Khusela Immunisation Study:

Strengthening clinic level immunisation service delivery in Western Cape Province, South Africa

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Abstract

Since implementation in 1974, the South African Expanded Programme on Immunisation (EPI) has had considerable impact on vaccine-preventable-diseases (VPDs). However, as in many low and middle-income countries, optimal vaccine coverage and immunisation program service delivery in South Africa remains an ongoing challenge with intermittent outbreaks of VPDs occurring.

This study describes the development of an adaptable and flexible approach that assessed EPI vaccine delivery and identified barriers to immunisation service delivery at the clinic level in the Western Cape Province, South Africa which aimed to reflect the reality of the immunisation service providers, community care workers and parents'/guardians' views and experiences.

Following this assessment, interventions were developed and implemented collaboratively drawing from principles of implementation research and delivery science, and experience-based co-design with key stakeholders and clinic staff that targeted identified barriers. These interventions were driven by the clinic staff with the intention that they were feasible and exclusively tailored to the needs of clinic providers and parents.

Evaluation post-intervention showed that there was overall improvement in parents'/guardians' knowledge about immunisation as well as increased community engagement. There was also greater commitment to improvement in quality of services from service providers. The approach used in this study was novel as it combined (1) assessment of clinic level, context-specific factors that affect immunisation service delivery, (2) implementation of interventions that addressed these gaps, and (3) evaluation to determine if interventions were effective in strengthening immunisation service delivery.

Declaration

This is to certify that:

1. The thesis comprises only my original work towards the Doctor of Philosophy;
2. Due acknowledgement has been made in the text to all other material used;
3. The thesis is less than 100,000 words in length, exclusive of tables, maps, bibliographies and appendices.

Andrea Alicia Timothy

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List of abbreviations

ACIC	Assessment of Chronic Illness Care
AEFI	Adverse events following immunisation
BCG	Bacillus Calmette-Guérin
CCW	Community care worker
CDC	Centers for Disease Control and Prevention
EPI	Expanded Programme on Immunisation
CoCTHD	City of Cape Town Health Department
DTaP-IPV-Hib-HBV	Diphtheria, tetanus, acellular pertussis/inactivated polio/Haemophilus influenzae type b and Hepatitis B vaccine
DTP	Diphtheria, tetanus, acellular pertussis vaccine
EBCD	Experience-based co-design
GRISP	Global Routine Immunisation Strategies and Practices
GVAP	Global Vaccine Action Plan
HepA	Hepatitis A vaccine
HPV	Human papillomavirus vaccine
ICCC	Innovative Care for Chronic Conditions
IRDS	Implementation research and delivery science
KAB	Knowledge, attitudes and beliefs
LMIC	Low-or-middle-income country
LSP	Logistics service provider
MCV1	Measles containing vaccine 1
MCV2	Measles containing vaccine 2
MMR	Measles, mumps, rubella vaccine
NAGI	National Advisory Group on Immunisation
NDoH	National Department of Health
NICD	National Institute for Communicable Diseases
NHS	National Health Service United Kingdom
OPV	Oral polio vaccine
PAR	Participatory action research
PCV1	Pneumococcal vaccine
PHC	Primary Health Care
PINA	Parental Immunisation Needs and Attitudes Survey
PPP	Public–private partnership
PREHMIS	Patient Record and Health Information System
PWD	People with disabilities

RV1	Rotavirus vaccine
RTHB	Road to Health Booklet
SACLA	South Africa Christian Leadership Assembly Health Project
Td	Tetanus and diphtheria vaccine
TdaP-IPV	Tetanus, diphtheria acellular pertussis / inactivated polio vaccine
TIP	Tailoring Immunisation Practices
UNICEF	United Nations Children's Fund
VAR	Varicella vaccine
VPD	Vaccine-preventable disease
WCDoH	Western Cape Department of Health
WHO	World Health Organization

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1 Introduction

Since implementation in 1974, the South African Expanded Programme on Immunisation (EPI) has had considerable impact on vaccine-preventable-diseases (VPDs) with the eradication of polio, maternal and neonatal tetanus and improved control of measles, pertussis and diphtheria [1-3]. However, as in many low and middle-income countries, optimal vaccine coverage and immunisation program service delivery in South Africa remains an ongoing challenge. Intermittent outbreaks of VPDs such as measles, diphtheria and pertussis have continued to occur in South Africa over the last ten years, largely related to pockets of low vaccine coverage. The urban areas in the Western Cape where access issues are prominent for many families, and migration to and from other provinces are common, has particularly low coverage for childhood vaccines which fall well below national targets [4-11].

An evaluation of immunisation service delivery, vaccine uptake and community engagement at the clinic level provides an opportunity to take a more systematic approach to develop new systems-oriented methods to support local immunisation programs and allow for the development of strategies that strengthen EPI delivery in the Western Cape to prevent further VPD outbreaks. It is clear that new approaches need to be driven at the clinic level by key staff engaged in immunisation service delivery and developed through local level research.

In order to effectively improve immunisation outcomes, existing immunisation assessment approaches need to be expanded with a more integrated and comprehensive approach that involves parents/guardians, health care staff and community members. By involving key stakeholders and understanding how all the individual components of the immunisation program work together, affect each other, and interact with other aspects of the broader health system, clinic vaccination activity targets may be reached more realistically.

Previous research highlighted a need for an assessment of immunisation service delivery at the clinic level in the Western Cape that adopts a holistic systematic approach which includes

identification of varied pathways for coverage improvement that will help inform efforts to strengthen immunisation service delivery [1, 3, 12, 13]. However, additional research is paramount to developing an approach that provides usable, systems-oriented assessments at the clinic level which are specifically adapted and tailored to address local clinic and community needs. This will allow for better targeted strategies that could improve immunisation service delivery and ultimately immunisation coverage. As a result, this research project utilised components of implementation research, and enabled the application and testing of a new way of thinking about immunisation program assessment, supplemented by broader health system analysis approaches to be exclusively tailored to the needs of clinic providers and parents/guardians in this setting.

1.1 Research purpose and significance

Fittingly, this project was named 'Khusela' which means 'to protect' in isiXhosa, one of the primary languages used in the Western Cape. **Figure 1.1** illustrates the logo that was designed by the primary researcher to highlight the purpose of this research which was to strengthen immunisation service delivery, i.e. to strengthen 'protection' in the Western Cape. This project describes and was intended to reflect the current reality of the immunisation service providers', community health leaders' and parents'/guardians' views and experience. It was hoped that any subsequent engagement that occurred between clinic staff and parents/guardians would be strengthened so that both groups continue to take ownership of improving immunisation services and coverage in their communities moving forward.

The study aimed to firstly develop an adaptable and flexible approach based on established systems assessment approaches that have assessed EPI vaccine delivery and identified barriers to immunisation service delivery at the clinic level in South Africa, and secondly to develop strategies collaboratively with key stakeholders and clinic staff that targeted identified barriers. These strategies were driven by the clinic staff and were delivered simply with the intention

that the interventions were feasible and transferable to other service models. The ultimate goal was to strengthen immunisation service delivery, and thus improve vaccine uptake for children under two years at the clinic level in a specified region in the Western Cape.

Figure 1.1. Logo designed for the Khusela Immunisation Study

1.2 Research question

This mixed-method study asked the following question to address the current issues pertaining to immunisation service delivery and vaccine uptake at the clinic level in the Western Cape: Can immunisation service delivery and uptake be improved by assessing barriers, and developing and implementing targeted intervention strategies at the clinic level for children aged 12-24 months in Khayelitsha in the Western Cape, South Africa?

1.3 Research objectives

The project aimed to strengthen immunisation service delivery for children aged under 24 months at the clinic level, in three public clinics within Khayelitsha that provide child health services in the Western Cape, by:

1. Identifying the number of EPI vaccines administered to children aged under 12 months old at baseline at each of the three clinics, averaged over a 3-month period;
2. Assessing the functioning of immunisation systems at the clinic level using a holistic systems approach to determine the key barriers and facilitators to service delivery in each clinic;

3. Using these data to develop and implement strategies over a 6-month period to strengthen immunisation service delivery and vaccine uptake for children aged under 24 months in each clinic;
4. Evaluating the effectiveness of the strategies in strengthening immunisation service delivery, including assessing vaccine uptake, community engagement and immunisation knowledge and quality of care for children aged under 24 months, 4-6 months post implementation in each clinic.

These objectives were addressed through three research activities:

1. A comprehensive systems assessment at the clinic level;
2. A set of interventions collaboratively developed by the primary researcher and clinic staff, and implemented at each of the three clinics;
3. Evaluation of the implemented interventions.

1.4 Research outcomes

The outcomes of this project were:

1. A record of the average number of EPI vaccines provided to children <12 months per month, pre and post implementation of strategies in the three clinics providing paediatric services.
2. A consolidated assessment of the functioning of the immunisation systems at the three clinics, including:
    a. A description of the clinic immunisation process;
    b. The daily and weekly average clinic cycle time, i.e. the amount of time the immunisation process takes from when a parent/guardian enters the clinic to when they leave the clinic;
    c. A ranked and prioritised list of key barriers and facilitators to immunisation service delivery;

d. Perceptions of health service providers regarding their knowledge and attitudes towards the EPI;
e. Perceptions of parents/guardians regarding their attitudes, concerns, knowledge and the acceptability of the EPI.

3. A set of key strategies driven by clinic staff and the community to improve immunisation service delivery and increase vaccine uptake;
4. Overall improvement in vaccine activity, community engagement, immunisation knowledge and quality of care.

1.5 Partnership with local government department and project funding

Prior to the commencement of this project, approval was obtained from both the Western Cape Department of Health (WCDoH) and the City of Cape Town Health Department (CoCTHD) (*Project ID: 6623*). Overall support was provided by Dr. Anthony Hawkridge, the Director of the Health Impact Assessment Directorate in the WCDoH. The primary researcher predominantly worked closely with the three clinics that provide paediatric services in the sub-district of Khayelitsha including the City Health Manager in Khayelitsha Dr. Virginia de Azevedo, the City Primary Health Manager in Khayelitsha Mrs. Shariefa Patel Abrahams, and the City Child Health Manager in Khayelitsha Sr. Bukelwa Mbalane.

Funding for this project was provided by the World Health Organization (WHO) through the Centre for Disease Control and Prevention (CDC), for projects towards strengthening immunisation programmes.

The primary researcher acquired ethics approval from the Human Research Ethics Committee at the University of Melbourne (*Ethics ID: 1546036*), and from the Human Research Ethics Committee at the University of Cape Town (*Ethics ID: 716/2016*).

1.6 Study setting

This study was carried out in the Khayelitsha sub-district in the Western Cape Province of South Africa as shown in **Figure 1.2**. Khayelitsha is located in the south-eastern part of the City of Cape Town municipal area which is approximately 25 kilometres from the centre of Cape Town. Khayelitsha, which means 'new home' in isiXhosa was developed in 1983 as part of the Group Areas Act of 1950 under the apartheid government. The sub-district has the largest concentration of poverty in the city of Cape Town with an unemployment rate of 42% and 55% of inhabitants living in informal dwellings. Khayelitsha has a very young population with approximately 37% of its residents being under 19 years of age and 12% are under 5 years old. Based on the most recent census which was conducted in 2011, the population of Khayelitsha was estimated to be 391,749. However, current estimates may be closer to 1-2 million residents [14, 15]. Of these residents, approximately 70% are single and have never been married, and 42% of households are headed by females. isiXhosa is the predominant language of the residents. Many residents were born in the Eastern Cape and there is considerable movement of people, particularly children between the Western and Eastern Cape [16, 17]. There is no recent published data about immunisation coverage in the sub-district of Khayelitsha; however, according to the Health Systems Trust within the district of Cape Town, immunisation coverage for all EPI vaccines for children under one year is 83%, and measles second dose coverage is 92%. This falls short of the national target of 92% coverage for fully immunised children under one year, and 96% for measles second dose coverage [18].

Three public clinics highlighted in **Figure 1.3** that provide child health services in Khayelitsha were recruited for this study, namely: Kuyasa Community Day Centre, Nolungile Clinic, and Town II Community Day Centre. These clinics were recommended by the City Health Manager Dr. Azevedo as they are all quite different from each other regarding size, number of patients seen, staff dynamics etc. They are also located in different areas of Khayelitsha, and therefore could provide a more comprehensive assessment of immunisation services in Khayelitsha.

However, these clinics are not the only clinics that provide paediatric services to the area. Additionally, there are five clinics managed by the City of Cape Town, and nine other clinics managed by the Western Cape Department of Health. This includes a facility run by the WCDoH that shares clinic space at Nolungile Clinic (run by the CoCT), however, as with other clinics in the area, these clinics do not generally have much to do with each other.

Figure 1.2. Map of Western Cape Province [19], blue star indicates location of Cape Town.

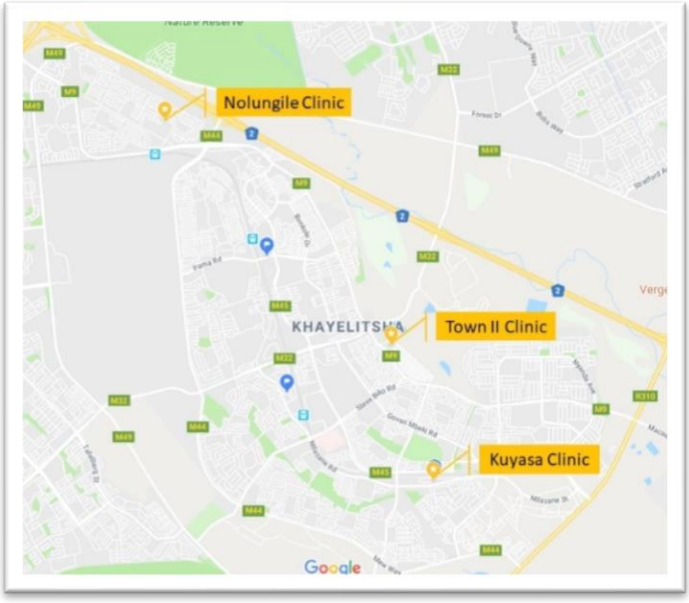


Figure 1.3. Map of Khayelitsha [20] showing location of the three paediatric clinics involved in this study.

1.7 Study design

This study falls within the scope of implementation research and delivery science (IRDS) and experience-based co-design (EBCD). A pre-post study design was used to answer the research question using the following methods:

1. **Analysis of individualised clinic immunisation data:** baseline and post-intervention clinic data were ascertained to determine the monthly average of EPI vaccine doses administered to children <12 months, over a 3-month period.
2. **Surveys:** 427 parents/caregivers were surveyed (researcher-administered surveys) prior to intervention implementation about their perceptions, and concerns about vaccines and experiences with immunisation service delivery, and 351 parents/caregivers were surveyed following implementation about any changes they had seen in immunisation services, as well as any changes in knowledge, perceptions and concerns about vaccines.
3. **Focus groups:** Four focus groups were conducted with both parents/guardians and community care workers (eight in total) from all three clinics to determine their perceptions, and concerns about vaccines and experiences with immunisation service delivery pre-intervention; and three focus groups were conducted with parents/guardians and community care workers (six in total) from all three clinics post-intervention to determine if they had noticed changes in immunisation services, perceptions, concerns and knowledge of vaccines.
4. **Semi-structured interviews:** 20 interviews were conducted with clinic staff and management before implementation to determine their attitudes and knowledge about vaccines and immunisation service delivery; and 20 interviews were conducted following intervention implementation to determine any perceived changes in immunisation service delivery, perceptions, concerns and knowledge of vaccines.

5. **Direct observation of immunisation facilities and procedures:** immunisation processes were observed at each clinic, including the clinic cycle time (the time taken for a child to complete a clinic visit for immunisation).
6. **Experience-based co-design and intervention implementation:** interventions that addressed identified barriers to service delivery were designed and implemented in a collaborative process with key local stakeholders such as administrative immunisation service staff and clinic staff.

1.8 Roles of the researcher and the research team

As primary researcher in this study, I considered myself as both an insider and an outsider researcher, or an 'inbetweener', defined as a situation where the researcher is both a part of the topic/community being investigated, as well as being external from it [21-23]. As a South African, with the majority of my family still living in South Africa, I had an understanding of the cultural background of the study participants, and was able to build a rapport and trust with those involved, especially with the sub-district and clinic management and staff. Clinic staff referred to me as "sisi" (sister) as they did with other staff members, thus could be considered an insider in some aspects. However, I left South Africa when I was quite young during the height of apartheid, and therefore did not grow up there but in a number of countries (New Zealand, Australia, the Philippines, Singapore and Malaysia). I also was an external researcher from the University of Melbourne, and was not a part of the particular Xhosa community that was being investigated, so I could also be considered an outsider. Throughout this research I was always mindful of my positioning, as well as the similarities and differences I shared with research participants, and essentially constantly shifted between both roles as an insider-outsider.

A number of people in addition to myself were involved in various capacities to execute this project. These roles and responsibilities of research team members are defined in **Table 1.1**. All team members involved were as follows:

- The primary researcher: Andrea Timothy (AT)
- The project advisory panel: Dr. Margie Danchin (MD), Professor Margaret Kelaher (MK), Professor Ross Bailie (RB), Dr. David Coetzee (DC), Dr. Chris Morgan (CM) and Dr. Neil Cameron (NC)
- Sub-district and clinic management
- Clinic staff: nurses, clerks, pharmacists, community care workers
- Parents/guardians
- Field workers
- Suppliers: radio station staff, graphic designers
- Additional key stakeholders: WCDoH, CoCTHD, WHO personnel

Table 1.1 Summary of roles and responsibilities of the research team

Project phase	Description of task	Research team member(s)
Initiation	Development of research protocol	AT
	Editing of research protocol	Project advisory panel
	Sourcing local collaborators in South Africa	AT
	Preparation of ethics applications	AT
	Editing of ethics applications	Project advisory panel
	Preparation of funding applications	AT
	Editing of funding applications	Project advisory panel
Study One: Health Services and Community Uptake Assessment	Data collection: interviews and focus groups with Sub-district, clinic management and clinic staff	AT
	Data collection: surveys and focus groups with parents/guardians, waiting time study	Field workers
	Data analysis	AT
	Overall consultation	Project advisory panel
Study Two: Developing and implementing strategies to address the barriers to service delivery and vaccine uptake	Data review and strategy prioritisation	AT Project advisory panel Sub-district & clinic management Clinic staff Additional key stakeholders
	Strategy review and finalisation	AT Sub-district & clinic management Clinic staff Suppliers
	Strategy implementation	AT Sub-district & clinic management Clinic staff
	Sourcing of suppliers (i.e. graphic designers, printers etc.)	AT
	Drafting of intervention concept and content	AT
	Ongoing communication with suppliers	AT
	Overall consultation	Project advisory panel
Study Three: Evaluating the effectiveness of interventions in strengthening immunisation service delivery	Data collection: interviews and focus groups with Sub-district, clinic management and clinic staff	AT
	Data collection: surveys and focus groups with parents/guardians, waiting time study	Field workers
	Data analysis	AT
	Overall consultation	Project advisory panel

1.9 Outline of thesis

This thesis contains six chapters. **Chapters 1 and 2** present a background to the context of the study, and an overview of immunisation services in South Africa and challenges involved, theories of health systems strengthening, and participatory action research in particular experience-based co-design. **Chapters 3 to 5** present the study findings for each of the study objectives described above, namely the qualitative and quantitative findings of a health services assessment, collaborative intervention development, and evaluation of the effectiveness of the implemented interventions. **Chapter 6** discusses the key findings and challenges of the study, including the methodology used, and implications for future research using this approach.

2 Literature Review

This chapter provides a literature review of three primary focus areas relevant to this study:

1. Approaches to immunisation systems strengthening, and
2. Immunisation services in the South African context; and
3. Previous studies focused on locally driven intervention development.

The first section focuses on strengthening immunisation services with an introduction to various health systems approaches, and also highlights the current gaps in the application of these approaches to immunisation services in the strategies or tools that are developed. The second section provides an overview of how immunisation services are delivered in South Africa, the challenges involved in providing these services, and a description of the more recent vaccine-preventable disease outbreaks in South Africa. The final section describes experience-based co-design research, and how this method can be used to develop locally driven interventions to strengthen immunisation services.

2.1 Strengthening Immunisation Services

The Expanded Programme on Immunisation (EPI) was established in 1974 in response to the success of the smallpox eradication programme, and to ensure that all children globally were able to access vaccines. At the time, the recommended vaccines protected against six diseases (tuberculosis (BCG), diphtheria, tetanus, pertussis (DTP vaccine), measles, and poliomyelitis). The effort to eradicate polio, and the new vaccines that have been introduced to eliminate measles and rubella, maternal and neonatal tetanus have led to quite broad immunisation programs that now routinely reach over 80% of children under the age of one year [24]. The program has had a number of successes during 2017:

- Approximately 85% of infants worldwide had received three doses of diphtheria-tetanus-pertussis (DTP3) vaccine;

- 85% of children under two years of age had received one dose of measles vaccine, and 67% had received two doses of measles vaccine; and
- 85% of infants received three doses of polio vaccine.

Polio has been targeted for global eradication, and has been eliminated in all countries except for Afghanistan, Pakistan and Nigeria; however, all countries remain at risk until polio is fully eradicated, and there are a number of challenges for routine immunisation services. For example, in 2017, it was estimated that 19.9 million infants worldwide were not reached with routine immunisation services, and approximately 60% of these children live in Afghanistan, Angola, the Democratic Republic of the Congo, Ethiopia, India, Indonesia, Iraq, Nigeria, Pakistan and South Africa [25]. To improve global coverage, the WHO has partnered with countries and other stakeholders to create the Global Vaccine Action Plan (GVAP) by providing equitable access to vaccines by 2020; however, to date GVAP goals are not on target to be met. In 2017, Ministers of Health from 194 countries endorsed a new resolution to strengthen immunisation to achieve the goals of the GVAP [25].

2.1.1 Health Systems Approaches and Health Systems Strengthening

The WHO defines a health system as "all organisations of people and actions whose primary intent is to promote, restore or maintain health" [26]. Not only does this encompass public health officials but also includes private, and not-for-profit service providers, community outreach workers, educators, researchers, patients and mothers caring for sick children [26, 27]. Seven systems strengthening approaches which will be discussed in detail below were identified to inform the design of this study to either broadly assess health systems or to design interventions to strengthen immunisation service delivery in particular.

2.1.1.1 Approaches to assess health systems

The first of these approaches is the WHO 'building blocks' framework which is a health systems framework that was developed to promote a current understanding of what a health system is, and what constitutes health systems strengthening. It was not designed as a research instrument but as a way to facilitate investments of resources in health systems, and describes this system as consisting of six 'building blocks': Service delivery, Health workforce, Information, Medical products, vaccines and technologies, Financing, and Leadership and governance. This approach has been widely used in health systems strengthening research which is defined as improving these six 'building blocks' of the health system and "managing their interactions in ways that achieve more equitable and sustained improvements across health services and health outcomes" [28, 29]. While systems strengthening here refers to improvement of the entire health system, this approach can be used as a different way of thinking about how to improve immunisation services by assessing the various components of an immunisation program more holistically. There have been few previous experiences using the WHO 'building blocks' approach to assess immunisation activities. Those that have been undertaken have highlighted both the advantages and limitations of this approach. For example, Mounier-Jack *et al.* in 2014, evaluated the impact of three disease control programs on health systems: measles eradication activities, new vaccine introductions, and polio eradication activities. It was found that the approach was useful in its simplicity in describing a health system, and in structuring the studies and data collection tools. However, there were limitations in that, the approach does not include a component for community engagement, and does not take into account how each of the 'building blocks' interact with each other [29]. In this study, the assessment and evaluation of immunisation services component was structured around the six 'building blocks' of health systems (Service delivery, Health workforce, Information Medical products, vaccines and technologies, Financing, Leadership and governance) to ensure that all aspects of the clinic delivered immunisation program was accounted for.

Approaches that are specific to immunisation programs are the WHO Global Routine Immunisation Strategies and Practices (GRISP) approach [30], and the WHO Tailoring immunisation programmes to reach underserved groups (TIP) approach [31]. Both approaches are designed to be used at the national level. GRISP is a framework that aims to outline the areas that national governments, global partners and donors need to invest in to improve immunisation programs. There are nine "transformative investments to achieve better immunisation outcomes" [30] which include taking into account national and operational factors, clinic level and community factors, as well as a "framework of strategies and practices for routine immunisation" [30]. Namely, these nine transformative investments should be made into the national team, strategies to reach, strategic and operational plans, operational level funding, vaccinator and manager skills, modern vaccine supply, accurate information system, life course vaccination, and community support. Like the WHO 'building blocks' approach discussed above, GRISP was not designed as a research tool but a framework to guide national immunisation policies and practices [30]. There has not been any published work where this framework was used. As a national level framework, many of the nine "transformative investments to achieve better immunisation outcomes" [30] are not applicable to clinic level assessment of immunisation services; however, GRISP still provides a helpful overview of some areas relevant to the clinic level to focus on, specifically "Strategies to reach," "Vaccinator and manager skills," and "Community support" [30]. These components informed the assessment and evaluation sections of this study.

The TIP approach was designed to assist WHO member states to tailor immunisation services to address immunity gaps. The approach aims to identify those that are more susceptible to VPDs, diagnose barriers and motivators to vaccination, and to design evidence-based strategies to sustain vaccination [31]. It was initially developed as a diagnostic guide which was influenced by health programme planning models, social marketing, and social and behaviour change communications to address vaccine hesitancy more effectively in the European Region.

The SAGE Working Group defined vaccine hesitancy as “a delay in acceptance or refusal of vaccines despite availability of vaccination services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines” [32].. The TIP approach was intended for use by healthcare professionals, public health authorities, and decision-makers to assist in determining specific behavioural factors leading to hesitancy in population subgroups; in order to apply appropriate interventions that differ based on the identified subgroup, particular context, setting and available resources [33, 34].

The Strategic Advisory Group of Experts on Immunisation (SAGE) Working Group on Vaccine Hesitancy concluded that TIP which has been locally adapted could be a valuable tool for use in all WHO regions to assist in addressing vaccine hesitancy, and may be applicable to other programs such as communicable, noncommunicable and emergency planning where outcomes are influenced by population behavioural decisions. TIP has mainly been applied in the European Region specifically Bulgaria, Sweden, and the United Kingdom [33]. In Bulgaria, TIP was applied to profile and target Roma populations and health care providers. One of the outcomes of the approach was a plan by the Bulgarian Ministry of Health to introduce new tools to strengthen communication between service providers and families in the community regarding immunisation, improve training of the Roma health mediators or community workers to optimise their role in immunisation promotion, modify school-entry policies, and provide more education about vaccines and infectious diseases in schools [34].

In Sweden, TIP was used to improve vaccination coverage among an ethnic minority group, Somali immigrants, and an anthroposophic community (whose philosophy is based on the teachings of Rudolf Steiner which maintains that natural means are needed to optimize physical, mental health and well-being). Through using this approach, it was found that respectful dialogue between healthcare providers and members of the anthroposophic community was important. For the Somali community, there was a need to recruit and support

‘vaccine champions’ from within the community to promote vaccinations, and there was still a need to explain the risks and benefits of the combined measles–mumps–rubella (MMR) vaccine to dispel the rumour of a link between MMR and autism. TIP was also helpful in identifying administrative and financial barriers within the health care system [34].

In the UK, Public Health England (PHE) and the National Health Service completed a TIP project to address sub-optimal immunisation coverage among Jewish orthodox communities in the Hackney Borough of London. It was found that rather than a cultural or religious anti-vaccination sentiment within the community, the main issues were related to access and convenience of immunisation services, and service provider concerns were related to delivering immunisation services to the large numbers of children with limited resources. The approach assisted in the categorisation of subgroups so that targeted interventions could be developed [34, 35].

More recently, the TIP approach was used in the Hunter New England Local Health District, New South Wales, Australia with the aim of identifying low immunisation coverage areas and to gain understanding of factors influencing immunisation uptake in those areas in order to develop tailored strategies for increasing immunisation coverage. Maitland was identified as having a relatively high proportion of children not fully immunised. The main themes that emerged were: (1) limited engagement with health services unless the need was urgent, (2) access barriers to immunisation services, and (3) a flexible, family centred service utilising strong partnerships which would be more effective in increasing childhood immunisation rates. The TIP approach was used to identify areas of low coverage, provide an understanding of factors affecting immunisation rates, and determine potential effective strategies [36].

In the cases described above, the TIP approach was primarily implemented by WHO Member States i.e. national level, or provincial level rather than health facility level. It was shown to be beneficial in that, the focus was on community engagement and considered a wide range of

behavioural determinants that affect immunisation uptake in many different settings with various communities. It was clear that for the approach to be successful, there needed to be a local sense of ownership, and a visible leadership for the approach to be sustainable rather than reliance on heavy WHO engagement. Limitations to the approach; however, was that it was difficult to translate the initial diagnosis research into implementation of practical interventions, and that the TIP guide as a diagnostic tool was insufficient for this, with some studies forgoing the implementation process altogether. Also, it was found that there was a large amount of time and technical skill required for the process to be successful [37]. The TIP approach was not utilised in the initial design of the current study; however, was referred to retrospectively.

In addition to the above approaches, there are additional tools and frameworks that can be adapted to holistically assess health systems or immunisation programs. The analytical framework for immunisation programs in Canada is an evaluation framework designed to be used at the provincial or territorial level to allow for comprehensive and systematic assessment of factors that need to be considered before making decisions about introducing new immunisation programs. These factors include burden of disease, vaccine characteristics, immunisation strategy and program, cost-effectiveness of program, acceptability of vaccine program, feasibility of program, ability to evaluate programs, research questions, equity of the program, ethical considerations, legal considerations, conformity of program, and political considerations [38]. While this framework was specifically designed to determine if and when new vaccines should be introduced, components of the framework are relevant to general assessment of existing immunisation programs. In the assessment and evaluation component of this study, six of the thirteen categories of the framework were used to structure the survey, and questions for the interview and focus group guides (Immunisation strategy and program, Acceptability of vaccine program, Feasibility of program, Ability to evaluate programs, Equity of the program, Ethical considerations).

The One21seventy Systems Assessment Tool is a systems assessment tool to support primary health care to be used at the health centre level. The tool was originally designed for assessing chronic disease care, and then adapted for use in maternal and child health. It is based on the Chronic Care Model and associated Assessment of Chronic Illness Care (ACIC) tool which is a quality improvement tool to assist organisations in evaluating chronic illness service delivery [39] and the WHO Innovative Care for Chronic Conditions (ICCC) Framework which outlines eight elements that need to be considered to improve outcomes for chronic illness [40, 41]. Like the analytic framework described above, while the tool was not specifically designed to assess immunisation programs, the components of the assessment tool are relevant and can be adapted for immunisation programs as they were in this study, specifically to structure question guides under the following categories: Delivery system design, Information systems and decision support, Self-management support, Links with community, other health services, and Organisational influence and integration.

The EquiFrame is a national level systematic policy analysis framework designed to analyse and facilitate the inclusion of core concepts of human rights and vulnerability in health policy to promote greater equity in health care. These 21 core concepts of human rights that should be considered for equity in health care include non-discrimination, individualised services, entitlement, capability-based services, participation, coordination of services, protection from harm, liberty, autonomy, privacy, integration, contribution, family resource, family support, cultural responsiveness, accountability, prevention, capacity building, access, quality, and efficiency. This framework is used to determine how inclusive health policies are at a national level; however, these concepts can be used to inform the assessment of health programs to ensure that they are also being implemented in practice [42]. All 21 core concepts were taken into consideration throughout the design of this entire study (assessment, intervention development and evaluation components of the study).

2.1.1.2 Approaches to design interventions to strengthen health systems

Another academic domain that can inform the strengthening of immunisation services is Implementation Research (sometimes linked with the terminology Delivery Science, IRDS). This approach is focused on producing practically usable knowledge to improve program implementation outcomes such as effectiveness, efficiency, quality, access, scaling-up and sustainability. It is the basis for context-specific, evidence-informed decision-making to facilitate what is possible in theory to become a reality in practice. In this approach, it is essential that there is collaboration with implementers, and that key stakeholders are involved in policy creation and program management [43]. In 2014, at the Global Health Systems Research Symposium held in Cape Town, there was a call to further expand the use of implementation research to "better address local, national, and global health challenges" [44]. This was the primary approach that influenced the design of the current study, with a focus on generating information which was practical and feasible, and in collaboration with key stakeholders to implement strategies that would have direct impact on improving specific outcomes in immunisation service delivery.

The approaches described above, and systems assessment tools based on these approaches have been used in other contexts to identify system issues requiring strengthening in low and middle-income countries; however, this has mostly been at the national level rather than at the clinic level. This study aimed to use components of these approaches and tools to design a novel approach that could be used to strengthen immunisation service delivery at a clinic level, in a way that was flexible, adaptable, context-specific to South Africa, and primarily informed by the needs of the community. These approaches are summarised in **Table 2.1**.

Table 2.1. Summary of systems strengthening approaches and tools that influenced this study

Systems strengthening approaches/tools	Description	How the approach was utilised in this study?
WHO 'building blocks' approach [28]	Health systems approach developed to promote a current understanding of what a health system is, and what constitutes health systems strengthening. Not designed as a research instrument but as a way to facilitate investments of resources in health systems.	The assessment and evaluation of immunisation services component of this study was structured around the six 'building blocks' of health systems: • Service delivery • Health workforce • Information • Medical products, vaccines and technologies • Financing • Leadership and governance
Global Routine Immunisation Strategies and Practices (GRISP) [30]	National level framework developed to outline areas national governments, global partners and donors need to invest in to improve immunisation programs. Not designed as a research instrument but as a way to facilitate investments of resources in health systems.	The assessment and evaluation of immunisation services component of this study was informed by the framework in general and three of the nine "transformative investments to achieve better immunisation outcomes" were taken into account: • Strategies to reach • Vaccinator and manager skills • Community support
Tailoring immunisation programmes to reach underserved group (TIP approach) [31]	National level approach designed to tailor immunisation services to address immunity gaps, to identify those that are more susceptible to VPDs, diagnose barriers and motivators to vaccination, and to design evidence-based strategies to sustain vaccination.	The primary researcher became aware of the TIP approach retrospectively to the initial design of the current study. Hence, it is important to clarify at the outset that the TIP approach was not utilised in informing the methods or study concept for this project
Implementation research and delivery science [43]	Health systems approach focused on producing practical knowledge and evidence-informed decision-making to improve program implementation outcomes.	Primary approach that influenced design of this study: • Focus on generating information that was practical and feasible • Collaboration with key stakeholders to undertake the research and implement strategies
Analytical framework for immunisation programs in Canada [38]	Province/Territory level evaluation framework developed to allow comprehensive and systematic evaluation of factors to be considered before making decisions about introducing new immunisation programs.	The assessment and evaluation component of this study used six of the 13 categories of the framework to structure question guides: • Immunisation strategy and program • Acceptability of vaccine program • Feasibility of program • Ability to evaluate programs • Equity of the program • Ethical considerations

One21seventy Systems Assessment Tool [41]	Health centre systems assessment tool to support primary health care. Originally designed for assessing chronic disease care, adapted for use in maternal and child health. Based on the Chronic Care Model and associated Assessment of Chronic Illness Care (ACIC) tool and the Care for Chronic Conditions (ICCC) Framework.	The assessment and evaluation component of this study used the categories of the tool to structure question guides: • Delivery system design • Information systems and decision support • Self-management support • Links with community, other health services and other services • Organisational influence and integration
EquiFrame: A framework for analysis of the inclusion of human rights and vulnerable groups in health policies [42]	National level systematic policy analysis framework to analyse and facilitate the inclusion of core concepts of human rights and vulnerability in health policy to promote greater equity in health care.	All 21 core concepts were taken into consideration throughout the design of the entire study (assessment, intervention development and evaluation components of the study).

2.1.2 A systems approach to strengthening immunisation services

The research described above provides a wealth of information regarding the gaps that need to be addressed in order to improve immunisation services [1, 3, 13, 45], and in general, such research addresses only specific elements of the immunisation program and the health system in which it sits [46-52]. In order to effectively improve health outcomes, existing immunisation assessment approaches need to be supplemented with a more integrated and comprehensive approach that looks at how all the individual components of the immunisation program work together, how they affect each other, and how they interact with other aspects of the broader health system.

2.1.3 Improving components of immunisation services in South Africa

The section above describes different approaches and tools that assess health systems or health programs in a holistic way; however, the majority of previous research and evaluation in South Africa has taken a siloed approach to the strengthening of immunisation service delivery, focused on identifying gaps in individual aspects of the immunisation program, such as information systems, staff training, vaccine coverage and cold-chain equipment [1, 12]. For example, in 2008, Corrigall, Coetzee and Cameron looked at immunisation coverage rates in

children aged 12-24 months in the Western Cape via a household survey that also asked caregivers for their reasons for not vaccinating their children. It was found that the most common reasons for missed vaccinations were clinic factors such as inconvenient immunisation times, or being given the incorrect immunisation date, lack of information for parents, the caregiver being unable to attend the clinic, and lack of motivation by parents to attend the clinic [1].

