CI        |
|---|--|-----------|------------|---------------|
| <b>Caregivers proximity to health care facility</b>             | Clinic is within walking distance  | 215       | 68%        | 62.7% - 72.9% |
|   | Caregiver has to use public transport (taxi or bus)  | 90        | 28.5%      | 23.8% - 33.7% |
|   | Caregiver has to use private transport (car).  | 11        | 3.5%       | 2% - 6.1%     |
| <b>Caregiver preference for attending immunization sessions</b> | An appointment is preferred for immunization   | 226       | 71.6%      | 66.3% - 76.2% |
|   | Will sit and wait your turn for immunization   | 69        | 21.8%      | 17.6% - 26.7% |
|   | Doesn't matter which method is used  | 21        | 6.6%       | 4.4% - 10%    |
| <b>Immunization stock-outs</b>                                  | Caregiver was turned away due to immunization stock-out but a follow-up appointment date was given | 130       | 41.1%      | 35.9% - 46.6% |
|   | Never been turned away for immunizations stock-outs  | 143       | 45.3%      | 39.9% - 50.8% |
|   | Caregiver was turned away due to immunization stock-outs, never given a return date                | 43        | 13.6%      | 10.3% - 17.8% |
| <b>Religious practices</b>                                      | Immunization is accepted by my religion  | 316       | 100%       | 100%          |
| <b>Cultural practices</b>                                       | Immunization is accepted by my culture   | 316       | 100%       | 100%          |

#### 4.5.1. Caregiver education level variables

Most caregivers, 90.2%, attended secondary school as indicated in Table 4 but very few (3.2%) commenced tertiary education. At the other end of the spectrum it was rare for caregivers to have no form of education at all, as indicated by only two caregivers (0.6%) had never attended school.

#### 4.5.2. Socio-economic variables

As Delft is an expanding community with an influx of people from rural areas, it is unsurprising that 27% of respondents live in informal housing. Ten percent of respondents had inadequate toilet facilities and 9.5% only had access to a communal water source. A total of 89.9% of caregivers have adequate toilet facilities as they have access to a flush toilet which is located either in the house or the in the backyard of a formal house, allowing them to keep the space in a sanitary and clean manner.

#### 4.5.3. Caregivers level of knowledge on immunization

Caregivers were knowledgeable about measles immunizations (88.6%) but had much less knowledge about other diseases that children should be immunised against. Caregivers were however mostly aware of the immunization schedule as specified on the RtHB.

#### **4.5.4. Caregivers attitude towards immunization**

Caregivers overwhelmingly (98.6%) accepted that immunization against childhood diseases are important.

#### **4.5.5. Caregivers practice influencing immunization**

Most caregivers were aware that fever is a common side-effect of immunization, yet it did not deter them from taking their child for follow-up immunization. Multiple immunizations per immunization session was preferable to multiple clinic visits.

Immunization services at the local health care facilities were easily accessible at both provincial government and local authority facilities with 68% of caregivers residing within walking distance of the local health care facilities. Preference for an appointment system for immunization was requested by 71.6% of caregivers. Immunization stock-outs were experienced by 54.7% caregivers which negatively impacts on immunization coverage. All caregivers indicated that immunizations were acceptable to their religious and cultural beliefs.



#### 4.6. Bivariate analysis

Bivariate analysis of potential factors associated with the prevalence of being fully immunized at 12 months and at 24 months was conducted as shown in Table 5. The bivariate analysis was conducted to compare two variables to determine the relationship between them. The independent variables, caregiver education level, socio-economic status, caregiver knowledge on immunization, caregiver attitude towards immunization and the influences of caregiver practices were compared to the main outcome measures of being fully immunized at 12 months and at 24 months.

**Table 5: Bivariate analysis of immunization prevalence**

| Variables                    | Categories                            | Fully Immunized at 12 months | Incomplete or no immunization administered at 12 months | 12 months             |                              | Fully Immunized at 24 months | Incomplete or no immunization administered at 24 months | 24 months             |                             |
|------------------------------|---------------------------------------|------------------------------|---|-----------------------|------------------------------|------------------------------|---|-----------------------|-----------------------------|
|                              |                                       |                              |   | PR                    | PD                           |                              |   | PR                    | PD                          |
| Caregiver education level    | Secondary/ Tertiary school attendance | 186                          | 109   | 1.66<br>[0.95 - 2.87] | 24.96%<br>[3.48% - 46.44%]   | 215                          | 80  | 1.39<br>[0.92 - 2.1]  | 20.5%<br>[-1.45% - 42.46%]  |
|                              | None/ Primary school attendance       | 8                            | 13  |                       |                              | 11                           | 10  |                       |                             |
| <b>Socio-economic status</b> |                                       |                              |   |                       |                              |                              |   |                       |                             |
| Dwelling type                | Brick house                           | 136                          | 94  | 0.88<br>[0.73 - 1.05] | -8.31%<br>[-20.08% - 3.46%]  | 163                          | 67  | 0.97<br>[0.83 - 1.23] | -2.39%<br>[-13.43% - 8.66%] |
|                              | Informal dwelling                     | 58                           | 28  |                       |                              | 63                           | 23  |                       |                             |
| Water source                 | Water tap available inside house      | 151                          | 105   | 0.82<br>[0.68 - 0.99] | 12.68%<br>[-25.58% - 0.21%]  | 181                          | 75  | 0.94<br>[0.8 - 1.11]  | -4.3%<br>[-16.59% - 8%]     |
|                              | Communal water source                 | 43                           | 17  |                       |                              | 45                           | 15  |                       |                             |
| Toilet type                  | Flush toilet                          | 178                          | 112   | 0.99<br>[0.73 - 1.37] | -0.16%<br>[-19.68% - 19.36%] | 210                          | 80  | 1.18<br>[0.86 - 1.61] | 10.88%<br>[-8.52% - 30.27%] |
|                              | Portable chemical Toilet/ bucket used | 16                           | 10  |                       |                              | 16                           | 10  |                       |                             |

| Variables   | Categories  | Fully Immunized at 12 months | Incomplete or no immunization administered at 12 months | PR                    | PD                           | Fully Immunized at 24 months | Incomplete or no immunization administered at 24 months | PR                    | PD                           |
|---|---|------------------------------|---|-----------------------|------------------------------|------------------------------|---|-----------------------|------------------------------|
| <b>Toilet location</b>                                | Inside house  | 157                          | 105   | 0.87<br>[0.71 - 1.07] | -8.59%<br>[-22.33% - 5.14%]  | 186                          | 76  | 0.96<br>[0.8 - 1.14]  | -3.08%<br>[16% - 9.83%]      |
|   | Backyard/ Communal toilet   | 37                           | 17  |                       |                              | 40                           | 14  |                       |                              |
| <b>Adequate toilet facilities</b>                     | Adequate  | 169                          | 115   | 0.76<br>[0.62 - 0.94] | -18.6%<br>[-34.04% - -3.20%] | 200                          | 84  | 0.87<br>[0.72 - 1.04] | -10.83%<br>[-23.36% - 3.70%] |
|   | Inadequate  | 25                           | 7   |                       |                              | 26                           | 6   |                       |                              |
| <b>Immunization importance explained to caregiver</b> | Caregiver was explained immunization importance by health care professional | 149                          | 85  | 1.16<br>[0.93 - 1.44] | 8.79%<br>[-3.61% - 21.21%]   | 174                          | 60  | 1.17<br>[0.98 - 1.41] | 10.94%<br>[-0.89% - 22.78%]  |
|   | No explanation on immunization importance was given to caregiver            | 45                           | 37  |                       |                              | 52                           | 30  |                       |                              |
| <b>Caregiver knowledge on lost/ misplaced RtHB</b>    | Caregiver requested replacement/ referral for replacement by CCW            | 190                          | 116   | 1.55<br>[0.72 - 3.33] | 22.09%<br>[-8.76% - 52.94%]  | 222                          | 84  | 1.81<br>[0.85 - 3.89] | 32.55%<br>[1.78% - 63.32%]   |
|   | Didn't know RtHB could be replaced  | 4                            | 6   |                       |                              | 4                            | 6   |                       |                              |
| <b>Caregiver knowledge on late immunizations</b>      | Return to clinic/ wait until next immunization                              | 181                          | 112   | 1.09<br>[0.76 - 1.58] | 5.25%<br>[-15.76% - 26.26%]  | 213                          | 80  | 1.29<br>[0.89 - 1.85] | 16.17%<br>[-4.71% - 37.07%]  |
|   | Didn't know immunizations can be given at a later date                      | 13                           | 10  |                       |                              | 13                           | 10  |                       |                              |

| Variables   | Categories  | Fully Immunized at 12 months | Incomplete or no immunization administered at 12 months | PR                     | PD                         | Fully Immunized at 24 months | Incomplete or no immunization administered at 24 months | PR                     | PD                          |
|---|---|------------------------------|---|------------------------|----------------------------|------------------------------|---|------------------------|-----------------------------|
| <b>Caregiver attitude towards the importance of immunization</b>        | Childhood immunization is very important  | 193                          | 118   | 3.10<br>[0.54 - 17.95] | 42.06%<br>[6.58 - 77.53%]  | 225                          | 86  | 3.62<br>[0.63 - 20.91] | 52.35%<br>[16.94% - 87.76%] |
|   | Not really important/ Not interested in immunizing his/her child/ not sure  | 1                            | 4   |                        |                            |                              |   |                        |                             |
| <b>Caregivers' attitude towards immunization associated fever</b>       | Go straight back to the clinic if child has a fever after immunization/ Give paracetamol syrup until the fever goes away                                | 193                          | 118   | 3.10<br>[0.54 - 17.95] | 42.06%<br>[6.58 - 77.53%]  | 225                          | 86  | 3.62<br>[0.63 - 20.91] | 52.35%<br>[16.94% - 87.76%] |
|   | Never take child back for any immunizations again after developing fever from immunization/ Don't know what to do if child has fever after immunization | 1                            | 4   |                        |                            |                              |   |                        |                             |
| <b>Caregivers attitude towards multiple immunization administration</b> | Multiple immunizations are a good idea.   | 118                          | 70  | 1.06<br>[0.88 - 1.27]  | 3.39%<br>[-7.57% - 14.35%] | 141                          | 47  | 1.129<br>[0.97 - 1.31] | 8.59%<br>[-1.67% - 18.85%]  |
|   | Multiple immunizations are not such a good idea, too much for child's body at one time/ Don't mind/Don't know if child gets multiple immunization       | 76                           | 52  |                        |                            |                              |   |                        |                             |