Jamin *et al.* in 2014, reviewed the District Health Information System EPI data in the Eastern Cape and questioned the large variations in coverage rates and values that exceeded 100% in some sub-districts [45]. A case study commissioned by WHO and PATH was completed in the Western Cape in 2011 that outsourced the vaccine supply chain to a private-sector company to determine if this would provide a solution to the problems associated with the logistics of delivering a vaccine program [52].

Ascertaining the knowledge, attitudes and beliefs of the clinic staff and parents is also important in any strategy to improve vaccine delivery and coverage. In 2012, Wiysonge *et al.* surveyed immunisation programme managers and found the main issues were vaccine stock-outs, parents/caregivers being told to come back to the clinic at another time, insufficient knowledge among health care workers, parents/caregivers and adolescents knowledge about vaccines and immunisation, insufficient financial and human resources and resistance from parents towards vaccinating their children [3]. Stellenberg *et al.* in 2015, looked at the knowledge of community care workers about key family practices which includes immunisation [13] where it was found that knowledge was inadequate to provide safe, quality care.

The majority of studies conducted in South Africa have determined the limitations, and areas that need improvement in the immunisation program. However, there have been limited locally

developed interventions that are specific to the South African context that actually address these gaps and aim to improve immunisation service delivery [1, 3, 13, 53-55].

2.1.3.1 Strategies to improve components of immunisation services

A number of specific tools and strategies; however, have been developed internationally to improve and strengthen immunisation services, and like the assessment studies mentioned above, take a siloed approach to improve individual components of the immunisation program. A review of global WHO guidance on improving immunisation service delivery shows a variety of tools available with a strong emphasis on vaccine handling and management, along with tools for improving planning (such as Reaching Every District) and community engagement. It is notable that these address provincial, district or national levels, and do not provide a holistic approach for clinic level assessment or improvement [56].

Some examples of strategies that focus on improving individual components of the immunisation program and implemented in low-and-middle-income countries are described in **Table 2.2**. These strategies aimed to improve immunisation coverage [46, 48-50], immunisation data quality [57], vaccine supply chain and cold chain management [52], communication between health services, parents and the community [51], and parent knowledge of vaccinations [47]. All were successful in improving the targeted component of the immunisation program, and while they were not holistic in their approach to systems strengthening, there were a number of aspects that are interesting to note. For example, with improvement of immunisation coverage as an aim, strategies were quite diverse, ranging from posters to visualise infants born in the community along with their immunisation dates in India and Timor-Leste [50], text message reminders in Zimbabwe [48], a smart phone record keeping application for doctors in China [49], to health education delivered with the assistance of community spiritual leaders in Iraq [46]. The methods to reach the same goal were very

different, illustrating that strategies need to be adaptable and flexible to account for the variances in the communities where the strategy is being implemented.

Also, what we can learn from these studies is that partnering with third party stakeholders with specific expertise rather than attempting to do so alone to improve outcomes is much more efficient and can have better results. For example, in the Western Cape, South Africa where vaccine supply chain management was outsourced to a specialised private company improved the efficiency of the vaccine supply chain [52]. Partnering with those that the community trusts can improve outcomes since the strategies will be relevant to the community's needs, and takes into account what is appropriate or feasible for a specific community [46]. Also, collaborative partnerships between immunisation providers can improve community engagement and quality of immunisation service [58].

Table 2.2. Examples of tools and strategies implemented to improve individual components of immunisation programs in low- and middle-income countries

Strategy/tool	Component of immunisation program targeted for improvement	Aim/outcome of study	Country	Level of implementation
My Village is My Home (MVIMH) tool [50] Poster-sized record of every infant born in the community and their vaccination dates	Immunisation coverage	• Community health leader, volunteer and health care worker monitoring of vaccination status in their community • Visual motivation to vaccinate more children and improve vaccination timeliness	India and Timor-Leste	District level
Data Quality Report Card (DQRC) [57] "Desk review" of available data and data verification using an Excel-based Data Quality Assessment (DQA) Tool	Immunisation data quality	Reviews: • Completeness of reporting • Internal consistency of reported data • External consistency of population data • External consistency of coverage rates	Global	National level

Text message reminders [48] Routine health education and automatic text message reminders sent to mothers or caregivers about their child's immunisation appointments (6-week, 10-week, and 14-week appointments)	Immunisation coverage	• Immunisation coverage improved significantly • Timely administration of vaccines due to the combination of reminders and health education	Kadoma City, Zimbabwe	District level
Outsourcing certain vaccine supply chain functions [52] Public-private partnership (PPP) between the WCDoH and a private sector logistics service provider (LSP) to outsource certain supply chain functions. LSP responsibilities included: • maintaining cold chain storage and management of vaccines for the province • distribution and transport from provincial warehouses to health centres	Vaccine supply chain: stock management, cold chain storage facilities and inefficiencies in government vaccine distribution	• Outsourcing vaccine supply logistics resulted in better vaccine management, handling and cold chain management • More cost effective to outsource these tasks as compared to when the WCDoH maintained responsibility	Western Cape, South Africa	Provincial level
Country map of communication interventions [51] Interventions visualised on the map and categorised as: • Inform and educate • Remind or recall • Teach skills • Enhance community ownership • Enable communication	Communication between health services, parents and communities about childhood vaccinations	Immunisation program managers able to identify: • Areas where vaccination communication interventions were concentrated • Where gaps in vaccination communication were	Bauchi State, Northern Nigeria and Cross River State, Southern Nigeria	Provincial level
Educational seminar [47] 1-hour educational seminar for parents consisting of: • 10-minute educational animated movie • 50-minute lecture using a PowerPoint slide presentation • Forum where parents could share feedback and concerns with health professionals	Parent knowledge about immunisation	Intervention was found to significantly increase parent knowledge.	Kuantan, Pahang state, Malaysia	Provincial level

Smart phone application [49] Designed to be used by village doctors to assist in recording and managing the vaccination process by: • automatically making appointments • recording and updating child immunisation information • generating a list of children that missed appointments • being a source of health information	Immunisation coverage	• Immunisation coverage improved (unclear if solely due to the mobile application as the intervention was paired with reminder text messages for parents to encourage timely vaccinations) • Study participants reported that their own efficiency in carrying out vaccination related tasks was improved due to the app	Xuanhan County, Sichuan Province, China,	Provincial level
Community spiritual leader assistance in a researcher delivered health education campaign [46] 3-hour programme in the format of health talks, posters and a film.	Immunisation coverage	• Vaccination coverage rates significantly improved • Demonstrated the importance of taking into account the local context in developing culturally appropriate interventions that are capable of effecting change	Akre district Kurdistan Iraq	District level
Collaborative Community Checklists for Immunisation [58] Locally adapted provider immunisation session checklists and community quality assessment checklists	Immunisation service quality and access	Perceived improvement in community's knowledge of immunisation, quality of service, and more active care-seeking for childhood vaccination	Ngaphe Township, Magway Region, Myanmar	District/facility level

These strategies addressed specific barriers to immunisation coverage or service delivery, showed success in improving outcomes, and provided valuable information on how methods used should be relevant to diverse communities at a district, provincial, and national level. However, there is limited research on comprehensive approaches that include clinic level assessment of barriers and limitations from both the perspective of clinic staff and parents in addition to targeted strategy implementation to improve vaccine coverage.

2.2 Immunisation services in South Africa

Immunisation services in South Africa are delivered in the private sector by general practitioners, and in the public sector by registered nurses who are also referred to as 'nursing sisters'. Immunisations are also delivered by nurses at pharmacies in what is referred to as a

'public-private partnership' (PPP). The Expanded Programme on Immunisation (EPI) forms the basis of immunisation services provided in the public sector while the private sector includes a few additional vaccines to the EPI. The EPI is an integral component of the comprehensive Primary Health Care (PHC) package and targets those aged under 13 years of age, and pregnant women.

According to South African EPI policy, immunisation services for children and women should be available daily ("Every Day should be an Immunisation Day") at all public health facilities which include clinics, hospitals and community health centres, and is offered as part of free health services available for women and children under 6 years [59].

2.2.1 The Expanded Programme on Immunisation (EPI)

The Expanded Programme on Immunisation (EPI) implemented in South Africa and globally in 1974, was developed by the World Health Organization (WHO) with the aim to make immunisation against vaccine-preventable diseases (VPDs) available to every child [1-3].

In South Africa, implementation of the EPI is executed at the provincial level, while the National Department of Health (NDoH) facilitates implementation via the development of EPI policies and overall monitoring of adherence to these policies. In addition to this, the National Advisory Group on Immunisation (NAGI) acts in an advisory capacity to the NDoH, especially in making decisions about the introduction of new vaccines to the EPI schedule [60]. Currently the South African EPI schedule has 11 antigens since the introduction of human papillomavirus vaccine (HPV) in 2014, and covers children aged 0-12 years of age (including booster immunisations) [60-62]. A fully immunised child in this study is defined as one who has received all scheduled immunisations aged under but not including 12 months, i.e. a child who has received timely vaccinations including the final pneumococcal vaccination at 9 months but not including the final measles vaccination at 12 months [18]. These vaccines are shown in **Table 2.3**. It is important to note that as of 2015, the South African EPI schedule had changed

measles dose 1 vaccine to be administered at 6 months, and measles dose 2 vaccine to be administered at 12 months (from 9 months and 18 months originally). However, none of the paperwork (including government policy and the Road to Health Booklet) has been updated to reflect this change beyond the yearly reporting of district, provincial, and national immunisation outcomes.

Table 2.3. South African EPI schedule and an example of a private vaccination schedule for 0-12-month-old children

Age	EPI Schedule	Private Schedule
At birth	Bacillus Calmette-Guérin (BCG) Oral polio vaccine (OPV0)	Bacillus Calmette-Guérin (BCG) Oral polio vaccine (OPV0)
6 weeks	Oral polio vaccine (OPV1) Rotavirus vaccine (RV1) Pneumococcal vaccine (PCV1) Diphtheria, tetanus, acellular pertussis / inactivated polio / Haemophilus influenzae type b and Hepatitis B vaccine (DTaP-IPV-Hib-HBV1)	Oral polio vaccine (OPV1) Rotavirus vaccine (RV1) Diphtheria, tetanus, acellular pertussis / inactivated polio / Haemophilus influenzae type b and Hepatitis B vaccine (DTaP-IPV-Hib-HBV1)
10 weeks	Diphtheria, tetanus, acellular pertussis / inactivated polio / Haemophilus influenzae type b and Hepatitis B vaccine (DTaP-IPV-Hib-HBV2)	Rotavirus vaccine (RV2) Pneumococcal vaccine (PCV2) Diphtheria, tetanus, acellular pertussis / inactivated polio / Haemophilus influenzae type b and Hepatitis B vaccine (DTaP-IPV-Hib-HBV2)
14 weeks	Oral polio vaccine (OPV2) Rotavirus vaccine (RV2) Pneumococcal vaccine (PCV2) Diphtheria, tetanus, acellular pertussis / inactivated polio / Haemophilus influenzae type b and Hepatitis B vaccine (DTaP-IPV-Hib-HBV3)	Rotavirus vaccine (RV2 or 3) Pneumococcal vaccine (PCV3)
6 months	Measles vaccine (MCV1)	
9 months	Pneumococcal vaccine (PCV3)	Measles vaccine (MCV1) or Measles, mumps, rubella vaccine (MMR1)
12 months	Measles vaccine (MCV2)	Measles vaccine (MCV2) or Measles, mumps, rubella vaccine (MMR1 or 2) Pneumococcal vaccine (PCV4) Varicella vaccine (VAR1) Hepatitis A vaccine (HepA)

The responsibility of the National Department of Health in administering immunisation services is to oversee policy, monitoring and setting national goals and targets for the EPI. While these goals are set at a national level, it is the responsibility of provincial and district level administration to implement effective immunisation programmes to achieve these targets. The most recent publicly available EPI goals were updated in 2014, and are in line with the

Department of Health Strategic Plan (2014/15 to 2018/19) and the Annual Performance Plans of the Department. These EPI goals include:

1. 95% vaccine coverage at the national level and 90% vaccine coverage in all districts by 2015 of fully immunised children under one year old; 98% at the national level by 2018;
2. Maintain polio free status until global polio eradication;
3. Maintain neonatal tetanus elimination status;
4. Achieve measles pre-elimination goals by 2015, i.e. Less than five confirmed measles cases per one million of the total population, measles elimination of less than one case per one million of the total population;
5. DTaP-HiB-HBV third dose to measles first dose dropout rate of less than 7% by 2015, and less than 5% by 2018;
6. Investigate and respond to 80% of suspected adverse events following immunisation (AEFIs);
7. Universal access to quality immunisation services which include new vaccines [59].

Conventional public or private health care centres remain the most common providers of vaccinations; however, childhood and flu vaccinations are also offered at some pharmacies across the country such as Dis-Chem, Clicks, Ackermans Pharmacy and Synergy Pharmacy. These pharmacies include a private well-baby clinic service at particular stores, and provide immunisations either according to the Expanded Programme on Immunisation or the "private schedule" which contains a few additional antigens such as measles, mumps and rubella vaccine (MMR) instead of measles containing vaccine (MCV) and varicella vaccine (VAR) based on the parents'/guardians' choice (see **Table 2.3**) [63-66]. The local supermarket PicknPay also offer a pharmacy and clinic service that provides well-baby checks, childhood vaccinations and flu vaccinations [67].

In addition to pharmacy clinic services, in 2015 Uber South Africa partnered with Discovery Health, a medical scheme administrator [68] to provide "on demand" flu vaccinations for those over 18 years old through "UberHEALTHSA". For a single day during flu season, users of the Uber mobile application would be able to request a flu vaccination to be given at a location of their choice. Once users had selected their location via the application, a Discovery-accredited nurse would be sent to the location to administer flu vaccinations for up to five individuals that were 18 years and over for a flat rate of R100 (approximately AU$10) [69]. As of April 2018, this service has been rebranded as "UberWELLNESS" and has expanded its partnership with Discovery Health to include Clicks and Dis-Chem pharmacies. The flu vaccination itself will be provided free of charge; however, the cost of the nurse visit will be R100 (approximately AU$10). This service is provided in Johannesburg, Pretoria, Cape Town, Durban and Port Elizabeth [70, 71].

2.2.2 Vaccine supply

Prior to 2003, the NDoH was responsible for procurement of vaccines where the department issued tenders on behalf of provinces and acquired stock from successful bidders. From 2004 to the present; however, vaccine supply and distribution has been administered by a public–private partnership (PPP) between the NDoH and Biovac Institute which is located in Cape Town. This PPP was put in place due to the reduction of quality of national vaccine production. Biovac is now solely responsible for vaccine procurement, manufacture and distribution on behalf of the NDoH for the entire country. Vaccine supply chain management remains the responsibility of suppliers within the provincial and district immunisation programme. It is estimated that Biovac distributes approximately 11.5 million vaccine vials per year which is equivalent to 46 million doses via distribution centres in Johannesburg and Cape Town [72].

2.2.3 Vaccine Preventable Diseases (VPDs) in South Africa

Since implementation, the EPI has had a considerable impact on VPDs in South Africa with the eradication of maternal and neonatal tetanus in 2002, the eradication of polio in 2006 with the last case reported in 1989, and an improvement in the control of measles with a reduction from 5,000-20,000 cases a year during the period of 1980-1997 to 8-59 cases a year between 1998-2002) [73]. The National Institute for Communicable Diseases (NICD) has reported more than 40% reduction in pneumococcal diseases in all age groups, with the greatest reduction in those under two years of age, and a 60% reduction in hospitalisations due to diarrhoea caused by rotavirus which has been attributed to the introduction of the pneumococcal and rotavirus vaccines in 2009 [60].

However, from 2003 to 2018, South Africa has experienced periodic outbreaks of vaccine preventable diseases in children, especially in peri-urban areas in the Western Cape where access and migration can be problematic. The largest outbreaks in the last 15 years have been measles outbreaks between 2003-05 where there were 1,676 laboratory-confirmed cases of measles in South Africa after its introduction from Mozambique [11, 54], and between 2009-11 where over 18,000 cases were reported nationally with the majority of these cases among infants less than one year old of age [11, 13]. There have also been smaller outbreaks over the last four years. In 2014, 62 cases of measles were reported across the country [7]. In 2015, outbreaks of measles were reported in the Western Cape, Gauteng, Mpumalanga, KwaZulu-Natal and Northern Cape [7]; during January to February 2017, 27 cases of measles were reported in Western Cape [8]; and during September 2017 to February 2018, 63 cases of measles were reported in KwaZulu-Natal [6, 10].

More recently, in addition to measles outbreaks, there have been outbreaks of other VPDs. In March 2015, there was a diphtheria outbreak with 15 cases reported in KwaZulu-Natal, nine of which were not fully immunised for diphtheria [4]; and in August 2017, four cases were

reported in Western Cape [5]. In December 2017, there was a report of an increase in pertussis cases in the Western Cape with 64 cases of the 76 identified cases aged under one year old [9]. The frequency of these outbreaks has highlighted a need for stronger immunisation services and improved vaccine coverage, as the majority of these outbreaks either occurred in areas that had low vaccine coverage and had failed to meet coverage targets, or in those that had missed vaccinations [5, 11].

2.2.4 Challenges in delivering immunisation services in South Africa

Despite significant improvements in the control of VPDs, vaccine coverage and immunisation program service delivery, there are many associated challenges. In any setting, whether high income or low-to-middle income countries, there are barriers to immunisation such as lack of access, low risk perception i.e. the diseases that vaccines protect against are not serious, distrust of medical practitioners and complacency, lack of information about vaccines and immunisation, alternative philosophical health beliefs or opposition to vaccination based on community belief systems, hesitancy, and behavioural or social determinants of health [31, 74, 75].

In the South African context in particular, there are many barriers associated with providing immunisation services. Vaccination coverage remains sub-optimal and estimation of coverage is complex. From 2012 to 2017, national immunisation coverage for fully immunised children under one year old was below the national target of 92% with the most recent estimate being 82% [18]. Out of nine provinces, only Gauteng surpassed the national target (97%), and only two provinces surpassed the national average which were KwaZulu-Natal (86%) and Free State (84%). Of the remaining six provinces (Western Cape, Northern Cape, Mpumalanga, Eastern Cape, North West and Limpopo) all had coverage of 80% or below [18].

Over the last five years, the national MCV1 coverage in South Africa has been estimated to have increased from 87% to 96% [76, 77] and MCV2 coverage from 75% to 96% [18].

However, these estimates may not be entirely accurate, especially as some provincial estimates are over 100% (Free State: 106%, Gauteng: 106%) [12]. In contrast to South African national estimates, the WHO reported in 2016 that the MCV1 coverage in children aged one year old in South Africa was 75% which is substantially lower than coverage in other Southern African countries (Lesotho, 90%; Namibia, 85%; Botswana, 97%)[78]. Similarly, diphtheria, tetanus and pertussis 3 (DTP3) coverage in South Africa is reported by the NDoH to be 90% among children aged one year old, while the WHO reports coverage to be 65% [77].

There are several reasons for the discrepancies between South African administrative data and WHO data. Estimating vaccination coverage remains a challenge due to the difficulty in determining both the numerator and the denominator used to calculate coverage [77]. Ordinarily, there is an underestimation of the denominators mainly related to the complexity of accounting for populations with high levels of migration. South Africa has a large migrant population (both legal and illegal) from Zimbabwe, Lesotho, and Mozambique, and while children of illegal immigrants may receive immunisations, they may not necessarily be accounted for in the national census, of which the most recent was in 2011 [79]. There is also a high amount of internal migration between rural villages and metropolitan areas, and back and forth between districts or provinces which is not always described in national population estimates [79].

As the data originate at the clinic level before coverage is calculated at the provincial or district level, there are associated challenges with the data collection process itself. It is primarily nursing staff and clerks that are responsible for data collection and compiling monthly statistics. However, as this is only one of their responsibilities, there may not be sufficient time for staff to complete this task [80].

This leads to data recording taking place much later than when vaccinations were actually administered, and a delay in collation of vaccine doses which affects the quality of the data

[80]. There is also duplication of data collection with nurses and clerks inputting data using multiple mediums in the same clinic such as tally sheets, multiple separate registers for patient data as well as the electronic health information system [81]. Specific training for staff involved in the data collection process is generally limited with the possibility of staff having limited statistical and data quality checking skills. As there are a number of steps involved in the data collection process before it is sent to the provincial/national level for analysis, there is an increased probability of transcription errors, and data quality checks and validation is generally only limited to ensuring that the data submitted was complete and on time according to sub-district deadlines, not if it was accurate [80, 81].

Not only are there possible inaccuracies in NDoH vaccination coverage estimates, there is also a clear discrepancy between WHO and NDoH data [82]. It is likely that the WHO data may be closer to a true representation of coverage based on recent measles and diphtheria outbreaks within the community in South Africa [4, 6-8, 11]. Accurate estimation of vaccine coverage is a major challenge that has a large impact in immunisation service delivery and vaccine uptake in South Africa, and is an area where more research is needed to improve processes. However, improving data quality was not an aim of this study and was considered beyond the scope of this project. The focus of this study was on improving health systems and identifying parental barriers to vaccination that could be grouped into the following three areas:

1. Clinic service delivery;
2. Community engagement and knowledge, and;
3. Quality of immunisation services.

Clinic service delivery include how the immunisation program itself is delivered, i.e. clinic processes, as well as the various components included in clinic services. Previous research in South Africa highlighted in **Table 2.4** has identified a number of barriers associated with clinic service delivery that have an effect on immunisation uptake, and also provide insight into what

factors caregivers consider when deciding to immunise their child. These barriers mainly relate to the way clinic staff carry out their duties, such as missed vaccination opportunities and parents given incorrect vaccination dates [1], their concerns about giving children multiple injections during a single clinic visit (mainly due to the crying and pain experienced by the child) [83], and accessibility issues such as the clinic being too far away for parents to travel to, inconvenient immunisation times, and long clinic waiting times and attitude of staff [1, 84] (see **Table 2.4**).

Limited parental knowledge about vaccines and immunisation, and community engagement with health services remains a challenge in providing immunisation services to the community and is a barrier to vaccine uptake [3, 83, 84]. Immunisation service providers have said that while parents may bring their child to the clinic for immunisations, they do this as it has become a routine activity without understanding the importance of immunisation [84]. There is also limited parent understanding of the EPI schedule [83]. Programme managers have also expressed concerns that parents may be potentially accessing misinformation about vaccinations propagated by anti-vaccination lobbies which may have a negative impact on vaccination coverage and cause a reluctance in parents to vaccinate their child [3].

In addition to this, it has been identified that socioeconomic status (SES) can be a barrier to accessing immunisation services mainly due to economic inequality rather than level of education [55]. While immunisation services within the public health system in South Africa are provided for free, there may be other indirect costs related to clinic services that have an impact on whether caregivers with a lower SES can access the clinic, for example, lack of funds to meet the cost of food while at the clinic or transport expenditures [55, 84].

Another factor that may affect utilisation of immunisation services is positive HIV status either of the parents or of the child. Positive status may reduce the probability of a child receiving

vaccinations as the parent may not want to disclose their status to the health care workers [55] (see **Table 2.4**).

Both EPI programme managers in South Africa and clinic staff have identified a number of barriers that affect the quality of immunisation services (see **Table 2.4**). These are mainly related to insufficient knowledge of vaccines and immunisation among staff with some staff providing incorrect information to parents, staff shortages and high staff turn-over, limited finances for provision of service, vaccine and resource shortages, poor communication among stakeholders such as NGOs and other organisations (advocacy and social mobilisation), and limited collaboration between the public and private health sectors [3, 53]. Staff have indicated that these barriers not only reduce the quality of services but also make it difficult to follow up on children who have missed immunisations [53, 84]. It has also been identified that there can be issues with the cold chain, in that it is not always well maintained during transportation and storage of vaccines [84] (see **Table 2.4**).

Table 2.4. Summary of South African studies that assessed barriers to vaccination

	Study	Barrier	Province
1) Clinic service delivery	Corrigall *et al.* (2008) [1] • Immunisation coverage rates and decision-influencing factors for caregivers to vaccinate their children • Cross-sectional household survey – '30 by 7' cluster sampling • Caregivers of children aged 12-23 months	Missed vaccination opportunities	Western Cape
		Parents turned away from clinic	
		Parents given incorrect vaccination dates	
		Accessibility of the clinic – too far	
		Inconvenient immunisation times	
		Vaccine shortages	
	Mothiba and Tladi (2016) [84] • Challenges when implementing the EPI and knowledge/practices of nurses • Semi-structured interviews with professional nurses • Rural primary healthcare facilities	Long waiting times	Limpopo
	Tabana *et al.* (2016) [83] • Acceptability of multiple vaccinations at a single clinic visit • Cross-sectional survey of caregivers of infants and vaccinators • Public and private primary healthcare facilities • Rural and urban areas • Convenience sample of caregivers ≥18 years old with infants aged between six weeks and six months old	Clinic staff concerns about multiple injections in a single immunisation visit (crying and pain experienced by the child)	Western Cape and KwaZulu-Natal
2) Community engagement and knowledge	Mothiba and Tladi (2016) [84] *description as above	Limited parent knowledge about the importance of immunisation – it has become a routine activity	Limpopo
	Tabana *et al.* (2016) [83] *description as above	Limited understanding of the EPI schedule	Western Cape and KwaZulu-Natal
		Non-compliance with scheduled return dates	
		Parent concerns about multiple injections in a single immunisation visit (crying and pain experienced by the child)	
	Wiysonge *et al.* (2012) [3] • Challenges EPI programme managers face during EPI delivery • Survey of national and provincial EPI managers and systematic review	Misinformation about vaccinations propagated by anti-vaccination lobbies	All provinces

	Ndirangu *et al.* (2009) [55] • Immunisation coverage rates and influence of maternal HIV status on child immunisation status • Household survey with mothers • Urban, peri-urban and rural areas • Mothers of children aged 12-23 months old	Positive HIV status of caregivers and/or child	KwaZulu-Natal
		Lower socioeconomic status of caregivers	
3) Quality of immunisation services	Wiysonge *et al.* (2012) [3] *description as above	Insufficient staff knowledge of vaccines and immunisation	All provinces
		Staff shortages and high staff turn-over	
		Limited finances for provision of service	
		Poor communication among stakeholders such as NGOs and other organisations (advocacy and social mobilisation), and	
		Limited collaboration between the public and private health sectors	
		Resource shortages (Road to Health booklets)	
	Mothiba and Tladi (2016) [84] *description as above	Poor maintenance of the cold-chain	Limpopo

2.3 Locally driven intervention development

In order to strengthen immunisation services to supplement this integrated and comprehensive systems assessment approach, strategies or interventions that are developed to address barriers to service delivery or coverage should consider the views of local stakeholders in that service such as service providers and service users. If intervention development is locally driven rather than solely driven by the researcher, and collaborative partnerships are formed to build trust, it is more likely that the intervention will actually address the needs of the community and result in sustainability and improved service outcomes [46, 85].

2.3.1 Experience-based co-design

Experience-based co-design (EBCD) uses the principles of participatory action research (PAR) as a method to engage service users in identifying areas that need change and in a process of collaborative development of solutions to these areas [86]. PAR aims to understand human experiences and to take action to solve difficult situations by empowering others, and through researchers collaborating with those that are being researched to improve conditions. The perspectives of study participants are integrated in all stages of the research process [87]. The ultimate goal of this is a better health-care experience for service users [88].

There are two stages in EBCD. The first component is an assessment or 'information gathering', specifically about the experiences of service users when utilising services to identify both positive experiences and areas needing improvement; namely barriers and facilitators of services or 'touchpoints'. The main aim of this component of assessment is to initially develop a clear understanding of service users' perceptions and experiences with all elements of the service, including processes, and service structures [86, 88]. This stage of EBCD is consistent with standard health systems strengthening assessment of health services; however, the second step of EBCD goes beyond this and includes a 'co-design process'. This is where both staff and service users are involved in a learning process facilitated by a third party to collaboratively design changes or interventions that are based on the barriers identified in the assessment component as areas needing improvement [88].

The participation of both service users and service providers is not only gathering information about the service itself but also in developing solutions to the perceived gaps in service delivery, allows for a partnership to be formed between the two parties, a collaborative decision-making process and greater engagement in improving the quality of health care experiences. This can result in better overall quality of care and service delivery [86].

There has been limited research on using EBCD to develop interventions to specifically improve immunisation outcomes and immunisation services either in South Africa or internationally. However, there have been a few studies conducted in South Africa that used either EBCD or PAR in other health contexts.

A study published in 2016 by van Deventer, Robert and Wright used EBCD to supplement a quality improvement intervention for malnourished or HIV positive children in North West Province, South Africa. Both clinic staff members and mothers/caregivers were interviewed and their experiences were analysed for 'touchpoints'. Staff and mothers/caregivers were initially part of separate feedback sessions before they were combined in one feedback session to share their experiences. From this session, mixed staff and mother/caregiver co-design groups were formed around three separate areas that were decided needed improvement. It was found that EBCD was beneficial in creating practical improvements that were focused on providing mother/caregivers and their children a better health service experience while also engaging staff in ongoing quality improvement. However, challenges involved in using the method were found, such as disagreements arising between staff and mothers/guardians, difficulty in recruiting and retaining mothers/caregivers for the study, and limited financial resources that effected the ability to implement some of the suggested solutions [89].

Petersen, Bailie and Bhana (2012) carried out a study in Northern KwaZulu-Natal that used a participatory implementation framework in the development of district mental healthcare. This was achieved by development of a community collaborative multisectoral forum which brought together different stakeholders to communicate, improve awareness of mental health, ensure political support, and prioritise interventions. Service providers and service users were involved in intervention development, community health workers were trained and supported to identify and assist people in the community with common mental disorders, and community members were trained and supported to run peer-to-peer interventions. The study found that

this framework, and in particular, community participation resulted in more culturally competent services and personal empowerment of those involved (i.e. services are able to provide health care that meet the social, cultural and linguistic needs of patients, and patients feel that they are able to have a say in how services can meet those needs). Challenges in the context of this study were that the majority of community members who were involved were marginalised women who had limited power to effect structural change [90].

These studies show that while there may be challenges involved, EBCD can be an effective method of developing interventions that are locally driven, and reflect the perspectives of all parties involved in the health service such as service providers both at the administrative level as well as the health centre level, service users, community health workers, and the community as a whole. EBCD can bring together key stakeholders to create solutions to barriers in service delivery that are not only practical but also culturally appropriate that may have significant impact on health service outcomes.

2.4 Application to strengthening immunisation services

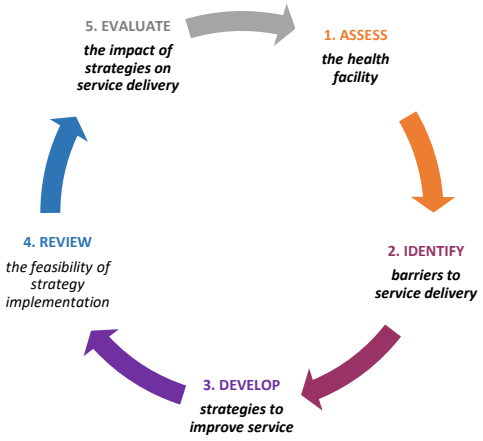
The primary aim of this project was to assess whether the use of a tailored systems assessment approach based on theory-driven frameworks could effectively assess barriers and facilitators to service delivery, and guide implementation of tailored strategies to improve immunisation delivery at the clinic level. This is an innovative research study in that it included both the assessment of clinic level, context-specific factors that affect immunisation service delivery, as well as the implementation of interventions that address these gaps to strengthen the program in a systematic way (see **Figure 2.1**). Health facilities were **assessed** holistically by observing clinic processes, and integrating the perspectives of not only health service providers but health service users as well. Based on these findings, barriers to service delivery were **identified** and prioritised based on the need of the facilities, and strategies were **developed** with the collaboration of service providers to address these barriers by **reviewing** the feasibility of

strategy implementation. Following an implementation period of 4-6 months, the impact that strategies had on service delivery was **evaluated** as indicated in **Figure 2.1.**

Every stage of this project including review of the data, and strategy development was driven by clinic staff and implemented over a short period of time. This was to ensure that clinic staff remained engaged with the project and that momentum was not to be lost. The aim of this project was also to improve dialogue between clinic staff and parents so that both groups were encouraged to take ownership of improving immunisation services and uptake in their community.

This project improved the delivery of immunisation within a large township in a specific region in the Western Cape through a rigorous local assessment process followed by tailored interventions aiming to improve immunisation coverage, quality and engagement for young children.

The approach piloted in this study can inform initiatives to further expand 'whole-of-system' approaches that apply WHO health systems thinking in other provinces to enable clinic staff to assess EPI vaccine delivery, identify barriers to immunisation service delivery, and develop targeted and simple strategies to address these barriers. These data also provide qualitative and attitudinal research on barriers to immunisation that include both access issues and hesitancy, for the first time in the African context.



ASSESS the health facility	IDENTIFY barriers to service delivery	DEVELOP strategies to improve service	REVIEW the feasibility of strategy implementation	EVALUATE the impact of strategy on service delivery
Clinic data assessment ***Clinic process observation*** ***Semi-structured interviews, focus groups and surveys***	***Based on the outcome of assessment***	***Based on identified barriers***	***For each potential strategy:***	***Clinic data assessment*** ***Clinic process observation*** ***Semi-structured interviews, focus groups and surveys***
Components that will be assessed:				*Components that will be assessed:*
Immunisation strategy and program ▪ *Clearly outlined strategy and consistent description of processes?*			*Does the facility have sufficient provincial/sub-district support to implement the strategy?*	**Immunisation strategy and program**
Information systems and decision support ▪ *Suitable information systems in place for patient management?* ▪ *Adherence to evidence-based guidelines to inform decisions?*				**Information systems and decision support**
Self-management ▪ *Promote and support self-management for clients i.e. processes in place that assist and support parents/guardians in maintaining their/their child's health, and parental knowledge?*			*Does the facility have the financial resources to support the strategy?*	**Self-management** **Links with community, other health services and resources**
Links with community, other health services and resources ▪ *Allow for communication and cooperation with other health centres, community-based organisations and programs?*			*Does the facility have sufficient staff to support the strategy?*	**Feasibility of program**
Feasibility of program ▪ *Program implementation feasible given existing resources and external influences?*				**Quality improvement of program**
Quality improvement of program ▪ *Aspects of the program monitored and evaluated to improve the quality of service delivery?*			*Does the facility have the necessary additional resources to implement the strategy?*	**Acceptability of vaccine program**
Acceptability of vaccine program ▪ *High level of demand or acceptability exist for the immunisation program?*				**Effectiveness of individual strategies implemented**

Figure 2.1.Summary of the approach used in this study

3 Health Services and Community Uptake Assessment: Assessing the functioning of immunisation systems at the clinic level

3.1.1 Introduction

This chapter describes the clinic level assessment of immunisation service delivery in three paediatric health centres in Khayelitsha, Western Cape to provide an overall understanding of the functioning of the immunisation program at each of the clinics. The assessment takes a socio-ecological approach and includes the perspectives of the service provider such as upper management, clinic staff, community care workers and service users such as the parents/guardians who bring their children to the clinic for immunisation. This study used a mixed-methods design where both quantitative and qualitative data were collected concurrently and then analysed. The assessment was also supplemented with an estimation of clinic vaccination activity, and observation of clinic processes.

This assessment consisted of four components:

1. Estimation of **vaccine doses administered** at the three paediatric clinics in Khayelitsha, where routine patient immunisation data of children aged 14 weeks-12 months was analysed to provide a baseline indication of vaccine activity at each clinic based on the number of vaccines administered at 14 weeks, 6 months, 9 months, and 12 months averaged over a 3-month period.
2. Assessment of **knowledge, attitudes and practices of immunisation service providers** and the community barriers and facilitators to EPI service delivery through semi-structured key informant interviews and focus groups with the Sub-District Health Manager of Khayelitsha, the Health Facility Managers, Immunisation Nurses, Clerks, Pharmacists and selected Community Care Workers from the three clinics.
3. Assessment of **knowledge, attitudes, beliefs (KAB) and concerns of parents/guardians** about vaccines and immunisation and their understanding of the

barriers and facilitators to having their child immunised at their local clinic through written surveys and focus groups conducted with randomly selected parents/guardians within the catchment area of the three clinics.

4. Assessment of **immunisation facilities and procedures through structured observation** of immunisation sessions at each clinic and an audit of infrastructure and equipment, using tools adapted from the WHO and national immunisation standards, and informed by WHO health systems frameworks.

3.2 Methods

3.2.1 Primary objective

The primary objective of the assessment study was to assess the functioning of paediatric immunisation systems at the clinic level for children under 12 months in three primary health care clinics in Khayelitsha, Western Cape, South Africa to determine the key barriers and facilitators to immunisation service delivery.

3.2.2 Secondary objectives

1. To identify the baseline number of vaccine doses given to children 12 months or less as recorded from individualised clinic data over a 3-month period from June to August 2017. Number of doses of diphtheria-tetanus-acellular pertussis-inactivated polio-*Haemophilus influenzae* type b-hepatitis B vaccine (DTP-IPV_HIB-HepB), measles vaccine (MCV) and pneumococcal vaccine (PCV) administered to children aged 14 weeks, 6, 9 and 12 months, as per the EPI.
2. To determine the knowledge, attitudes and engagement of service providers in the three clinics towards service delivery of the EPI.
3. To determine the knowledge, attitudes, beliefs (KAB), concerns and engagement of parents/guardians of children aged under 12 months towards immunisation who attended the three clinics.

4. To determine potential access issues or practical barriers for parents/guardians of children aged under 12 months for parents/guardians attending the three clinics to have their child immunised through structured observation and an audit of clinic processes.

3.2.3 Hypotheses

1. Delivery of the EPI at the clinic level in the Western Cape is hindered by inter-linked system weaknesses and programmatic problems constraining service delivery, and/or deficiencies in health care worker knowledge, attitudes, beliefs or practices.
2. Parents'/guardians' knowledge, attitudes, beliefs and concerns about immunisation and service delivery and/or access issues play an important role in the low vaccine coverage in children aged under 12 months old in the Western Cape contributing to sub-optimal immunisation service delivery.

3.2.4 Study setting

Three public clinics that provide child health services in Khayelitsha were recruited for this study: Kuyasa Community Day Centre, Nolungile Clinic, and Town II Community Day Centre. All three clinics provide standard primary health care services including immunisation, HIV and TB care with the bulk of care provided by registered nurses and enrolled nurses. The three clinics range in size with Kuyasa seeing approximately 1000-1500 primary health care patients under the age of 5 years per month, Nolungile approximately 2000-2500 per month and Town II approximately 600-1000 patients per month.

3.2.5 Study duration

This study was carried out over a 6-month period between November 2016 and April 2017 which included assessment of the EPI service providers and service users, and immunisation service delivery as described.

3.2.6 Participants

A total of 46 EPI service providers and 450 service users were engaged in the study. This included the Khayelitsha sub-district Child Health Manager, Khayelitsha sub-district Primary Health Care Manager, three health facility/deputy health facility managers, six immunisation (enrolled or registered) nurses, three pharmacists and six clerks, 26 community care workers and 450 parents/guardians of children aged under 12 months who attended one of the three clinics.

3.2.6.1 Selection criteria of participants

As this project was conducted in collaboration with the Western Cape Department of Health and the City of Cape Town, the sub-district Child Health Manager, sub-district Primary Healthcare Manager, and Health Facility Managers had already been engaged to participate prior to the commencement of the study. Nurses, clerks, pharmacists, and community care workers were recruited via the Health Facility Managers.

Inclusion criteria: To participate in the study, sub-district managers and health facility managers needed to have direct involvement either in the management or administration of EPI service delivery. Nurses had to have direct involvement either in the management or administration of vaccines including interaction with parents/guardians of children aged under 12 months old who accessed the clinic. Clerks and community care workers needed to have direct interaction with parents/guardians of children aged under 12 months old who accessed the clinic and pharmacists had to be involved in the ordering process for vaccines for EPI service delivery.

Sampling of EPI service users was purposive in that they had to be parents/guardians of children aged under 12 months who attended the three clinics within the community. Parents/guardians were approached by field workers in the waiting areas of the clinic to obtain a convenience sample based on parents/guardians who had the time to participate in the survey

within the child health waiting area of the clinics with a subset of these participants randomly selected to be involved in focus groups.

3.2.7 Sample size

Based on the estimation that there were 10 000-12 000 children aged between 12 and 24 months [16] in the sub-district of Khayelitsha with a confidence interval of 0.05, the aim was to survey 300-500 parents/guardians who attended any one of the three clinics.

3.2.8 Estimating number of vaccines provided by three paediatric clinics in the sub-district of Khayelitsha

Individual patient level immunisation data are routinely collected in children aged under 5 years old at each clinic (Nolungile Clinic, Town II Clinic and Kuyasa Clinic) and recorded in paper folders which are stored in filing cabinets in the clinics. These data are then entered into an electronic data management system (Patient Record and Health Information System, PREHMIS) ideally on a daily basis by the clinic clerks.

The data includes information on the number of people who attended the clinic for specific services and number and type of vaccine doses administered (see **Table 3.1**). Every month, the clinics compile their data and submit it to sub-district management for monitoring and evaluation of immunisation service delivery targets.

Vaccine doses for children <12 months were collected over a 3-month period between June and August, 2017 to provide a baseline monthly average of the number of vaccines administered by each of the three clinics. The aim was to ascertain the number of vaccine doses averaged over a 3-month period as opposed to calculating immunisation coverage rates. This is because, it was difficult to reliably determine the denominator or number of children accessing the clinic for immunisation as clinics do not have defined catchment areas and there is huge movement in and out of the area.

Table 3.0.1.South African EPI schedule from birth to 12 months [61, 62]

Age	EPI Schedule
At birth	Bacillus Calmette-Guérin **(BCG)** Oral polio vaccine **(OPV0)**
6 weeks	Oral polio vaccine **(OPV1)** Rotavirus vaccine **(RV1)** Pneumococcal vaccine **(PCV1)** Diphtheria, tetanus, acellular pertussis / inactivated polio / *Haemophilus influenzae* type b and Hepatitis B vaccine **(DTaP-IPV-Hib-HBV1)**
10 weeks	Diphtheria, tetanus, acellular pertussis / inactivated polio / *Haemophilus influenzae* type b and Hepatitis B vaccine **(DTaP-IPV-Hib-HBV2)**
14 weeks	Oral polio vaccine **(OPV2)** Rotavirus vaccine **(RV2)** Pneumococcal vaccine **(PCV2)** Diphtheria, tetanus, acellular pertussis / inactivated polio / *Haemophilus influenzae* type b and Hepatitis B vaccine **(DTaP-IPV-Hib-HBV3)**
6 months	Measles vaccine **(MCV1)**
9 months	Pneumococcal vaccine **(PCV3)**
12 months	Measles vaccine **(MCV2)**

Data were collected on vaccines administered at the following time points: (1) 14 weeks: DTP3; (2) 6 months: MCV1; (3) 9 months: PCV3; (4) 12 months: MCV2. At 14 weeks, only DTP3 was collected and reported because this was used for clinic and sub-district reporting. An aggregate of the number of doses given over this 3-month period was calculated for each vaccine listed, and a monthly average was calculated in order to account for month to month variation.

3.2.9 Assessing immunisation systems and community engagement

3.2.9.1 Development of assessment tools

The interview and focus group guides used for the key informant interviews and focus groups (see ***Appendix 1***) were adapted from a number of key sources.

These included:

(1) the WHO health systems framework which describes health systems as consisting of six ‘building blocks’ [28]

(2) other WHO immunisation assessment resources such as the "Monitoring the immunisation system" module from the Training for mid-level managers handbook [56]

(3) One21seventy Systems Assessment Tool developed through a collaboration between Menzies School of Health Research, the Lowitja Institute, ABCD National Research Partnership, and Beyondblue which assesses strengths and weaknesses of health care facilities [41]

(4) an analytical framework for immunisation programs developed in Canada which was designed to evaluate factors that need to be considered in immunisation programs [38].

These sources were chosen based on their relevance to health systems strengthening approaches. Each source had components that were designed to assess different areas of health systems or facilities. They were also chosen after group discussion and consultation with the project advisory panel (Dr. Margie Danchin, Professor Margaret Kelaher, Professor Ross Bailie, Dr. David Coetzee, Dr. Chris Morgan and Dr. Neil Cameron) who have expertise in assessment and evaluation of health systems and programs in low resource settings.

The interview and focus group guides that were used also incorporated components from the EquiFrame, a systematic policy analysis framework that assesses 21 core concepts of human rights, and the degree to which these concepts are addressed in health policy [42]. Additionally, a list of potential barriers to EPI service delivery was compiled from the existing literature which correlated with specific questions in the interview guides, focus group guides, and surveys. Thus, assessment tools were developed that were relevant to the local context through combining different elements from these sources.

The parent survey included health system elements and assessed parents'/guardians' perceptions of the barriers and facilitators to having their child immunised at their local clinic,

as well as their knowledge, attitudes, beliefs and concerns about vaccines and immunisation. The survey was adapted from the Australian Parental Immunisation Needs and Attitudes Community Survey (PINA-Hospital outpatients, PINA-Community/MCHC clinics and PINA-Antenatal clinics) developed by Danchin et al. in 2017 to assess vaccine hesitancy and parental concerns about vaccination [74, 75], and the WHO SAGE working group on vaccine hesitancy survey [32]. Qualitative data were also collected from a proportion of parents/guardians surveyed who were invited to participate in focus groups. The focus group guide incorporated elements of the hesitancy survey, health systems components, and components from the EquiFrame [42] (see ***Appendix 1***).

Before the assessment tools were finalised, pilot interviews were conducted with the sub-district Child Health Manager, a facility manager, an immunisation nurse, and a pharmacist to refine them and to assist in directing what questions should be asked in the semi-structured interviews and focus groups (see ***Appendix 1***). Local stakeholders, specifically the sub-district Child Health Manager and the sub-district Primary Healthcare Manager were also consulted about the assessment tools to ensure that the questions being asked were culturally appropriate, and relevant to the local context.

3.2.9.2 Knowledge and attitudes of service providers regarding EPI service delivery

Semi-structured interviews were conducted with the sub-district Child Health Manager, sub-district Primary Healthcare Manager, the Health Facility Managers from the three clinics (Nolungile, Town II, and Kuyasa) as well as two Immunisation Nurses, two Clerks, and one Pharmacist from each clinic (see **Table 3.2**). Before the interviews commenced and written informed consent was obtained, participants were provided with plain language statements that included a brief description of the study and study outcomes. Interviews were approximately 30-40 minutes long and conducted in English by the primary researcher. These interviews took place over a 1-month period. Interviews with clinic staff were conducted at

the clinics during periods that did not detract from their daily workload, and interviews with sub-district management were conducted at the City of Cape Town offices in Khayelitsha.

Before the focus groups commenced, participants were provided with plain language statements that included a brief description of the study, and study outcomes prior to obtaining written informed consent. Focus groups were conducted with selected community care workers (see **Table 3.2**). A PowerPoint presentation was created with each question on individual slides, for participants to refer to while they discussed each point. Focus groups took place over a 3-week period and were approximately 45-60 minutes long. These focus group sessions were conducted in English by the primary researcher at the clinics either before Community Care Workers were sent into the community to follow-up on patients, or when they had returned.

3.2.9.3 Attitudes, beliefs and concerns of service users

As the primary language of the community is isiXhosa, three interviewers (research assistants) who had language skills in both isiXhosa and English were hired to conduct the surveys as well as the focus groups. All materials, i.e. surveys, the focus group guide, plain language statement and consent forms were translated into isiXhosa. Before commencing the study, interviewers were trained by the primary researcher over a period of one week to ensure consistency. The three interviewers were provided with a brief protocol to refer to if they found it necessary during the first week of data collection. Training included (1) how to approach prospective study participants, (2) how to use the plain language statement and consent forms, and (3) how to conduct the surveys and focus groups. (see ***Appendix 2***).

A small pilot survey was conducted with 10 parents/guardians over the course of one week with the interviewers using the translated materials. After the pilot survey; however, it was established that parents/guardians found it difficult to understand the isiXhosa translations of the plain language statement, consent form and survey questions as they found the language

used to be too formal. Therefore, English versions of all materials were used with the interviewer supplementarily translating into colloquial isiXhosa only when parents/guardians did not understand particular sections of the English translation.

Survey data were collected and managed using REDCap hosted at the Murdoch Children's Research Institute. REDCap is an online application designed to support data capture by providing (1) an interface for validated data entry; (2) audit trails for tracking data manipulation and export procedures; (3) automated export procedures for data downloads to statistical packages; and (4) procedures for importing data from external sources [91]. As internet access was not reliable in the area where data were being collected, interviewers used the REDCap Mobile App which allowed for offline data collection. Data were stored securely in the application on the interviewer's mobile device and was then uploaded to the online database when a secure internet connection was available. The Mobile App also assisted the interviewers in collecting qualitative data from the open-ended questions that were included as a part of the survey using a feature that allowed for audio files to be uploaded and linked to individual survey records. Prior consent was obtained for parents/guardians to be recorded. The target was to complete 300-500 surveys with parents/guardians who attended Nolungile Clinic, Town II Clinic or Kuyasa Clinic. Interviewers conducted surveys over a 2-3-week period at each clinic until the target of 100-150 surveys per clinic was reached (see **Table 3.2**).

Focus groups took place over a 3-week period and were conducted by the same interviewers who carried out the surveys, and had language skills in isiXhosa and English. Focus groups were approximately 45-60 minutes long. One focus group was conducted at each clinic, and six parents/guardians were recruited per focus group from the clinic waiting areas (see **Table 3.2**). The assessment tool used complemented both the survey, as well as the assessment tools used for the clinic staff interviews, and the focus groups with community care workers. A hardcopy of a PowerPoint presentation with each question on individual slides was provided

for participants to refer to while they were discussing each point. Questions were presented in English and were translated into colloquial isiXhosa by the interviewer, and discussion between parents/guardians was carried out in isiXhosa. Focus groups were conducted at the clinics during the one-hour nurse lunch break in a vacant consultation room.

Over the period that the surveys and focus groups were conducted, interviewers kept a diary that included detailed notes of their observations and perceptions of how the clinic was run, and their interaction with parents/guardians. Interviewers also had regular debriefing sessions with the primary researcher at the end of the day to check consistency, and ascertain and manage any issues related to data collection.

Table 3.2. Summary of data collection at each study site

<table>
<tr><th colspan="6">Khayelitsha sub-district</th></tr>
<tr><td colspan="6">30-40 minute interview with Sub-District Child Health Manager (n = 1)
30-40 minute interview with Sub-District Primary Healthcare Manager (n = 1)</td></tr>
<tr><th colspan="2">Nolungile Clinic</th><th colspan="2">Town II Clinic</th><th colspan="2">Kuyasa Clinic</th></tr>
<tr><td>30-40 minute interviews</td><td>Two 45-60 minute focus groups</td><td>30-40 minute interviews</td><td>45-60 minute focus group</td><td>30-40 minute interviews</td><td>45-60 minute focus group</td></tr>
<tr><td>Health Facility Manager (n = 1)</td><td rowspan="4">Community Health Leaders (n = 2) (n = 8)</td><td>Health Facility Manager (n = 1)</td><td rowspan="4">Community Health Leaders (n = 8)</td><td>Health Facility Manager (n = 1)</td><td rowspan="4">Community Health Leaders (n = 8)</td></tr>
<tr><td>Nurses (n = 2)</td><td>Nurses (n = 2)</td><td>Nurses (n = 2)</td></tr>
<tr><td>Clerks (n = 2)</td><td>Clerks (n = 2)</td><td>Clerks (n = 2)</td></tr>
<tr><td>Pharmacist (n = 1)</td><td>Pharmacist (n = 1)</td><td>Pharmacist (n = 1)</td></tr>
<tr><td colspan="2">15-20 minute surveys with Parents/guardians (n = 150)</td><td colspan="2">15-20 minute surveys with Parents/guardians (n = 150)</td><td colspan="2">15-20 minute surveys with Parents/guardians (n = 127)</td></tr>
<tr><td colspan="2">Two 45-60 minute focus group with Parents/guardians (n = 6) (n = 5)</td><td colspan="2">45-60 minute focus group with Parents/guardians (n = 6)</td><td colspan="2">45-60 minute focus group with Parents/guardians (n = 6)</td></tr>
</table>

- → *Total number of interviews with management:* 5
- → *Total number of interviews with nurses:* 6
- → *Total number of interviews with clerks:* 6
- → *Total number of interviews with pharmacists:* 3
- → *Total number of focus groups with community health leaders:* 4
- → *Total number of surveys with parents/guardians:* 427
- → *Total number of focus groups with parents/guardians:* 4

3.2.9.4 Direct observation of immunisation facilities and procedures

The daily immunisation process at each clinic was observed from arrival to when the parents/guardians left the clinic. This aspect of the study aimed to triangulate and supplement the data that was collected from the interviews with clinic staff and focus groups with community care workers and parents/guardians.

3.2.9.4.1 Clinic cycle time study

In addition to observing the immunisation process at each clinic, the clinic cycle time was assessed. A research assistant spent one week (Monday to Friday) at each clinic from clinic opening (7:30am) to closing time (4pm) and observed how long the clinic cycle lasted for parents/guardians bringing their child into the clinic for immunisation. The research assistant sat at the Queue Marshal's front desk near the entrance of the clinic and gave stickers with the time of entry written on them to parents/guardians with a child/children that were coming to the child health service. Stickers were not visible to clinic staff, and only clinic management was aware that clinic cycle time studies were ongoing as per their own request to ensure there was no bias. These stickers were then collected and placed in a log-book with the exit time recorded when the parent/guardian left. The daily average clinic cycle time per parent/guardian, and weekly average clinic cycle time for each clinic was calculated.

3.2.10 Application of research rigour to the study data collection

To ensure that qualitative research is reliable and valid, the following criteria should be addressed in any study: credibility, transferability, dependability, and confirmability [92]. **Table 3.3** outlines how this rigour was applied to both the quantitative and the qualitative research conducted in this study. A number of quantitative and qualitative data collection methods were used and data were collected from three different sources in order to compare and contrast findings. There was prolonged engagement between the primary researcher and interviewers with participants; allowing for a sense of understanding to form between both

parties which resulted in participants being more open to share information. During the interview process, questions were reframed and repeated to ensure understanding and internal consistency was ensured by using the same research processes throughout. In addition, the methods used and the data collected was discussed with the project advisory panel to check coherence of methods.

To ensure the transferability of data collected, any demographic information gathered via the study was compared to census data. A field journal was also held by the primary researcher and interviewers throughout the study to keep track of the study process, and to reflect on personal influences and opinions on the data collection process and hypotheses generated over the course of the fieldwork period. In addition, all interviews and focus groups were audio recorded, transcribed, and then checked against the original recording for accuracy. Interview transcripts were thematically analysed, guided by the Braun and Clark method for thematic analysis in qualitative research (i.e. familiarisation with the data, coding, generating initial themes, reviewing themes, defining and naming themes, and writing up) [93]. Iteratively developed themes were then coded using NVivo.

Table 3.3. Application of rigour using both quantitative and the qualitative research in this study [92, 94]

Criteria for the assessment of rigour in research	Application in this study
Credibility	***Prolonged engagement* –** an extended period of time was spent with study participants ***Reflexivity* –** a field journal was kept ***Triangulation of data methods and data sources* –** data were collected via surveys, semi-structured interviews and focus groups from three different sources; parents/guardians, clinic staff and management, and community care workers ***Peer examination* –** research process, methods and data were discussed with the core research team ***Interviewing process* –** questions reframed, repeated and expanded during each interview, interviews were internally consistent, and participants also shared examples of other's experiences
Transferability	***Comparison of sample to demographic data* –** demographic information was collected from participants in this study and compared to 2011 South African National Census data ***Dense sample* –** demographic information was collected for all survey, interview, and focus group participants
Dependability	***Dependability audit* –** methods reviewed by the project advisory panel before the commencement of data collection, and at the end of the study ***Dense description of research methods* –** methods for each component of the study were written before carrying out data collection, and modified after data collection to reflect changes made ***Triangulation* –** data were collected using a number of different methods, and from three different data sources, including direct observation ***Peer examination* –** research process, methods and data discussed with the project advisory panel ***Code-recode procedure* –** all qualitive data were coded and recoded after a period of 1 week, each set of data were then compared with the other
Confirmability	***Triangulation* –** data were collected using a number of different methods, and from 3 different data sources including direct observation ***Reflexivity* –** field journal was kept

3.2.11 Outcome measures

3.2.11.1 Primary outcome

A ranked and prioritised list, and description of key barriers and facilitators to immunisation service delivery based on the experiences of service providers and service users.

3.2.11.2 Secondary outcomes

- Baseline immunisation uptake data using the number of DTP3, MCV1, PCV3 and MCV2 doses provided at week 14, 6 months, 9 months, and 12 months at each clinic per month, averaged over 3 months.
- Perceptions of health service providers regarding their knowledge, attitudes and engagement towards the EPI.

- Perceptions of parents/guardians regarding their knowledge, attitudes, beliefs, concerns, engagement and the acceptability of the EPI.
- Potential access or practical barriers that affect parents/guardians immunising their child.

3.2.12 Data analysis

3.2.12.1 Identification of barriers, facilitators and potential strategies

Barriers, facilitators and potential strategies were identified from the surveys, interviews and focus groups with clinic staff, community care workers and parents/guardians. Data were ranked and prioritised based on whether more than one cohort identified the same barrier, facilitator or potential strategy (i.e. factor) for service delivery improvement. For example, if all three cohorts (clinic staff, community care workers, and parents/guardians) identified the same factor, this was ranked as a first priority to address in the Intervention development phase. If two cohorts had identified the factor (community care workers and parents/guardians, or clinic staff and parents/guardians, or clinic staff and community care workers), this was ranked as a second priority to address during the Intervention development phase. Finally, if a factor was only identified by one cohort, this was ranked as a third priority to address during the Intervention development phase (see **Table 3.4**).

Table 3.4. Cohort ranking of factors for intervention targets, including barriers, facilitators and potential strategies

Barrier/facilitator/potential strategy identified by:	Ranking
Clinic staff ***AND*** Community Care Workers ***AND*** Parents/guardians	1
Community Care Workers ***AND*** Parents/guardians	2
Clinic staff ***AND*** Parents/guardians	2
Clinic staff ***AND*** Community Care Workers	2
Parents/guardians	3
Community Care Workers	3
Clinic staff	3

Further prioritisation was carried out during the Intervention development phase of the project which is described in Chapter 4.

3.2.12.2 Quantitative analysis

The aggregate of the number of vaccine doses administered over a 3-month period was calculated and averaged to account for month to month changes. Survey data were exported from REDCap to Excel, cleaned, collated, and then exported to SPSS to perform descriptive statistics. The difference in survey responses at each clinic was calculated using proportion tests, 95% confidence intervals, and p-values (significant difference if <0.05), and Chi-square tests were used to ascertain if there were significant variances.

3.2.12.3 Qualitative analysis

Core themes and sub-themes were identified from interviews and focus groups with service providers and users. The frequency of these identified themes was measured, as well as any patterns that emerged from the coded data using NVivo to assist in the organisation of data.

3.3 Results

In this section, additional to the assessment of vaccination activity and clinic procedures, quantitative findings are detailed followed by individual clinic comparisons of parents'/guardians' knowledge, attitudes, and beliefs about immunisation, as well as qualitative findings of both parents'/guardians' and staff knowledge, attitudes, and engagement related to immunisation services.

3.3.1 Baseline estimation of vaccine doses provided by clinics

Description of routine immunisation data collection processes completed by clinics

Each clinic collected immunisation data for monitoring and evaluation purposes. Ideally, data collection was to occur daily by both the nurses involved with delivering immunisation and the clerks which would then be collated on a monthly basis (first week of the month) and submitted to the sub-district Department of Health (DOH). Data collection was primarily done manually, and then entered into an electronic Patient Record and Health Management Information System (PREHMIS). This process is summarised in **Figure 3.1** and was the same at all three clinics. Following child immunisation visits, nurses recorded vaccinations given manually in four different places: (1) their own handwritten register that they keep for monitoring purposes, (2) the child's folder which contained their medical records, (3) the PREHMIS data collection form, and (4) the Road to Health booklet which is a parent/guardian-held record of their child's immunisations and health milestones. The folders and the PREHMIS data collection forms were then given to the clerks to input data into PREHMIS. This process was supposed to occur daily. During the first week of the month, all data were then collated by both the nurses and clerks to be submitted to the sub-district DOH who then analysed the data submitted, and defined monthly targets for clinics to reach.

As this was the only immunisation data available at both the clinic and the sub-district level, the estimation of vaccination activity at each clinic was limited to the average number of

specific vaccine doses administered per month. As outlined, data were collected on vaccines administered at 14 weeks (DTP3), 6 months (MCV1), 9 months (PCV3), and 12 months (MCV2) (see **Table 3.5**).

Over the 3-month period (June-August 2017), Nolungile Clinic administered the most vaccinations (325 vaccinations in total), followed by Kuyasa Clinic (221 vaccinations in total) and Town II Clinic (131 vaccinations in total). The doses delivered partly reflects the size of the clinics as Nolungile sees a larger number of patients compared to Kuyasa and Town II. There are numerous problems associated with the way immunisation data are collected at the clinics meaning that it is probable that the data presented below in **Table 3.5** may not be an accurate representation of vaccine doses administered at the clinics. The clinic data collection process and the quality of data were identified as a barrier that needed to be addressed to improve service delivery but were beyond the scope of this project.

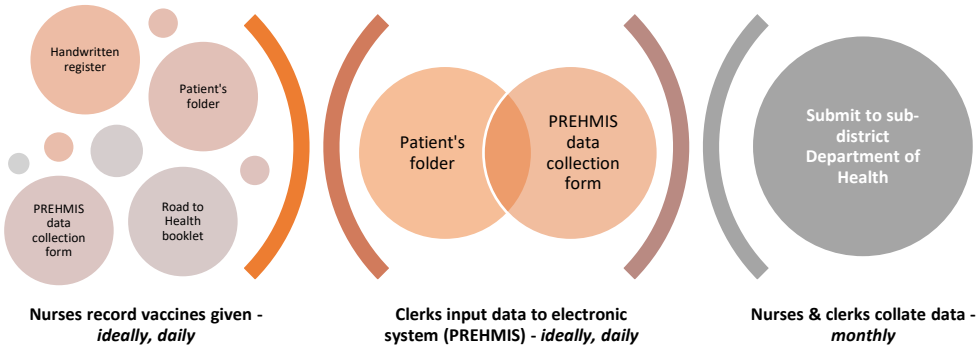


Figure 3.1. Clinic process for immunisation data collection

Table 3.5. Vaccine doses administered per month at clinics

Vaccines administered	Kuyasa Clinic (total # vaccines administered/month = 221) n (%)	Nolungile Clinic (total # vaccines administered/month = 325) n (%)	Town II Clinic (total # vaccines administered/month = 131) n (%)
DTaP-IPV-HepB-Hib (Hexavalent) 3rd dose (14 weeks)	49 (22)	92 (28)	36 (27)
Measles 1st dose (6 months)	56 (25)	89 (27)	35 (27)
PCV 3rd dose (9 months)	67 (30)	82 (25)	35 (26)
Measles 2nd dose (12 months)	49 (22)	62 (19)	25 (19)

Errors in vaccine dose recording

There are a number of steps in this clinic data collection process that increased the chances for errors to be made. For example, there was a lot of duplication in recording immunisations given as nurses recorded the same data in three different places that were used for clinic monitoring and evaluation, and clerks used two different sources to input data electronically. Not only did this duplication allow for incorrect data collection but it also took a lot of time which reduced the likelihood of nurses and clerks actually recording data accurately on a daily basis. This created a backlog of data being entered into the electronic system. During the period of time that the primary researcher was at the clinic for data collection for this project, it was observed that while the clinic staff knew that the data they were collecting was used for monitoring and evaluation purposes, it did not seem to be high on their priority list since they all had other duties to attend to, and there was no dedicated nurse or clerk at the clinic to manage the data collection process on a daily basis. During the first week of the month where data were needed to be submitted to the DOH, there was a scramble by the clinic staff to enter and collate data, which did not allow for much time to check that the data being submitted was correct. There was also no clinic analysis of immunisation data. This was left for the sub-district DOH to deal with, and even then, analysis was minimal with data being presented as graphs of raw values such as the number of vaccines given at each clinic per month, as well as an arbitrary target number of vaccines to be administered per month. Vaccine coverage, and drop-out rates were not calculated.

3.3.2 Direct observation of immunisation facilities and procedures

Some parents/guardians had mentioned that they would arrive at the clinic a few hours earlier than clinic opening time to queue to get in because they were concerned about waiting times. It was observed that immunisation for children at the clinic was quite a lengthy process (summarised in **Figure 3.3**). While all three clinics had appointment systems, the majority of parents/guardians who brought their children in for immunisations were walk-ins.

The observed process was as follows:

(i) When a parent/guardian entered the clinic, they saw the Queue Marshal at the door whose role was to keep track of the walk-in clients.

(ii) A number was given to the parent/guardian, and sometimes the time they arrived was written on a sticker and placed on their clinic card. This clinic card was then placed in a box by the reception windows where the clerks sat.

(iii) Clerks then looked for the child's folder containing their medical records while parents/guardians sat in the first waiting area.

(iv) Once parents/guardians were given their child's folder, they moved to the second waiting area in the child health section for their child to be seen by the nurse for a child development screen, growth monitoring, weight check, and to be given vitamin A supplements and deworming treatments.

(v) After this well-child check, they were sent to the child health waiting area once again to wait to be seen by the immunisation nurse before they could leave the clinic.

In Kuyasa and Nolungile Clinic, if a child was due for their 9-month immunisation, this process was fast-tracked. Folders for these children were already held by the nurses, so they could go directly to the child health waiting area for the well-child check before receiving their immunisation (see **Figure 3.2**).

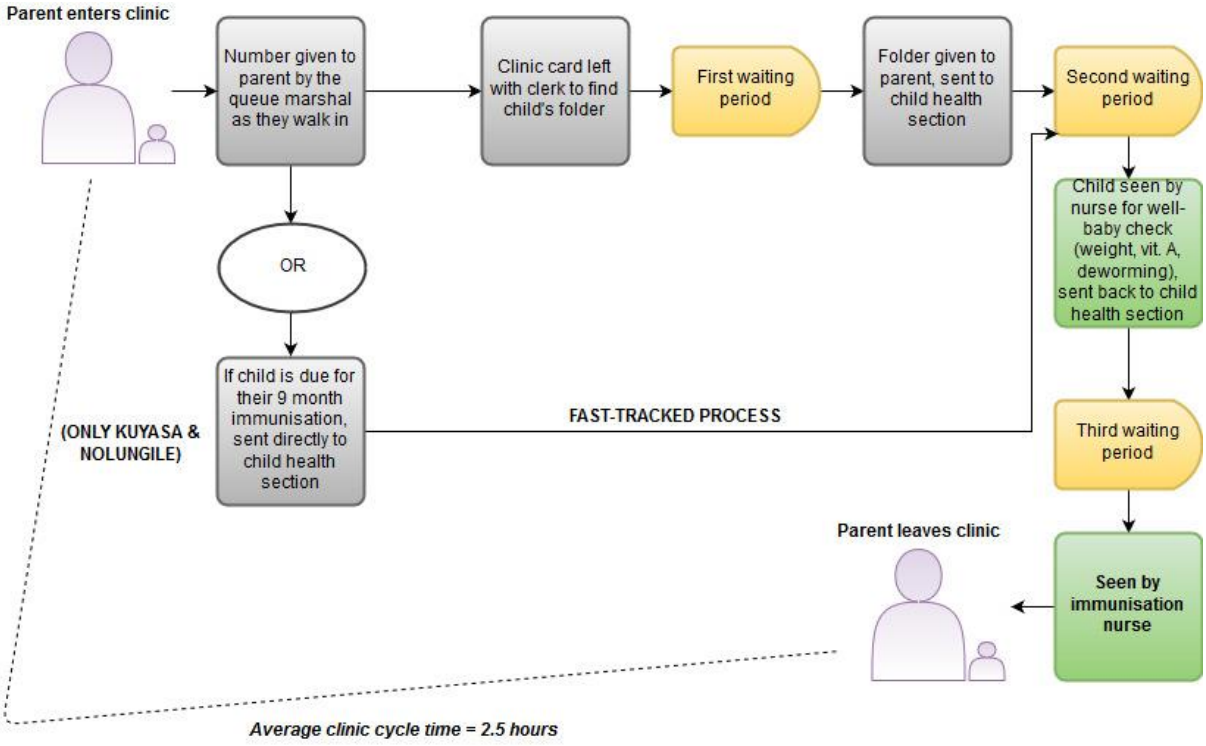


Figure 3.2. Clinic process for child immunisation visits

3.3.2.1 Clinic cycle time

The clinic cycle detailed above, ranged from approximately 2 to 3.5 hours with an average clinic cycle time of 2.5 hours and encompassed the complete clinic process of getting a child immunised. There was not much difference in cycle times between clinics; however, certain days had a longer clinic cycle time of approximately 3 hours. Kuyasa's longest average daily cycle time was on Thursday, and Nolungile and Town II's longest average daily cycle time was on Monday (see **Figure 3.3**). Staff at all three clinics identified that they felt Mondays and Tuesdays were their busiest days.

During this period of data collection, it was observed that after 12pm-1pm, the staff at Kuyasa Clinic blocked off the entrance to the clinic to prevent additional clients from walking in, and would only attend to clients who were already in the clinic despite an actual clinic closing time of 4pm.

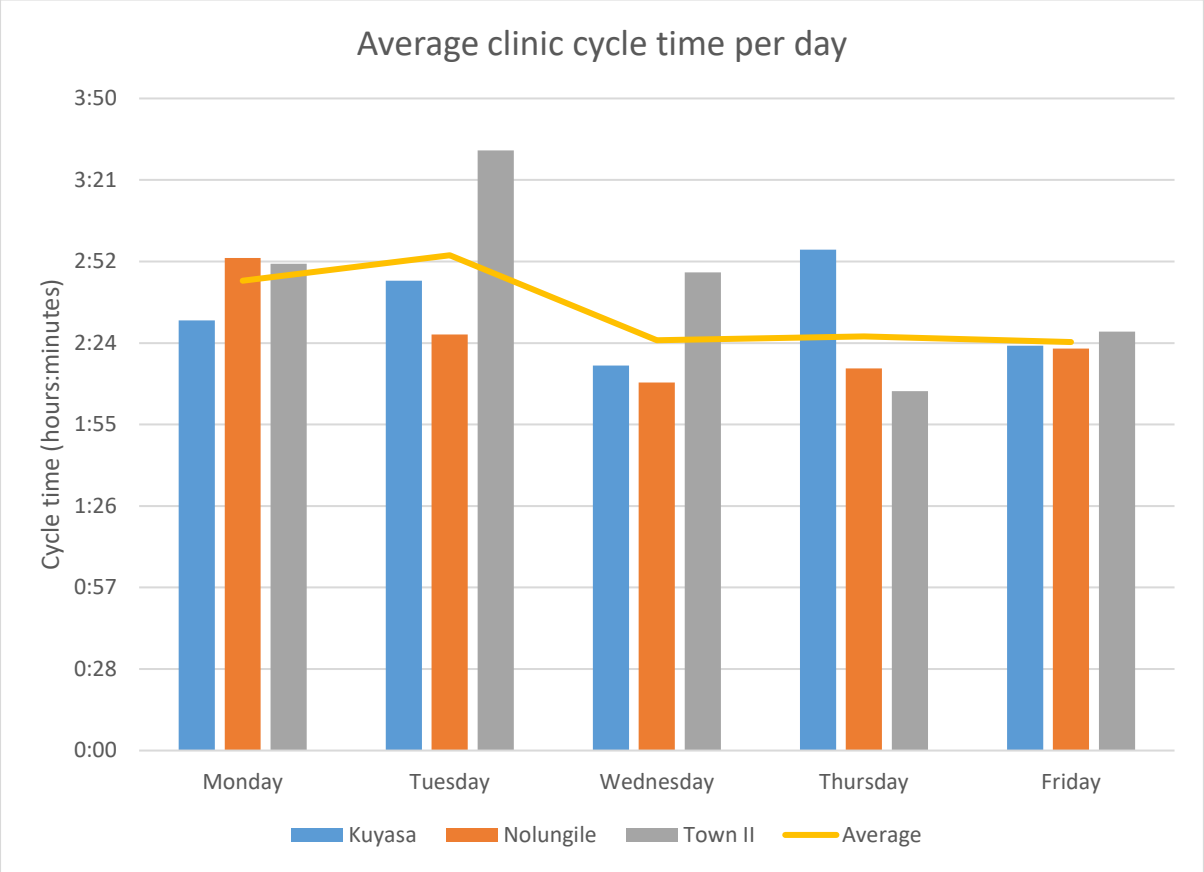


Figure 3.3. Average daily clinic cycle time at each clinic

It is clear from the observation of the immunisation process at clinics that the waiting time, or clinic cycle time was a major barrier. Rather than immunisation being a relatively straightforward procedure, parents/guardians were required to wait in at least two different waiting areas and there were a number of 'steps' involved. There was also the problem of waiting for files to be found by clerks, particularly for walk-in clients. It was clear that the clinic cycle times were a barrier that needed to be addressed.