| Variables   | Categories  | Fully Immunized at 12 months | Incomplete or no immunization administered at 12 months | PR                     | PD                           | Fully Immunized at 24 months | Incomplete or no immunization administered at 24 months | PR                    | PD                          |
|---|---|------------------------------|---|------------------------|------------------------------|------------------------------|---|-----------------------|-----------------------------|
| <b>Caregiver preference for attending immunization sessions</b> | An appointment is preferred for immunization  | 135                          | 91  | 0.91<br>[0.76 - 1.10]  | -5.82%<br>[-17.54%] - 5.90%] | 158                          | 68  | 0.93<br>[0.80 - 1.07] | -5.64%<br>[-16.35% - 5.06]  |
|   | Will sit and wait your turn for immunization/ Doesn't matter which method is used   | 59                           | 31  |                        |                              | 68                           | 22  |                       |                             |
| <b>Caregivers proximity to health care facility</b>             | Clinic is within walking distance   | 134                          | 81  | 1.05<br>[0.87 - 1.27]  | 2.92%<br>[-8.67% - 14.48%]   | 153                          | 73  | 0.98<br>[0.56 - 1.6]  | -1.11%<br>[-11.74% - 9.51%] |
|   | Clinic is accessed by public/ private transport   | 60                           | 41  |                        |                              | 62                           | 28  |                       |                             |
| <b>Immunization stock-outs</b>                                  | Caregiver was turned away due to immunization stock-out but a follow-up appointment date was given, or caregiver had never been turned away due to immunizations stock-outs | 172                          | 101   | 1.23<br>[ 0.91 - 1.67] | 11.84%<br>[-4.16% - 27.84%]  | 199                          | 74  | 1.16<br>[0.91 - 1.48] | 10.10%<br>[-5.28% - 25.49%] |
|   | Caregiver was turned away due to immunization stock-out and never given a return date   | 22                           | 21  |                        |                              | 27                           | 16  |                       |                             |

Given that there were only 2 variables associated with being fully immunised (adequacy of toilets and water source), given that both of them were barely statistically significant, and given that they were only associated with full immunization at 12 months and not at 24 months, multivariate analysis is of no added value and hence was not undertaken.

## CHAPTER 5: DISCUSSION

### 5.1. Introduction

The study focused on factors affecting immunization prevalence and the drop-out rate, as well as areas of concern raised in the past through published literature and health care professionals. Immunization prevalence is thought to be influenced by the caregiver's perception, knowledge, attitude towards immunization and practice on immunizing. Other factors such as the influence of immunization stock-outs on immunization prevalence were also examined.

### 5.2. Prevalence of immunization

Fully immunized prevalence is similar in both the survey data and the WCG: Health data, based on the 95% confidence levels. According to the survey data Delft was found to have an immunization of 61.4% amongst the fully immunized child at 12 months of age; the WCG: Health data recorded a marginally higher fully immunized prevalence at 67.1% (WCG: Health, 2015). Both sets of data analysed indicated lower immunization prevalence than that of the Tygerberg sub-district, which at 78% is still lower than the national and WHO immunization prevalence set target of 90% (DoH, 2014). One can speculate that caregivers' are either taking their children to be immunized outside their area that they reside which contributes to the sub-district immunization prevalence data. The comparison of all the other final dose immunizations for the various antigen types showed minimal variation in prevalence between the survey data and that reported via routinely collected data by the WCG: Health. Low immunization prevalence as reported for OPV1 and PCV2 at health care facility level may due to an inaccuracy in recording by health care professionals. The findings of a study conducted in Gauteng in 2003, indicated 79% of children were fully immunized (Fonn *et al*, 2006). Similar immunization prevalence data were discussed in articles written by Health Systems Trust, 2014; Madhi *et al*, 2014; UNICEF, 2016; Mohamud *et al*, 2014; and Subaiya *et al*, 2015, denoting that immunization prevalence varies from country to country and region to region.

The survey data shows that children who at 9 months of age were still under-immunized were able to catch-up on immunization before 12 months of age resulting in an increase in the immunization prevalence rate by 12.7%. Similarly, the fully immunized prevalence rate of children aged 12 and 24 months improved by 10.1%. Therefore, encouraging caregivers to take children for immunization, despite the lateness of immunization administration, could result in an improved immunization prevalence and improved immunity against childhood diseases.

It is noted that some children did not receive one or more antigens due to the time-bound nature of the immunization administration. The assumption is that this could have been as a result of the caregivers'

failure to return to the facility with the child when the immunization was due or the facility having an immunization stock-out. The RV (Rotavirus vaccine) is contra-indicated for administration after 24 weeks of age due to the susceptibility of the child developing intussusception (NDOH, 2012).

Intussusception is defined as an uncommon form of bowel obstruction which causes the bowel to fold back on itself like a telescope. Thus despite children being afforded the opportunity to catch-up on missed immunization doses, the aforementioned immunizations cannot be administered at a later time period.

The appointment of Community Care Workers (CCW) and the addition of a community day centre in the community could have aided in improving immunization prevalence. The CCW's are expected to review the RtHB as part of their daily activities, thus the referral of the un-immunized and under-immunized child to the nearest health care facility providing child health services is done on a daily basis for households that are visited. Identifying children who are un-immunized and under-immunized is part of the Catch-and-Match project in Delft as well as part of the household registration process being conducted by community based services (Von Delft, 2015). This strategy to utilize the CCW to increase immunization prevalence is in keeping with the Ward-Based Primary health care model which South Africa started introducing as part of the Primary Health Care Re-Engineering strategy in 2011 (Department of Health, 2011). Although the additional community day centre in this community may have potentially resulted in more children who had defaulted on immunizations before 12 months gaining access to the required immunizations at a later date, there is no indication that the additional facility made any impact on the immunization prevalence as the facility only became functional mid-August 2014 and at that stage the utilization of community day centre was low.

### **5.3. Immunization drop-out rate**

The study found that at birth, 4.1% of children were either not immunized with one or both birth immunizations and this proportion un-immunised children remained the constant at 12 and 24 months of age. Two types of immunization are administered at birth namely, BCG (Bacille Calmette Guerin) and OPV (oral polio vaccine). BCG vaccine is administered to protect the child from developing tuberculosis, one of the most common diseases in the Western Cape. However, BCG vaccines are only provided at birthing units, thus children who have missed out on the BCG vaccine would not be offered the BCG immunization before their first birthday. Health care facilities that provide child health services, including immunizations, do not stock BCG vaccine as part of their routine childhood immunizations as BCG is provided in a multi-dose vial for 10 children (NDOH, 2012).

The immunization drop-out rate measured between birth and 6 weeks of age is 7.3%. This drop-out rate may be influenced by the two different types of service delivery points. Children are administered

OPV and BCG within birthing units where they form part of a captive audience. At 6 weeks of age the caregiver is responsible for bringing the child to the nearest health care facility for subsequent immunizations as per the immunization schedule (EPI-SA). As the two types of service delivery points are often not on the same premises, these children then become lost to follow-up. The Delft community, however, has its own birthing unit although women from other health drainage areas outside Delft also give birth there.

According to the survey data, the immunization drop-out rate for children who have received the PCV immunization was 20.6% between 6 weeks and 9 months, yet the drop-out rate between 6 weeks and 14 weeks was 7.3% which is the same as the drop-out rate between birth and 6 weeks. This indicates that caregivers are more likely to take their children for immunizations within the first 14 weeks of their lives as indicated in the WCG: Health, 2015, immunization prevalence data. One can therefore assume that the same children who did not receive their immunization at 6 weeks also did not receive immunizations at 14 weeks. Similarly, Ibnouf *et al*, 2007, determined that in Sudan 88.7% were vaccinated with BCG at birth and 74.4% of children were vaccinated with the measles vaccine at 9 months of age indicating a drop-out rate of 14.3%.

It is disconcerting to note that by the time some children had received their first immunization at birth and were recorded as being fully immunized at 12 months the drop-out rate according to the survey data was 34.5% and at 24 months there was only a slight improvement to 24.4%. The large drop-out rate denotes that many children are not fully protected against vaccine preventable childhood illnesses. This in turn leads to vaccine preventable disease outbreaks such as South African measles outbreak in 2010 where the case fatality ratio in children under five years was 6.9 (Bernhardt, *et al*, 2013). WHO, 2014, noted that most children who have a history of incomplete immunization reside in low and middle income countries such as South Africa. In Borno State, Nigeria, the drop-out rate at 9 months is 32%, yet more children are vaccinated in that age group than those in the 14 weeks category as parents do not believe in the efficacy of the DPT vaccine (Omotara *et al*, 2012).

#### **5.4. Caregiver knowledge about immunizations**

According to the survey data analysis, most caregivers responded that health care professionals had imparted information on the importance of immunization, as well as the reasons specific immunizations had been administered. Almost all caregivers interviewed could name measles as one of the childhood illnesses that their child is immunized against, although only 27.5% of caregivers indicated knowledge about tetanus immunization. This implies that knowledge on immunization and the diseases that it prevents aid in improving immunization prevalence. CCW's are in a good position

to facilitate access to health care services and to ensure that caregivers are well versed in their understanding of the RtHB when conducting their household assessment visits.

The findings of a community survey conducted by Bernhardt *et al*, 2013, in the Western Cape, contradicts the Delft survey findings, as Bernhardt *et al* found that caregivers indicated lack of information on immunization. The reasons cited for low immunization prevalence within that study included that caregivers were unsure when to return for follow-up immunization or that immunization was important. Similarly, in a survey conducted in Istanbul, it was found that 43.6% of parents lacked knowledge about immunization (Torun and Bakirci, 2006). The study conducted Hamid *et al*, 2012 in India, however, concurs with the study findings in the Delft community where they established that in general there was good knowledge about the importance of immunization, despite the fact that parents were not clear on the reasons for the vaccinating. The findings of this survey and the one conducted by Hamid *et al*, 2012 in India implies that the knowledge imparted by health care workers affects the knowledge of the caregiver as immunization sessions are seen as information sharing sessions (Hamid *et al*, 2012). Imparting information about immunizations tends to allay the fears of caregivers and results in fewer post immunization visits to health care facilities for the treatment of unrelated immunization medical conditions (Gust *et al*, 2006).

### **5.5. Caregiver attitudes towards immunization**

Very few caregivers in the survey indicated a negative attitude towards immunizing their child against vaccine preventable diseases but almost half of the caregivers indicated that they were either unsure or not in favour multiple immunizations per session. Similarly, in the Netherlands 69% of parents, indicated that three or more immunizations per immunization session was too many, and in this setting the caregivers preferred an additional visit to cover the extra immunizations (Kaaijk *et al*, 2014).

According to the survey, half of the caregivers indicated that they would rather take their child back to the health care facility for treatment of fever post immunization, as they do not like to treat the fever at home. This is comparable to the findings of McKee and Bohannon, 2016, who conducted a study in 30 states of the United States of America and found that if health professionals informed parents of possible adverse events and side-effects, more parents were open to immunizing their child and returning to the health care facility for follow-up immunizations. The Delft survey found that less than 1% caregivers indicated that they would not return with their child for follow up immunizations. This finding is similar to a study conducted in America by Gust *et al*, 2006, where caregivers indicated that if their child contracted an adverse event following immunization such as fever, they were less likely to return to a health care facility for immunization. Even when the event was unrelated to the immunization but occurred after the child received the immunization, the caregiver would omit future

immunizations (Gust *et al*, 2006). The access to medication to treat immunization associated fever and the use of home remedies was not explored in this setting, thus the caregiver attitude towards treating immunization associated fever at home might be linked to lack of knowledge on how to treat the fever.

### **5.6. Caregiver practices influencing immunization prevalence**

The distance that the caregivers resided from the health care facility or travelled using either public or private transport did not have any statistical significance on immunization prevalence, although the Delft community is a densely populated urban area with short distances between homes and the health care facility. In contrast, a study in Ethiopia by Mohamud *et al*, 2014, where distances were greater, found that caregivers indicated that the distance they needed to travel to the travel the health care facility was an obstacle to their child receiving all the required immunizations.

Most caregivers indicated a preference for an appointment system when attending immunization sessions, yet there is currently no appointment system at government health care facilities for immunization and child health services within the Delft community. This implies that the fully immunized prevalence could improve should an appointment system be implemented for well-child health care including immunizations at health care facilities. Corrigal *et al*, 2008, found that 13.5% parents indicated a lack of motivation to attend the clinic for childhood immunization. This study found that system issues such as a lack of an appointment system did not deter 21.8% of caregivers who reported that they were willing to sit and wait their turn to have the child immunized.

A high proportion of caregivers were denied immunization services at some stage due to immunization stock-outs and a third of these caregivers were not given dates to return for the child to be immunized. This resulted in caregivers returning to the health care facility several times before the child's immunization was fully up-to-date. Therefore, it is critical that immunization shortages are addressed as this influences timeous immunization administration which impacts negatively on immunization prevalence specifically with time-bound immunizations.

Despite the diversity within the community, none of the caregivers who participated in the survey indicated that their religious or cultural practices negatively influenced their decision to immunize their child. In comparison to the survey findings, a study conducted in Borno State, Nigeria, indicated that cultural and religious beliefs served as the stumbling blocks in accessing immunization services as most people believe that traditional medication is the first level of care (Omotara *et al*, 2012). Similarly according to study conducted by Pelčić *et al*, 2016, in Croatia, the parents of various religious backgrounds are refusing immunization based on religious beliefs.

## 5.7. Socio-demographic factors

A few caregivers (21/0.6%) had no education or primary school education, however, caregiver literacy level did not appear as a reason to influence their knowledge about, attitude towards or practice on the immunization prevalence of their child. These survey findings are similar to the community survey findings of Bernhardt *et al*, in 2013 when they conducted a review of measles vaccination coverage in the Western Cape following a measles outbreak which resulted in a mass vaccination campaign being conducted. Bernhardt *et al*, 2013, determined that caregivers' literacy level was high and that there was no statistical association between routine immunization and the literacy level of the caregiver.

In contrast, findings in a case-control study conducted in Jamaica in 2010 indicated that caregivers who have less than secondary school education had children who had a low immunization prevalence rate) - demonstrating that caregiver literacy level has a positive influence on immunization prevalence. (Shuaib, *et al*, 2010). Similarly, Mohamud *et al* (2014) conducted a study in Ethiopia, where they too found that when caregivers' had a high literacy level, the child was more likely to be immunized and developed less vaccine preventable diseases.

Dwelling type, water availability in households, access to toilets and location of toilets were the variables used to measure the socio-economic status of the community. In a community with mixed access to toilet facilities, most caregivers had access to adequate toilet facilities. Thus children who have a high immunization prevalence are less likely to develop childhood diseases spread by the oro-faecal route due to their access to adequate toilet facilities and water. This similar to findings by Mara *et al*, 2010, who conducted systematic reviews of articles, concluded that improved access to toilet facilities results in improving health and socio-economic benefits for the individual.

There was no statistically significant associations with being fully immunised at 24 months, whilst being fully immunised at 12 months was paradoxically negatively statistically associated with having piped water via an inside tap and with having adequate toilet facilities. This lack of statistical significance could be due the implementation of South Africa's housing Reconstruction and Development Plan (RDP), which improves access to water and toilet facilities despite having communal access to these facilities. The naïve researcher assumed that adequate toilet facilities would indicate higher immunization prevalence.

## 5.8. Limitations

The sampling method of selecting every 80<sup>th</sup> household resulted in a bigger sample of caregivers being interviewed (490 caregivers interviewed), yet the sample size (n=384) was not attained as the children excluded did not fit the eligibility criteria due to their age or that they did not reside in the community

in the first year of their life. Sampling every 80<sup>th</sup> household proved difficult as numbering of houses were not consecutive in certain areas of Delft such as, TRA or Blikkiesdorp, thus the sample is interviewed is an approximate sample despite all areas within Delft being covered.

Replacement sampling of households was also done if caregivers were not home after the second visit to the property. This could have led to selection bias as CCW's may have randomly chosen any household when they discovered a lack of enrolment of study participants. More children may have been eligible for the study however the lack of possession of a RtHB excluded them from the study, as the researcher did not want recall bias to influence the immunization prevalence outcomes. Thus inferred results were used to determine the outcome of the survey conducted. A few children (n=10) were not in possession of RtHB's resulting in them being excluded from the survey as their immunization status could not be validated and to prevent recall bias from occurring, caregivers were not interviewed as the child's immunization status could be verified. Selection bias could have been introduced based on this criterion as caregiver knowledge on immunization, caregiver attitude towards immunization and caregiver practices influencing was not measured in these 10 caregivers.

Anxiety of caregivers of children, who access Child Care Grants and where the children were partially immunized, caused some caregivers to refuse to be interviewed. CCW's did not keep record of caregivers who not at home at the time the study was conducted, thus the researcher is unsure whether more children may have been eligible to participate in the study.

Immunization data obtained from the Western Cape Government: Health information was checked through validating for measurement error by checking for data outliers in the immunization data through validation of facility level data. The threats to validity include history, maturation and testing. For example, history may be related to the experience of an adverse event following immunization at a previous immunization session or based on hearsay of another caregiver. There is a low risk of selection bias as systematic review of the data collected was conducted, thus children who did not fit the eligibility criteria was excluded from the study.

Even though immunization stock-outs and distance to the health care facility was measured, health system issues such as health care facility operational times were not explored. So too children who's caregivers did not believe in immunization could not fully be assessed without the possession of a RtHB.



## CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

### 6.1. Conclusions

The study determined that immunization prevalence was low within the Delft community at 12 months with a slight improvement at 24 months. Immunization prevalence per vaccine antigen was measured in both the study data and the WCG: Health data and it was found that the immunization prevalence data was similar. Minor discrepancies were noted between the two sets of data reviewed. The administration of BCG being limited to administration only at birthing units is challenging as the child who missed this immunization due to immunization stock-outs are not afforded the opportunity to catch-up on this immunization at child health facilities offering childhood immunization services.

Despite one immunization (OPV1) being recorded as having low immunization prevalence at 38.9%, none of the other immunization data reflected such poor immunization prevalence. This could be due to poor recordkeeping at facility level resulting in under-reporting, as there is no disparity in the use of the routine data denominator which is set at provincial level therefore the immunization prevalence is measured against the same population figure.

As noted in the previous chapter, the study findings have indicated that most caregivers had their children immunized and were able to identify when the child's next immunization was due. Caregivers had a positive attitude towards childhood immunization which refutes health care workers perceptions that caregivers are disinterested in having their children immunized. The study indicated that immunization knowledge imparted by health care workers play a vital role in immunization prevalence, therefore ensuring that health care providers are well versed in immunizations as well its side-effects and the treatment is essential.

The challenge caregivers indicated that immunization stock-outs resulted in 13.6% of caregivers being turned away from health care facilities at some stage without being given a follow-up immunization appointment, resulting in caregivers' returning to the health care facility several times before the child's immunization is fully up-to-date. Immunization stock-outs need to be addressed at a provincial and national level to reduce the incidence of immunization stock-outs which impacts negatively on immunization prevalence specifically with time-bound immunizations.

On a positive note, health system issues, such as the lack of an appointment system did not appear to deter caregivers from taking their children for immunization despite the preference for one. Thus one could assume that introducing an appointment system would result in a higher fully immunized prevalence.

## 6.2. Recommendations

The following strategies recommended below are to improve immunization prevalence, to ensure that children receive their immunizations timeously and reduce the number of under-immunized children:

- Introduce an appointment system for immunization sessions at health care facilities.
- Use CCW's to follow-up children at their homes, including un/under-immunized children who presented previously at the health care facility for other childhood ailments or who had been identified during CCW household assessments to ensure that the caregiver brings the child for his/her immunizations.
- Review current practice which limits BCG administration to birthing units, as the cost benefit of opening a BCG vaccine vial outweighs the treatment of tuberculosis.
- Conduct further investigations to determine the cause of the high immunization drop-out rate.