3.3.3 Attitudes, beliefs and concerns of parents/guardians

This section details both the quantitative and qualitative findings of the parent/guardian assessment.

3.3.3.1 Quantitative findings

3.3.3.1.1 Socio-demographic characteristics of survey participants

The socio-demographic characteristics of survey participants are detailed in **Table 3.6**. Of the 427 participants surveyed, the majority (416; 98%) were female with ages ranging from 16 to 64 years old, and aged between 20 to 34 years old (72%). Over half of the participants were single mothers (59%). 55% of the participants were born in Eastern Cape province while 40% were born in Western Cape province. The most common language spoken at home was isiXhosa (92%), and the majority of participants had either some secondary school education (42%), or had completed secondary school (46%). 53% lived in brick houses (formal dwellings), and the average household size was five (number of adults or children living in the same dwelling). Most mothers had one child (53%), and the largest percentage of children ranged from 5-9 months old (24%). Excluding the gender ratio of participants of this study, the demographic make-up of the cohort recruited was very similar to that of the sub-district of Khayelitsha as detailed in data from the most recent South African census in 2011 [16].

Table 3.6. Socio-demographic characteristics of survey participants (n = 427; Kuyasa = 127; Nolungile = 150; Town II = 150)

Variable	N (%)
Gender	
Female	**416 (98)**
Male	10 (2)
Age (years) **Range = 16-64** **Mean 27.68 (SD 6.85)** **Median = 27**	
<20	40 (9)
20-24	**105 (25)**
25-29	**114 (27)**
30-34	**86 (20)**
35-39	50 (12)
40-44	11 (3)
45-49	4 (1)
≥50	2 (1)
Marital status	
Father of the child does not live with you but supports you or the child	46 (11)
Father of the child lives with you	53 (13)
Married	62 (15)
Mother of the child does not live with you but supports you or the child	2 (1)
Mother of the child lives with you	4 (1)
Single father	4 (1)
Single mother	**251 (59)**
Single mother and father of the child lives with you	2 (1)
Widow	1 (0.2)
Province/Country of birth	
Eastern Cape	**234 (55)**
Gauteng	6 (1)
Ghana	1 (0.2)
KwaZulu-Natal	6 (1)
Mpumalanga	1 (0.2)
Western Cape	171 (40)
Zimbabwe	4 (1)
Language(s) spoken at home	
English	3 (1)
isiXhosa	**381 (92)**
isiXhosa and English	12 (3)
isiXhosa and isiZulu	2 (1)
isiXhosa and Sotho	2 (1)
isiZulu	6 (1)
Shona	1 (0.2)
Shona and English	2 (1)
Sotho	4 (1)
Sotho, isiZulu and isiXhosa	1 (0.2)
Highest level of education	
Completed primary school	4 (1)
Completed secondary school	**196 (46)**
Some primary school	5 (1)
Some secondary school	175 (41)
University/further education	46 (11)

Type of dwelling	
Backyard dwelling	21 (5)
Brick house	**223 (53)**
Shack	178 (42)
Number of children and adults living at the same dwelling	
1	6 (1)
2	19 (4)
3	81 (19)
4	**132 (32)**
5	80 (19)
6	51 (12)
7	27 (7)
8	15 (4)
9	7 (2)
≥ 10	6 (1)
Number of children	
1	**224**
2	130 (31)
3	50 (12)
4	18 (4)
5	2 (1)
6	1 (0.2)
11	1 (0.2)
Age of youngest child **Range = 1 month-21 years**	
0-4 months	35 (8)
5-9 months	**102 (24)**
10-14 months	81 (19)
15-19 months	68 (16)
20-24 months	59 (14)
2-4 years	65 (15)
5-9 years	2 (1)
10-14 years	5 (1)
≥15 years	1 (0.2)

3.3.3.1.2 Parent/guardian knowledge, attitudes and concerns about immunisation and vaccines

The first section of the survey ascertained what parents/guardians thought about immunisation, and if they had any specific concerns about either the immunisation program or vaccines themselves (see **Table 3.7**). Overall, there was overwhelming support for immunisation with 96% of participants responding positively. Similarly, the majority of respondents had positive responses about immunisation and vaccines.

Almost all (98%) participants agreed that vaccines were important for their child, and parents/guardians thought that vaccines were safe (96%), effective (87%), and necessary to

protect their child (96%); however, 10% did worry that vaccines would do their child more harm than good, and 15% had some concerns about immunising their child. These concerns were mainly about their child getting too many vaccines in the first two years of life (79%), immune system sensitivity (19%), and the pain involved when vaccinating their child (9%).

The majority of parents/guardians cared about herd immunity and they thought it was important to vaccinate their child in order to protect others in the community (91%) while only 8% believed that if other children in the community were vaccinated, it was not necessary to vaccinate their own child.

While parents/guardians had very positive opinions about immunisation, access was clearly identified as an issue with 28% of parents/guardians reporting that it was difficult to get their child vaccinated. Reasons for this difficulty in accessing the clinic are detailed in later sections. It was also of interest that 20% of parents/guardians believed that vaccines were given to children to prevent diseases that are not common, indicating that parents/guardians need further information about the frequency and potentially the severity of VPDs.

Table 3.7. Knowledge, attitudes and concerns about immunisation and vaccines

	Agree
	N (%)
Vaccines are important for my child	**418 (98)**
I worry that vaccines will do my child more harm than good	41 (10)
It is difficult to get my child vaccinated	119 (28)
The current recommended vaccines and the times they are given is appropriate for my child	**370 (87)**
Vaccines are safe for my child	**410 (96)**
Vaccines are effective for my child	**370 (87)**
Vaccines are necessary to protect my child	**408 (96)**
The current recommended vaccines and the times they are given are designed by people who care about children's health	**358 (84)**
It is important for my child to be vaccinated in order to protect others in the community	**389 (91)**
Because other children are vaccinated, it isn't necessary to have my child vaccinated	36 (8)
My child's immune system is more sensitive than most	80 (19)
Children's immune systems could be weakened by vaccines	8 (2)
Children get too many vaccines during the first 2 years of life	**336 (79)**
Vaccines contain ingredients that can cause serious harm	5 (1)
The pain of vaccine needles is too great for my child to bear	38 (9)
Vaccines are given to children to prevent diseases that are not serious	20 (5)
Vaccines are given to children to prevent diseases that are not common	84 (20)
It is better for children to get diseases rather than get protection from diseases through vaccines	5 (1)
Vaccines can cause social, behavioural or developmental problems	1 (0.2)
Vaccines can cause allergies	3 (1)
There are better ways to protect children against disease than vaccines	16 (4)
Serious side effects from vaccines are too common for me to accept	1 (0.2)
I do not have any concerns about immunising my child	**347 (81)**

3.3.3.1.3 Community engagement with clinic and clinic staff

The second section of the survey consisted of questions designed to determine community engagement with the clinic, and with clinic staff. Some of the reasons for access being identified as an issue became apparent. **Table 3.8** shows parental/guardian report of interaction with clinic staff. Only 50% of parents/guardians felt comfortable with the way they were treated at the clinics with the main reasons given by parents/guardians that they felt uncomfortable or that the clinic was not welcoming (27%), staff were unfriendly (26%), or unhelpful (24%), and that they did not receive a clear explanation from staff about their child's immunisation visit when they attended (21%). There was also some concern about confidentiality in the clinic (11%). However, the majority of parents/guardians (91%) said that they had not experienced discrimination at the clinic due to either disability, age, gender, ethnicity, religion, or how far away they live from the clinics.

Table 3.8. Parental/guardian report of interaction with clinic staff

	N (%)
Parents comfortable with the way they are treated at the clinic	
Yes	**213 (50)**
No	185 (44)
Unsure	25 (6)
Reasons parents are comfortable with the way they are treated at the clinic	
Friendly staff	154 (36)
Helpful staff	**174 (41)**
Clinic is welcoming	136 (32)
No concerns about confidentiality	153 (36)
Clear explanation received from staff	137 (32)
Other	4 (1)
Reasons parents are not comfortable with the way they are treated at the clinic	
Unfriendly staff	112 (26)
Unhelpful staff	101 (24)
Clinic is not welcoming	**116 (27)**
Concerns about confidentiality	46 (11)
No clear explanation received from staff	89 (21)
Other	9 (2)
Parents have experienced discrimination at the clinic from staff	
Yes	20 (5)
No	**385 (91)**
Unsure	19 (5)
Reasons for discrimination	
Disability	1 (0.2)
Age	**12 (3)**
Gender	0 (0)
Ethnicity	3 (1)
Religion	3 (1)
Distance they live from the clinic	1 (0.2)
Other	2 (1)

Interaction between clinic staff and parents/guardians was identified as a barrier with just under half of the cohort reporting that they felt uncomfortable with the way they were treated. When these data were further analysed according to responses given by parents/guardians at each individual clinic, some differences emerged. **Figure 3.4** shows the proportion of parents/guardians from either Nolungile, Town II or Kuyasa that responded positively regarding whether they felt comfortable with how they were treated at the clinic. Data indicated that Nolungile performed significantly better than the other two clinics in relation to staff and parents'/guardians' interaction based on parents'/guardians' perceptions (76% vs 31% at Kuyasa and 41% at Town II; p-value = <0.001). This can also be seen in **Figure 3.5** which illustrate the reasons parents/guardians were either comfortable or uncomfortable with the way they were treated at the clinics. A larger proportion of parents/guardians from Nolungile Clinic reported that they felt staff was friendly (65%) and helpful (72%), the clinic was welcoming

(63%), they did not have concerns about confidentiality (65%), and thought they received a clear explanation from staff about their clinic visit (67%) as compared to parents/guardians from Kuyasa and Town II. (see **Figure 3.5**).

The impression that Nolungile Clinic performed better seemed to be an accurate reflection from what was personally observed by the primary researcher at the clinics, as well as from the feedback provided by the interviewers who assisted with data collection at the three sites. Nolungile staff and management did seem more willing to help not only the clinic clients but the primary researcher and interviewers as well. Staff had a good rapport with parents/guardians and community care workers, and management was very willing to listen when parents/guardians had any issues that they needed assistance with despite being very busy. Interviewers for this project stated that they thought Nolungile staff was very helpful during the time they were at the clinic, and were quite friendly with them. In contrast to Kuyasa and Town II where interviewers felt they were observed rather closely by staff to 'find out what was being said,' and they had to be quite persistent with staff when they required assistance.

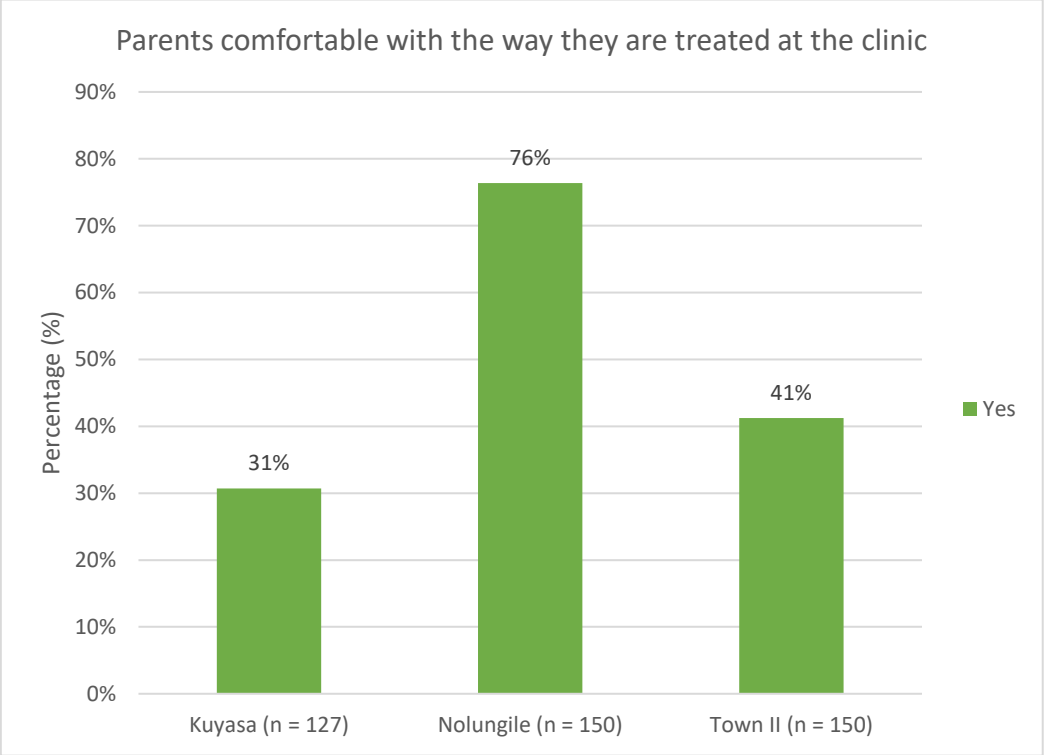


Figure 3.4. Parents'/guardians' opinion on if they feel comfortable with how they are treated at each clinic

Responses compared at each clinic. Difference between Nolungile Clinic compared to Kuyasa Clinic and Town II Clinic are statistically significant (p-value = <0.001).

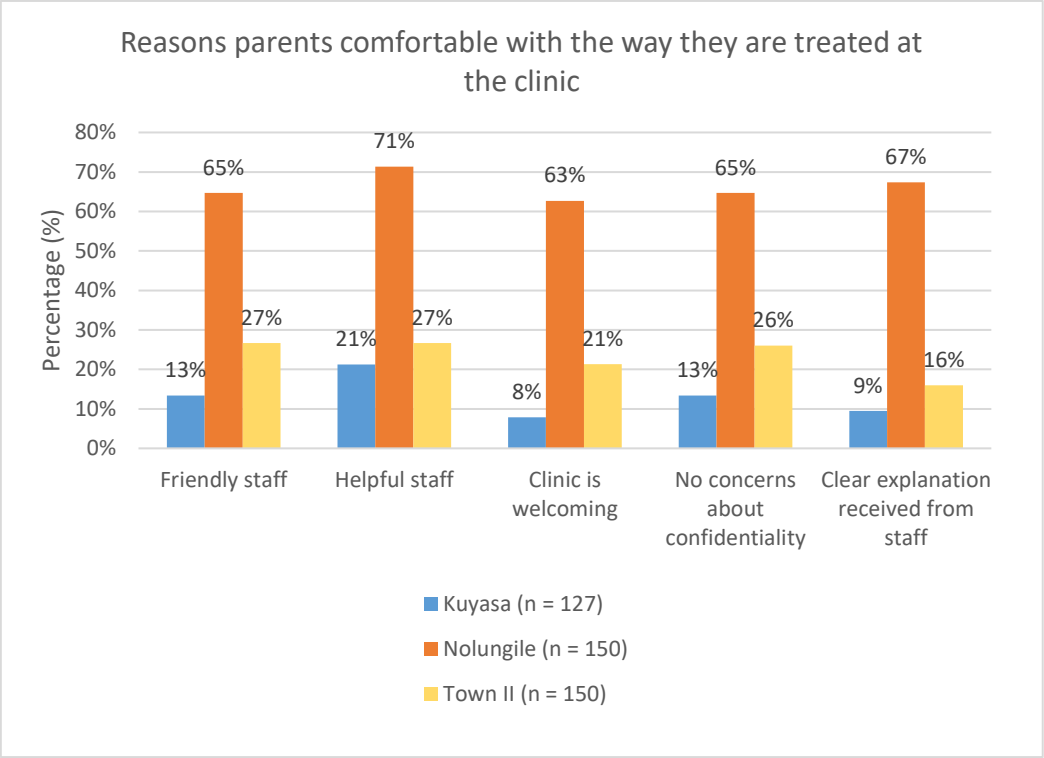


Figure 3.5. Reasons parents feel comfortable with how they are treated at each clinic

Responses compared at each clinic. Difference between Nolungile Clinic compared to Kuyasa Clinic and Town II Clinic are statistically significant (p-value = <0.001).

Unlike the split in the overall cohort of parents/guardians regarding their opinions about staff and parents'/guardians' interaction, there seemed to be a consensus in parents/guardians reporting limited linkages between the clinic and other health services, community organisations and clinic resources that they are aware of (see **Table 3.9**).

Of the total 419 respondents, 87% parents/guardians said that they had not been referred to other community health services such as social services, the clinic nutrition unit, or other non-profit organisations, and 86% said that there were no peer-to-peer support or information sessions in the clinic. However, there were variations when parents/guardians were asked about resources available at the clinics with 55% reporting that they were provided with information about vaccines and immunisation services at the clinics while 42% were not. If information was provided, the majority seemed to come directly from the clinic nurses (48%) rather than from other resources such as posters (24%), pamphlets (23%), information provided by community care workers (21%), or community outreach activities (19%). This difference in opinion regarding access to information at clinics seems to correlate with whether parents/guardians felt they had enough knowledge to make decisions about vaccinating their child with 56% agreeing that they did but 25% participants saying that they felt they did not. When parents/guardians were asked about what their preferred source of information was to gain knowledge about vaccines and immunisation services, clinic nurses were named as the most preferred source (78%), followed by media such as TV, radio or magazines (54%), and the Department of Health website (50%).

Table 3.9. Links with community, other health services and resources (n = 427; Kuyasa = 127; Nolungile = 150; Town II = 150)

	N (%)
Referred to other community health services such as social services, the nutrition unit, or non-profit organisations	
Yes	40 (10)
No	**372 (89)**
Unsure	7 (2)
Peer-to-peer support or information sessions	
Yes	39 (9)
No	**368 (87)**
Unsure	16 (4)
Information about vaccines and immunisation services provided	
Yes	**235 (55)**
No	181 (43)
Unsure	9 (2)
Type of information provided	
Posters	104 (24)
Pamphlets	100 (23)
Community outreach activities	82 (19)
Nurse provides information	**205 (48)**
Community care workers provide information	89 (21)
Other	14 (3)
Parents feel they have enough knowledge to make good decisions about vaccinating their child	
Agree	**239 (57)**
Disagree	107 (25)
Unsure	76 (18)
Information sources parents use to gain knowledge about vaccines and immunisation services	
General practitioner(s)	119 (28)
Clinic nurse(s)	**334 (78)**
Traditional healer(s)	10 (2)
Internet	173 (41)
Department of Health website	215 (50)
Media (TV, radio or magazines)	232 (32)
Social media	137
Groups opposed to vaccination	15 (4)
Family and friends	183 (43)
Other	8 (2)
None of the above	15 (4)

When responses were analysed from each individual clinic, significant differences emerged with Nolungile Clinic appearing to have performed better. Of the participants that said they had been referred to other services, 24% were from Nolungile Clinic (vs 2% at Kuyasa and 2% at Town II; p-value = <0.001), 26% of respondents that said that there was peer-to-peer support and information sessions at Nolungile Clinic (vs 0% at Kuyasa and 1% at Town II; p-value = <0.001), and 86% said that they were provided with information about vaccines and immunisation services (vs 35% at Kuyasa and 42% at Town II; p-value = <0.001) (see **Figure 3.6**). This can also be seen with the types of information provided at clinics, with the majority

of these responses being parents/guardians from Nolungile Clinic who identified that posters (67%), pamphlets (64%), community outreach activities (51%), and information provided by nurses (66%) and community care workers (57%) were available at their clinic (see **Figure 3.7**). The data indicates that Nolungile not only had more links with other services but also provided more information about vaccines and immunisation services to parents/guardians as compared to the other two clinics. The greater engagement that Nolungile Clinic seemed to have with the community and the provision of more educational opportunities between parents/guardians and staff also correlates with parents'/guardians' opinion on whether they felt they had sufficient knowledge to make decisions about vaccinating their child with 83% of participants that responded positively from Nolungile (vs 41% at Kuyasa and 44% at Town II; p-value = <0.001) (see **Figure 3.8**).

These findings are consistent with what was observed in the clinics. All clinics had additional services; however, they were either not referring or informing parents/guardians about these services, or parents/guardians were just not aware that these services were available. Parents/guardians from Nolungile indicated that there was peer-to-peer support or information sessions available at the clinic. This most likely was a reference to the health talks that community care workers provided in the mornings as the clinic did not have any formalised support groups for parents/guardians. Some parents/guardians said that they just talked to each other and shared experiences in the waiting areas while they were waiting for their child to be seen by the nurses. Some information was provided by the clinics about vaccines and immunisation services; however, the majority of this information was provided by Nolungile Clinic alone and overall, was quite limited. The staff at Nolungile Clinic did seem to be more willing to provide more information to parents/guardians, and had handmade posters about the dangers of not vaccinating children which were visible on the walls of the child waiting area. This information about immunisation and related clinic services were identified as a major barrier that needed to be addressed for parents.

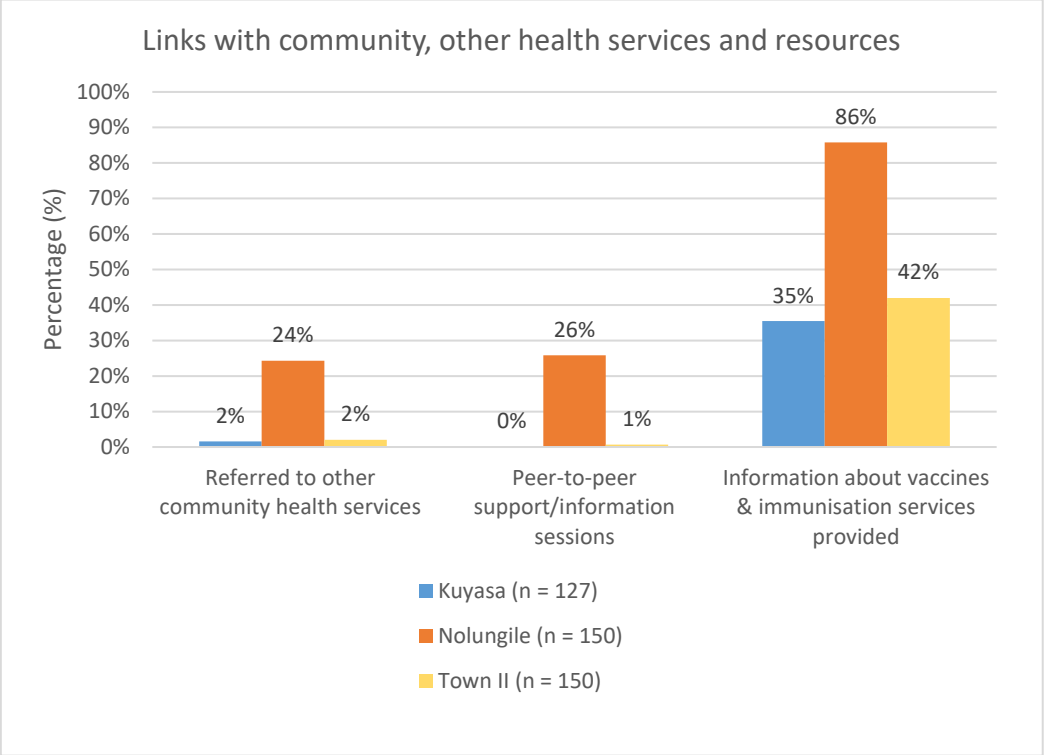


Figure 3.6. Clinic links to other services and resources provided
Responses compared at each clinic. Difference between Nolungile Clinic compared to Kuyasa Clinic and Town II Clinic are statistically significant (p-value = <0.001).

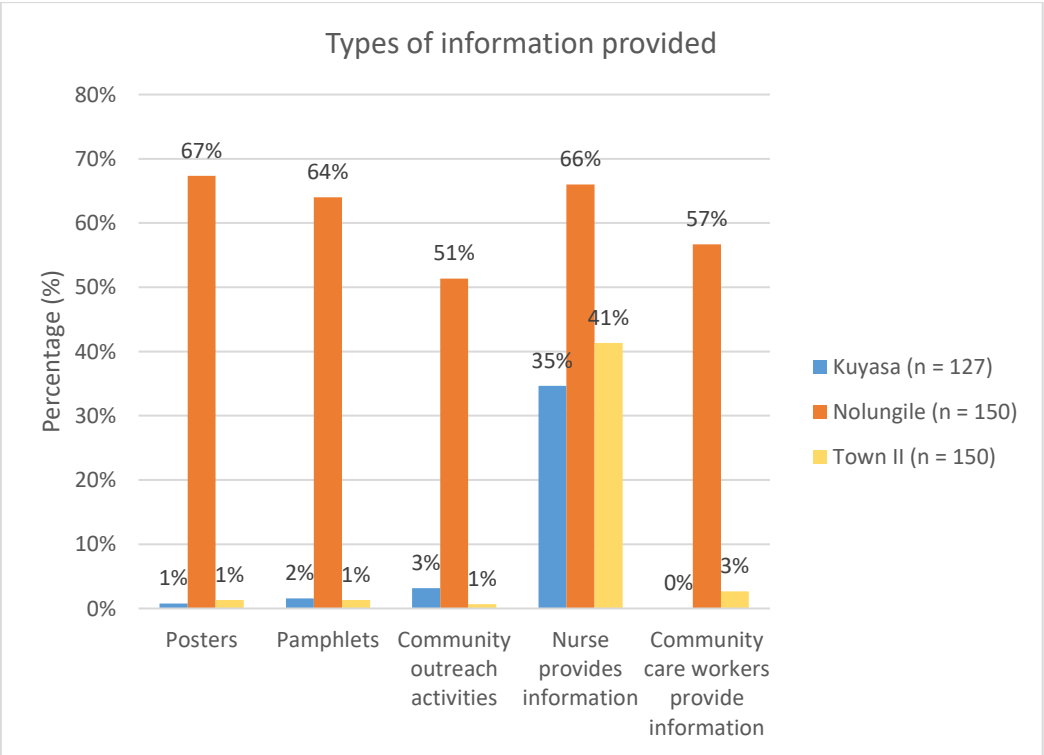


Figure 3.7. Types of information provided to parents/guardians at each clinic
Responses compared at each clinic. Difference between Nolungile Clinic compared to Kuyasa Clinic and Town II Clinic are statistically significant (p-value = <0.001).

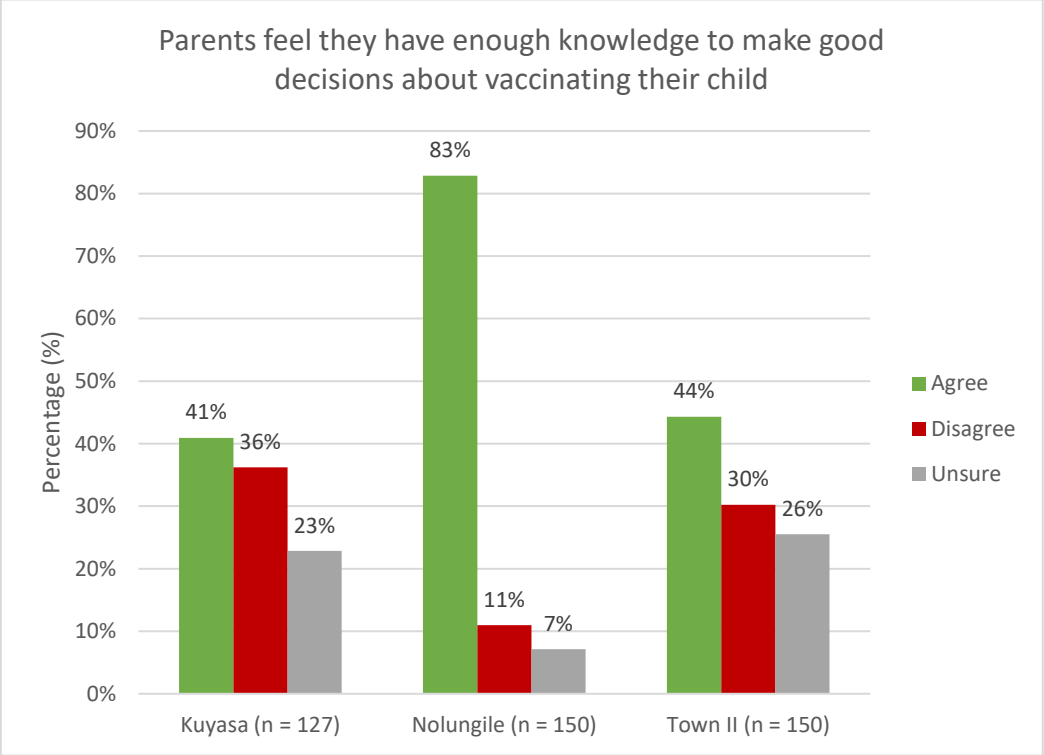


Figure 3.8. Knowledge to make decisions about vaccinating their child
Responses compared at each clinic. Difference between Nolungile Clinic compared to Kuyasa Clinic and Town II Clinic are statistically significant (p-value = <0.001).

The final section of the survey consisted of questions designed to find out how accessible parents/guardians thought clinics were, and how satisfied they were with the service they received (see **Table 3.10)**. Overall, 70% reported that clinics were accessible with 29% of parents/guardians reporting that they were not. Of those who reported that clinics were not accessible, the main reason given was that waiting times were too long (23%). The majority of parents/guardians (91%) also reported that they did not receive any communication from clinics to remind them of upcoming appointments, or follow-up on missed appointments. If parents/guardians were contacted, they said that it was primarily via the clinic card where nurses wrote when their child's next appointment will be (21%) but the majority stated that the clinic did not communicate with them in general (72%).

When asked about what method of communication they would prefer, most parents/guardians said they would prefer communication via text message (85%), or via phone call (52%). Positively, 98% of parents/guardians held records of their child's immunisations in the form of

the Road to Health Booklet which is given to mothers either at the child's birth, or the child's first clinic appointment.

Long waiting times were quite clearly the main accessibility issue that parents/guardians identified which was also observed. Parents/guardians were of the opinion that waiting for their child's folder to be found by the clerks took the longest time. All three clinics did have an appointment system for child immunisations which was introduced in order to reduce waiting times as folders of children who were scheduled for that day would have already been found, and were held by either the clerks or the nurses who carried out the well-child checks before immunisation. However, it was found that not many parents/guardians were aware that the clinics had this system and were walk-in clients, indicating that the clinics did not seem to effectively communicate this option to parents/guardians. In addition to this, the limited communication and follow-up with parents/guardians regarding their child's immunisation dates were identified as barriers that required improvement.

When parents/guardians were asked what they thought about the overall service delivered at the clinic, opinions were split with 44% saying they thought services were delivered appropriately and effectively while 43% disagreed. This split in opinion was the same regarding the quality of the service (44% thought it was good quality, 43% disagreed), and satisfaction with services provided (51% very satisfied, 41% unsatisfied). For those that responded positively, they mainly attributed this to friendly or helpful staff, and that they were able to get what they needed from the nurses or doctors such as medication or vaccinations. Parents/guardians who said they were unsatisfied with services seemed to start with a positive statement, and then finish with a negative. For example, they would say that they were satisfied with the medical treatment that they received at the clinic but were unhappy because waiting times were too long, or staff were unfriendly.

Satisfaction with services, opinions about the quality of services, or how appropriate and effective services had more to do with how parents/guardians were treated personally by staff or how long they had to wait. Parents/guardians did say; however, that despite these issues, they felt they were able to let the clinic know if they were not satisfied with services (72%), and their preferred methods of doing this was through a complaints box (60%), or by directly speaking to the facility manager (41%). All clinics had a 'complaints and compliments box' which was placed at the entrance to the clinic near the Queue Marshal. However, this was not a confidential method of communication for parents/guardians to express their opinions as they were required to write their name and contact details on the form so that clinic staff could follow up on the issue with parents/guardians. Upper management also stated that the number of complaints or compliments that clinics received fed into clinic monitoring and evaluation processes, and that they were required to follow up on each one. It was thought that staff may discourage parents/guardians from filling forms out and preferred to personally deal with issues so that it did not need to be reported officially. The method for parents/guardians to provide feedback to the clinic was identified as an area that could be improved on.

Table 3.10. Clinic service delivery: Accessibility and parent/guardian satisfaction

	N (%)
Clinics are accessible	
Yes	**294 (70)**
No	124 (29)
Unsure	4 (1)
Reasons clinics are not accessible	
Clinic is too far away	19 (4)
Do not have transport to clinic	8 (2)
Cannot afford to pay for transport to the clinic	6 (1)
Immunisations offered during times parents cannot attend	9 (2)
Waiting time is too long	**100 (23)**
Unaware of when to bring their child back to the clinic for vaccinations	4 (1)
No time to come to the clinic	9 (2)
Have to take a day off work to come to the clinic	39 (9)
Other	2 (1)
Communication from clinics to remind parents of appointments or follow-up when appointments are missed	
Yes	37 (9)
No	**385 (91)**
Unsure	1 (0.2)
Clinic methods of communication when parents are contacted	
Phone call	20 (5)
Text message	17 (4)
Email	0 (0)
Mail	0 (0)
Community care worker visit	6 (1)
Clinic card	91 (21)
The clinic does not communicate with me	**306 (72)**

Parent preferred method of communication	
Phone call	221 (52)
Text message	**363 (85)**
Email	34 (8)
Mail	14 (3)
Community care worker visit	40 (9)
Other	9 (2)
Hold records of child's immunisations (Road to Health Booklet)	
Yes	**411 (98)**
No	9 (2)
Unsure	1 (0.2)
Service delivered appropriately and effectively	
Yes	**186 (44)**
No	183 (43)
Unsure	55 (13)
Clinic provides good quality service	
Yes	**186 (44)**
No	181 (43)
Unsure	57 (13)
Satisfaction with immunisation services provided at the clinic	
Very satisfied	**216 (51)**
Unsatisfied	174 (41)
Unsure	34 (8)
Able to let the clinic know if they are not satisfied with the service provided	
Yes	**308 (72)**
No	84 (20)
Unsure	34 (8)
Parent preferred methods of providing feedback	
Complaints box	**254 (60)**
Talk to nurse	119 (28)
Talk to doctor	53 (12)
Talk to facility manager	174 (41)
Talk to receptionist	36 (8)
Talk to Community Care Workers	51 (12)
Other	4 (1)

Similarly, differences can be seen when responses are assessed by individual clinics with most of the positive responses coming from Nolungile Clinic. Of parents/guardians who found clinics accessible, 89% were from Nolungile as compared to 54% from Kuyasa, and 64% from Town II (p-value = <0.001) (see **Figure 3.9**). The two main reasons that parents/guardians said clinics were not accessible was due to either long waiting times, or that they had to take a day off work to go to the clinic. Of the total cohort that stated the clinic was too far away, 1% were from Nolungile (vs 9% at Kuyasa and 5% at Town II; p-value = <0.001), 6 % said there were long waiting times (vs 42% at Kuyasa and 25% at Town II; p-value = <0.001), and 4% had work commitments that affected their clinic visits (vs 9% at Kuyasa and 15% at Town II; p-value = <0.001) (see **Figure 3.10**). This seemed to suggest that while these were issues at the clinics, it was less prevalent at Nolungile in comparison to the other clinics.

Of the parents/guardians who said they thought services were delivered appropriately and effectively, 78% were from Nolungile (vs 23% at Kuyasa and 28% at Town II; p-value = <0.001) (see **Figure 3.11**), and 86% of parents/guardians from Nolungile said services were of good quality (vs 18% at Kuyasa and 24% at Town II; p-value = <0.001) (see **Figure 3.12**). Also, the majority of those who were satisfied with services were from Nolungile (84% vs 28% at Kuyasa and 37% at Town II; p-value = <0.001) (see **Figure 3.13**).