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## Annexure 1: Evolution of South African immunization schedule through the years

| Vaccine   | Age  | 1974 | 1995 | 2007 | 2009 | 2015 |
|---|--|------|------|------|------|------|
| Bacille Calmette Guerin (BCG)   | Birth  | √    | √    | √    | √    | √    |
| Oral Polio Vaccine  | Birth  | √    | √    | √    | √    | √    |
| Diphtheria Tetanus Pertussis (DTaP)   | 6 weeks<br>10 weeks<br>14 weeks<br>18 months                     | √    | √    | √    |      |      |
| Measles   | 9 months<br>18 months  | √    | √    | √    | √    | √    |
| Haemophilus Influenza type b combined (HiB)   | 6 weeks<br>10 weeks<br>14 weeks                                  |      | √    | √    |      |      |
| Hepatitis B (Hep B)   | 6 weeks<br>10 weeks<br>14 weeks                                  |      | √    | √    | √    |      |
| Diphtheria, Tetanus, acellular Pertussis, Inactivated Polio Vaccine, Haemophilus Influenza type b combined (DTaP-IPV/Hib) | 6 weeks<br>10 weeks<br>14 weeks<br>18 months                     |      |      |      | √    |      |
| DTaP-IPV/Hib/ Hep B   | 6 weeks<br>10 weeks<br>14 weeks<br>18 months                     |      |      |      |      | √    |
| Pneumococcal Conjugate vaccine (PCV)  | 6 weeks<br>14 weeks<br>9 months                                  |      |      |      | √    | √    |
| Rotavirus vaccine   | 6 weeks<br>14 weeks  |      |      |      | √    | √    |
| Diphtheria Tetanus  | 5 years  | √    | √    |      |      |      |
| Human Papilloma Virus Vaccine   | Grade 4 girls aged 9 years and older in public education schools |      |      |      |      | √    |
| Tetanus Diphtheria  | 6 years<br>12 years  |      |      | √    | √    | √    |

(Source: Department of Health, 2015)

## Annexure 2a: Participant Questionnaire - English



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### PARTICIPANT QUESTIONNAIRE

Date of interview:..... Interviewee number:.....

Area interviewee lives in:..... Interviewer's name:.....

How long is child living in Delft: .....

|   |   |   |   |
|---|---|---|---|
| Date of birth    --/--/----<br>DD/MM/YYYY   | What is the sex of the child                    | M | F |
| Age person being interviewed .....yrs<br>Relationship to child.....                   | What is the sex of the person being interviewed | M | F |
| Does the child have a Road to Health Booklet in which the immunizations are recorded? |   | Y | N |

| 1. Immunization status of child (Check Road to Health Booklet for immunization record) |                   |            |
|--|-------------------|------------|
| Did the child receive the following immunization? (Record the date given.)             |                   |            |
| Age at immunization  | Immunization name | Date given |
| Birth Immunization   | OPV 0             |            |
|  | BCG               |            |
| 6 weeks immunization   | OPV1              |            |
|  | RV1               |            |
|  | DTaP-IPV-Hib1     |            |
|  | Hep B1            |            |
|  | PCV1              |            |
| 10 weeks immunization  | DTaP-IPV-Hib2     |            |
|  | Hep B2            |            |
| 14 weeks immunization  | DTaP-IPV-Hib3     |            |
|  | Hep B3            |            |
|  | PCV2              |            |
|  | RV2               |            |
| 9 months immunization  | Measles 1         |            |
|  | PCV3              |            |

|   |
|---|
| <b>2. Education level of caregiver</b>  |
| <b>Which is the highest standard/ grade that you have passed? (Tick 1 answer only)</b>    |
| <ul style="list-style-type: none"> <li>• Never attended school</li> </ul>                 |
| <ul style="list-style-type: none"> <li>• Primary (Grade 1 – Grade 7)</li> </ul>           |
| <ul style="list-style-type: none"> <li>• Secondary/ High school (Grade 8 – 12)</li> </ul> |
| <ul style="list-style-type: none"> <li>• Tertiary (College/ University)</li> </ul>        |

|   |
|---|
| <b>3. Socio-economic status (Tick 1 option only)</b>  |
| <b>3.1 Dwelling type (Tick 1 only)</b> <ul style="list-style-type: none"> <li>• House/ brick structure</li> <li>• House/ informal dwelling in backyard</li> <li>• Informal dwelling in informal settlement not in backyard</li> </ul> |
| <b>3.2. Water availability (Tick 1 only)</b> <ul style="list-style-type: none"> <li>• Water available in the house</li> <li>• Water available in the yard</li> <li>• Communal tap outside</li> </ul>                                  |
| <b>3.3 Type of toilet available (Tick 1 only)</b> <ul style="list-style-type: none"> <li>• Flush toilet</li> <li>• Portable chemical toilet</li> <li>• Bucket used</li> </ul>   |
| <b>3.4. Location of the toilet (Tick 1 only)</b> <ul style="list-style-type: none"> <li>• In the house</li> <li>• In the yard</li> <li>• Communal toilet</li> </ul>   |

|   |   |   |
|---|---|---|
| <b>4. Knowledge about immunization</b>  |   |   |
| 4.1 Has a nurse or anyone else ever explained to you the importance of having your child immunized?   | Y | N |
| 4.2. Can you name the diseases that the immunizations can protect your child against?<br><i>(Ask the caregiver to give the names of the diseases. Tick those that they mention but do not give them hints.)</i> <ul style="list-style-type: none"> <li>• Measles</li> <li>• Diarrhoea</li> <li>• Pneumonia</li> <li>• Tetanus</li> <li>• Tuberculosis (TB)</li> </ul> |   |   |

4.3. The Road to Health Booklet has a record of your child's immunization. Can you show me which immunization your child will be given at his next clinic visit? (Tick 1 of the following only).

- Caregiver can correctly indicate which immunization is due next on the Road to Health Booklet.
- Caregiver did not know how to check which immunization is due next in the Road to Health Booklet.

*(Explain to caregiver how to read Road to Health Booklet if they did not show when the child's next immunization is due).*

4.5 What would you do if your child's Road to Health Booklet has been lost/ misplaced/ burnt?

*(Read out the answers and ask the caregiver to choose 1. Tick 1 of the following only).*

- Go back to the clinic where the child got the last immunization and ask for the book to be replaced
- Wait until a Community Care Worker visits and gives a referral slip to the clinic before going back to the clinic.
- Don't know

*(If the caregiver did not know that they could go back to the clinic for a new Road to Health Booklet, tell them they can get one for free at the clinic here child got the last immunization)*

4.6 If your child has missed his/ her immunization, what will you do?

*(Read out the answers and ask the caregiver which one they would do. Tick answer they give)*

- Go to clinic with the child for the immunization if it is late.
- Wait until the next immunization is to be given.
- Don't know

*(If the caregiver did not know that the child can receive immunization even if late, explain to them that the child can still get it).*

## **5. Attitude towards not vaccinating (Tick one option only)**

5.1 How important is it that your child is immunized? *(Read out the answers and ask the caregiver which one they think is right. Tick answer they give)*

- Very important
- Not really important/ Not interested in immunizing his/her child
- Don't know if it's important.

5.2. What would you do if your child has a fever after receiving a vaccine?

*(Read out the answers and ask the caregiver which one they think is right. Tick answer they give)*

- Go straight back to the clinic
- Never take child back for any immunizations again.
- Give "panado" syrup until the fever goes away
- Don't know

*(Explain to caregiver that a slight fever after immunization is normal, but if it continues after giving "panado" syrup, then they need to go back to the clinic).*

5.3 How do you feel about your child getting more than one immunization at a time?

*(Read out the answers and ask the caregiver which one they think is right. Tick answer they give)*

- Good idea, as my child would only have to come to the clinic a few times for immunizations.
- Not such a good idea, too much for child's body at one time.
- Don't mind/Don't know

## 6 Immunization practices

6.1 How do you usually travel to the clinic from your home?

*(Read out the answers and ask the caregiver to choose 1. Tick 1 of the following only).*

- Walking distance
- Use public transport (taxi or bus)
- Use private transport (car).

6.2 When going to take your child for his/her immunization do you prefer

*(Read out the answers and ask the caregiver to choose 1. Tick 1 of the following only).*

- An appointment
- To sit and wait your turn
- Doesn't matter

6.3 Have you ever been turned away from the clinic due to immunization stock-outs?

*(Read out the answers and ask the caregiver to choose 1. Tick 1 of the following only).*

- Yes, and I was told when to come back for child's immunization., an appointment date was given
- Yes, but I was not told when to come back.
- No

6.4 Does your religion stop you from immunizing your child, for example, being Seven's Days Adventist, Jehovah's Witness?

Y N

6.5 Does your cultural practices stop you from immunizing your child, that is, if you are a Rastafarian you are not allowed to have your child immunized?

Y N

## Annexure 2a: Deelname Vraelys - Afrikaans



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### DEELNAME VRAELYS

Datum van Onderhoud:..... Kandidaat se no:.....  
 Area waar kandidaat woon:..... Ondervraer se naam:.....  
 Hoe lank woon die kind in Delft: .....

|   |  |   |   |
|---|--|---|---|
| Hoe oud is u kind .....maande   | Wat is die geslag van u kind                           | M | V |
| Hoe oud is die persoon wat ondervra word<br>.....jaar<br>Verwantskap aan die kind (Ouer/ Voog/ Familielid)<br>..... | Wat is die geslag van die persoon wat<br>ondervra word | M | V |
| Het die kind 'n immunisasie boekie waarin al die immuniserings aangedui is?   |  | J | N |

### 2. Immunisering status van kind ( Kontroleer Immunisasie boekie vir immuniserings rekord)

Het die kind die onderstaande immuniserings ontvang? (Teken die datum aan wanneer die immunisering gedoen is.)

| Ouderdom tydens immunisasie | Tipe immunisasie | Datum toegedien |
|-----------------------------|------------------|-----------------|
| Geboorte immunisering       | OPV 0            |                 |
|                             | BCG              |                 |
| 6 weke immunisasie          | OPV1             |                 |
|                             | RV1              |                 |
|                             | DTaP-IPV-Hib1    |                 |
|                             | Hep B1           |                 |
|                             | PCV1             |                 |
| 10 weke immunisasie         | DTaP-IPV-Hib2    |                 |
|                             | Hep B2           |                 |
| 14 weke immunisasie         | DTaP-IPV-Hib3    |                 |
|                             | Hep B3           |                 |
|                             | PCV2             |                 |
|                             | RV2              |                 |
| 9 maande immunisasie        | Masels 1         |                 |
|                             | PCV3             |                 |

|   |  |
|---|--|
| <b>2. Opleidingsvlak van ouer/voog</b>                |  |
| <b>Hoogste kwalifikasie geslaag/verwerf (Merk 1 )</b> |  |
| • Geen onderrig ontvang                               |  |
| • Primêr (Graad 1 – 7)                                |  |
| • Sekondêr/ Hoër Skool (Graad 8 – 12)                 |  |
| • Tersiêr (Kollege/ Universiteit)                     |  |

|  |  |
|--|--|
| <b>3. Sosio-ekonomiese status</b>  |  |
| <b>3.1 Tipe woning (Merk net 1)</b>  |  |
| <ul style="list-style-type: none"> <li>• Huis/ baksteen struktuur</li> <li>• Huis/ informele struktuur in erf</li> <li>• Informele struktuur in informele nedersetting (nie in erf)</li> </ul> |  |
| <b>3.2. Water beskikbaarheid (Merk net 1)</b>  |  |
| <ul style="list-style-type: none"> <li>• Lopende water beskikbaar in huis</li> <li>• Lopende water beskikbaar in erf</li> <li>• Gemeenskaplike kraan buite</li> </ul>                          |  |
| <b>3.3 Tipe toilet beskikbaar (Merk net 1)</b>   |  |
| <ul style="list-style-type: none"> <li>• Spoel toilet</li> <li>• Draagbare chemise toilet</li> <li>• Emmer gebruik</li> </ul>  |  |
| <b>3.4. Ligging van toilet (Merk net 1)</b>  |  |
| <ul style="list-style-type: none"> <li>• In die huis</li> <li>• In die erf</li> <li>• Gemeenskaplike toilet</li> </ul>   |  |



|  |    |     |
|--|----|-----|
| <b>4. Kennis oor immunisasie</b>   |    |     |
| 4.1. Het 'n verpleegkundige of enigiemand al aan u die noodsaaklikheid van immunisering van u kind aan u verduidelik.  | Ja | Nee |
| 4.2. Kan u die siektes noem waarteen u kind geïmmuniseer word? (Vra die ouer/voog om die siektes te noem, merk dit af maar moenie wenk gee nie)  |    |     |
| <ul style="list-style-type: none"> <li>• Masels</li> <li>• Diarroeë</li> <li>• Pneumonia</li> <li>• Tetanus</li> <li>• Tuberkulose (TB)</li> </ul>   |    |     |
| 4.3. Die immunisasie boekie het 'n rekord van u kind se immuniserings. Kan u my wys watter immunisering u kind volgende gaan kry? (Merk 1 van die volgende)  |    |     |
| <ul style="list-style-type: none"> <li>• Ouer/voog kon aandui in boekie wat die volgende immunisasie is.</li> <li>• Ouer/voog kon nie aandui in boekie wat die volgende immunisasie is nie.</li> </ul> (Verduidelik en wys aan ouer/voog hoe om te bepaal wat die volgende immunisasie en datum in die immunisasie boekie is.) |    |     |
| 4.4. Wat sal u doen indien u kind se immunisasie boekie verlore, misplaas of verbrand is? (Lees die antwoorde en vra die ouer/voog om 1 te kies. Merk net 1 van die volgende)  |    |     |
| <ul style="list-style-type: none"> <li>• Gaan u terug gaan na die kliniek waar u kind sy/haar laaste immunisering ontvang het en vra dat die boekie vervang word.</li> <li>• Gaan u wag tot die Gemeenskap gesondheids dienste werker u besoek en 'n verwysings strokie gee vir die kliniek.</li> </ul>                        |    |     |



- Weet nie

(Sou die ouer/voog nie weet dat hul kan terug gaan na die kliniek vir nuwe immunisasie boekie, vertel hul dan asseblief dat hul kan terug gaan na die laaste kliniek waar die kind geïmmuniseer is en 'n gratis boekie daar kan kry.)

4.5. Wat sal u doen indien u kind 'n immunisering gemis het? (Lees die antwoorde en vra ouer/voog om 1 antwoord te kies en merk dit)

- Sal u na die kliniek gaan vir die immunisering al is dit te laat.
- Of sal u wag vir die volgende immunisasie datum.
- Weet nie

(As ouer/voog nie weet nie verduidelik dan aan hul dat die kind kan gaan vir immunisering al is dit laat en hul hoef nie te wag vir volgende datum nie.)

## 5. Houding oor nie immunisering

5.1. Hoe belangrik is dit dat u kind geïmmuniseer word?

(Lees die antwoorde en vra ouer/voog om 1 antwoord te kies en merk dit)

- Baie belangrik
- Nie regtig belangrik nie/ Stel nie belang dat my kind geïmmuniseer word nie.
- Weet nie of dit belangrik is nie.

5.2. Wat sal u doen indien u kind 'n koors ontwikkel na immunisering?

(Lees die antwoorde en vra ouer/voog om 1 antwoord te kies en merk dit)

- Gee "panado" stroop tot koors daal.
- Gaan dadelik terug na die kliniek.
- Neem nooit weer my kind vir verdere immunisasie.
- Weet nie.

(Verduidelik aan ouer/voog dit is normaal vir kind om 'n ligte koors te hê na immunisering maar sou koors nie breek na toediening van "panado" stroop nie, neem kind terug na die kliniek

5.3. Hoe voel u daarvoor dat u kind meer as een immunisering kry op 'n slag? (Lees die antwoorde en vra ouer/voog om 1 antwoord te kies en merk dit)

- Goeie idee, dan hoef my kind minder na die kliniek te gaan vir immunisasie.
- Nie so goeie idee nie.
- Weet nie

## 6. Immuniserings praktyke

6.1. Hoe ver is die kliniek van u woning?

- Loop afstand
- Moet gebruik maak van publieke vervoer (taxi/ bus)
- Moet gebruik maak van eie vervoer (motor)

6.2. Hoe sou u verkies om u kind te neem vir immunisasie na die kliniek. (Lees die antwoorde en vra ouer/voog om 1 antwoord te kies en merk dit)

- 'n Afspraak
- Sal sit en wag vir ons beurt
- Maak nie saak nie.

6.3 Was u al ooit weg gewys vanaf 'n kliniek omdat daar nie voldoende voorraad was nie. (Lees die antwoorde en vra ouer/voog om 1 antwoord te kies en merk dit)

- Ja, en ek het 'n ander afspraak datum vir die immunisering gekry.
- Ja, maar ek het nie 'n ander datum gekry om terug te kom nie.
- Nee

|  |    |     |
|--|----|-----|
| 6.4. Weerhou u geloofs oortuiging u daarvan om u kind te laat immuniseer bv. Sewe Daagse Adventiste of Jehovah Getuies?                                  | Ja | Nee |
| 6.5. Weerhou die uitvoering van u kulturele waardes u van immunisering van u kind? As u Rastifaria is, word u nie toegelaat om u kind te immuniseer nie. | Ja | Nee |



**Annexure 2c: Participant Questionnaire - Xhosa**

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**IMIBUZO YOMTHATHINXAXHEBA**



Usuku lovavanyo:..... Inombolo omvavanywa:.....

Indawo ahlala kuyo umvavanywa:..... Igama lomvavanyi:.....

Lingakanani ixesha uhlala eDelft: .....

|   |  |            |              |
|---|--|------------|--------------|
| Umhla wokuzalwa ___/___/____<br>ye-DD/MM/YYYY   | Usesiphi isini<br>umtwana?               | Yinkwenkwe | Yintombazana |
| Mingaphi iminyaka yomntu<br>obekudliwana-ndlebe .....<br>Nizalana ngantoni nomntwana<br>..... | Usesiphi isini umntu<br>obebuzwa imibuzo | Yinkwenkwe | Yintombazana |

**1. Inkcukacha malunga nogonyo lomntwana (Qwalasela incwadana yogonyo)**

**Uzi fumene na umntwana ezizigonyo zilandelayo? (Phawula zonke izigonyo azifumeneyo umntwana)**

| Ubudala bomntwana                        | Isigonyo nxaxheba | Umhla |
|--|-------------------|-------|
| Isigonyo saxa egqibakuzalwa              | OPV 0             |       |
|  | BCG               |       |
| Isigonyo Seeveki ezilishumi ezintandathu | OPV1              |       |
|  | RV1               |       |
|  | DTaP-IPV-Hib1     |       |
|  | Hep B1            |       |
|  | PCV1              |       |
| Isigonyo Seeveki ezilishumi              | DTaP-IPV-Hib2     |       |
|  | Hep B2            |       |
| Isigonyo Seeveki ezilishumi linane       | DTaP-IPV-Hib3     |       |
|  | Hep B3            |       |
|  | PCV2              |       |
|  | RV2               |       |
| Isigonyo seenyanga ezilithoba            | Measles 1         |       |
|  | PCV3              |       |

|  |
|--|
| <b>2. Umgangatho wemfundo kaNompilo</b>  |
| <i>Lithini inqanaba eliphezulu oliphumeleleyo? (Phawula ibenye impendulo)</i>  |
| <ul style="list-style-type: none"> <li>• Zange ndiye esikolweni</li> </ul>   |
| <ul style="list-style-type: none"> <li>• Amabanga asezantsi (inqanaba loku qala ukuyokutsho kwinqanaba lesi xhenxe)</li> </ul> |
| <ul style="list-style-type: none"> <li>• Amabanga aphakamileyo</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Ikholeji okanye iyunivesi</li> </ul>  |