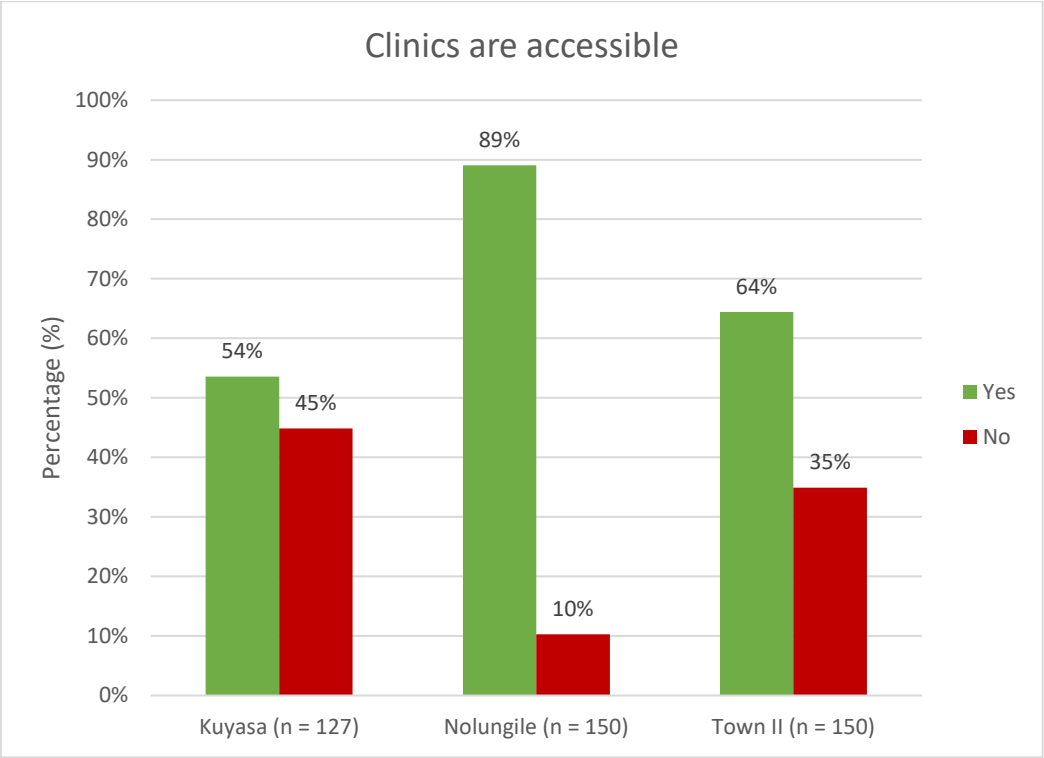


Figure 3.9. Accessibility of clinics
Responses compared at each clinic. Difference between Nolungile Clinic compared to Kuyasa Clinic and Town II Clinic are statistically significant (p-value = <0.001).

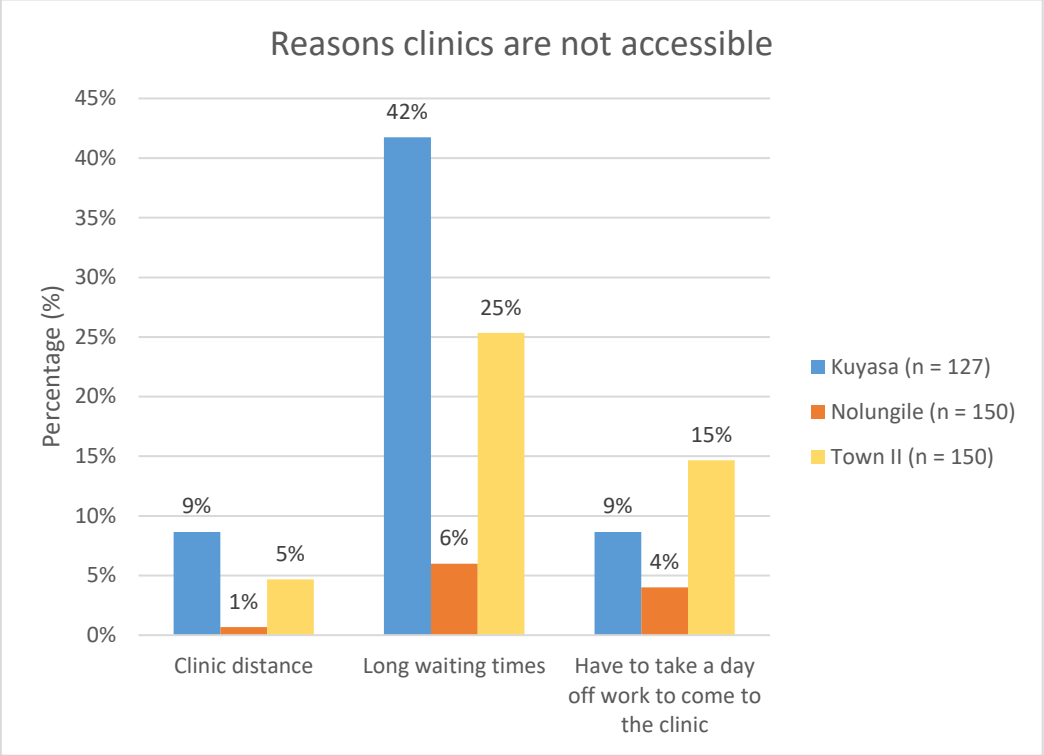


Figure 3.10. Main reasons clinics are not accessible
Responses compared at each clinic. Difference between Nolungile Clinic compared to Kuyasa Clinic and Town II Clinic are statistically significant (p-value = <0.001).

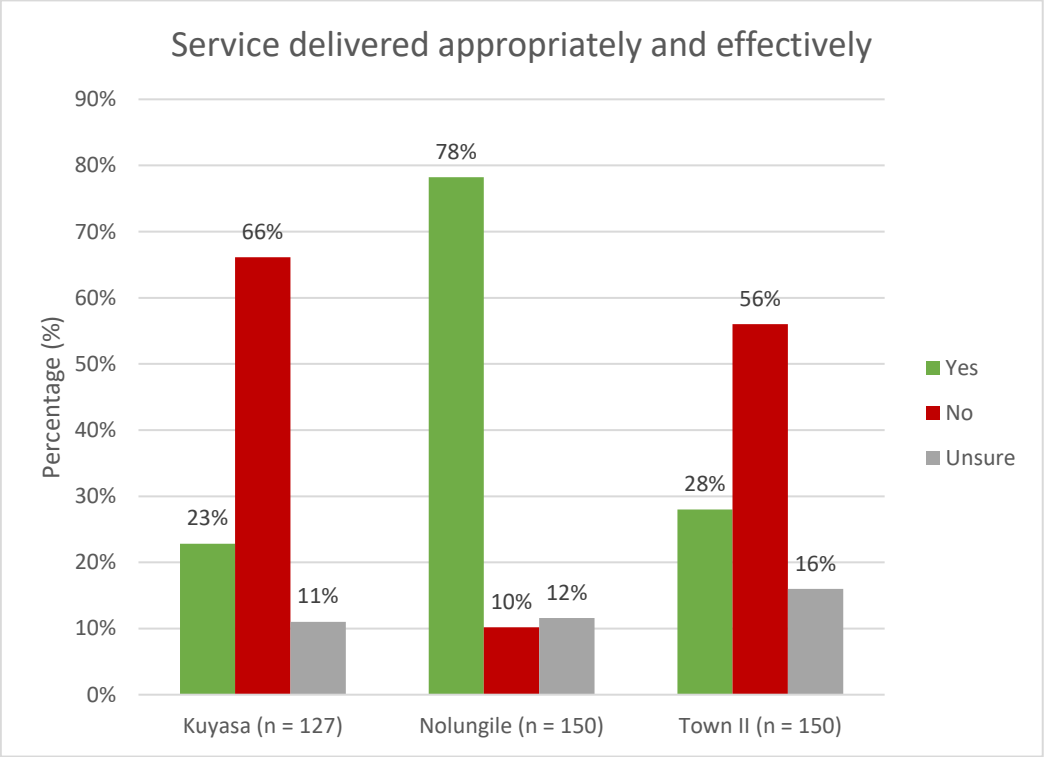


Figure 3.11. Appropriateness and effectiveness of clinic service delivery
Responses compared at each clinic. Difference between Nolungile Clinic compared to Kuyasa Clinic and Town II Clinic are statistically significant (p-value = <0.001).

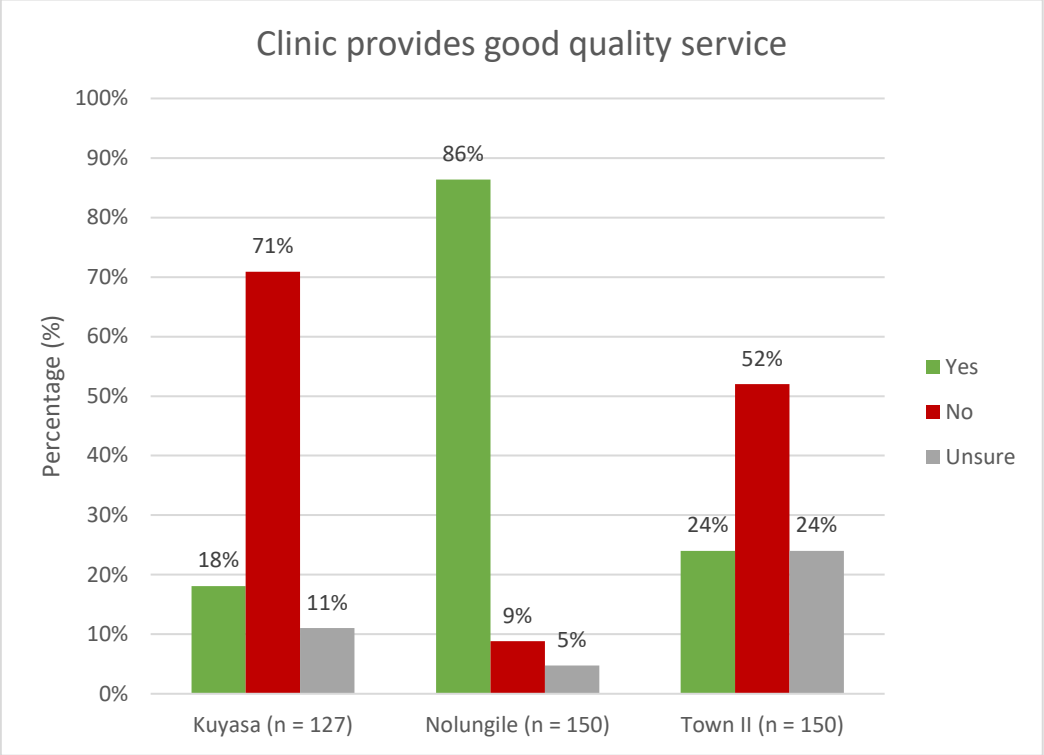


Figure 3.12. Quality of clinic services
Responses compared at each clinic. Difference between Nolungile Clinic compared to Kuyasa Clinic and Town II Clinic are statistically significant (p-value = <0.001).

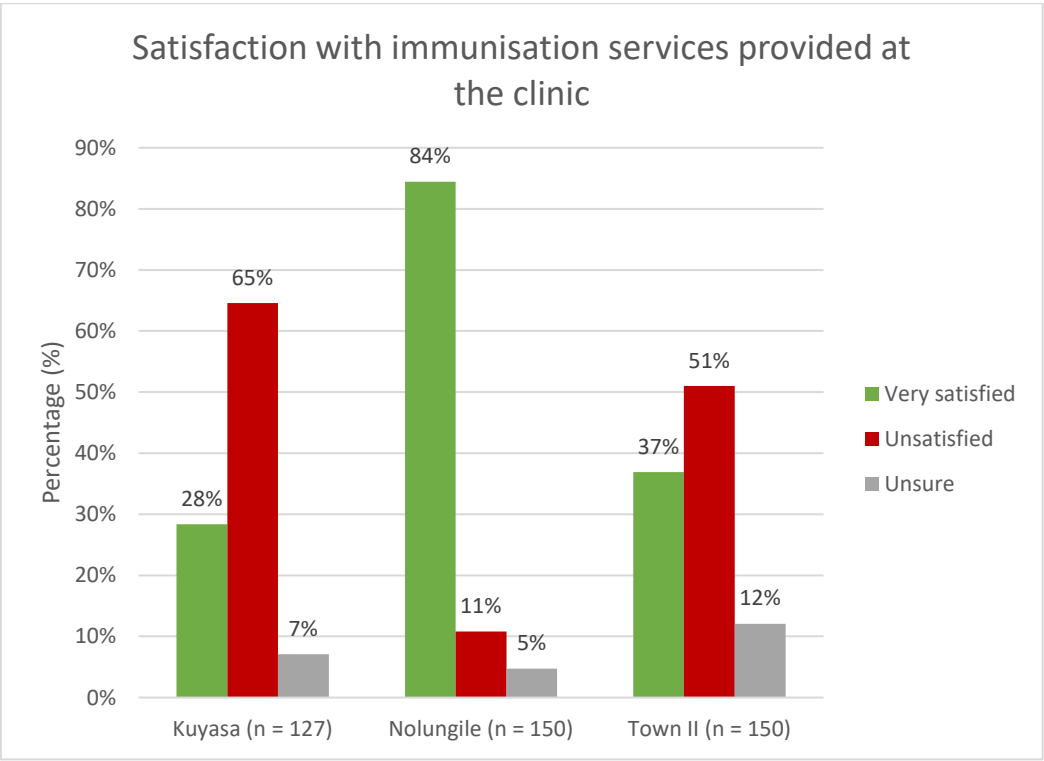


Figure 3.13. Parent/guardian satisfaction with services provided at clinics
Responses compared at each clinic. Difference between Nolungile Clinic compared to Kuyasa Clinic and Town II Clinic are statistically significant (p-value = <0.001).

3.3.3.2 Qualitative findings

This section describes the qualitative findings of the service users from the Health Services and Community Uptake Assessment. Focus groups with parents/guardians attempted to unpack barriers identified above in detail to determine more clearly the areas that needed improvement at each clinic and how this could be facilitated.

The main themes that emerged from these focus groups were as follows:

1. Acceptability of vaccine program and services at the clinic: the importance of immunisation, parents'/guardians' concerns about immunisation, parent/guardian-staff interaction, and waiting times.
2. Immunisation strategy and program: the effectiveness and accessibility of services.
3. Self-management: parent/guardian-held immunisation records, parents'/guardians' knowledge about immunisation and clinic processes.
4. Links with community, other services and resources: resources about vaccines and immunisation, awareness of non-profit organisations, or other health services.
5. Quality improvement of program: satisfaction with service provided, parent/guardian suggested clinic strategies for improvement of immunisation services, and parent/guardian suggested community strategies.

3.3.3.2.1 Socio-demographic characteristics of focus group participants

Four focus groups were conducted at the three clinics, with 23 parents/guardians participating in these focus groups. All participants were female, and ages ranged from 19 to 47 years old. The majority of participants were single mothers (70%), Eastern Cape was the province of birth for 70% of participants, and the language spoken at home was isiXhosa for all participants. The highest level of education for most participants was secondary school (35% completed Grade 11, 26% completed Grade 12). Of the 23 participants, 48% had one child, mostly aged between 13-18 months old (48%) (see **Table 3.10**).

Table 3.11. Demographic information of focus group participants (parents/guardians)

Age	Gender	Marital status	Province of birth	Language spoken at home	Highest level of education	Highest grade/ level completed	Number of children	Age group of youngest child
28	Female	Father of the child lives with them	Eastern Cape	isiXhosa	Secondary school	Grade 12	2	13-18 months
22	Female	Single mother	Western Cape	isiXhosa	Secondary school	Grade 11	1	13-18 months
24	Female	Single mother	Eastern Cape	isiXhosa	Secondary school	Grade 11	2	13-18 months
25	Female	Single mother	Eastern Cape	isiXhosa	Secondary school	Grade 10	2	13-18 months
33	Female	Father of the child lives with them	Eastern Cape	isiXhosa	Secondary school	Grade 12	2	19 months-6 years
35	Female	Father of the child lives with them	Western Cape	isiXhosa	Secondary school	Grade 11	2	13-18 months
31	Female	Married	Eastern Cape	isiXhosa	Secondary school	Grade 11	2	13-18 months
30	Female	Single mother	Eastern Cape	isiXhosa	Primary school	Grade 6	2	13-18 months
22	Female	Single mother	Eastern Cape	isiXhosa	Secondary school	Grade 12	1	10-12 months
22	Female	Single mother	Gauteng	isiXhosa	Secondary school	Grade 12	1	10-12 months
31	Female	Single mother	Eastern Cape	isiXhosa	Secondary school	Grade 12	3	13-18 months
22	Female	Single mother	Eastern Cape	isiXhosa	Secondary school	Grade 10	1	19 months-6 years
30	Female	Single mother	Eastern Cape	isiXhosa	Secondary school	Grade 12	1	19 months-6 years
22	Female	Single mother	Western Cape	isiXhosa	Secondary school	Grade 11	1	13-18 months
24	Female	Father of the child lives with them	Eastern Cape	isiXhosa	Secondary school	Grade 11	1	19 months-6 years
34	Female	Single mother	Eastern Cape	isiXhosa	Secondary school	Grade 11	2	-
27	Female	Single mother	Western Cape	isiXhosa	Secondary school	-	2	13-18 months
36	Female	Single mother	Eastern Cape	isiXhosa	Primary school	-	1	13-18 months
20	Female	Father of the child does not live with them, but supports them or the child	Eastern Cape	isiXhosa	Secondary school	Grade 9	-	-
31	Female	Single mother	Eastern Cape	isiXhosa	University or further education	3rd year	1	10-12 months
19	Female	Single mother	Western Cape	isiXhosa	Secondary school	Grade 10	1	19 months-6 years
47	Female	Married	Eastern Cape	isiXhosa	Secondary school	Grade 9	4	7-9 years
-	Female	Single mother	Western Cape	isiXhosa	Secondary school	Grade 11	1	19 months-6 years

3.3.3.2.2 Acceptability of vaccine program and services at the clinic

The importance of immunisation

"Because immunisation is important you can even walk a long distance to come to the clinic" **(NP1)**.

As with the parents/guardians who participated in the survey, parents/guardians who participated in the focus groups all thought that immunisation was very important for their child. The main reasons that they provided for this opinion was that it protected their child from diseases and kept their child healthy. One parent/guardian also said that even if their child did get the disease after they had been vaccinated, it would not be that severe. Additionally, there was the assumption that if a child did contract a VPD, it was because they were not vaccinated:

> *I think it is important because it protects the children from diseases like measles, polio and other. So that they can be protected from such diseases. I have never seen a child with measles and if they have it,* [it] *is because the child was not vaccinated* **(NP2)**.

One parent/guardian even drew the comparison between HIV/AIDS and VPDs with the idea that 'prevention is better than cure':

> *When it comes to diseases like AIDS it* [is] *said that prevention is better than cure. It's the same with child immunisation, prevention is better that cure because you will be preventing those diseases, that means you won't have to worry about measles outbreak on your child, you even if it* [the child] *does get measles, like she has already mentioned it won't be so severe. It could be prevented* **(NP4)**.

This appeared to indicate that the parent/guardian seemed to have actually thought about the reasons why immunisation is important beyond it being something that the clinic nurses have told them what they need to do for their child. Not only was immunisation considered important to parents/guardians, they thought that the nurses emphasised the importance to them as well:

> *The last time when I was here, I used to work at* [name of clinic]. *My child was sick so the first thing they ask when I got here "is the child immunised?" And they were adamant that they need to make sure that the child has been immunised. If happened that I am far, it is okay for me to come this side because it is important for the child to be immunised, they* [the clinic staff] *do not discriminate against you because of where you come from. The health of child is important* **(NP5)**.

> *I think the programme is taken as highly important. Like just now I took this child, they* [the nurses] *just showed me that there are more other vaccinations that the child can get so I saw that this people* [clinic staff] *really think about the children. But then I haven't had any complaints for now* **(NP6)**.

Parents/guardians felt this showed them that the nurses cared for the health of their child, and that the immunisation program offered at the clinic was a necessary component of their child's clinic visits.

Concerns about immunisation

While parents/guardians felt immunisation was important, a few did express some concerns, mainly to do with possible side effects, and not knowing what to do: *"... sometimes there are after effects, sometimes the children get fever, I don't know what to do about that"* **(KP1)**, or the child experiencing pain at the injection site: "… *sometimes the child would be bruised after being injected"* **(KP2)**. Besides this particular concern, they did not have any issues regarding the safety or efficacy of vaccines, or worries that vaccination would harm their child. However, this did signify to the primary researcher that additional information regarding potential side effects, and what a parent/guardian should do after their child has been immunised would be worthwhile.

Another concern that some parents/guardians had was that their child might get sick while they were in the waiting areas with others that were ill, and that there was no separate waiting area for child health: "*The children should be seated separately. Some other patients have TB, the child might be infected. There should be a separate area for children"* **(NP1)**. Another parent/guardian suggested that if children were to be in waiting areas with other patients, that there should be roaming nurses to triage patients to prevent other people in the waiting areas from being affected:

> *… there is a lady who brought her new born baby, she can't even walk properly. That concerns me, that worries me. A 5-day new born here at the clinic with everyone inside the room, some are coughing, that can be harmful to the child. The child might get infected. She has to wait with us at the queue. There should be other nurse going around checking for patients who needs attention* **(NP2)**.

In talking to parents/guardians, it was clear that their concerns about immunisation mainly revolved around their limited knowledge about side effects, and the need for them to wait with their child in general waiting areas which they thought might be a risk to their child's health. As mentioned in the section above, parents/guardians who bring their child for immunisation are required to wait in two waiting areas; the first general waiting area with everyone else waiting for folders, and the child health waiting area where children who are visiting the clinic for well-child checks and immunisation sit with children who are ill. Many parents/guardians stated that they would prefer if there was an entirely separate child health section.

Prioritisation of other programs at the clinic

Some parents/guardians had stated how they thought that nurses did emphasise the importance of immunisation to them; however, others were of the opinion that other programs at the clinic are prioritised more:

> *Other programs are prioritised like the HIV program, mother to mother* [mothers2mothers]*; there are people running those programs, they explain everything but when it comes to immunisation nothing much is being done. They prioritise the HIV program, they do not educate us about child immunisation* **(KP1)**.

This was observed when the primary researcher and the interviewers were at the clinics. All clinics had quite extensive HIV and TB programs which not only seemed to be the primary focus of the community care workers but also most of the health education and health promotion materials provided at the clinics. There was not a lot of information about immunisation specifically available at the clinic, and there was no support structure for child health as there was for clients who were part of the HIV and TB programs.

Parent/guardian and staff interaction

As with parents/guardians who participated in the survey, parents/guardians from the focus groups generally expressed feeling dissatisfied with the way staff communicated with them and treated them. Many stated that they felt they were not treated with respect and did not like

how staff talked to them: "*Sometimes they* [clinic staff] *are okay, they would communicate with us properly and explain, sometimes they are rude they would shout at when you ask for clarification. They are not the same, some are rude, some are nice"* **(KP2)**. One parent/guardian stated that because of staff attitudes, they avoided asking questions: "*We are reluctant to ask questions because we don't want to be yelled at and if you ask them, they would tell you to look at the booklet…* **(KP4)**, and another was generally uncomfortable with the manner in which the nurse spoke to her:

> *I can't say I don't have any* [concerns] *because I once came bringing a letter from the doctor so the child could do some blood test, so the nurse was asking me questions in front of 5 to 7 nurses, and also in front of other patients. I let her finish asking all the question and then I told her that I was admitted on Sunday night, then she asked how could I bring the child on Thursday. Then I told her that the child was admitted on Sunday, then they gave me a letter that states that I must bring the child to the clinic on Thursday. She read the letter from the hospital, I had to answer in front of all the nurses, so I didn't like the way she was addressing me at all because she thinks I am an uncaring, stupid parent* **(NP7).**

This highlighted a potential issue with confidentiality which a few other parents/guardians brought up. Many participants in the focus groups said that they thought staff were rude: "*They* [should] *change the staff if they do not want to work. That is why most parents don't come to the clinic, it's because of the way they treat us, they are rude* **(NP5)**. They also felt that this attitude of staff affected their ability to do their job properly:

> *There are always rude towards the patients… I think they bring their personal issues at work and take it out on us. They have bad attitudes and they are rude, they should leave their issues at the gate and when they get to work, they should do what they get paid for. They bring their personal issues to work and they answer you rudely like when you ask if you don't understand what's wrong with the child instead of explaining they will be asking you as if you are the one who is hired by the department of health while you know nothing and then they will give you a multivitamin, then tell you that there is no medication* **(NP6)**.

Others had different experiences at the clinics, and mentioned that they thought staff were quite friendly: "*Based on my experience and also based on my child*['s] *health I was satisfied. Sister* [name] *really made me feel welcome and comfortable* **(NP8)**. They also expressed satisfaction with their experience at the clinic:

> *Usually the nurses are friendly, especially to people who have children. When you are going for consultation, they are friendly to the child and the parent. I am speaking from my personal experience compared to other clinics, Nolungile clinic is one of the best here in Khayelitsha. At other clinics the nurses would shout at you if your child is crying, they would shout you for that. That is what I have seen in other clinics not here at Nolungile. This clinic is the best here at Khayelitsha that is my personal observation* **(NP9)**.

Some parents/guardians said that while they were aware that clinics had an appointment system, and that these appointments were important, clinic staff were not very clear when they communicated with them about immunisation dates for their child:

> *They pay attention to the ones with appointments. I had an appointment on the 21st it was a holiday so I came today they said that I should have come yesterday... They set an appointment on a holiday. It's either I come before or after the 21st because it was a holiday, so they said they will assist me last. I should wait but they were closed on the 21st... They are the ones who put that date for me* **(TT2)**.

Others said they had no issues with staff being unclear with immunisation dates and information about which immunisations were to be given. One even pointed out that it was her own mistake: "*I am the one who is wrong. I was supposed to bring my child for 18 months, I did not check the date, they are the one who reminded me about it"* **(NP3)**.

There were also issues with parents/guardians feeling that others were given preferential treatment when they came to the clinic: "*They would assist the ones who have just arrived while the others are waiting here because they know them. That's what happens here at this clinic. We tolerate this because we can't go anywhere else"* **(TTP1)**. It is possible that these parents/guardians who appeared to have been treated preferentially had set appointments with the clinic, and therefore were treated before other walk-in parents/guardians. However, whatever the case may be, this shows that some parents/guardians did have the perception that they were treated differently to others, and also draws attention to the limited awareness of being able to make immunisation appointments for their child.

Many parents/guardians had indicated that in order to bring their child to the clinic, they had to take a day off work as they expect to wait in the clinic for a long period of time. Sometimes,

due to either stock outs, or staff not allowing clients to be seen after a particular time, parents/guardians are sent away and told to come back on another unspecified day. One parent/guardian described this situation, and indicated a loss of trust in the clinic because of it: "*Asking for a day off at work then you come here and they tell you to go back, how will you be able to come back here again?"* **(TTP2)**.

Other parents/guardians said that they felt their child's care was not prioritised, and that the nurse was not there when they were supposed to be:

> *I am not satisfied. I have been here since morning, my child is sick, I was told to go to room 92. When I got there, they told that the other nurse went for a class. I asked them, "what I am supposed to do now? So, the class is more important than the child?" The nurses are rude and even when they go [for] lunch they just go without informing us that they are going to lunch* **(NP8)**.

One parent/guardian said that "*they* [nurses] *spend most of their time on WhatsApp. They spend more time on lunch time and tea breaks. They talk too much; the rooms would be empty and locked no one will be working"* **(NP7)**, and another similarly said "*… you will find 4 or 5 nurses in the ward busy talking about their own private issues, and they will be asking you what's wrong with the child. I don't understand how you are supposed to explain the health issues to so many nurses at the same time. They don't work, they just sit in one place and talk to each other"* **(NP5)**. This was also observed during the period when the primary researcher and interviewers were at the clinics. All clinics only have either one or two nurses available daily delivering immunisations, so if that nurse has other responsibilities such as delivering health talks, attending professional development courses etc., then there is no one else to cover for them, resulting in a delay in seeing clients. The interviewers also observed that staff tended to take morning tea or lunch breaks at the same time, and left parents/guardians to wait in the waiting areas until they were done; again, as there was no one to cover for them. A number of issues are highlighted here. Firstly, there was a lack of communication between staff as they were unaware that the other nurse was unavailable, there was a miscommunication between the staff and parent/guardian, as the parent/guardian was left to wait without being properly

informed about where the nurse was, there was a mismanagement of staff's time, and there was a shortage of staff since there was no one left to take over when other staff were occupied.

Waiting times

One common barrier identified by majority of parents/guardians was that waiting times in the clinics were too long, and that when they attend the clinic, they are expected to spend most of the day there:

> *When I come to the clinic I should be prepared to wait. If I arrive here at 8:00am I will leave here at 3:00 or 4:00pm. I spend the whole day here at the clinic, I can't do other things… I won't have time to do other things because I will be at the clinic the whole day* **(NP2)**.

During the assessment period, it was observed that clinics had promotional materials indicating that clinic visits should not take any longer than three hours. A number of parents/guardians seemed aware of this but still felt that they were at clinics for a lot longer than that:

> *They need to be fast; we are not supposed to wait long for file, they should at least take 20 or 30 minutes to look for a file, they should be sorted. We should not spend more than 3 hours here at the clinic as it is written on the pamphlets. They should not mix adults and children's files; they should be separated* **(KP2)**.

Other parents/guardians mentioned that there were no facilities at the clinics for their child: "*The service here at the clinic is bad because you wait for a long time to get your file and there is no room for changing nappies for babies, you have to go outside* **(KP3)**. Parents/guardians also had issues with not having sufficient food or other necessities to last the entire time they need to wait at the clinic:

> *Sometimes when you come here, you don't bring enough food for your child, then you spend the rest of your day at the clinic. The child would be hungry and crying. Children are very important; they should be taken care of* **(NP1)**.

> *We wait here for a long time and you won't be able to do other things at home. The child would use all their nappies while waiting here. You will be stuck here in the clinic you can't leave before you are assisted* **(KP4)**.

> *I am also not satisfied with the services because we spend a lot of time here at the clinic. The child gets irritable and we become hungry while waiting here because we breast feed. They tell us to go eat outside. Sometimes we can't go eat outside because of the rain* **(KP5)**.

It was clear that the long waiting times at clinics have additional effects that perhaps the clinics do not take into account. While the primary researcher and interviewers were at the clinics, it was seen that there were no facilities for parents/guardians such as changing areas for babies. At one point it was observed that a parent/guardian used a spare table that was located in the waiting room to change their child. Also, parents/guardians did not have access to food or drink facilities.

3.3.3.2.3 Immunisation strategy and program

Effectiveness of services

Quite a few parents/guardians expressed dissatisfaction with how effective services were at the clinic, highlighting a number of issues such as the perception that staff were not well trained, lost files, and limited staff:

> *The person is not trained for the job so she is doing the job that she doesn't even know. The cleaners and securities go in and look for our files, that's when files get lost. They even rearrange our numbers; the last person will be assisted first. They should deal with the reception issue and hire staff that will work at the reception. They must also know the job; the windows must be open and those people should know their job... Even when you want to ask simple question you must stand on a queue just to ask a question... like when you don't know where to write your name and you want to ask, you must queue first just for a question* **(TTP1)**.

Missing files in particular were mentioned by parents/guardians as a common problem with some stating that most of their waiting time was due to clerks trying to find their files: "*...sometimes the file would be lost and they won't let you know that your file is lost until you go ask them where is your file. That is when they'll tell you that your file is lost after spending 3 hours waiting for the file"* **(KP2)**. Once again, it is noted that there was a breach of confidentiality mainly to do with who were able to access parents'/guardians' medical files. This was also observed by the primary researcher during the assessment period in Kuyasa clinic where files were stacked on tables in corridors that were publicly accessible.

Many parents/guardians spoke about how they had come to the clinic for their child's immunisation only to be turned away after being told that the vaccine was out of stock:

> *My child was injected with an injection that is meant for 10 weeks but he is 4 months. Now he is 7 months, he just got immunisation for 6 months. They usually ran out of vaccinations… When he was 3 weeks, he got one injection. On his 10 weeks, he was given an injection for 4 months. On his 4th month, he got an injection for 10 weeks... I would come here and they will tell me that they have run out vaccinations. They can let you wait until one o'clock, then they will tell us that it is too full, we must come back tomorrow. They should tell us earlier if there no vaccinations so that we can go back early* **(NP4)**.

> *My child was supposed to get two injections but he was only given one injection, they told me that he will get the other injection next time when we come back, they did give him another injection when we came back. I came here to get the 14 weeks vaccinations they said they have run out of vaccination they will be available the following week. When I came here the following day, I got it... I didn't feel good* **(KP2)**.

This also highlighted how vaccine stockouts affect timely vaccination. It was clear that these parents/guardians were aware of what vaccines their child should have been given and at what time points, and were concerned when they were not received according to the schedule.

Access

Parents/guardians stated that clinics were generally accessible as there are a number of clinics in Khayelitsha, and they are able to get to them. However, they did encounter some challenges that affected their ability to attend the clinic. For example, many parents/guardians said that they missed their child's immunisation appointments due to work commitments and would require them to take a day off: "*It's not that all parents don't want to come to here, is just that they might be afraid to speak to their employers asking for day off"* **(NP10)**. If they did miss appointments due to work, others said that they would try to come on other days but would experience delays as they would then be considered walk-in clients rather than clients with appointments:

> *The appointment date could be on the 20th, and if you are not able to make it on that date, maybe because of work, then you come the following day or after two days. They will tell that you will be assisted later, after they have assisted the others, even though you came early because it is not your appointment date.*

> *They don't even ask what your problem is, they just tell you that you will be assisted last* **(TTP3)**.

One parent/guardian mentioned that she was sometimes unable to attend the clinic because she was unable to arrange childcare for her other children: "*I have just made a call now; my other child is outside. I have many children, so I wanted to ask someone to look after them,"* and when asked if she had left her other child at home alone, she replied, "*because I had to come here"* **(NP1)**. Some parents/guardians relied on other family members to bring their child to the clinic, and mentioned that if appointments were missed, they got yelled at by the nurse: "*My mother can't bring my child here at the clinic because she is also taking care of my sister's child. You have to come to the clinic no matter what because if you miss an appointment, they will yell at you"* **(KP3)**. Another parent/guardian said something similar regarding some parents/guardians who did not go to the clinic because they were scared to after they had missed appointments:

> *Sometimes the problem lies with the parents because they might miss one immunisation, then they would just stop the immunisation because they are scared of being shouted at the clinic, so they end up not taking their children for immunisation. There is a certain lady who has a 2-year-old baby. She said that her child has not been immunised since* [the] *6 months* [vaccine]*, she said she was scared to come to the clinic after missing an immunisation* **(KP4)**.

There were also other, indirect expenses that prevented parents/guardians from attending clinics. For example, one parent/guardian said that she was unable to come to the clinic if she did not have necessary items for her child: "*Sometimes I don't come due to the shortage of baby products like nappies, so I'll just come the following week without being called by anyone from the clinic… when I don't have them, I don't come to the clinic"* **(NP2)**. Another parent/guardian said that not having phone credit prevented her from going to the clinic: "*You must have airtime in order to make an appointment. If you don't have airtime you won't be able to make an appointment. You might not even be successful with setting the appointment"* **(TTP4)**.

A number of parents/guardians indicated that they think some clinics in Khayelitsha provide better service; that others would prefer to go there, and did not like that they did not have a choice in this:

> *My other experience is, we all live at Khayelitsha, but we are only allowed to go to the clinics which are next to the area we live in, even though when you think that the clinics in the other area of Khayelitsha are the best.* **(NP2)**

> *I don't see any reason why they don't have to treat the child when you brought the child to the other area because you brought the child to get the necessary vaccination. They will be shouting at you telling you that they won't help you because you are from the other side of Khayelitsha and we are talking about a child who is sick or a child who needs vaccination. We are employed, we have to ask for lifts to come to the clinic, so I don't see any reason for them not to help you because we are still at Khayelitsha* **(NP3)**.

Other parents/guardians and staff; however, have contradicted this perception of a lack of choice in clinics parents/guardians could attend. Some parents/guardians said that despite living in the Kuyasa area for example, they still went to Nolungile Clinic, and some staff described similar situations. There did not seem to be an enforced rule stating which clinic parents/guardians should go to based on the area that they lived in, and it seemed to vary from case to case. Also, since Khayelitsha does not have well defined catchment areas, it is more likely that parents/guardians will be seen regardless of where they go.

3.3.3.2.4 Self-management

Parent/guardian-held immunisation records

When asked if parents/guardians had records of their child's immunisations, most said that they did, referring to the Road to Health Booklet (RTHB). Parents/guardians seemed to be reliant on this to know when their child's next immunisation date would be: "*They are listed on the card"* **(NP4)**, and for any additional information about immunisation: *"The info is written on the booklet… Everything is written on the booklet* **(KP3)**.

Parent/guardian knowledge about immunisation and clinic processes

A number of parents/guardians were knowledgeable about immunisation in that they were aware that vaccines protected their child from diseases, and not vaccinating would result in a greater risk of them being infected: "*If the child is not vaccinated it easier for them to have other diseases"* **(TTP2)**. "*When your child gets vaccinated, he doesn't become vulnerable to measles. When he is not vaccinated, he has a high risk of getting measles"* **(TTP3)**. One parent/guardian also stressed the importance of immunisation since newborns are vulnerable:

> *Yes, it is safe for your child. It can prevent your child from sicknesses. Vaccination is very important, new born babies are vulnerable. It very important for each and every parent to immunise their child, so it keeps the child in good health. We need to protect them from birth* [so] *the child* [will] *grow up with good health* **(NP8)**.

It was observed by the primary researcher and interviewers during surveys and focus groups with parents/guardians, that parents/guardians who had more of an understanding about immunisation were the younger mothers. They seemed to have more knowledge, and were more willing to find out additional information about immunisation from the nurses or from other sources. One thing that was noticed was that some parents/guardians seemed quite aware about standard nurse practices, and they pointed out that they felt it was important to watch what the nurses were doing when immunising their child to ensure that they were doing the right thing:

> *First thing is being organised. You must be present when the child is being immunised and witness everything, see what the nurse is doing. There are different kinds of immunisation so you must make sure that your child gets the correct one* **(NP5)**.