|   |
|---|
| <b>3. Inkukacha malunga nezokuhlala nezezimali</b>  |
| <b>3.1 Isimo sezentlalo - (Phawula ibenye impendulo)</b>  |
| <ul style="list-style-type: none"> <li>• Umzi/Indlu eyakhiwe ngezitena</li> <li>• Indlu/ unxuse ngasemva etyotyombeni</li> <li>• Unxusile ematyotyombeni</li> </ul> |
| <b>3.2. Amanzi afumaneka phi - (Phawula ibenye impendulo)</b>   |
| <ul style="list-style-type: none"> <li>• Amanzi afumaneka endlini</li> <li>• Amanzi afumaneka eyadini</li> <li>• Kwitepu kawonke - wonke</li> </ul>                 |
| <b>3.3 Uhlobo lwendlu yangasese (Phawula ibenye impendulo)</b>  |
| <ul style="list-style-type: none"> <li>• Indlu yangasese egungxulwayo</li> <li>• Omchiza yangasese</li> <li>• Indlu yangasese yamabhakethi</li> </ul>               |
| <b>3.4. Indawo yangasese - (Phawula ibenye impendulo)</b>   |
| <ul style="list-style-type: none"> <li>• Isendlini</li> <li>• Isayadini</li> <li>• Ikwindawo kawonke-wonke</li> </ul>   |

|   |     |      |
|---|-----|------|
| <b>4. Ulwazi ngokubhekiselele kugonyo</b>   |     |      |
| 4.1 Umongikazi ukhe waku cacisela na ngokubaluleka kokugonywa komntwana wakho?  | Ewe | Hayi |
| 4.2. <b>Khankhanya izifo ezinoku khuselwa lugonyo (Buza unompilo amagama ezizifo)</b>   |     |      |
| <ul style="list-style-type: none"> <li>• Imasisi</li> <li>• Utyatyazo</li> <li>• Isifo semiphunga</li> <li>• Umhlathi nkqi</li> <li>• iTibhi</li> </ul> |     |      |

4.3. Incwadana yomtwana incngxelo ngezigonyo. Ungandibonisa ukuba sesiphi isigonyo aza kusifumana xa aphinde waya ekliniki? (*Phawula ibenye impendulo*).

- Unomphilo angakubonisa ngoku chanekileyo ukuba sesiphi isigonyo aza kusifumana kwixesha elizayo kwincwadana yezemphilo.
- Andiyazi  
(*Chazela uNompilo ukuba ifundwa njani incwandana yezempilo ukuba akuchazwanga ukuba zinini izigonyo ezilandelayo*)

4.4 Ungathini ukuba incwanadana yomntwana yezempilo ilahlekile/ akuyazi ukuba uyibeke phi/ itshile? (Funda ukhwaze impendulo ucele uNompilo ukuba akhethe. *Phawula ibenye impendulo*).

- Phindela ekliniki apho umntwana ebefumene izigonyo zokugqibela uba cele ukuba bakunike enye incwandana.
- Linda ade uNompilo aze kuku velela akunike iphetshana lokuphindela ekliniki.
- Andiyazi  
(*Ukuba uNompilo ebenga yazi ukubaku funeka babuyele ekliniki ukuyo kufumana incwadana yezempilo baxebele ukuba bangayifumana simahla ekliniki apho umntwana ebefufemene isigonyo sokugqibela*)

4.5. Ukuba umntwana wakho uthe waphosa izigonyo, kufuneka wenze ntoni. (Funda ukhwaza iimpindulo ubuze uNompilo ukuba yeyiphi abangayenza (*Phawula ibenye impendulo*))

- Yiya ekliniki nomtwana ukuba agonywe ukuba ushiywe lixesha.
- Linda kude kufike isigonyo esilandelayo.
- Andazi

5. Uluvo malunga nokungonyi (*Phawula ibenye impendulo*)

5.1 Kutheni kubalulekile ukugonyi. (Funda ukhwaza iimpindulo ubuze uNompilo ukuba yeyiphi abangayenza (*Phawula ibenye impendulo*))

- Ibaluleke kakhulu.
- Ayibalulekanga kakhulu/ Akanamdlala wokugonyi umntwana
- Andazi

5.2. Ukuba umntwana wakho ushushu emva kokufumana isigonyo. (Funda ukhwaza iimpindulo ubuze uNompilo ukuba yeyiphi abangayenza (*Phawula ibenye impendulo*))

- Yiya ekliniki nomtwana ukuba ushushu.
- Ungaze uphinde umse umntwana ukuba afumane naziphi na izigonyo kaphinde.
- Nika ipanado bude buphele ubushushu.
- Andazi  
(*Chazela uNompilo ukuba ubushushwana bomtwana emva kwesigonyo bulindelekile kodwa ukuba abupheli emva kokunika ipanado mababuyele ekliniki*).

**5.3 Uyiva kanjani into yokuba umntwana afumane izigonyo ezingaphezu kwesinye ngexesha?(Fundu ukhwaza iimpendulo ubuze unompilo ukuba yeyiphi abangayenza (*Phawula ibenye impendulo*))**

- Licebo elilungileyo, elokuba umntwana eza kuya ekliniki amaxesha ambalwa ukuyo kumana izigonyo.
- Asilocebo elilungileyo ukuba umntwana afumane izigonyo ezininzi ngaxeshanye.
- Andazi

**6 Izinto ezinoku bangela ukuba ungayi ukuyo kugonya umntwana**

6.1 Ikude kangakanani iikliniki kwikhaya lakho? (*Phawula ibenye impendulo*).

- Umgama ohanjwa ngeenyawo.
- Isithuthi sika wonke – wonke (taxi or bus)
- Isithuthi sakho osiqhubayo.

6.2 Xa usiya kugonya umntwana wakho ukhetha ntoni kwezi zilandelayo.

(Fundu ukhwaza iimpendulo ubuze unompilo ukuba yeyiphi abangayenza. *Phawula ibenye impendulo*).

- Ukubhukisha kwangaphambili
- Ukuhlala phantsi ndilindele ukubizwa.
- Andinangxaki

**6.3. Wawukhe wajikwa na ekliniki ngenxa yokungabikho kwesigonyo?( Phawula ibenye impendulo).**

- Ewe, ndaxelelwa ukuba mandibuye nini ukuzo kugonya umntwana, ndaphinda ndaxelelwa ukuba ndibuye nini kaphinde.
- Ewe, andikhage ndixelelwe ukuba ndibuye nini kaphinde.
- Hayi.

6.4 Inkolo yakho ayikuvumeli na ukuba ugonye umntwana wakho umzekelo icawa yama Sabatha?

Ewe

Hayi

6.5 Isithethe sakho asikuvumeli na ukuba ugonye umntwana wakho umzekelo ukuba uliRasta akavumelekaga ukuba ugonye umntwana wakho?

Ewe

Hayi

## Annexure 3a: Patient information leaflet - English



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### INFORMATION SHEET

**Project Title:** *The prevalence of immunization and the factors associated with low immunization prevalence in an urban community in the Western Cape*

#### **What is this study about?**

Children are immunized from birth until they are 12 years of age against vaccine preventable diseases, e.g. measles, whooping cough, tetanus, diarrhoea, pneumonia.

This is a research project being conducted by Michelle Williams. I am a Master's student at the University of the Western Cape and employed by the Western Cape Government: Health as the Facility Based Programme Manager within the Northern/ Tygerberg sub-structure based in Bellville. We are inviting you to participate in this research project.

#### **What will I be asked to do if I agree to participate?**

You will be asked to some questions as to what issues are associated with bringing children to the clinic for immunizations. The interviews will last about 20 minutes. We will only be asking questions about children aged 12-24 months of age from their caregivers/ parents. Your permission/consent is required for the researcher to interview you.

We will ask questions about your child's immunization status, about your educational level, whether you are working (employed), and what you know about immunizations, whether you take your child for immunizations and if your religious or cultural practices influence your child's immunization.

#### **Would my participation in this study be kept confidential?**

The researchers undertake to protect your identity and the nature of your contribution. No personal details will be mentioned in the study report of this particular part of the study. Your personal information will be put into a code which means that, (1) your name will not be included on the questionnaires and other collected data; (2) a code will be placed on the questionnaire and other collected data; (3) through the use of an identification key, the researcher will be able to link your

questionnaire to your identity; and (4) only the researcher will have access to the identification key. The information will be used strictly for research purposes.

To ensure your confidentiality, the questionnaires will be kept in a locked filing cabinet in the researcher's office, only identification codes will be used on the data forms and computers that are password protected will be used to store electronic data. Should we write a report or article about this research project, the data will be presented as aggregate data and your identity will be protected.

### **What are the risks of this research?**

There may be some risks from participating in this research study. You may feel uncomfortable with some of the questions asked but none that you may not deal with on daily basis such as about your religious or cultural beliefs and practices. Whatever information you give me will not affect the care you receive from the clinic, and will not be given to anyone else except for improving the programme. You will be able to access immunization services at the local health care facility irrespective of your responses during the interview as your personal information will not be discussed with anyone outside the research study group. All human interactions and talking about self or others carry some amount of risks. We will nevertheless minimise such risks and act promptly to assist you if you experience any discomfort, psychological or otherwise during the process of your participation in this study. Where necessary, an appropriate referral will be made to a suitable professional for further assistance or intervention.

### **What are the benefits of this research?**

The information collected will help us improve the immunization services in this district. This research is not designed to help you personally, but the results may help the investigator learn more about reasons people do not bring their children for immunization at clinics. The information gathered will benefit the immunization programme and the immunization services. We hope that, in the future, other people might benefit from this study.

### **Do I have to be in this research and may I stop participating at any time?**

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

### **Why am I doing this study?**

The information from the immunization programme at health care clinics show that most



caregivers take children to the clinic until they are 14 weeks old (3 months of age), after that, the number of children who are brought for immunizations drop. Therefore, we would like to find out reasons for parents/ caregivers not bringing their child back to the clinic for further immunizations.

**What if I have questions?**

Thank you for your consideration of this request. If you are willing to participate, please sign the consent form. This research is being conducted by Ms. Michelle Williams and Dr. Hazel Bradley, at the University of the Western Cape.