> *I think first of all the nurses must be professional, because if the nurses are not professional you won't be able to trust them. If they are clean and they must keep the equipment in a clean area, they must not use the equipment once is open* **(NP6)**.

> *That is what we are cautious about because the nurse might make a mistake and reuse the injection. You should witness everything, see all the equipment that is being used. When you are going to the pharmacy section to get medication, you need to check if they gave you the correct medication because they can give your child a wrong medication* **(NP7)**.

This attitude is most likely influenced by South African HIV/AIDS health promotion which highlights for example, ensuring that needles/injections are not shared, making sure they are from unopened packages, and that clinic workspaces are "clean". While some parents/guardians are knowledgeable in these aspects, it was clear that some did not entirely understand clinic process such as the appointment system, and were under the mistaken impression that those with appointments were treated differently to those that did not, and thought that they needed to wait until the appointment date to bring their child to the clinic even if they were sick: "*The appointment system is okay but it doesn't mean that they should not pay attention to those without appointment. If you are sick you have to wait for your appointment. Let's say your appointment is next month, so you will have to come to the clinic the following month because of the appointment"* **(TTP6)**. This indicated that perhaps the appointment system was not clearly explained to parents/guardians, and it was not emphasised that if the child was sick, to bring them to the clinic immediately, regardless of when their appointment was.

3.3.3.2.5 Links with community, other health services and resources

Resources about vaccines and immunisation

A number of parents/guardians mentioned that there was limited information about immunisation at the clinics, and this affected parents'/guardians' ability to understand the importance of immunisation:

> *Because they* [parents] *do not have enough information, they do not know the importance of child immunisation. The problem lies with the department. They do not reach out to the community about child immunisation, there is lack of information* **(KP2)**.

> *You have limited information about immunisation. If the child doesn't get immunised, he might not be able to walk, he can be weak, that can also the result from not immunisation your child, so immunisation is very important. They need to educate the community more about immunisation* **(KP3)**.

This was observed while the primary researcher and interviewers were in the clinics. There were no health promotion materials specifically about immunisation at the clinics but mainly

about diarrhoea, HIV/AIDS, tuberculosis, breastfeeding, and child nutrition. Clinics and parents/guardians seemed to be reliant on the RTHB for information about immunisation.

Awareness of non-profit organisations, or other health services

All clinics had links to non-profit organisations, or offered other health services at the clinics that parents/guardians could be referred to if necessary. A few parents/guardians involved in the focus groups could name examples of services that they knew of such as nutrition services: *My child was underweight; she was referred to Philani they monitored her health. She was discharged when she okay* **(KP3)**, a peer-to-peer maternal/child health service mainly focused on the prevention of paediatric HIV/AIDS: *"...they only tell us about Mother to Mother* [mothers2mothers]*... It's about breast feeding so that you don't infect the child* **(KP2)**, and outreach services: "*...they even come to your home to check the child"* **(NP2)**.

Parents/guardians were particularly aware of outreach services that were provided by the clinic where nurses would visit creches or day cares to immunise children:

> *I have a child who is attending a day care, there are ladies who go there to immunise the children. I am not sure which clinic are they working at; they would ask us to bring the child's cards at the day care* **(TTP2)**.

Other outreach services such as community care worker or social worker home visits are provided: *"There is one whereby the social workers would go to the child's home to check how the child is being treated, all those kinds of things* **(NP1)**. As with the parent surveys, there was a split in whether parents/guardians were aware of these services or not. It is possible that the parents/guardians who were unaware of additional services offered at the clinic were not in need of them, and were therefore not referred to them which would justify this lack of knowledge; however, it did indicate that perhaps there needed to be more information available about these services in clinics.

3.3.3.2.6 Quality improvement of program

Satisfaction with service provided

As with the parents/guardians who participated in the parent surveys, there was a spilt in opinion regarding whether parents/guardians were satisfied with the service provided at clinics. However, when questioned further, it became clear that while they were satisfied with services themselves, such as the medical treatment provided as their child did not suffer any adverse effects: "*I am satisfied, because after my child has been immunised, he hasn't had any problems* **(KP1)**, they were not satisfied with other factors that contribute to services provided:

> *The problem is that you have to be here very early and spend about 4 hours here and wait for 2 hours for your file we wait for a long time. I am satisfied with the immunisation services; the problem is that you spend the whole day here sometimes they close without helping you* **(KP2)**.

Parents/guardians mentioned that when they were not satisfied with services provided, they were able to provide feedback to the clinic, and felt comfortable speaking directly with staff: "*There is a suggestion box but I have never used it. I will voice my concerns with the Sister or any person that I think might be able to help me without being angry* **(NP1)**. "*When I am dissatisfied, I would go to the manager and tell him that I am not satisfied with the service I got from the nurse in that room* **(NP2)**. However, others said that even if they did provide feedback to the clinic, they felt that nothing changed: "*No, that box is not useful, nothing happens after you have written your complaint* **(KP1)**. "*There is a complaint box; I don't know if they read them or what, I have written a complaint I don't know what happened to it… nothing has been changed* **(TTP1)**.

Parent/guardian suggested clinic strategies for improvement of immunisation services

When parents/guardians were asked what they thought the clinics could do to improve services, they had a number of suggestions ranging from how clinic processes could be improved to how community services could be strengthened. Parents/guardians suggested improvements to clinical processes included health promotion and education, to how clinic processes could be

changed. Some parents/guardians suggested that radio promotion could be beneficial so that parents/guardians would know the importance of immunisation:

> *They should go to the radio and explain everything, why the child needs to be immunised. Some parents would default the immunisation and miss other vaccination. They should not miss any vaccines; they should know that it is important to immunise their children* **(KP1)**.

Others mentioned that they would like health promotion materials about immunisations both in the clinics, and in public places like shops: "*There should be posters around shops* **(KP2)**, "*They should give us pamphlets at the clinic… people would respond well to the pamphlets"* **(NP1)**, and that nurses should provide more information during immunisation sessions: "*There should be someone to educate us about child immunisation and its importance. If no one is to educating us, we will think that it is not important"* **(KP3)**. One parent/guardian mentioned that clinic staff having an open line of communication was important for conveying information about immunisation:

> *They* [clinic staff] *need to improve communication. After immunising the child they should explain the after effects. We should be aware of the after effects like fever. You shouldn't be surprised when that happens. They should communicate with the parents and explain everything to us* **(KP4)**.

There were also suggestions of more formalised immunisation workshops or education sessions:

> *There should be immunisation workshops where people are educated about different kinds of immunisation and what happens if I miss my appointment, how can* [I] *be assisted after missing my appointment. They* [parents] *should be informed about the disadvantages of not immunising because the knowledge that they have is limited. Some people would say that their child was not immunised and nothing has happened to him, so if they explain the benefits, I think the people would be more interested* **(NP1)**.

Regarding clinic process changes, one parent/guardian suggested that if there are complaints made or feedback provided to clinic management, then once issues have been dealt with, management should then communicate that with parents/guardians: *"Our grievances should be taken to the management then management will speak to the employees. They should communicate with us"* **(TTP1)**. Another parent/guardian said that they thought SMS reminders

would be helpful: "*...they can SMS to remind us about immunisation"* **(KP3)**. A number of others suggested that immunisations should be fast-tracked to reduce waiting times by eliminating the medical file system for immunisations and relying on the RTHB:

> *At my clinic there is no need to have a file, they record everything on the card. When you go for immunisation you only have to take your card. It's a different form here…If there is someone working with files, they give you your file then you go sit were you are supposed to be seated and you don't sit with adults* **(TTP1)**.

> *When it comes to child immunisation,* [I] *don't think that you need a file when you have a road to health booklet. You should not waste time waiting for the file, you must go straight to the immunisation room. I think weighing the children is important when you come for immunisation, yes, it is important but it doesn't have to be done when you are here for immunisation* **(NP1)**.

One parent/guardian suggested that immunisation services should be separated from other child health services:

> *There should be one room for immunisation only. There should be nurses delegated for specific task, for immunisation, weight, the sick ones separately, they should be separated. They should not put us all in one area. We can't be in the same line"* **(TTP2)**.

As waiting times, and immunisations being offered at times that were inconvenient for parents/guardians, some suggested that after-hours services should be provided so that they could still go to work:

> *For example, you might come here in the morning knowing that you might be able to go to work. If you spend 3 hours you would be able to go to work. Let's say maybe you came here at 7:00am, then you leave at 9:00am, you will be able to go to work* **(KP4)**.

> *They* [nurses] *should work Saturdays. Some people work Monday to Friday, they do not get day off. They should ask other nurse to work on Saturdays to accommodate those who work Monday to Friday* **(NP4)**.

Some parents/guardians suggested patient-held medical records to reduce the time spent waiting for files. So, rather than the clinic keeping files, the parent/guardian brings the file with them when they attend the clinic: "*I am not satisfied with the way I am treated because I can spend 3 hours. They would say that the file is lost, they don't make a new file for you, it is better if we leave with the file"* **(KP2)**. "*It's better if you leave with your file so that you can be*

assisted quickly. Because they are always getting lost so it would be better if we leave with the files. It will be safe; it is not going to get lost" **(KP3)**. Another suggestion was a separate filing system for adults and children: *They should be separated; the children files should be separated from adult's files* **(KP4)**.

Parent/guardian suggested community strategies

Parents/guardians also had suggestions for what they thought the community could do to improve services. This included encouraging parents/guardians to discuss immunisation among themselves: "*The parents should talk about immunisation"* **(NP7)**, and utilising parents/guardians as health promoters:

> *They must look for people who can spread the awareness about the program. Most people are not employed. They can be able to employ some people and give them stipend. They should employ people with children, they must not just employ anyone. They can spread awareness and invite people from the community. The community will know more about the program* **(NP1).**

Findings from the focus groups show that parents/guardians not only understood the importance of vaccines and immunising their child but could compare how important it was in relation to other health issues. According to parents/guardians, they were satisfied with the medical treatment that was provided, and dissatisfaction stemmed from systemic issues of the service such as the way staff treated them, long waiting times, and lack of health promotion materials about immunisation. Parents/guardians were not only willing to discuss what they thought barriers and facilitators to service were but were also able to make suggestions about how they thought services could be improved both by clinic staff, and by the community. **Tables 3.12-3.14** show the compiled lists of barriers, facilitators, and potential strategies to improve immunisation service delivery as identified by parents/guardians attending services at the three clinics.

Table 3.12. Parent/guardian identified list of barriers to immunisation service delivery

Theme	Sub-theme	Barrier
Engagement	**Knowledge**	• Limited information about immunisation • Parents reliant on RTHB to know next immunisation date/additional immunisation information • No health promotion materials in the clinic • Parents unaware of clinic procedures • Parents have concerns about immunisation • Parents unaware where to get new RTHB if lost
	Attitudes	• Poor communication between staff and parents • Staff are rude • Parent's perception that nurses do not care • Parents scared to ask nurses questions • Parents scared to come to the clinic after missing vaccinations • Inconsistency in how nurses communicate with parents • Parent's perception that staff are easily irritable • Staff are unfriendly
	Acceptability of services	• Waiting times too long • Parent's perception of staff not paying attention to parents/not doing their job • No separate child health section • Loss of trust in clinic • Parents perception of preferential treatment • Parents perception that they are not treated respectfully • Parents not satisfied with overall service • Parent's perception their child's care is not prioritised • Parent's perception that they are chased away from the clinic • Parents have no choice in which clinic they can attend • Parent perception that when they provide feedback, nothing changes • Parents have concerns about children getting sick while waiting for immunisations
Quality	**Access**	• Parents have challenges accessing the clinic • Parents miss immunisation appointments due to work commitments • No facilities at the clinic for parents & their child • Parents unaware of relevant NGOs/other services offered • Parents unable to arrange childcare for other children in order to come to the clinic • Limited patient follow-up • Parents miss immunisation appointments due to caregivers not being able to bring child to clinic • Nurses refuse to treat if parent is not living in the catchment area
	Confidentiality	• Parents have concerns about confidentiality
	Integration of services	• Prioritisation of other programs
	Effectiveness of services	• Parent's perception that staff are not well trained • Lost files • Parents told to come back at another date due to vaccine shortage • Vaccine shortage • Parents lose RTHBs • Limited staff

Table 3.13. Parent identified list of facilitators to immunisation service delivery

Theme	Sub-theme	Facilitator
Engagement	**Knowledge**	• Parents think immunisation is important • Parents knowledgeable about standard nurse practices • Nurses remind parents about immunisations • Parents knowledgeable about immunisation • Parents aware of when to bring their child for immunisations • Parents have heard about immunisation in the community
	Attitudes	• Clinic staff are friendly • Nurses emphasise importance of immunisation
	Acceptability of services	• Parents satisfied with overall service • Parents satisfied with medical treatment received • Parents don't have concerns about immunisation • Parents able to provide feedback about services
	Non-discrimination	• No discrimination
Quality	**Access**	• Parents aware of outreach services • Clinics are accessible • Mass campaigns
	Confidentiality	• Parents don’t have concerns about confidentiality
	Integration of services	• Nurses inform parents about relevant NGOs and refer to other services
	Effectiveness of services	• Parent-held vaccination records

Table 3.14. Parent suggested list of potential strategies to improve immunisation service delivery

Theme	Sub-theme	Strategy
Engagement	**Knowledge**	• Radio promotion • Parent-to-parent immunisation talks • Immunisation workshops or education sessions • Health promotion materials • More information provided by nurses • Parents as health promoters
	Acceptability of services	• Feedback relayed from management to parents
Quality	**Access**	• More regular outreaches/Nurse home visits • SMS reminders • Appointment system • Fast-tracked immunisations • After hours services so parents can still go to work • Separate child health section
	Effectiveness of services	• Patient-held medical records • Separate filing system for adults & children

3.3.4 Knowledge and attitudes of service providers

3.3.4.1 Qualitative findings

This section describes the qualitative findings of the service providers (i.e. community care workers, clinic staff, and sub-district management) from the Health Services and Community Uptake Assessment.

The main themes that emerged from these focus groups were as follows:

1. Acceptability of vaccine program and services at the clinic: the importance of immunisation, parent/guardian concerns about immunisation and confidentiality, and waiting times.
2. Immunisation strategy and program: the effectiveness and accessibility of services.
3. Self-management: parent/guardian knowledge about immunisation.
4. Links with community, other services and resources: outreach services, relationship between community care workers and clinic staff.
5. Quality improvement of program: clinic strategies for improvement of immunisation services, and community strategies.

3.3.4.1.1 Acceptability of vaccine program and services at the clinic

Importance of immunisation

Like the parents/guardians involved in the study, both the staff interviewed and community care workers involved in the focus groups felt that immunisation was an important part of clinic services, and also thought that parents/guardians felt the same: "*I think the immunisation is very important to the parent because some of them they know the consequences and they also understand what should happen if the babies are not going to the immunisation"* **(KCCW3)**. However, while immunisation was considered to be important, it was mentioned that service providers noticed parents/guardians had some concerns.

Parent/guardian concerns

According to service providers, there was general satisfaction with the program itself but most of the concerns that parents/guardians had, related to possible side effects that may occur after immunisation:

> *I think there are people that are happy about the immunisation programme. But also, there are people who are not happy because you will find other people, they say if they can be in the clinic for an injection, maybe after one day the child will get feverish or will get a rash. I don't know whether it is true or not* **(KCCW1)**.

This was not a commonly held concern; however, it was important to note that more information needed to be provided to address this concern.

Another concern that community care workers brought up was parents'/guardians' concern regarding confidentiality, specifically about their, or their child's HIV status being exposed which may have influenced whether they brought their child to the clinic:

> *I think some of them, there are those who are HIV positive and then because of the stigma and something, many go to visit them. It is like we are exposing them. They are not aware if we are doing it, even if someone is negative or positive, but because of the stigma they don't want us* [to visit them], *especially if the parent is HIV positive. It is like we are exposing them or we are disclosing their status. Yeah, I think that is the problem* **(KCCW2)**.

The possible risk of exposure of HIV status was mentioned by all cohorts who participated in this study (parents/guardians, community care workers, and staff members), with some saying that parents/guardians would sometimes rip out the pages that state HIV status in the RTHB so that no one will know. It was clear that despite extensive health promotion campaigns in South Africa, there was still stigma associated with HIV that affected some parents/guardians seeking medical treatment or attending routine clinic services. This indicated that it was necessary to build better rapport between these parents/guardians, community care workers and staff so that they felt comfortable and safe at the clinic, and trusted service providers.

Waiting times

Long waiting times in general, as well as the waiting time associated with staff trying to find folders were again identified as a major barrier to parents/guardians attending the clinic:

> *Because of the queues, long queues and in the clinic, you will find out that their* [the clinic] *staff is not quickly serving them* [the parents]. *That is why they don't like to come to the clinic… And sometimes when they come to the clinic you will find out that the folders are being misplaced, then we have to stay there and wait for your folder to be found. So, there are problems* **(KCCW1)**.

One difference; however, was that quite a few service providers mentioned that while waiting times were a problem, parents/guardians should just have patience and not expect quick service: "*The parents don't have patience. If the parent comes here at 8am for injections, she expects or he expects to go out by 10am but she will go after 2pm or 3pm from here"* **(NCCW2)**. Some also said that more education was needed for parents/guardians to understand that long waiting times were sometimes necessary:

> *I think education in the clinic is very important to make them understand. Sometimes they even have to wait for that longer or so much longer because they are not the only ones who are ... there are a lot of people. Sometimes the others are very sick and they have to be attended to first because of the illnesses, you know. So, they have to wait because sometimes there is a shortage of staff in the clinics. So, I think education will make them understand that we have to wait at the clinic under these circumstances* **(KCCW3)**.

It was interesting to note that while service providers acknowledged the problem of waiting times, they seemed to accept it as a part of clinic processes, rather than as something that needed to be improved on as a clinic. The onus was placed on the parent/guardian to understand this and be patient.

3.3.4.1.2 Immunisation strategy and program

Effectiveness of immunisation services

While only a few parents/guardians identified that there were vaccine shortages at times when they came to the clinic, all service providers said that this was a problem: "*…sometimes they* [the parents] *go back without having the immunisation because of sometimes they* [the nurses] *said it is out of stock"* **(KCCW2)**. Pharmacists said that there had been times where they had

to phone other clinics to see if they had stock they could share. During the assessment period, it was found that clinics were experiencing a shortage of 'Hexaxim vaccine' (DTaP-IPV-Hep B-Hib vaccine), and had to tell some parents/guardians to come back to the clinic at another time.

It was also identified that there were staff shortages which made it difficult to manage the number of clients who attended the clinic daily: "*I think there is a shortage with staff because you will find it is one sister for the immunisation then there are many people who are coming in for immunisations"* **(KCCW1)**. Shortages were not only due to limited human resources at the management/administrative level but also due to staff unplanned leave:

> *...I think because of the high volumes of patients coming, and sometimes shortage of staff, not that they are short but most don't come to work because they are booked off sick or they are on leave or they are on training, so you find that one nurse covers two people's work, so that is very common* **(CHM)**.

Related to this shortage of staff, community care workers confirmed what parents/guardians said regarding staff who went on breaks with no one to relieve them while parents/guardians were left to wait until they came back:

> *...the clinic is not far, it is not far. The parents, they were complaining about the staff, the way, when the staff are going for their tea time, all the staff going to the tea time they were not relieved. The parents they think they are supposed to relieve, when the other people didn't go to the lunchtime, the other people they were helping the people. That is why they don't want to come to the clinic* **(NCCW1)**.

3.3.4.1.3 Self-management

Parent/guardian knowledge about immunisation

Service providers were divided about whether they thought parents/guardians had knowledge about immunisation, and were comfortable asking for further information:

> *I think some of them they know because you will get the parent that will ask you 'what is this for?', 'when am I coming back and for what?'. There are parents who are shy or scared to speak to the nurses. So, I think it is 50/50* **(KCCW2)**.

They also confirmed that some parents/guardians seemed scared or shy to talk to nurses and simply accepted what staff told them without necessarily understanding. This indicated again that engagement between staff and parents/guardians needed to be encouraged, and different formats of information should be provided.

3.3.4.1.4 Links with community, other services and resources

Service providers did say that all clinics held health talks and that there was health promotion material; however, these were more specifically for tuberculosis, and HIV/AIDS, not immunisation. Community care workers were the clinic's primary link to community organisations, and they were utilised for health talks and outreach services.

Outreach services

Follow-up of parents/guardians is mainly done through outreach services where community care workers do home visits to recall parents/guardians whose child has missed appointments:

> *I am not sure; but I heard about something like that where the parent must give their phone numbers and stuff so that they can be reminded but I never hear someone got the SMS or something. We are the ones who have to go, and if that parent didn't come then we have to go back again and make sure she did come to the clinic* **(KCCW1)**.

Nurses have monitoring books that keep track of children's immunisation dates. There are no reminder phone calls; however, only if appointments are missed a number of times in a row do the nurses let community care workers know to visit the home and encourage parents/guardians to bring the child to the clinic:

> **TTCCW3:** *They write the next date of the clinic to the card. They didn't call the parents to come to the clinic for immunisation, and the parents have the responsibility to take their child for the immunisation. They don't do phone calls.*

> **TTCCW4:** *But if the parent is not coming at all, there is a recalling book. The nurse must write a recall to the parents to bring the child to the clinic*.

Another outreach service that clinics provide are nurse and community care worker visits to creches in the area to vaccinate children:

> *…I think two weeks back we had a programme like this, we visited the crèches and stuff and that is when we found the children who never come to the clinic. So, they were all sent to the clinic to get their injections…they are just lazy to come to the clinic* **(KCCW4)**.

There was the perception among some service providers that there were no extenuating circumstances that prevented parents/guardians from bringing their child to the clinics but that they were lazy, did not care for their child, or did not know when they should have visited the clinic:

> *The other challenge is that the parents, some of them they don't care for their children. They are bringing them and they don't know whether she is supposed to take the child to the clinic unless the clinic does the follow ups* **(NCCW3)**.

Something that was mentioned by all community care workers at all three clinics; however, was that alcohol was a problem in the community, and that during house visits the house or child will be 'dirty', and there was a perception that sometimes there was a general lack of parental care of their child which resulted in them not bringing their child to the clinic. As it was the community care workers who actually did the home visits, this may be a legitimate concern; however, there is a possibility that this perception may be overstated as community care workers generally deal with parents/guardians who may be more vulnerable than the majority of the community.

Most of the health education is also provided by the community care workers, who note that sometimes parents/guardians are scared to come back to the clinic after they miss appointments, so they try to provide more information to those parents/guardians during home visits about why it is important to visit the clinic:

> *The others are complaining about that if you didn't take your child to the clinic on that date you were supposed to take your children to the clinic, they are afraid to come back to the clinic because the nurses shout at them. Then they default the child for the immunisation. But we try, when we get that problem, when we do our home visits, we try to explain to the mothers that now you must go to the clinic because this is the health of your children. Maybe your children are going to get disabled because you are defaulting your child with the immunisation* **(TTCCW2)**.

> *We try to educate the parents about the importance of coming to the clinic and then you try by all means that she* [the parent] *must be patient when they are here because she is not the only person they are attending to. And try to show that there are some diseases that maybe the child doesn't get the immunisation that they may easily catch them. We try do that* **(NCCW1)**.

Relationship between community care workers and clinic staff

Community care workers are the primary link between the clinic staff and the parents/guardians; however, all of the community care workers who participated in the focus groups expressed dissatisfaction with the way they were treated by the clinics. As they were the ones who carried out home visits when parents/guardians missed appointments, they felt that these were perhaps not managed well by clinic staff, and they have to take responsibility for minimal follow-up on the part of the clinic:

> *I am not happy because you will find out that you get the recall when it is very urgent, then you have to rush there and leave everything behind. So, I think somewhere, somehow, they are failing because they are supposed to know who was supposed to come and not to come, you see* **(KCCW3)**.

All of the community care workers mentioned that they had limited training, did not get paid very well for the work they did, and felt that they were under-utilised:

> **KCCW4:** *…if they can train us, give us a proper training because we are not lazy to go to the community, they are lazy. And they must get a fine so that we can get paid. If we are getting paid, we will do that job properly, happily*.
>
> **KCCW5:** *It is like we are volunteering. You will be shocked if you can see our job and you also can see our salaries, you will be shocked*.
>
> **KCCW4:** *And now we are working, yes, we do like our jobs, we have got a passion for our jobs. We are willing but the treatment, it is killing us*.
>
> **KCCW5:** *And we are the best people to take care of that…because we are in-between* [the clinic staff and parents], *so we are the best really*.

Furthermore, a few community care workers from Kuyasa felt that the clinics looked down on them since they did not complete high school, and restricted what they were could do in the clinics. Some also indicated that they had concerns about their safety while carrying out home visits, as some areas of Khayelitsha were dangerous.

3.3.4.1.5 Quality improvement of program

Suggested clinic strategies for improvement of immunisation services

When asked about what they thought the clinic could do to improve services, service providers suggested fast-tracked immunisations or stand-alone immunisation services within the clinic with designated staff dealing with immunisation only:

> *…in the reception maybe there must be someone who is specifically dealing with the parents who come for immunisation…dealing with those who came for immunisation so that they can be quick in the lines, you see, because now even if you came for something else then you have to put your card there and it depends whose folder is going to come first. But if I, as an example, I am dealing with those who come for immunisation, I think the queues will be more faster than now* **(KCCW3)**.

Other suggestions included providing more health promotion material in clinics, creches, and community shops, as well as promotion on the radio. A few service providers talked about what was done in the TB clinic where clients were rewarded when they finished their course of medications, and suggested that this may work with immunisations as well. For example, once a child has been fully immunised, the clinic could hold a small party for the child, or give them a small gift to encourage parents/guardians to immunise their child on time.

Suggested community strategies for improvement of immunisation services

Suggestions for what the community could do to improve immunisation services not only included an expansion of the role of the community care workers but also that people within the community could be trained to provide peer-to-peer and education about immunisation to the rest of the community:

> *I think we must teach the community first. We must recruit those young ladies, even the older people, to educate on what is the importance of immunisation. I think we must have that announcement to the community. They must come together to teach them and to educate* **(TTCCW1)**.

Findings from the focus groups and interviews with service providers show that as with the parents/guardians, they felt that the immunisation program was an important component of clinic services. Service providers identified that parents/guardians had concerns about possible

side effects of vaccines, and thought that more information about this would be beneficial. There was also the concern of possible exposure of parent/guardian or child HIV status which may have affected clinic attendance. Many of the concerns that parents/guardians had about systemic issues of service delivery were confirmed by service providers, such as waiting times, and parent/guardian and staff interaction. In addition to this, community care workers identified that there was some tension between them and clinic staff regarding follow-ups, how they were treated, and that they felt they were not utilised to their best capacity.

3.4 Discussion

The clinic level assessment of immunisation service delivery described in this chapter aimed to provide an understanding of the functioning of the immunisation program at each of the three clinics through observation of clinic processes, and obtaining the perspectives of both service providers and service users.

Of the parents who participated in this study, most were aged between 25 and 29 years old, and were single mothers with one child. The majority of these parents had a high school education, and over half had migrated from Eastern Cape Province. The study cohort could be considered as being quite representative of the sub-district of Khayelitsha, since the demographic data collected was comparable to the most recent South African census data [16].

From surveys with parents/guardians, it was found that there was an overwhelming support for the immunisation program, and that they found immunisation to be very important. There were not many concerns about the safety of vaccines, and if there were, this stemmed from not having enough knowledge about potential common side effects following immunisation. Most of the issues that parents/guardians encountered were related to access namely waiting times, limited follow-up from clinics regarding missed appointment, convenience of services regarding times immunisations are offered, and interactions between parents/guardians and clinic staff such as feeling unwelcome at the clinic, and unfriendly or unhelpful staff. There

was also limited referrals to other community health services, lack of peer-to-peer support or information sessions, and limited information about immunisation provided at the clinics. All of these barriers fed into parents'/guardians' opinions regarding satisfaction with the clinic, and how appropriate and effective they thought services were with over half identifying that while they were satisfied with medical services provided, they were not satisfied with the way they were treated at the clinics by staff.

These barriers to immunisation service identified by parents/guardians were very similar to those identified in previous studies carried out in South Africa where inconvenience of immunisation times, waiting times, and limited parent knowledge about vaccines and EPI schedules were the major issues rather than any vaccine hesitancy due to concerns about safety [1, 83, 84]. Barriers to service delivery were mainly systemic issues, poor communication between clinic staff and parents as in other low-and-middle-income countries (LMIC) [95]. These were very different to studies carried out in Australia using the Parental Immunisation Needs and Attitudes (PINA) survey, which the parent survey used in this study was based on. In these studies, pregnant women, parents of children aged under 5 years old attending general paediatric outpatient clinics, and of children aged under 19 months attending routine community maternal and child health nurse appointments were surveyed. Despite overall support for immunisation, these studies found that parents had concerns about safety relating to the number of vaccines administered during the first 2 years, vaccine ingredients, and autism rather than the access or convenience issues identified as problems in this study [74, 75, 96]. These significant barriers that many African countries experience make vaccine hesitancy in South Africa much more complex to determine and have differing influences as compared to high-income countries [97, 98].

It was found that, Nolungile Clinic clearly outperformed Kuyasa Clinic and Town II Clinic on a number of different aspects including parents'/guardians' opinion about overall services. As

Nolungile was rated highly in parent/guardian interaction with staff, links with community, other health services, provision of resources and knowledge sharing, and accessibility; it made sense that parents/guardians were more satisfied with their services and thought they were of good quality. This also indicated that these were the areas that the other two clinics needed to improve on in order to enhance the quality of their services.

Focus groups with parents/guardians elucidated the findings from the surveys where it was found that some parents were actually quite knowledgeable about immunisation, and could compare the program to other preventative programs such as the HIV/AIDS program with one parent stating that, *"prevention is better than cure"* (**NP4**). However, many parents felt that they would appreciate more information about immunisation. The majority of parents/guardians expounded on their negative interaction with clinic staff. These parents/guardians identified that sometimes they were given the wrong dates for their child's appointment, turned away due to vaccine stock outs, and also thought that there was a limited number of staff with some not well trained which confirmed findings of other studies carried out in South Africa [1, 3, 55, 83, 84].

The barriers to immunisation service identified by service providers were very similar to those identified by parents/guardians; however, there were additional issues that they mentioned. For example, despite data showing in this study that the majority of parents/guardians had some or had completed secondary school education, a number of service providers assumed that parents'/guardians' level of education hindered their capacity to understand information about immunisation. A number of studies completed in LMICs have found that the level of education parents have may influence vaccine uptake, and increase the risk of incomplete vaccination [99-101]. This study; however, seemed to indicate that education level had little effect on parents'/guardians' ability to understand the importance of immunisation, and their willingness and motivation to bring their child to the clinic as was found in a study completed in

Mozambique [102], indicating that service providers may have underestimated the ability of parents/guardians who attended clinics. Service providers also said that parents'/guardians' concerns regarding the possible exposure of their or their child's HIV status may have influenced clinic non-attendance. This is consistent with other studies in LMICs where it was found that positive HIV status correlated with low immunisation uptake, due to fear of stigma either at the clinic or in the community [55, 103, 104]. Other barriers that service providers identified were related to limited availability of resources needed to provide an effective service such as lack of funding, staff shortages and high staff turnover, and vaccine shortages, all of which are barriers that have been identified by immunisation program managers in South Africa, as well as in other studies completed in LMICs [3, 95]

Another difference between parent/guardian identified barriers and service provider identified barriers was the approach service providers had to the accessibility issue of clinic waiting times. Parents were very frustrated and thought improvements were necessary to reduce waiting times, many services providers seemed to feel that long waiting times were inevitable, and that there was no need to change the way things were done beyond educating parents about the necessity of waiting times, and to be more patient and understanding of clinic staff and processes. This showed a disconnect between what was acceptable to parents, and what the service providers thought was acceptable. While parents thought that medical services provided were satisfactory, they expected more from other aspects of immunisation services such as convenience, respectful treatment and better communication from clinic staff, as well as more information about immunisation. Service providers on the other hand seemed to feel that as long as satisfactory medical treatment had been provided, that was sufficient. It was clear that improved communication was needed between parents/guardians and service providers, and a greater understanding of their individual perspectives.

Both cohorts had a number of suggestions regarding how services could be improved both by the clinic, as well as by the community which provided a basis for study two where interventions were developed collaboratively to address the main barriers identified by service users and service providers in study one.

4 Developing and implementing strategies to address the barriers to service delivery and vaccine uptake

4.1 Introduction

Chapter 3, identified the barriers and limitations to immunisation service delivery and vaccine delivery at the clinic level. Most health systems assessments that are conducted make recommendations on how to address identified barriers [1, 3, 12, 13] but do not implement and evaluate the subsequent interventions. This is particularly true of the WHO TIP approach where concrete guidance for intervention implementation is not given once barriers have been identified after quite a lengthy process [31, 35-37]. This chapter describes the design of interventions arising from the Health Services and Community Uptake Assessment and the subsequent development, implementation and evaluation of these interventions.

The design for this component of the project was influenced by Implementation Research and Delivery Science (IRDS) and Experience-based co-design (EBCD) as described in Chapter 2. IRDS allows for context-specific, evidence-informed decision-making to assist in the translation of theoretical knowledge into approaches that can be put into practice. It is essential that there is collaboration between the research team, and key stakeholders that are involved in policy creation and program management [43]. EBCD identifies areas that need change through "information gathering" about the experiences of service users when utilising services to identify barriers and facilitators (completed in the Health Services and Community Uptake Assessment), and includes a process of collaborative development or "co-design" where both staff and service users design solutions to identified barriers, facilitated by a third party [86, 88].

Consistent with these approaches, both service providers and service users were engaged in identifying areas that needed improvement and involved in a collaborative process of

intervention development and implementation [86]. The perspectives of all participants in this study were integrated into all stages of the research process [87].

There has been limited research on using both IRDS and EBCD to develop interventions to specifically improve immunisation uptake and immunisation services either in South Africa or internationally. Most studies have used the approaches in quality improvement interventions for chronic health or mental health conditions, specifically because these conditions require service users to have more of a longer term interaction with health services [89, 90]. The aim of this study was to use aspects of these approaches to design a novel method that could be used to strengthen immunisation service delivery at the clinic level that was context-specific to South Africa, and locally rather than researcher-driven. This chapter describes the methodology used to develop and implement interventions to improve immunisation service delivery at the three clinics.

4.1.1 Primary objective

The primary objective of this study was to develop and implement strategies based on identified key barriers to strengthen immunisation service delivery and vaccine uptake for children aged under 12 months in collaboration with the Sub-District Child Health Manager, Sub-District Primary Health Care Manager, Health Facility Managers and Nurses.

4.1.2 Hypothesis

The primary researcher hypothesised that a tailored, theory-based, holistic systems assessment of immunisation service delivery at the clinic level could generate a set of interventions to successfully improve immunisation service delivery and uptake.

4.2 Methods of intervention development

The interventions were developed following the Health Services and Community Uptake Assessment, and were informed by barriers that were deemed priorities by the relevant local stakeholders through:

1. Identifying strategies that could improve immunisation service delivery at each of the three clinics based on identified barriers and facilitators.
2. Establishing a project working-group with the Sub-District Child Health Manager, Health Facility Managers, and Nurses to assist in the development of feasible and sustainable strategies based on facility resources, to provide feedback on the creation of resources and training, and to assist in communicating the overall strategy implementation approach to clinic staff.
3. Participatory monitoring with the Sub-District Child Health Manager, Sub-District Primary Health Care Manager, Health Facility Managers, and Nurses to ensure that each potential strategy was deemed feasible and acceptable by implementers, and enhanced routine clinic operations.

The rich data gathered through the surveys and focus groups with parents/guardians, focus groups and interviews with clinic staff and clinic observation, provided the basis of a clear plan for the next phase of the intervention study. At the outset of the intervention study, it was important to consult with and involve key decision-makers, health care providers and parents/guardians who understood, appreciated and made use of the created health promotional materials.

4.2.1 Study duration

This study commenced immediately after the Health Services and Community Uptake Assessment and incorporated a 3-month strategy development period and a 4 to 6-month implementation period, driven by clinic staff and the community.

4.2.2 Participants

As this project was completed with the support of the Western Cape Department of Health and funded by the WHO, key stakeholders who formed the team in the initial stages of the intervention development process included the WHO National Professional Officer (EPI), the Western Cape Department of Health Provincial EPI Manager, the Western Cape Department of Health Provincial EPI Cold-chain Manager, and the Western Cape Department of Health Director of Health Impact Assessment. In addition, project working-groups consisting of the staff at Nolungile Clinic, Kuyasa Clinic, and Town II Clinic (Child Health Manager and Primary Health Care Manager, three each of health facility managers, deputy health facility managers, immunisation nurses, professional nurses and clerks). These working groups assisted in reviewing the study one data, identifying and developing feasible strategies, providing feedback on resources and training materials and assisting in communicating the overall strategy implementation approach to clinic staff. In total, 37 EPI service providers and 16 users (parents/guardians of children aged under 12 months who attended one of the three clinics) were engaged in study two.

4.2.3 Selection criteria of participants

The criteria used to select participants for inclusion in the study was that EPI service providers listed above had to be directly involved in either the management or administration of EPI service delivery. Nurses and clerks had to have direct involvement either in the management or administration of EPI service delivery, including interaction with parents/guardians of children aged under 12 months old who accessed the clinic, and service users were

parents/guardians of children aged under 12 months old who attended the three services within the community.

4.2.4 Intervention development process

Figure 4.1 graphically represents the process used to identify, review, prioritise and finalise strategies to develop interventions to improve delivery and uptake of immunisation services.

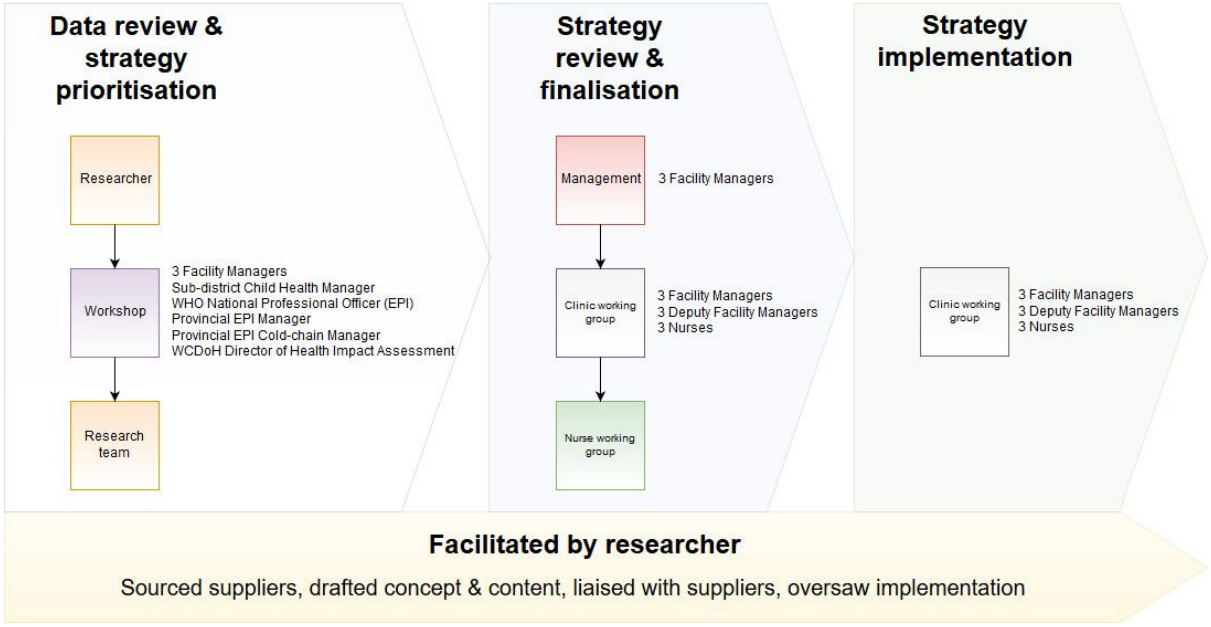


Figure 4.1. Strategy development and implementation process

4.2.4.1 Data review and strategy prioritisation

<u>Step 1: Data review and prioritisation by the primary researcher</u>

Based on the findings of the Health Services and Community Uptake Assessment, a prioritised list of potential strategies to address identified barriers proposed by clinic staff, community care workers and parents/guardians were compiled. Transcripts of interviews with clinic staff, focus groups with community care workers, focus groups with parents/guardians, and parent/guardian survey data from the observational study were screened for barriers to inform potential strategies. These potential strategies were grouped into three themes:

(1) clinic service delivery and immunisation uptake;

(2) community engagement and knowledge; and

(3) quality of care.

The potential strategies were then prioritised as follows based on whether more than one cohort who participated in the assessment study identified the same potential strategy:

- If the same strategy was identified by all three cohorts, namely clinic staff, community care workers, and parents/guardians, this was itemised as a ‘first priority strategy’.
- If the same strategy was identified by two cohorts then this was itemised as a ‘second priority strategy’.
- If a strategy was only identified by one cohort, these strategies were not included in the prioritised list of strategies.

The list of twelve strategies presented below in **Table 4.1** formed the basis of the intervention development process which was further reviewed and refined through the project working groups. The theme ‘clinic service delivery and immunisation uptake’ was not included in this list since strategies that were grouped under this theme were only identified by one cohort and there was no overlap of identification.

Table 4.1. Prioritised list of potential strategies

Theme	Potential strategy	Cohort identified by	Priority
Community engagement & knowledge	Health promotion via radio Additional health promotion materials & talks in the community Health education needed	Clinic staff, community care workers & parents/guardians	**1**
	Door to door visits for immunisation Employ parents & other community members to assist with health promotion/education activities in the community Immunisation workshops for parents	Community care workers & parents/guardians	**2**
	Greater cooperation with parents who can provide immunisation information to other parents in the community	Clinic staff & parents/guardians	**2**
	Mothers given health education during pregnancy/first clinic visit about immunisation "Baby of the Month" party for the child when fully immunised Reminder phone calls for parents	Clinic staff & community care workers	**2**
Quality of care	Separate filing system for children – kept apart from adult's folders	Community care workers & parents/guardians	**2**
	Separate area for immunisations & child health – children to be organised in waiting area based on their age Clinics offering immunisations on weekends/after hours when parents able to get off work	Clinic staff & parents/guardians	**2**

Step 2: Data review and prioritisation by the Khusela Immunisation Study Workshop

The first working group, conducted on 20 June 2017 at Khayelitsha Training Centre was a whole day workshop. The participants met with the research team, and included the Facility Managers of the three clinics, the Khayelitsha Sub-district Child Health Manager, WHO National Professional Officer (EPI), Western Cape Department of Health Provincial EPI Manager, Western Cape Department of Health Provincial EPI Cold-chain Manager and Western Cape Department of Health Director of Health Impact Assessment. The research team included the primary researcher and three members of the project advisory panel (Dr. Margie Danchin, Dr. David Coetzee and Dr. Neil Cameron). The background of the project and progress to date was presented, as well as an overview of the barriers, facilitators and potential strategies identified from the data collected in study one. Following presentation of the data, an unstructured group discussion of identified barriers was facilitated by the primary researcher.

Participants were then shown a slide with the list of 12 potential strategies that were identified by the three cohorts, including the clinic staff, community care workers, and parents/guardians. These were compiled during the "Data review and prioritisation by the researcher" component of the study as described above in **Table 4.1**. Participants were asked to write down which five strategies they thought were of the highest priority on individual post-it notes. Participants were not limited to the potential strategies presented on the slide and were free to include their own suggested strategies as part of their five prioritised strategies. Each participant was then asked to individually present their five potential strategies to the rest of the group. This was followed by an unstructured group discussion about these potential strategies and how they should be prioritised.

Finally, an overview of the implementation process and working group structure was presented to the group so that everyone was aware of the ongoing process of strategy development and implementation post the Khusela Immunisation Study Workshop.

Figure 4.2. Strategies identified and prioritised by workshop participants

Step 3: Data review and prioritisation by the research team

Following the workshop, the strategies that were discussed and identified by workshop participants on individual post-it notes were compiled and further prioritised by the primary researcher as presented in **Figure 4.2**. Strategies were firstly prioritised based on the number of workshop participants that identified the same strategy. Thereafter they were categorised as either (i) "Must-have", which were immediate goals with an immediate impact; (ii) "Nice-to-have", which were mid-term goals with a mid to long-term impact; (iii) or "Should-do", which were long-term goals with a long-term impact as shown in **Table 4.2**. The "Must-have" strategies were prioritised as these were deemed feasible to implement in the timeframe of the project and based on the available clinic and project resources.

Table 4.2. Prioritised list of potential strategies from Khusela Study Workshop

	Khusela Workshop prioritisation	Researcher prioritisation		
Strategy	**Number of people identified by (total number people at workshop = 11)**	**Must-have**	**Nice-to-have**	**Should-do**
Health promotion material developed & distributed in clinic, community, halls, church, schools, spaza shops	8	X		
Health promotion via local radio by clinician	8		X	
Health education in pregnancy (Basic Antenatal Care (BANC) /adoption/gay/same sex	7	X		
Health education by parents & community members/CCWs - Greater cooperation with parents who can provide information to other parents, Community gogos (grandmothers) especially for young mothers, club/support group	7	X		
SMS reminder system - linked to functional defaulter tracking	4			X
Daily health talks in the clinic/community	3	X		
CCWs into homes/door to door (National Health Insurance NIH outreach)	3		X	
Separate area/fast-track for immunisation - well-baby clinic	3		X	
Remove folders, upgrade record keeping/user friendly capturing system (electronic)	3			X
Saturday morning clinics/weekends/after hours at private providers - public/private partnership	3			X
Better communication with clients i.e. Tell parents next appointment date as well as writing on the card	2	X		
Immunisation workshops for parents - run by nurses, then CCWs	2	X		
Health promotion via media/infomercials	2		X	
Targeted Advocacy, Communication & Social Mobilisation (ACSM) e.g. organic mothers, migrant community	2		X	
Separate filing system	2			X
Change norms - use every opportunity for immunisation	1	X		
Clinics brighter/friendly, encourage staff friendliness	1	X		
Outreach sites set up at strategic places & times	1		X	
Provider checklist based on WHO checklist - health education before & after session e.g. follow-up	1	X		
Health promotion via social media	1		X	
Health promotion videos in waiting rooms	1		X	
Link immunisation with other health activities	1		X	
When clinic sessions on reduce waiting times	1		X	
Baby of the Month	1			X
Extended hours	1			X
File/folder of family together	1			X
Find ways to improve creche registration without reporting to official registration	1			X
Go back to RTH card kept by mothers (electronic)	1			X
Importance of immunisation to be added to RTHB (briefly)	1			X
Legal accountability of ‘anti-vaxxers’	1			X
License community health workers to give all vaccines	1			X
Link grant & optimal child care	1			X
Link immunisation to Home Affairs & Social Development grant departments	1			X
Make vaccines mandatory	1			X
Measure EPI coverage through surveys only at district level	1			X
Reminder phone calls	1			X
School entry policy electronic register	1			X

Based on the outcomes of the workshop and researcher prioritisation, the following nine "Must-have" strategies were identified:

- Health promotion materials developed and distributed in clinics, community, halls, church, schools, 'spaza shops' (informal convenience stores run from homes).
- Health education in pregnancy (Basic Antenatal Care (BANC), as well as for those who adopt children, and same sex couples.
- Health education by parents/guardians and community members or community care workers i.e. greater cooperation between clinics and parents/guardians or community 'gogos' (grandmothers) who are trained and can provide education to other parents/guardians, especially for young mothers, in a club/support group format.
- Daily health talks in the clinic/community.
- Better communication with clients i.e. inform parents/guardians about the next appointment date as well as writing it on the card.
- Immunisation workshops for parents/guardians - run by nurses, then CCWs.
- Change norms - use every opportunity for immunisation.
- Clinics brighter/friendly, encourage staff friendliness.
- Provider checklist based on WHO checklist – items would include if health education before and after immunisation session were carried out, if proper follow-up occurred, if parents/guardians were referred to other services etc.

After further discussion between the research team these nine strategies were grouped into three overarching strategies, and selected for development and implementation at the three clinics:

1. **Intervention #1: Health promotion materials**

   Health promotion materials that were developed were distributed at the clinics.

2. **Intervention #2: Nurse-led education sessions at the clinic**

   Intervention #2 incorporated the workshop suggested strategies of health education in pregnancy, cooperation with community care workers, daily health talks, and immunisation 'workshops' where parents/guardians could contribute and gain information through questions and answer sessions.

3. **Intervention #3: Staff and parent quality checklists**

   The staff and parent quality checklists incorporated the suggestions that there was an improvement in communication between parents/guardians and staff and to encourage friendliness, that every opportunity was used for immunisation, and to ensure that follow-up occurred after immunisation sessions.

Draft overview of interventions that was presented to the first Management Working Group

A brief overview of the three strategies and how they could work was drafted, as well as an initial plan on how the working groups would be structured. Each intervention was to have a separate working group consisting of relevant key staff members, community care workers, and parents/guardians.

Intervention #1: *Health promotion materials*

It was determined that health promotional materials would be an effective way to raise awareness of the clinic and its processes relating to the immunisation appointment system and provide parents/guardians with information about vaccines by encouraging them to have their children vaccinated. These health promotional materials were to be clinic focused, and developed in collaboration with non-governmental organisations (NGOs), such Medécins Sans Frontières (MSF), or other organisations such as Soul City Edutainment and Community Media Trust (an organisation that specialises in creating educational material presented in 'prime time popular mass media, and social media, combined with social mobilisation) since they had

experience in developing similar materials [105]. Examples of resources were to be presented to working groups to ascertain their preferences.

Working group #1 members included: one facility manager, one nurse, two community care workers, two parents/guardians

Intervention #2: *Nurse-led education sessions at the clinic*

Nurse-led education sessions were planned to occur fortnightly. It was suggested that community care workers would assume responsibility for these sessions after being provided with appropriate training. These sessions were considered to be a valuable part of efforts to educate parents/guardians and were to be linked with well-baby care or pregnancy education groups.

Working group #2 members included: one facility manager, one nurse, two community care workers, two parents/guardians

Intervention #3: *Staff and parent quality checklists*

Staff checklists were developed to act as a prompt to streamline and optimise the immunisation delivery process. These checklists were based on the Collaborative Community Checklists for Immunisation study completed in Myanmar, and were chosen as a model as they were designed for hard-to-reach communities, and aimed to build 'collaborative relationships between health providers and communities' [58]. They included aspects of the process that may have been overlooked in the day-to-day immunisation sessions, such as notification of stockouts, record of session times and whether education sessions had taken place and whether health promotion materials had been distributed, friendliness and welcome during sessions, sufficient communication with parents/guardians, reminders to follow-up on missed vaccinations, referrals to other units etc. Staff checklists were linked to parent checklists that aimed to not only act as a means to provide feedback on immunisation services but also as an education tool for parents/guardians to be aware of what they should expect from every immunisation session.

Working group #3a members (staff checklist) included: one facility manager, one nurse, one clerk

Working group #3b (parent checklist) included: two community care workers, two parents/guardians

The above overview was presented during the next phase of the development process for further refinement.

4.2.4.2 Strategy review and finalisation

Working group with management

The second working group was conducted on 26 June 2017 at Town II Clinic. This working group consisted of the facility managers of Nolungile Clinic, Town II Clinic, and Kuyasa Clinic. The primary aim of this working group was to finalise the interventions to be implemented at the three clinics and decide ongoing participation in the working groups. The three draft interventions described above were presented to the working group for their input. In addition to these three interventions, the possibility of adding a fourth intervention was also discussed.

During the course of the working group, the following decisions were made:

1. The working group preferred that the primary researcher take the lead on developing the health promotion materials with specific input from members of the working group relating to the look and feel of the materials, and whether they were appropriate for the target audience.
2. Rather than fortnightly education sessions, it was decided that sessions would occur daily before the morning immunisation schedule commenced and would be specifically linked with well-baby care. Sessions would be brief and approximately 10-15 minutes in duration. It was also important that the sessions were nurse-led and in collaboration with community care workers; namely those from Philani (an

organisation that recruits ‘Mentor Mothers’ to address maternal, child health and nutrition issues [106]), South Africa Christian Leadership Assembly Health Project (SACLA; a community health worker program [107]), and the infant feeding counsellor.

3. There would be two separate staff checklists; one for immunisation nurses and one for clerks. The working group also proposed that the parent checklists could be facilitated by the infant feeding counsellor or queue marshal.
4. The clinics already had links to a local community radio station due to a monthly health slot that all Khayelitsha clinics shared which was funded by the City of Cape Town. However, this shared monthly health slot was not child health or immunisation specific and topics varied based on what was relevant to clinics at the time. The working group discussed the possibility of adding weekly radio sessions to provide education on the EPI vaccines and the immunisation process at the clinics to the current set of interventions. Sessions were to be one hour in duration and include a question and answer segment where listeners had the opportunity to call in or message the radio station, and interact with nurses. One nurse from each clinic would rotate weekly and be rostered to attend the radio session. Furthermore, one of the facility managers volunteered to contact the radio station and set up an initial meeting with the radio presenters. This helped to build rapport with the presenters who were able to gain an understanding of what the clinics were hoping to achieve from the weekly radio sessions.
5. All clinics were to implement the same four interventions; however, modifications could be made to each intervention based on the needs of each clinic and at the discretion of the working group.
6. Finally, the structure of the working groups was discussed. Immunisation nurses were to be involved for the initial development stages, and parents/guardians and CCWs

were to be involved later if necessary. It was also decided that rather than separate working groups for each intervention as initially planned, this would be combined into one working group as the participants for each would be the same. Facility managers also opted to be kept regularly informed and consulted about progress of the working group primarily via a WhatsApp group.

Clinic working group, and weekly nurse working group

The third working group was conducted on 7 July 2017 at Site B Youth Clinic which was somewhat centrally located to the three clinics involved in the working groups. This working group consisted of three facility managers, three deputy facility managers, and three nurses from the three clinics (one manager, one deputy and one nurse from each clinic). The facility managers themselves had suggested that they attend this first working group with the nurses so that the nurses would be aware that the project was ongoing with their manager's support.

As the deputy facility managers and the nurses in this working group were not involved in the initial workshop, a brief overview of the data regarding barriers and facilitators to immunisation service delivery was presented by the primary researcher before discussing the interventions. This was so that the nurses were aware of the reasoning behind the development of the specific interventions that were chosen to be implemented in the clinics.

Subsequent working groups consisted of only the immunisation nurses from each clinic which ran weekly from 14-28 July 2017. The main priorities of this working group were to make decisions about the content of the interventions, as well as the logistics of how the interventions would be run. Minutes were taken during these face-to-face weekly meetings, and participants had further communication via email and a working group WhatsApp group to make decisions about the interventions.

4.2.4.3 Development of Intervention #1: Health promotion materials

It was noted that the majority of the health promotion materials displayed in the Khayelitsha paediatric clinics were HIV and tuberculosis (TB) related that were provided either by the Province Department of Health, or the City of Cape Town, and there was nothing specifically related to immunisation. On the other-hand, Nolungile Clinic had posters which they created themselves by using coloured cardboard and pictures of children who had vaccine-preventable diseases (VPDs). However, these posters did not receive a favourable response from parents/guardians. Some parents/guardians highlighted that they found these posters to be "traumatising" since the pictures that staff chose to use on the posters were quite graphic representations or worst-case scenarios of VPDs. Information about immunisation is provided to parents/guardians in the Road to Health Booklet (RTHB). However, parents/guardians felt the RTHB was confusing as in addition to being a record for clinics of the child's health which may not be relevant for parents, the health information provided for parents was very text heavy. In the initial stages of development, the plan was to create the immunisation promotion materials in collaboration with NGOs or groups such as MSF, Soul City Edutainment or Community Media Trust since they were already involved in the clinics or had a presence in the area. Collaboration with MSF was initially sought as they had previously created materials to be distributed in the clinics in Khayelitsha in a style that was thought to be suitable for immunisation related materials. When these organisations were approached, they were happy to share any child health related materials they had developed; however, they had not specifically created materials relating to child immunisation. Therefore, it was decided that materials would be developed independently and presented in a more simplified and engaging format.

This was additionally beneficial as it was possible to tailor the materials to the needs of the clinics. Health promotion materials were predominantly developed by the primary researcher in partnership with a local graphic design supplier, with consultation from the research team.

Specific input was gathered from the working group in relation to the look and feel of the materials, and whether they were appropriate for the target audience.

Development of content for materials

Based on the findings from study one, it was found that parents/guardians either did not have sufficient knowledge or requested to receive more information about the following topics:

- The clinic, and clinic processes such as the appointment system for immunisations
- The importance of childhood immunisation
- The vaccine schedule including which vaccines were given and what diseases they protected children against, and
- Potential common side effects of vaccines, and what to look for and what to do if they occurred.

It was decided that materials would be developed with the above four topics in mind. The working group was in agreement with these four topics, to each be developed as separate resources. They also decided on and preferred a cartoon or infographic style with minimal text rather than photographs since they felt that this would appeal more to the parents/guardians who attended the clinics. The working group also proposed that the materials show a comparison between immunised well-babies and non-immunised sick babies. It was determined that parents/guardians would have an opportunity to provide feedback in the working group during the later stages of the materials' development, prior to implementation.

Once the themes for the materials were finalised, the primary researcher used resources from the National Health Service United Kingdom (NHS), Centers for Disease Control and Prevention (CDC), United Nations Children's Fund (UNICEF), the New Zealand Ministry of Health, Victoria State Government Health and Human Services, Vaccine Hub Australia, and the Health Service Executive Ireland to determine the general look and feel of the materials.

Sourcing graphic design suppliers for development of the health promotional materials

Eight different graphic design suppliers were contacted to find out what their process would be to design and develop these materials, the cost and timeframe for development. Two Fishes Design was eventually chosen as they could adhere to our proposed timeline, were cost effective, and willing to provide us with a number of design options and modifications. Initial communication was between myself and the Creative Director, and subsequent communication was between myself and the Graphic Designer.

Development process of health promotional materials with graphic designer

The interaction with the graphic designer was consistently followed by utilising the process shown in **Figure 4.3**. This allowed the primary researcher to track and trace changes, and to ensure that all iterations included the specified modifications as defined. The process also provided visibility and progress with regards to the development of the health promotional materials.

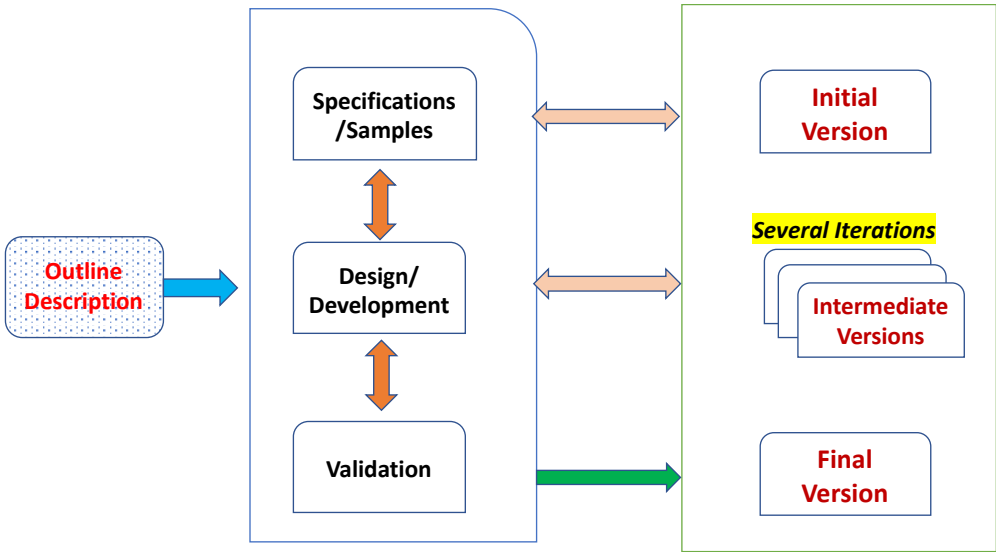


Figure 4.3. Incremental design and development of health promotional materials

The sourced example materials described above were sent to Two Fishes Design along with a description of the concept, and a first draft of the text for each of the materials. They were asked to design four A2 size posters with four matching A6 size postcards for each of the themes. Based on the information that was initially provided to them, the designer came up

with two different options for the "look and feel" of the materials as shown in **Figure 4.4**. Once the "look and feel" was chosen, content and overall design was modified. The first iterations of the materials were very text heavy, and not very visually appealing; therefore, revisions were made to reduce text while still maintaining the overall message that was to be conveyed to the target audience by using more graphics/illustrations on the materials instead.

Six different edits and changes (three major and three minor edits) were made during the design process over a two-month period (August to September 2017) after consultation with the research team and the graphic designer.

The fourth draft of the materials were provided to the working group at the end of this two-month period to obtain their feedback, and to assist them with structuring the clinic education sessions and radio sessions.

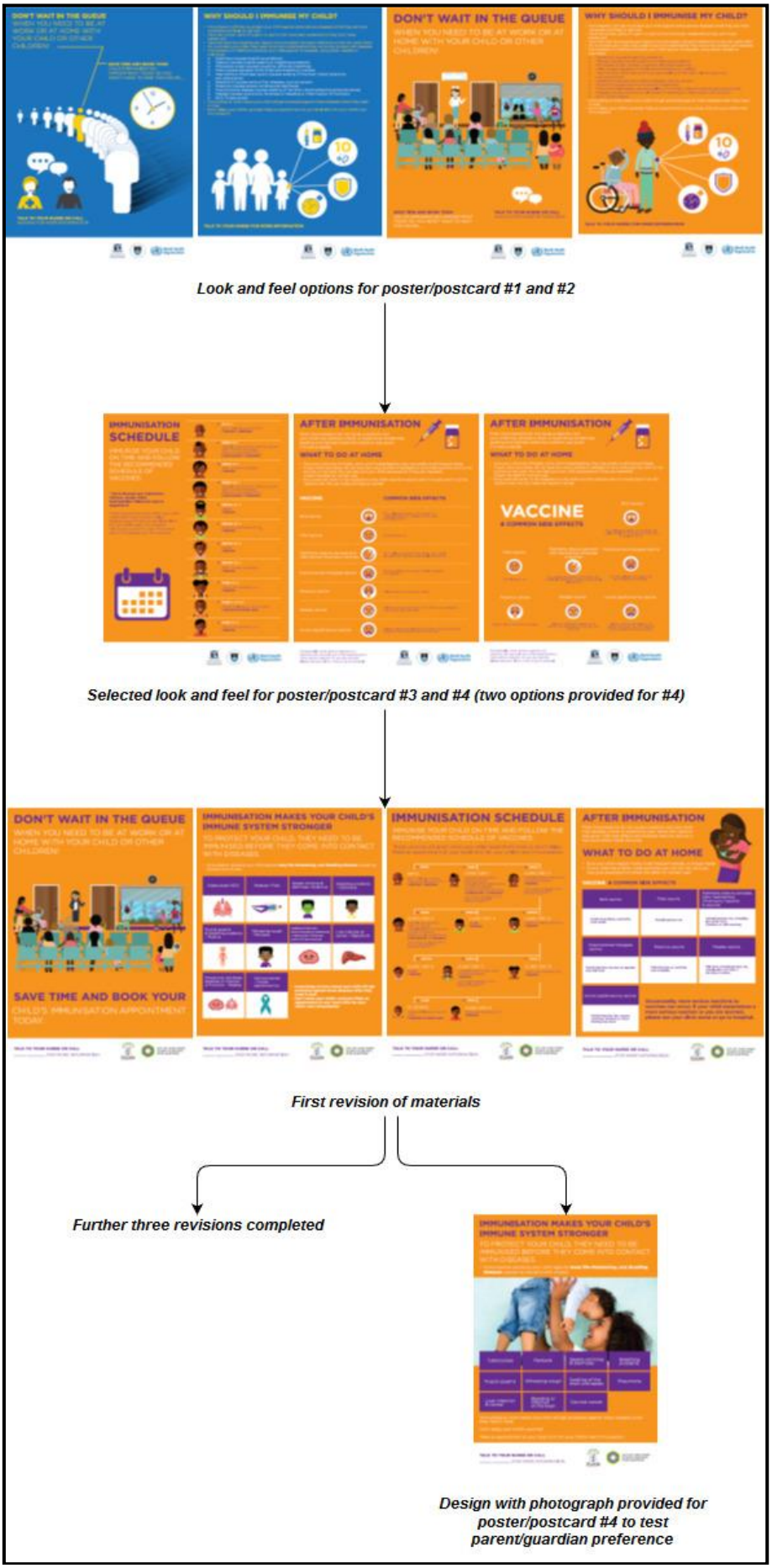


Figure 4.4. Draft designs of health promotion materials

Testing materials with parents/guardians

These draft materials were then tested with parents/guardians at the three clinics. 18 parents/guardians who attended either one of the three paediatric clinics in Khayelitsha were recruited to be involved in semi-structured interviews to test the materials. A convenience sample of parents/guardians was obtained based on parents/guardians that were available in the child health waiting area of the clinics. As the primary language of the community is isiXhosa, an interviewer (research assistant) that had language skills in both isiXhosa and English was hired to conduct the interviews. English versions of all materials were used, with the interviewer supplementarily translating into colloquial isiXhosa only when parents/guardians did not understand particular sections of the English translation. Draft materials were shown to parents/guardians, and they were asked to assess five key areas: (1) attention, (2) comprehension, (3) motivation, (4) personal relevance, and (5) cultural appropriateness.

Following the feedback obtained from both the clinic staff and parents/guardians over a two-week period (October 2017), minor changes were made to materials such as increasing the font size and a slight modification to a particular graphic on one of the posters/postcards before they were finalised, printed, and distributed to the clinics (November 2017). Promotional materials were also professionally translated into isiXhosa so that clinics could have both English and isiXhosa language options available for parents/guardians.

4.2.4.4 Development of Intervention #2: Nurse-led education sessions at the clinic

All three clinics already had daily health talks in place; however, these talks only occurred once in the morning and were not immunisation specific. Community care workers would also conduct health talks in the morning on HIV and TB. During the working group with nurses, it was decided that sessions would occur daily before the immunisation schedule started in the morning and would be specifically linked with well-baby care education.

Sessions were planned to be nurse-led when first implementing the intervention and would then be delivered in collaboration with community care workers from Philani, SACLA, and the infant feeding counsellor after they had been trained by the nurses.

Education sessions for parents/guardians were primarily developed by the nurse working group. It was decided that the sessions would be 15 minutes in duration on a daily basis, nurse-led and occur four times a day. In this way, these sessions would capture as many parents/guardians as possible upon arrival for their child's immunisation appointments at different times throughout the day. The session times varied at each clinic based on the size of the potential audience. For example, Nolungile Clinic started sessions first thing in the morning before immunisation schedules commenced, and Town II Clinic started sessions following morning tea as this was the time when most of the parents/guardians brought their children to the clinic. Education sessions were included in a "parent support group" component where parents/guardians could ask the nurse questions about the content presented. The content of these immunisation education sessions also linked to the promotion materials that were being developed, and other well-baby services.

4.2.4.5 Intervention #3: Staff and parent quality checklists

While staff checklists were designed to be a prompt to streamline and optimise the immunisation delivery process, and encourage friendliness and welcome during the immunisation sessions; parent checklists were intended to function as both an education tool for parents/guardians to be aware of what they should expect from every immunisation session and also to prompt them to approach nurses with anything they were unsure of or wanted more information about.

Two separate staff checklists were developed; one for the immunisation nurses, and one for clerks.

Drafts of the immunisation nurse checklist, clerk checklist, and parent/guardian checklist were presented to the working group, as well as to the clerks for their feedback. Minor changes were made by the staff to the staff-specific checklists such as a few items being removed because these items were not entirely relevant to daily tasks of the nurses or clerks. With regards to the parent checklists, the working group decided that this would be facilitated by the infant feeding counsellor at each clinic who would hand out the parent checklists to parents/guardians once they enter the clinic and collect them when the parent/guardian leaves the clinic.

After the checklists were finalised by the primary researcher, the nurse and clerk checklists were piloted with staff over a one-week period in order to check if any additional changes were needed to be made, and if the checklists correctly captured necessary daily immunisation tasks. All immunisation nurses and clerks were provided with the final draft of the checklist that was relevant to them. During the course of a week, the checklist was either kept on the nurse's desk in front of her while she carried out immunisation sessions or taped on the clerk's window in front of them so that they could easily refer to the checklist. At the end of the pilot, no additional edits were required.

Parent checklists were also translated into isiXhosa so that parents/guardians could have both an English and isiXhosa language option.

4.2.4.6 Development of Intervention #4: Weekly radio sessions

As mentioned above, all the City of Cape Town clinics in Khayelitsha shared a sub-district funded, monthly 1-hour radio session on the local community station ZiboneleFM where the facility managers rotated on a month to month basis and discussed various health issues and clinic processes. Although initial discussions were held during the development process of the interventions with the sub-district manager, sub-district child health manger, and sub-district primary health care manager as to whether funding would be available to expand these radio sessions to include immunisation specific education presented by immunisation nurses, it was

found that this would not be possible. Given that the research team and clinic teams felt that the radio sessions would be a valuable strategy to improve awareness and knowledge of immunisation, this research project funded these sessions for a 6-month period.

ZiboneleFM is a community radio station based in Town II in Khayelitsha. Zibonele means 'experience for yourself' in isiXhosa. The radio station was established in 1993 with the primary purpose of informing and educating the local community about relevant health issues. In addition to this, ZiboneleFM broadcast local news, political news, local music, and has a number of talk shows. The radio station estimates that they have approximately 236,000 listeners between the age of 18-45 years. They are the third largest community radio station in South Africa, and the largest in Western Cape [108].

An initial meeting was set up with the Sales and Marketing Manager, the Programmes Manager, one of the clinic facility managers and the primary researcher to primarily discuss if the radio station would be interested in broadcasting the immunisation education sessions, the feasibility of these sessions, and the cost involved.

Regular radio sessions were confirmed for a 6-month period. After discussions with the Sales and Marketing Manager of the radio station, it was decided that the ideal timeslot would be from 11am to 12pm during the 'Health Esithebeni Nosapho' show, as this was the most popular listening time for the target audience. Sessions were held weekly for a three-month period, and fortnightly for the following three months. The radio station initially asked for brief overviews of the sessions and potential questions that the radio presenter could ask the nurse to draft and send to them prior to the scheduled session. Content for the radio sessions were discussed during the working group with the nurses, and it was decided that radio sessions would also primarily be linked to the promotion materials being developed. The overview of the first radio session was drafted by the primary researcher, and the nurses took on the responsibility to create the content of all following radio sessions.

The radio station also assisted with collecting and compiling data in order to measure how effective the radio sessions were. Recordings of each session were kept, as well as records of listener questions via social media, SMS, and phone calls.

4.2.5 Outcome measures of intervention development

4.2.5.1 Primary outcomes

Implementation of a set of key strategies driven by clinic staff and the community to improve immunisation service delivery and increase vaccine uptake.

4.2.5.2 Secondary outcomes

- The degree to which the intervention was implemented as planned
- Adjustments that were made to interventions and why

4.3 Description of interventions implemented

Interventions had staggered implementation in the clinics from the first week of September, 2017 until 29 November, 2017. This was not the intended plan; however, either due to clinic resources, timelines of the different companies that were partnered with for specific components of the interventions, or other extenuating circumstances that caused delays, it was not feasible to implement all interventions at the same time. Interventions were monitored by clinic staff during the implementation period through regular meetings and a WhatsApp group. While clinics were able to make modifications to interventions as they saw fit in order to be more relevant to their needs, all clinics decided to implement strategies in the same way.

4.3.1 Nurse-led education sessions

Implemented 4 September 2017, in clinics for 6 months

From the first week of September 2017, daily immunisation education sessions commenced in clinic waiting rooms. Sessions were led by either a professional nurse or an immunisation nurse in the morning before regular clinic services commenced while parents/guardians entered the

clinic and placed their clinic cards in the box at the clerk's window for their folders to be retrieved. Following this first morning session led by the nurses, community care workers continued running a further three sessions throughout the day. A question/answer component was included after each talk, with nurses or community care workers also asking parents/guardians questions to see if they understood what was being presented. During all of these education sessions, reference was made to the health promotion materials that were developed. Topics discussed included those described above.

Following each session, this was recorded in the clinic Health Promotion Book, where daily health promotion activities are entered for monitoring purposes. The Sub-District Health Promoter and Sub-District Child Health Manager also carried out random clinic visits to check and sign Health Promotion Books to ensure that sessions were being completed.

The regular radio sessions were also marketed in clinic waiting areas during the education sessions to increase listenership and gauge if they were being received well with the parents/guardians in the community.

While for the most part, sessions were run in the same way at all clinics, there were some minor differences from clinic to clinic, mainly to do with the time each session started, and when specific topics were presented.

4.3.2 Checklists

Staff checklists implemented 4 September 2017, in clinics for 6 months

Parent checklists implemented 16 October 2017, in clinics for 5 months

Staff quality improvement checklists were implemented from the first week of September 2017. Prompts were separated into items that should be carried out before, during, and after immunisation sessions. These items were mainly reminders to ensure that parents/guardians were aware of when they needed to come to the clinic, that the relevant people are informed if there was insufficient stock, encourage more communication and a better rapport with

parents/guardians, and carry out proper follow-up of missed appointments as shown in **Figures 4.5** and **4.6**.