You are welcome to contact me on 083 235 1155 or at the office on 021 918 1977 or via email on [michelle.williams@westerncape.gov.za](mailto:michelle.williams@westerncape.gov.za)

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This research has been approved by the University of the Western Cape's Senate Research Committee.  
(REFERENCE NUMBER: 15/7/7)

## **Aanhegsel 3b: Pasiënt informasie pamflet**



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### **INFORMASIE BLADSY**

**Projek Titel: *Die doeltreffendheid van immunisering en faktore rakende lae immuniserings dekking in stedelike gemeenskappe in die Wes Kaap.***

#### **Waaroor gaan die projek?**

Kinders word van geboorte af tot die ouderdom van 12 jaar oud geïmmuniseer teen die volgende siektes, bv. Masels, Kinkhoes, tetanus (klem in die kaak), diarree en pneumonie (long ontsteking).

Hierdie is 'n navorsingsprojek van Michelle Williams. Ek is 'n meesters graad student by die Universiteit Wes Kaap en werksaam by die Wes Kaapse Departement van Gesondheid as die Fasiliteits gebaseerde program bestuurder in die Noordelike/Tygerberg sub streek, gebaseer in Bellville. Ons nooi u graag uit om deel te neem aan die navorsings projek.

#### **Wat word van u verwag sou u instem om deel te neem?**

U sal 'n paar vrae gevra word rondom redes/probleme wat ondervind word wanneer kinders na kliniek gebring word vir immunisering. Die onderhoud sal omtrent so 20 minute duur. Onderhoude sal gedoen word met ouers/voogde van kinders ouderdom 12-24 maande. U toestemming is nodig vir die navorser om die onderhoud te voer.

Vrae sal handel oor u kind se immunisering status, u skool kwalifikasie, of u werksaam is, wat u kennis is in verband met immunisasie, of u u kind gereeld neem vir sy/haar immuniserings en of u kulturele of geloofswaardes enige invloed het op u kind se immunisering.

#### **Word u deelname in die studie konfidensieel gehou?**

Die navorser in die projek onderneem om u identiteit en bydrae te beskerm. Geen persoonlike informasie sal genoem word in die studie verslag. U persoonlike informasie sal vervang word met 'n kode, met betrekking tot (1) U naam, dit sal nie ingesluit word by die vraelys en ander versameling van data nie: (2) 'n Kode sal geplaas word op die vraelys en versamelde data; (3) Die informasie sal

beskerm word deur 'n identifikasie kode; (4) Net die navorser het toegang tot u informasie deur middel van die identifikasie kode. U informasie sal uitsluitlik gebruik word vir die navorsings projek.

Om streng vertroulikheid te verseker, sal alle vraelyste in 'n geslote kabinet geberg word in die navorser se kantoor, net die identifikasie kode sal gebruik word op die data vorms en rekenaars sal beskerm wees met 'n wagwoord vir elektroniese data. Sou daar 'n verslag of artikel geskryf word oor die navorsings projek, sal u identiteit ten alle tye beskerm en vertroulik gehou word.

### **Wat is die risiko in deelname aan die navorsings projek?**

Daar is min risiko verbonde aan die studie. U mag ongemaklik voel met party van die vrae wat aan u gestel word oor u kulturele en geloof's pratyke maar niks meer as wat u op 'n daagelike basis sal tõe kom nie. Dit is u keuse om deel te neem aan die studie. Enige informasie wat u gee aan die navorser, sal u beslis nie benadeel in terme van gehalte diens en sorg by die kliniek nie, dit help net om die program te verbeter. Maak nie saak wat u terugvoering was gedurende die onderhoud nie, u informasie sal met niemand bespreek word buite die studie groep nie, en u sal nog steeds toegang hê tot ons plaaslike gesondheids klinieke vir immuniserings. Ons sal nie te min als in ons vermoë doen om risikos so min as moontlik te hou asook om u hulp aan te bied as u ongemaklik voël tydens die onderhoud. Indien nodig sal ons u verwys vir verdere professionele ondersteuning.

### **Wat is die voordele van die navorsings projek?**

Die gekollekteerde inligting sal ons help om immuniserings dienste in die distrik te verbeter. Die navorsings projek is nie om individue as sulks te help nie, maar sal die navorser 'n breedvoeriger idee gee waarom mense nie hul kinders na die kliniek bring vir immunisasie nie. Die inligting sal strek tot voordeel van die immunisasie program en immuniserings diens aan die publiek. Met hierdie studie hoop ons dat mense in die toekoms voordeel kan trek uit 'n beter diens en program.

### **Kan ek enige tyd my deelname aan die projek stop?**

U deelname aan die projek is vrywillig. U kan kies om deel te wees van die projek, of glad nie, of u kan te enige tyd stop om deel te wees, sou u oorspronklik ingestem het. Indien u sou besluit om te onttrek uit die studie sal u geensins gepenaliseer word of enige voordele verloor waarvoor u kwalifiseer.

### **Hoekom neem ek deel aan die studie?**

Volgens inligting en data van die immuniserings program by ons Gesondheidsorg klinieke, bleik

dit dat ouers/versorgers kinders na die klinieke neem vir immunisasie tot die ouderdom van 14 weke (3 maande) oud, daarna is daar 'n daling in die statistieke van immunisering. Daarom wil ons graag uitvind wat die rede is hoekom ouers/versorgers nie die kinders terug bring vir immunisering nie.

### **Wat doen ek as ek enige vrae het?**

Sou u deelneem aan die projek en het die toestemmings brief geteken en u het enige vrae, kan u Mev Michelle Williams kontak by onderstaande nommers. Sy doen die projek in samewerking met Dr Hazel Bradley van die Universiteit Wes Kaap.

Mev Michelle Williams

Sel no: 083 235 1155

Kantoor no: 021 918 1977

E-pos: [michelle.williams@westerncape.gov.za](mailto:michelle.williams@westerncape.gov.za)

Prof Helen Schneider

Hoof van Department

Skool van Publieke Gesondheid

Universiteit van Wes Kaap

Privaatsak X17

Bellville 7535

[soph-comm@uwc.ac.za](mailto:soph-comm@uwc.ac.za)

OF

Prof José Frantz

Dean van die Fakulteit van Gemeenskap en Gesondheids  
wetenskappe

Universiteit van Wes Kaap

Privaatsak X17

Bellville 7535

[chs-deansoffice@uwc.ac.za](mailto:chs-deansoffice@uwc.ac.za)



Die navorsing is goed gekeur deur die Universiteit Wes Kaapse Senate Navorsings Komitee.  
(VERWYSINGS NOMMER: 15/7/7)

## Annexure 3c: Patient information leaflet - Xhosa



### YUNIVESI vase WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2809, Fax: 27 21-959 2872

E-mail: [soph-comm@uwc.ac.za](mailto:soph-comm@uwc.ac.za)

### INKCUKACHA

**Umqolo wophando: Inani lognyo nezinto ezihambela na nokuhla kwezinga logonyo kwi sixeko sepuma Koloni**

#### **Lumalunga nantoni oluphando?**

Abantwana bagonywa ukusuka ekuzalweni ukuya kuma kwiminyaka elishumi linamibini le minyaka bekhuselwa kwizifo ezinjenge masasi, unkonkonko, umhlathi nkgi, ukuhambisa, isifo semiphunga.

Olu luphando olwenizwa ngu Michelle Williams Umgumfundi kwi Yunivesi yase Western Cape uqeshwe lisebe lezemphilo kurhulume nte wentshona Koloni uphangela Facility Based Programmes kwi Northern/ Tygerberg sub-structure re emi eBelville. Siyakumema ukuba uthathe inxaxhesa koluphando.

#### **Mibibuzo mini endiza kuyibuzwa ukuba ndithe ndathath inxa xheba?**

Uza kubuzwa imibuzo emayela nokuziza umntwana ekliniki ukuza afumane izigonyo. Imibibuzo iyakuthatha imizuzu engamashumi amabini kuphela. Siyakubuza ngabantwana abakwinyanga ezi phakathi kweshumi elinambini ukuya kumashumi amabini anane emiyako sobe sibuzwa unompilo okanye umzali. Umphandi uyakufuna Imvume yakho ukuze obe nako ukuqhuba nemibuzo.

Sobe sibuzwa imibuzo ngogonyo lo mntwana wakho, ngezinga lezemfundo, imeko zeze mpangelo, nokuba wazi ntoni ngogonyo Uyamsa na umntawana ukuba afumane izigonyo siyakube sibuzwa nokuba inkolo nesithelethe zinagalelo linin a ekugonyweni komntwana wakho.

#### **Ukuzibandakaya kwam kolu phando kuya kugcinwa kuyi mfihlo na?**

Umphandi uyakukufihla ukuba ungubani negalelo lakho. Akukho zinkcukacka zakho ziyakuVe zaw kwi riporti yoluphando. Izinto eziyenge gama lakho, ifani yakho nedelisi ziya kuba kwi khowudi ithi ke lento igama lakho alisayi kkufakwa kule mibuzwa na nolunye ulwazi olufu maneke kuwe. Ikhawudi iyakuba kwimibuzo kusetyenziswa isitshixo. Nguphandi kuphela one mvume kwesisi tshixo. Ulwazi olunfumanekileyo luyaku setyenziselwa uphando lodwa. Ukuqinisekisa imifihlo yakho,

impendulo nemibuza iya kugcinwa kwi khabhathi etshixwayo kwi ofifi yomphandi. Yi khwowudi kuphela eyakusetyenziswa kwi computers ezivulma nge password xa sibhala iriporti ngoluphando inkcuka cha ngawe ziya kufihlwa.

### **Buthini ubungozi boluphando?**

Ungakhethetha ukungazi bandaka nyi nolu phando. Naluphi na ulwazi othe wandini ka lona alusayi kuchaphazela iinkonzo omele kukuzfumana ekliniki. Olu lwazi

### **Ithini inzuzo yoluphando?**

Ulwazi olufumanekileyo luyakunce da ukuphucula ugonyo kwiDistrict. Olu phando alwe nzelwanga ukunceda wena wedwa. Imiphumela iyakunceda uphandi ukuba azi ngakumbi ukuba zithini na izizathu ezibangela ukuba abantu bangabazisi abatwana babo ukuba baze kugonya ekliniki. Ulwazi olufuma nekileyo luya kuba yinzuzo kwiinkonzo zogonyo. Siyathemba ukuba nabanye abantu bayakuzuzisa koluphando kwixesha elizayo.

### **Xa ndikoluphando ndivumelekile na ukuyeka nangaliphi na ixesha ukuthatha inxaxheba?**

Inxaxheba yakho koluphando ingemvume yakho. Ungangathathi inxaxheba ungayeka nanaliphi na ixesha ofumkuyeka ngalo. Ukuba uketha ukungathathi inxaxheba okanye ukhetha ukuyeka akusayi kohlwaywa okanye uphuncu kane namalungelo akho.

### **Ndilwenzela ntomi oluphando?**

Ulwazi olufumaneke kwikonzo zoku gonya ekliniki lubonisa ukuba oonompilo ngabo abathetha abantwana babase ekliniki kude kube ziiiveki ezilishumi elinane ubudala (iinyayanga ezihtathu zobudala) emva koko unini lwabantwana aba fumana iinkonzozogonyo luyehla. Ngako oko ke siFuna ukufumana izizathu ezibangela ukuba abazali nonomphilo bangabazisi abantwana ekliniki kaphinde ukuza kufumana izigonyo.

### **Ndiya kuthini ukub ndinemibuzo?**

Enkosi ngokuqwalesela esisicelo. Ukuba uno mdlawokuthatha inxaxheba, nceda tyikitya ifomu yesivumelwano. Oluphando lwenziwa ngu Nkosasana Michelle Williams no Gqirha Hazel Bradley, kwi Univesi Yentsho na Koloni.

Ungandi fumana kwezi nombolo zomnxa zilandelayo 083 235 1155 okanye 021 918 1977 okanye email [michelle.williams@westerncape.gov.za](mailto:michelle.williams@westerncape.gov.za)

Prof Helen Schneider  
Head of Department  
School of Public Health  
University of the Western Cape  
Private Bag X17  
Bellville 7535  
[soph-comm@uwc.ac.za](mailto:soph-comm@uwc.ac.za)

**OR** Prof José Frantz  
Dean of the Faculty of Community and Health Sciences  
University of the Western Cape  
Private Bag X17  
Bellville 7535  
[chs-deansoffice@uwc.ac.za](mailto:chs-deansoffice@uwc.ac.za)

Olu phando lupasiswe yi Univesi Yentsho na Koloni Senate Research Committee. (REFERENCE NUMBER: 15/7/7)



**Annexure 4a: Consent form (English)**



**UNIVERSITY OF THE WESTERN CAPE**

Private Bag X 17, Bellville 7535, South Africa

*Tel: +27 21-959 2809, Fax: 27 21-959 2872*

**E-mail: soph-comm@uwc.ac.za**

**CONSENT FORM**

**Title of Research Project:**                    *The prevalence of immunization and the factors associated with low immunization prevalence in an urban community in the Western Cape*

The study has been described to me in language that I understand. My questions about the study have been answered. I understand what my participation will involve and I agree to participate of my own choice and free will. I understand that my identity will not be disclosed to anyone. I understand that I may withdraw from the study at any time without giving a reason and without fear of negative consequences or loss of benefits.

Do I have your permission to continue with questions?    Yes    No

**Participant's name:** .....

**Participant's signature:** .....

**Date:** .....

Address: .....

Interviewee's no: .....



## Aanhangsel 4b: Toestemmings Brief



### UNIVERSITEIT VAN WES KAAP

Privaatsak X 17, Bellville 7535, Suid Afrika

Tel: +27 21-959 2809, Faks: 27 21-959 2872

E-pos: [soph-comm@uwc.ac.za](mailto:soph-comm@uwc.ac.za)

### TOESTEMMINGS BRIEF

**Projek Titel:** *Die doeltreffendheid van immunisering en faktore rakende lae immuniserings dekking in stedelike gemeenskappe in die Wes Kaap.*

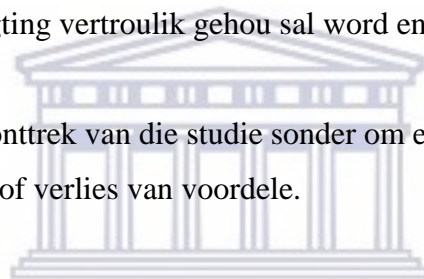
Die studie is aan my verduidelik in my moedertaal en ek verstaan ten volle die omvang van die studie.

My vrae ten opsigte van die studie is beantwoord.

Ek verstaan verder wat my deelname behels, en my deelname aan die projek is uit my eie vrye wil.

Ek verstaan dat my persoonlike inligting vertroulik gehou sal word en geensins alom bekend gemaak sal word nie.

Ek verstaan dat ek te enige tyd kan onttrek van die studie sonder om enige rede te gee of enigsins bedreig te voel vir nadelige gevolge of verlies van voordele.



**Het ek (onderhoudebeampte) u toestemming om voort te gaan met die vrae?**      **Ja**      **Nee**

UNIVERSITY of the  
WESTERN CAPE

**Deelnemer se naam:** .....

**Deelnemer se handtekening:** .....

**Datum:** .....

**Adres:**.....

**Onderhoudebeampte no:** .....

**Annexure 4a: Consent Form - Xhosa**



**UNIVERSITY OF THE WESTERN CAPE**

Private Bag X 17, Bellville 7535, South Africa

*Tel: +27 21-959 2809, Fax: 27 21-959 2872*

**E-mail: [soph-comm@uwc.ac.za](mailto:soph-comm@uwc.ac.za)**

**Iphepha lesivumelwano**

**Umqolo wophando:**

**Inani lognyo nezinto ezihambela na nokuhla kwezinga  
logonyo kwi sixeko sepuma Koloni**

Uphando luqutywe ngolwimi endilwaziyo. Iimpendulo zam malunga nophando ziphendulekile. Ndzivumele ukuthatha inxaxheba andinyanzelwanga. Ndiyiqonda kakuhle ukuba andiswayi kuchazwa nakubanina. Ndiyayoqonda ukuba ndingahoxa na nimina ngaphandle kokumika isizathu, nangaphandle kokoyika imiphumela engemihle okanye ukuphulukana namalungelo.

Ndiyaayifumana na imvume yakho yokuqhubeka nemibuzo? Ewe Hayi

**Igamalomthathi nxaxheba:** .....

**Igamalomthathi Tyikitya:** .....

**Date:** .....

Inombolo yomnxeba yomthathi nxaxheba: .....

## Annexure 5: Ethics approval from the University of Western Cape Senate Research Committee



UNIVERSITY of the  
WESTERN CAPE

### DEPARTMENT OF RESEARCH DEVELOPMENT

10 December 2015

#### To Whom It May Concern

I hereby certify that the Senate Research Committee of the University of the Western Cape approved the methodology and ethics of the following research project by:  
Ms M Williams (School of Public Health)

Research Project:                      The prevalence of immunization and the factors associated with low immunization prevalence in an urban community in the Western Cape.

Registration no:                        15/7/7

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.

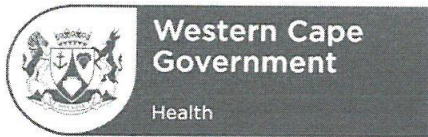
A handwritten signature in black ink, appearing to read 'P. Josias'.

*Ms Patricia Josias  
Research Ethics Committee Officer  
University of the Western Cape*

Private Bag X17, Bellville 7535, South Africa  
T: +27 21 959 2988/2948 . F: +27 21 959 5170  
E: [pjosias@uwc.ac.za](mailto:pjosias@uwc.ac.za)  
[www.uwc.ac.za](http://www.uwc.ac.za)

A place of quality,  
a place to grow, from hope  
to action through knowledge

## Annexure 6: Permission for research study: Western Cape Government: Health



### STRATEGY & HEALTH SUPPORT

Health.Research@westerncape.gov.za  
tel: +27 21 483 6857: fax: +27 21 483 9895  
5<sup>th</sup> Floor, Norton Rose House,, 8 Riebeeck Street, Cape Town, 8001  
[www.capegateway.gov.za](http://www.capegateway.gov.za)

REFERENCE: WC\_2016RP35\_553  
ENQUIRIES: Ms Charlene Roderick

University of the Western Cape  
Faculty Health Science  
Robert Sobukwe Road  
Bellville  
7535

For attention: **Mrs Michelle Williams**

Re: **The prevalence of immunization and the factors associated with low immunization prevalence in an urban community in the Western Cape**

Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that you do not require the approval of the department for your research as it will not be accessing information and facilities from the provincial government department of health.

We recognise that the study has the potential to address an important health challenge facing our population and as such request that you provide feedback on your study,

Kindly provide the department with an electronic copy of the final feedback (**annexure 9**) within six months of completion of research. This can be submitted to the provincial Research Co-ordinator ([Health.Research@westerncape.gov.za](mailto:Health.Research@westerncape.gov.za)).

The reference number above should be quoted in all future correspondence.

Yours sincerely

A handwritten signature in blue ink that reads 'A HAWKRIDGE'. The signature is stylized and appears to be written over a printed name.

A HAWKRIDGE.

DR A HAWKRIDGE  
DIRECTOR: HEALTH IMPACT ASSESSMENT  
DATE: 8/2/2016.

**Annexure 7: Extract from Western Cape Government: Health immunization daily tally sheet**

| PATIENT STICKER OR<br>CONTACT DETAILS AND FOLDER NUMBER | IMMUNIZATION |     |         |     |               |        |          |               |          |           |        |          |     |                  |      |                 |
|---|--------------|-----|---------|-----|---------------|--------|----------|---------------|----------|-----------|--------|----------|-----|------------------|------|-----------------|
|   | Birth        |     | 6 weeks |     |               |        | 10 weeks |               | 14 weeks |           |        | 9 months |     | 12<br>mont<br>hs |      |                 |
|   | OPV 0        | BCG | OPV1    | RV1 | DTaP-IPV-Hib1 | Hep B1 | PCV1     | DTaP-IPV-Hib2 | Hep B2   | -IPV-Hib3 | Hep B3 | PCV2     | RV2 | Measles 1        | PCV3 | Fully Immunized |
|   |              |     |         |     |               |        |          |               |          |           |        |          |     |                  |      |                 |
|   |              |     |         |     |               |        |          |               |          |           |        |          |     |                  |      |                 |
|   |              |     |         |     |               |        |          |               |          |           |        |          |     |                  |      |                 |
|   |              |     |         |     |               |        |          |               |          |           |        |          |     |                  |      |                 |