These staff checklists were conducted in parallel to the parent checklists, or "parent feedback forms." The main aims of both the staff and parent checklists was to encourage dialogue between both parties, monitor satisfaction with the delivery of immunisation by the staff, ensure all elements of the immunisation process were implemented and to inform parents/guardians of what they should expect out of every immunisation session. Items on the parent/guardian version of the checklist were to gauge whether parents/guardians had sufficient understanding of the immunisation session, were comfortable with how staff communicated with them, and if they had been exposed to the other interventions that were implemented in the clinics. Philani community care workers assisted with facilitation of the parent checklists in the clinic waiting areas to ensure parents/guardians are aware of what they needed to do. Parents/guardians would receive the checklists as they were entering the facility at the Queue Marshal's desk while they would be receiving their queue number. Community care workers would be in the waiting areas assisting parents/guardians who would fill out the checklist after their child's immunisation appointment and would then return the checklists to either the community care workers, or the Queue Marshal at the facility entrance.

Implementation of parent checklists as presented in **Figure 4.7** was slightly delayed since clinics had almost exhausted their printing budget for the year. Almost a month after implementation of the staff checklists the primary researcher became aware of the issue and an online option for checklists was provided and offered at clinics. However, this was not utilised. Moreover, once it was determined that the project could provide the clinics with funding, additional printed copies of the checklists were provided.

Kuyasa: Nurse Immunisation Checklist

Before the immunisation session

No.	Item	Tick in the box if complete
1.	Prior notice to parents about date and time of immunisation session	☐
2.	Health Education/materials distributed before commencing the immunisation session	☐

During the immunisation session

No.	Item	Tick in the box if complete
3.	Greet the client and caregiver and ask them if they have any concerns. If necessary, check the general health status of the child.	☐
4.	Review the client's immunisation card and confirm contact details with the caregiver	☐
5.	Determine all eligible vaccinations based on the national schedule, client's age and possible contraindications	☐
6.	Record all vaccinations in register, due list, and immunisation card	☐
7.	Communicate key messages, including potential AEFIs and give parents health promotion materials if appropriate	☐
8.	Inform caregiver when the child's next immunisation is due	☐
9.	Refer parents to other community health services such as social services, the nutrition unit, or non-profit organisations if appropriate	☐

After the immunisation session

No.	Item	Tick in the box if complete
10.	List the names of children who missed vaccination and require follow up	☐
11.	Take appropriate action and prepare list of children to be vaccinated next month, including children that missed their vaccination this month	☐

Figure 4.5. Nurse immunisation checklist

Kuyasa: Clerk Immunisation Checklist

Before daily immunisation sessions

No.	Item	Tick in the box if complete
1.	Prior notice to parents about date and time of immunisation session	☐

During daily immunisation sessions

No.	Item	Tick in the box if complete
2.	Greet the client and caregiver and ask them if they have an immunisation appointment	☐
3.	Ensure contact details of caregiver are up to date	☐
4.	Remind client to make an appointment for the next immunisation session to save time and skip the queue	☐
5.	Record all vaccinations in PREHMIS	☐
6.	Inform caregiver when the child's next immunisation is due	☐

After daily immunisation sessions

No.	Item	Tick in the box if complete
7.	List the names of children who missed vaccination and require follow up	☐
8.	Take appropriate action and prepare list of children to be vaccinated next month, including children that missed their vaccination this month	☐
9.	Prepare folders for the next day's immunisation appointments	☐

Figure 4.6. Clerk immunisation checklist

Immunisation Program Feedback

The purpose of this form is to help us understand what your experience with the immunisation program at our clinic was like. Please answer the questions below to help us decide how we can provide you with a better immunisation service.

No.	Item	Circle one box Yes/Unsure/No		
1.	Did you feel the immunisation provider treated you respectfully?	✓	?	×
2.	Did you understand which vaccinations your child was given (that is: against what diseases)?	✓	?	×
3.	Was the vaccination/s your child received recorded on your vaccination card/Road to Health booklet?	✓	?	×
4.	Do you understand when your child should come back for the next vaccination?	✓	?	×
5.	Do you understand the possible side-effects of the vaccination received?	✓	?	×
6.	Are you aware of other community health services such as social services, the nutrition unit, or non-profit organisations that you may be eligible for?	✓	?	×
7.	Have you ever attended a health education talk about immunisation in the clinic?	✓	?	×
8.	Have you ever received/seen any posters or pamphlets about immunisation in the clinic?	✓	?	×
9.	Have you ever heard anything about immunisation on your local radio station?	✓	?	×
10.	Did you feel the service was delivered appropriately and effectively?	✓	?	×
11.	Did you feel that the clinic provided a good quality service?	✓	?	×

Additional feedback:

Thank you for your help ☺

Figure 4.7. Parent checklist – Immunisation Program Feedback form

4.3.3 Radio

Implemented 26 September 2017, in clinics for 6 months

Radio sessions were 1-hour in duration and held every Tuesday, from 11am-12pm on local community radio station ZiboneleFM. Information presented during these sessions linked with the health promotional materials and the daily clinic education sessions. The radio session included a question/answer component where listeners were invited to call in or message the radio station to directly communicate with the nurses. Initially one immunisation nurse from each clinic was to rotate weekly for each session; however, the clinics decided that it was best to have two nurses for each session; one immunisation nurse and one professional nurse so they would be able to support each other and answer the listener questions more easily. Following the first radio session, the clinic staff themselves took responsibility for determining the nurses' schedule, and what was to be presented during each session.

Topics discussed included those described above, as well as immunisation and prevention of diarrhoea, The Road to Health Booklet, other child health services such as Vitamin A supplementation, deworming, and oral rehydration therapy.

4.3.4 Health promotion materials

Implemented 29 November 2017, in clinics for 4 months

The first poster/postcard as shown in **Figure 4.8** was designed to promote awareness of the immunisation appointment system in the clinics, and thereby reduce waiting times, long queues, delays and perhaps rushed immunisation. This could provide parents/guardians with time to discuss the vaccines being administered in a less hasty immunisation session, resulting in a comfortable experience for both the child and parents/guardians.

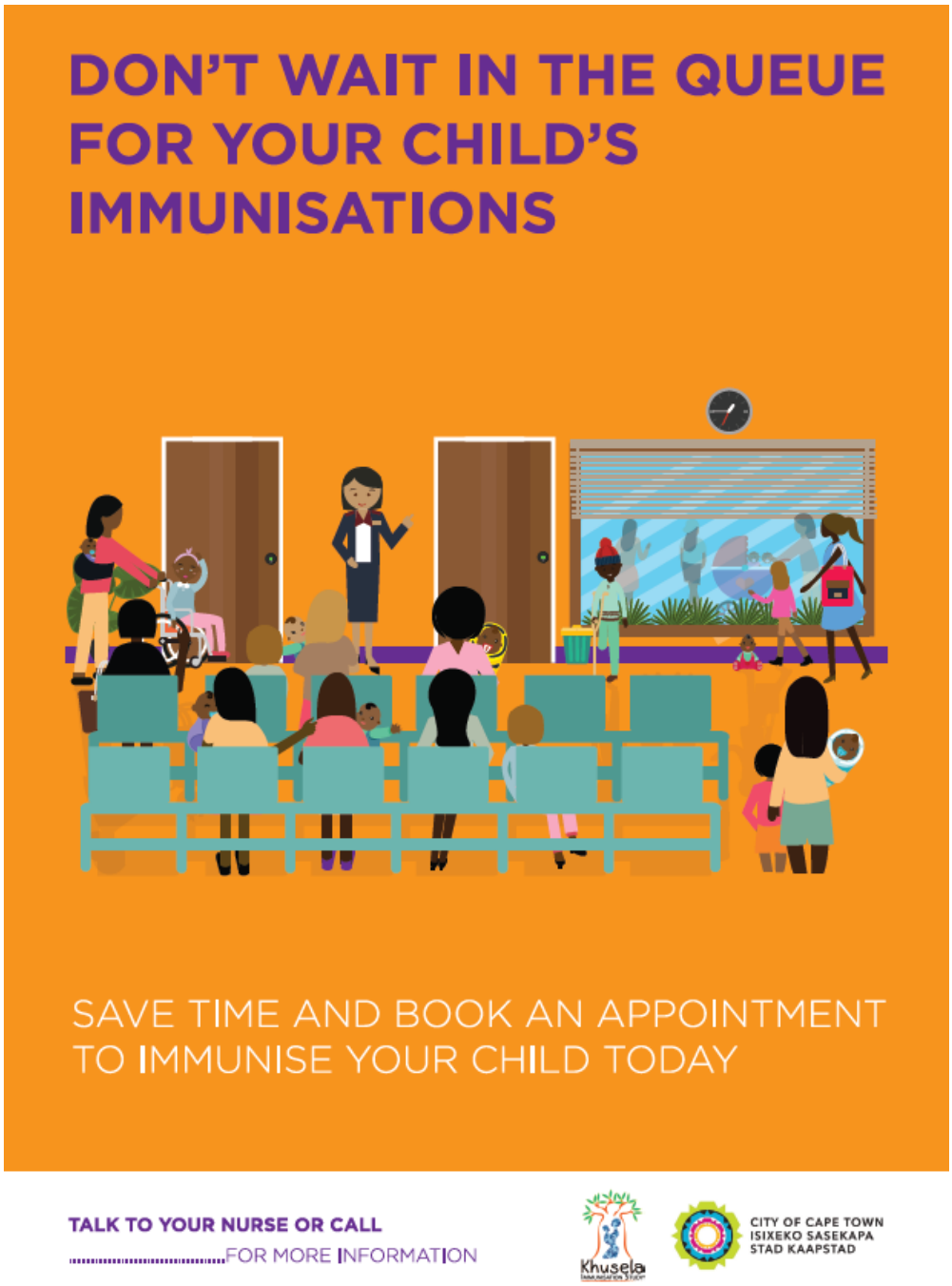


Figure 4.8. English poster/postcard #1 - promotion of immunisation appointment system

The second poster/postcard shown in **Figure 4.9** aimed to provide information about why immunisation is important and illustrated the possible disease outcomes children could experience if they were not vaccinated. The carefully thought out images intends to gently capture the interest of parents/guardians, and effectively recommends that children be fully immunised.

Figure 4.9. English poster/postcard #2 - importance of immunisation

The third poster/postcard is a simplified illustration of the vaccine schedule presented in **Figure 4.10**. The schedule outlined the ages at which the child should be vaccinated to receive the earliest and best protection against vaccine preventable diseases.

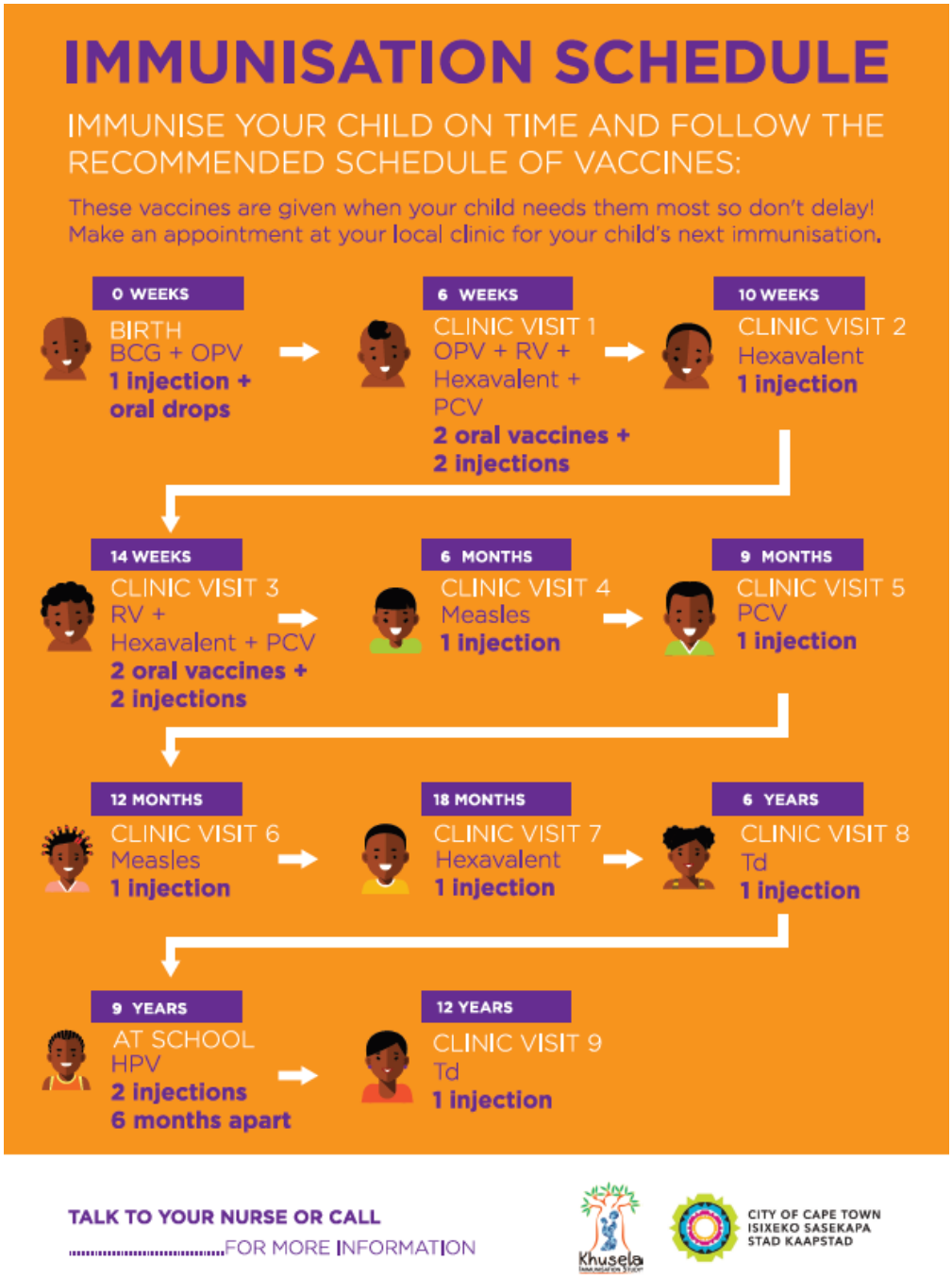


Figure 4.10. English poster/postcard #3 - immunisation schedule

The fourth poster/postcard in **Figure 4.11** featured a happy and healthy child with parent/guardian as the primary image conveying the benefits of protecting the child together with information about possible common side effects of vaccines, and what parents/guardians could do at home after the child had been immunised.

Figure 4.11. English poster/postcard #4 - what to do at home after immunisation and common possible side effects

Draft versions of the promotion materials were circulated from the end of September 2017 and staff used these materials to structure clinic education sessions and radio sessions. English versions of the finalised posters and posters were provided to clinics at the end of November 2017. During this period, the primary researcher was informed by the clinics that they would prefer one single postcard which contained all the information of the four individual postcards as they thought this would be easier for the parents/guardians to handle and have all necessary information more easily accessible. Therefore, the design of the postcards was modified from four individual A6 postcards to one A6 bi-fold postcard. The three clinics were provided with four A2 size English posters, 12 A2 size isiXhosa posters, 100 English postcards, and 500 isiXhosa postcards each.

4.3.5 Ongoing communication with clinic staff and monitoring of interventions

During the intervention development process, clinic staff preferred to communicate via a WhatsApp group created by the primary researcher when necessary. The participants of this group included the immunisation nurses, professional nurses, deputy facility managers, and facility managers of the three clinics, the Sub-district Child Health Manager and the primary researcher. Initially this was primarily used to discuss ongoing tasks and as a planning tool while developing interventions; however, this evolved into a forum where staff were not only providing project updates but also troubleshooting interventions, discussing daily routine immunisation tasks, encouraging each other after the designated nurses completed their radio presentation, and sharing tips and advice between the three clinics periodically. For example, Nurse 1 mentioned in the group during one of the radio sessions that *"Sr* [name] *is comfortable on the radio."* While Nurse 2 continued by commenting on the positive atmosphere shown throughout the session: "*I like the team spirit."* At the conclusion of that day's radio session, Nurse 4 supported the nurse who was presenting: *"Well done, that was so fluent and informative. Keep up the team spirit."*

This support network allowed for capacity building of nurses in that it encouraged collaboration and built the confidence of those engaged in implementing interventions. This was further confirmed by the following interaction between two of the nurses:

> Nurse 1: *Well done to all of you who took up the challenge to give the talks on radio, answering questions from members of the public.*
>
> Nurse 2: *Thank you sis* [name]. *It was indeed a challenge, public can be challenging and intimidating at the same time, but we all pull through without bringing the City name in disrepute*.

During the month of face-to-face working group meetings, nurses indicated they generally did not communicate very often with their colleagues from the other clinics. However, it was encouraging to note that the initiation of working group meetings allowed them to share ideas about how immunisation service delivery could improve. For example, Kuyasa clinic already had fast-tracked immunisation for 9-month old children, and their method of doing this was shared during the first nurse working group meeting. At the following working group, Nolungile mentioned that the advice Kuyasa Clinic shared had prompted them to commence fast-tracked 9-month immunisation that week. Town II also said that they were going to start fast-tracked immunisations the following week with a dedicated immunisation clerk.

Another positive outcome of the development process was that the three clinics' representatives held weekly meetings every Friday morning with the Sub-District Child Health Manager, and the Sub-District Primary Health Care Manager. These meetings were to discuss and plan for the upcoming weekly radio session as well as to review the public's questions and comments from the previous week's radio session. They also discussed the progress of the other interventions. While not formally planned, this ongoing communication between the three clinics emerged as an additional fifth intervention.

4.4 Discussion

This chapter describes the development and implementation process of interventions that aimed to address the barriers identified in the Health Service and Community Uptake Assessment in order to improve immunisation service delivery and uptake. The main goal of this study was to ensure that the interventions were relevant to the needs of the clinics and developed with as much input from the clinic staff as possible in a collaborative process to ensure maximum engagement and sustainability according to the principles of IRDS and EBCD [43, 86, 87].

While there was input from local stakeholders in intervention development, it was not as participatory as initially expected but more researcher-driven. For example, facility management and the clinic staff were very receptive to being involved in the development and implementation process and were engaged during the working groups with discussions of how they thought things could be done differently in the clinics. However, when plans for the interventions were presented to the working groups for feedback, clinic staff generally did not have any further suggestions or changes they wanted made. They were interested in the interventions and believed it was worthwhile to implement them; however, they just did not seem to have much of an opinion on how they could enhance or add to them. This may have been due to a lack of confidence in expressing what they thought should be done. This was also the case when specific tasks were allocated such as editing checklists to suit their needs or approving or making changes to draft text for health promotion materials. Constant reminders from the primary researcher and the Sub-District Child Health Manager were necessary to keep them motivated, since at the next working group, none of the tasks had been completed. Clinic staff seemed to prefer that the primary researcher took the lead during the development and implementation process while they had more of an approval role, which may have had to do with the hierarchical nature of the nursing system in South Africa. Due to this, the originally planned format of the working groups needed to be adapted to suit the preferences of the staff.

The working group also needed to be expanded to include facility managers and the Sub-District Health Manager in addition to the nurses.

This lack of motivation, and unwillingness to be involved in the development and implementation of materials in a more hands-on capacity may have been due to the negative and challenging relationship the clinics have experienced with the non-profit organisations (NPOs) and other previous research that was carried out in Khayelitsha. All three clinics have strong partnerships with these NPOs as they have worked in the community for a long period of time; however, they work quite independently with very little input from the clinics. Researchers tend to work in the clinics for a short period of time then leave once their study is complete as described in interviews with clinic staff and focus groups with community care workers in study one.

Another factor that may have had an influence on the development and implementation process, and motivation to be involved was the high staff turnover rate and rotation between departments. During the 3-month development period and the 6-month implementation period, four staff members that were part of the working group left and were replaced with three new staff members, and were removed or added to the working group WhatsApp group accordingly without prior explanation. This meant that not everyone involved in the working group during this period was fully informed about the project itself, and were only aware that the clinics were running certain interventions that they needed to be involved in.

This resulted in clinic staff having reduced responsibility for interventions, and highlighted the need for a dedicated person from within the clinics to act as project champion to encourage improvement and commitment to the project [109, 110], as well as provide support beyond what the primary researcher could provide [111]. While the Sub-District Child Health Manager did attempt to act in this capacity, due to the responsibilities associated with her position, she was not always available to do so. The project champion would ideally take responsibility for

overall development and implementation of interventions, and therefore monitoring and evaluation of immunisation service delivery as their sole role. This integration of the role into standard clinic or sub-district policy and practice would allow for reduced external support (either by the researcher or through funding), increase sustainability, and improve outcomes as this would be the responsibility of the project champion [109, 112]. In focus groups with community care workers, they expressed a wish to be more involved in clinic projects, and thought that they were utilised as fully as they potentially could. If training was provided, and more responsibility was delegated to implement interventions under the supervision of the project champion, a greater partnership with community care workers could not only greatly improve sustainability but reduce the strain on clinic staff due to limited staff numbers and a high turnover rate [109, 110, 112].

As mentioned above, while there was limited participation in the development of the interventions, the working groups did lead to regular, ongoing communication between clinic staff, a greater partnership between management and nurses and peer-to-peer support. It has been shown that peer-to-peer support that facilitates exchange of information, provides access to resources, and provides advice increases staff self-efficacy, and sustainability of programs [113]. This not only allowed for adaptation of interventions during the implementation period according to clinic needs but also influenced how daily immunisation service delivery was carried out. The adaptability of interventions, and clinic staff willingness to change clinic practices based on what was seen to be successful in other clinics showed that there was a high level of engagement of clinic staff and a commitment to improving immunisation service delivery; however, it was not always practically feasible due to their daily clinic responsibilities.

There were limitations that could have affected the success of not only the individual interventions but the overall approach used such as the overwhelming responsibilities of under-

staffed clinics, and high turnover rates that had an impact on clinic staff participation which is a problem consistent with nurses in health facilities across South Africa [114, 115]. There were also limitations as the project was externally funded, therefore the likelihood of interventions that required financing (e.g. printing of checklists and health promotion material, and radio sessions) remaining in place was unlikely if a funding source was not obtained by sub-district management.

However, while there were limitations, they did not detract from the advantages of the approach. In order to facilitate sustainability of new interventions, there needs to be a "culture of support", where there are partnerships with key stakeholders, continuous improvement to meet changing needs (i.e. environmental, economic, social or cultural needs), and staff engagement [111, 113, 116]. In this study, all of these factors were present, in addition to the participatory nature of the process which allowed for the development and implementation of interventions that were relevant, culturally appropriate and addressed the needs of the clinics.

5 Evaluating the effectiveness of interventions in strengthening immunisation service delivery

5.1 Introduction

This study mirrored study one, the Health Services and Community Uptake Assessment study, and was conducted six months after intervention implementation with the aim to evaluate the impact of the co-designed strategies on specific service delivery components. The evaluation measured changes in the following components:

1. Clinic service delivery such as vaccine doses administered, clinic cycle times (waiting times), and changes in clinic immunisation processes.
2. Community engagement and knowledge which included changes in health facility staff engagement activities and commitment to improving immunisation service delivery and coverage in the community, differences in parents'/guardians' knowledge about vaccines and immunisation, and parent/guardian engagement with the health facility.
3. Quality of care changes in overall parent/guardian satisfaction with services provided, changes in perceptions and attitudes of clinic staff, community health leaders, and parents/guardians regarding immunisation, and changes in acceptability of the immunisation program.

A process evaluation was also conducted to determine whether:

1. The interventions were implemented as planned, and to what degree.
2. Any adjustments made to interventions, and why.
3. Effectiveness of the interventions from parents/guardians and clinic staff feedback, what additional information was needed, what they liked, what they did not like.

5.2 Methods

Methods used for the evaluation study were the same as those used for the assessment study with some minor modifications, specifically the streamlining of evaluation tools to measure changes in specific outcomes.

5.2.1 Primary objective

The primary objective of study three was to evaluate the effectiveness of strategies implemented in strengthening immunisation service delivery for children aged under 24 months.

5.2.2 Secondary objectives

1. To identify changes in baseline number of vaccine doses given to children under 12 months from individualised clinic data over a 3-month period (March to May 2018) compared to the pre-intervention period (June to August 2017). Children aged under 12 months were chosen for this particular component of the study, to encapsulate the immunisation schedule and the key measurement of vaccine doses used for sub-district and provincial routine reporting of data.
2. To determine changes in knowledge, attitudes and engagement of service providers in the three clinics towards service delivery of the EPI.
3. To determine changes in knowledge, attitudes, beliefs (KAB), concerns and engagement of parents/guardians of children aged under 24 months towards immunisation who attended the three clinics.

5.2.3 Hypothesis

Implementation of clinic level interventions were able to address inter-linked system weaknesses and programmatic problems constraining immunisation service delivery, and improve clinic immunisation services, community engagement and knowledge about vaccination, and quality of care provided by the clinics.

5.2.4 Study duration

Study three was carried out over a 3-month period between March and May 2018, four to six months following intervention implementation. The study included evaluation of all interventions implemented, as well as changes made to the immunisation service based on the perspectives of service providers and service users.

5.2.5 Participants

A total of 47 EPI service providers and 369 service users, namely parents/guardians were engaged in study three. Participants included the Khayelitsha sub-district Child Health Manager, Khayelitsha sub-district Primary Health Care Manager, three health facility/deputy health facility managers, six immunisation (enrolled or registered) nurses, three pharmacists, six clerks, 26 community care workers and 369 parents/guardians of children aged under 24 months who attended one of the three clinics.

5.2.6 Selection criteria of participants

As far as possible, the same service providers who were involved in study one and two were recruited for study three. Nurses, clerks, pharmacists, and community care workers were recruited with the assistance of the health facility managers. Radio staff were also recruited for their feedback.

Inclusion criteria: To participate in study three, direct involvement was required by: (1) sub-district managers and health facility managers in the management or administration of EPI service delivery; (2) nurses in the management or administration of vaccines including interaction with parents/guardians of children aged under 24 months old who accessed the clinic; (3) clerks and community care workers with parents/guardians of children aged under 24 months old who accessed the clinic, and (4) pharmacists in the ordering process of vaccines for EPI service delivery. Clinic service providers involved with the intervention development

process and radio staff involved either as presenters or management of radio sessions were preferentially recruited.

As in study one, sampling of EPI service users was purposive to include parents/guardians of children aged under 12 months who attended the three clinics within the community. Parents/guardians were approached by field workers in the waiting areas of the clinic to obtain a convenience sample based on parents/guardians who were available to participate in the survey within the child health waiting area of the clinics with a subset of these participants randomly selected to be involved in focus groups.

5.2.7 Sample size

Using a confidence interval (CI) of 0.05, the aim of the study was to survey 300-500 parents/guardians who attended any one of the three clinics.

5.2.8 Estimating changes in the number of vaccines provided by three paediatric clinics in the sub-district of Khayelitsha

Individual patient level immunisation data routinely collected by the clinics was used to estimate the change in vaccine doses administered by the clinic between March and May, 2018 compared to the baseline monthly average of the number of vaccines administered before intervention implementation between June and August, 2017. An aggregate number of vaccine doses for the specified vaccines for children <12 months, administered over this 3-month period was collected at the following time points:

- 14 weeks: DTP3
- 6 months: MCV1
- 9 months: PCV3
- 12 months: MCV2

The percentage difference for each of these time points was calculated based on the pre-intervention baseline data. In measuring vaccine doses as an outcome, the assumptions were

made that there was no major change to the catchment areas served by the clinics over the study period, and that there was no major stock-out affecting the measured period.

5.2.9 Assessing immunisation systems and community engagement

5.2.9.1 Development of evaluation tools

The interview and focus group guides used for study three (see ***Appendix 3***) were adapted from those applied in study one which incorporated components from a number of key sources (WHO health systems, other WHO immunisation assessment resources, One21seventy Systems Assessment Tool, an analytical framework for immunisation programs developed in Canada, the Equiframe, and the Australian Parental Immunisation Needs and Attitudes Community Survey [28, 38, 41, 42, 56, 74, 75]). Evaluation tools remained the same as the assessment tools for the most part, with additional sections included that were specifically related to process evaluation.

5.2.9.2 Knowledge, attitudes and engagement of service providers regarding EPI service delivery

As in study one, semi-structured interviews were conducted with the key stakeholders and clinic staff including the sub-district Child Health Manager, sub-district Primary Healthcare Manager, the Health Facility Managers from the three clinics (Nolungile, Town II, and Kuyasa) as well as two immunisation nurses, two clerks, and one pharmacist from each clinic (see **Table 5.1**). Participants were provided with plain language statements that briefly described the study, and written informed consent was obtained before the interviews commenced. Interviews were approximately 30-40 minutes long and were conducted in English by the primary researcher. These interviews took place over a 1-month period.

Focus groups were conducted with selected community care workers (see **Table 5.1**). Participants were provided with plain language statements and written informed consent was obtained prior to commencement of focus groups. A PowerPoint presentation was created with

each question on individual slides, for participants to refer to while they discussed each point. Focus groups were approximately 45-60 minutes long and were conducted in English by the primary researcher, over a 3-week period.

5.2.9.3 Attitudes, beliefs and concerns of service users

Three interviewers who had language skills in both isiXhosa and English were hired to conduct both the surveys as well as the focus groups with parents/guardians. All materials, i.e. surveys, the focus group guide, plain language statement and consent forms were presented in English, and interviewers supplementarily translated into colloquial isiXhosa when parents/guardians did not understand particular sections of the English translation. Interviewers were trained before commencement of the evaluation by the primary researcher over a one-week period to ensure consistency, and the interviewers were provided with a brief protocol to refer to during surveys and focus groups if they found it necessary. Training included an overview of the study and how to approach prospective study participants, use the plain language statement, obtain informed consent and conduct the surveys and focus groups (see ***Appendix 3***).

Survey data were collected and managed using REDCap, hosted at the Murdoch Children's Research Institute (MCRI). Interviewers used the REDCap Mobile App which allowed for offline data collection. Data were stored securely in the application on the interviewer's mobile device and was then uploaded to the online database when a secure internet connection was available. The Mobile App also allowed interviewers to collect qualitative data from the open-ended questions that were included as a part of the survey using a feature that allowed for audio files to be uploaded and linked to individual survey records. The Mobile App also assisted interviewers in clarifying questions about specific interventions as images of intervention materials were uploaded in the surveys for parents/guardians to refer to if necessary. Prior consent was obtained for parents/guardians to be recorded.

Interviewers conducted surveys over a 2-3-week period at each clinic, until the target of 100-150 surveys per clinic was reached, with a total of 300-500 surveys with parents/guardians at all three clinics. (see **Table 5.1**).

Focus groups took place over a 3-week period and were conducted by the same interviewers who carried out the surveys. Three focus groups were held (one at each clinic) and were approximately 45-60 minutes long. Six parents/guardians were recruited per focus group from the clinic waiting areas (see **Table 5.1**). A hardcopy of an English PowerPoint presentation, with each question on individual slides was provided for participants to refer to while they were discussing each point. Questions were translated into colloquial isiXhosa by the interviewer, and discussion between parents/guardians was carried out in isiXhosa.

Over the period that the surveys and focus groups were conducted, interviewers kept their observations and perceptions of how the clinic was run, and their interaction with parents/guardians. There were also regular debriefing sessions with the interviewers and the primary researcher at the end of each day to check consistency and manage any issues related to data collection.

Table 5.1. Summary of data collection at each study site

<table>
<tr><th colspan="6">Khayelitsha sub-district</th></tr>
<tr><td colspan="6">30-40 minute interview with Sub-District Child Health Manager (n = 1)
30-40 minute interview with Sub-District Primary Healthcare Manager (n = 1)</td></tr>
<tr><th colspan="2">Nolungile Clinic</th><th colspan="2">Town II Clinic</th><th colspan="2">Kuyasa Clinic</th></tr>
<tr><td>30-40 minute interviews</td><td>45-60 minute focus groups</td><td>30-40 minute interviews</td><td>45-60 minute focus group</td><td>30-40 minute interviews</td><td>45-60 minute focus group</td></tr>
<tr><td>Health Facility Manager (n = 1)</td><td rowspan="4">Community Health Leaders (n = 8)</td><td>Health Facility Manager (n = 1)</td><td rowspan="4">Community Health Leaders (n = 8)</td><td>Health Facility Manager (n = 1)</td><td rowspan="4">Community Health Leaders (n = 8)</td></tr>
<tr><td>Nurses (n = 2)</td><td>Nurses (n = 2)</td><td>Nurses (n = 2)</td></tr>
<tr><td>Clerks (n = 2)</td><td>Clerks (n = 2)</td><td>Clerks (n = 2)</td></tr>
<tr><td>Pharmacist (n = 1)</td><td>Pharmacist (n = 1)</td><td>Pharmacist (n = 1)</td></tr>
<tr><td colspan="2">15-20 minute surveys with Parents/guardians (n = 112)</td><td colspan="2">15-20 minute surveys with Parents/guardians (n = 126)</td><td colspan="2">15-20 minute surveys with Parents/guardians (n = 114)</td></tr>
<tr><td colspan="2">45-60 minute focus group with Parents/guardians (n = 5)</td><td colspan="2">45-60 minute focus group with Parents/guardians (n = 2)
(n = 4)</td><td colspan="2">45-60 minute focus group with Parents/guardians (n = 6)</td></tr>
<tr><th colspan="6">ZiboneleFM</th></tr>
<tr><td colspan="6">30-40 minute focus group with Sales and Marketing Manager, Sales and Marketing Officer, and Radio Presenter (n = 3)</td></tr>
</table>

- → *Total number of interviews with management:* 5
- → *Total number of interviews with nurses:* 6
- → *Total number of interviews with clerks:* 6
- → *Total number of interviews with pharmacists:* 3
- → *Total number of focus groups with community health leaders:* 3
- → *Total number of surveys with parents/guardians:* 352
- → *Total number of focus groups with parents/guardians:* 4
- → *Total number of focus groups with radio staff:* 1

5.2.9.4 Direct observation of immunisation facilities and procedures

To triangulate and supplement data that was collected from the interviews and focus groups with service providers and service users, the daily immunisation process at each clinic was observed by the primary researcher from arrival to when the parents/guardians left the clinic.

5.2.10 Application of research rigour to the study data collection

As with study one, to ensure that study three was reliable and valid, the aim was to address the following criteria: credibility, transferability, dependability, and confirmability [92]. Rigour was applied to study three with a number of quantitative and qualitative data collection methods utilised, and data collected from multiple sources in order to compare and contrast findings. Due to the prolonged engagement between the primary researcher, interviewers and study participants, there was a good rapport formed between all parties which resulted in participants being more open to sharing information, especially service providers. Internal consistency was ensured as the same research processes were used throughout the study, and methods used and the data collected was discussed at length with the project advisory panel (Dr. Margie Danchin, Professor Margaret Kelaher, Professor Ross Bailie, Dr. David Coetzee, Dr. Chris Morgan and Dr. Neil Cameron) to check coherence.

Any demographic information that was gathered via the study was compared to census data to ensure the transferability of data collected. A field journal was kept by the primary researcher throughout the study in order to keep track of the study process, to reflect on personal influences and opinions on the data collection process and data outcomes that emerged over the course of the fieldwork period.

Finally, all interviews and focus groups, as well as some components from surveys were audio recorded, transcribed, and then checked against the original recording for accuracy. The Braun and Clark method for thematic analysis in qualitative research was then used to analyse interview transcripts [93]. Recurring themes were then coded using NVivo to assist with the organisation of data.

5.2.11 Outcome measures

5.2.11.1 Primary outcome

Overall improvement in clinic immunisation services, community engagement and knowledge by service providers and parents/guardians, and quality of care following intervention implementation.

5.2.11.2 Secondary outcomes

- Increase in average number of immunisation doses delivered over a 3-month period, between March and May, 2018 compared to June and August, 2017 using the number of DTP3, MCV1, PCV3 and MCV2 doses provided at week 14, 6 months, 9 months, and 12 months at each clinic.
- Improvement in perceptions of health service providers regarding their knowledge, attitudes and engagement towards the EPI.
- Improvement in perceptions of parents/guardians regarding their knowledge, attitudes, beliefs, concerns, engagement and the acceptability of the EPI.
- Service user and service provider perceptions of implemented interventions.
- Describe changes made to interventions during the implementation period.

5.2.12 Data analysis

5.2.12.1 Quantitative analysis

An aggregate of the number of vaccine doses administered over a 3-month period was calculated and averaged to account for month to month changes. Survey data were exported from REDCap to Excel, cleaned and collated. Data were then exported to SPSS to perform descriptive statistics. The difference in vaccine doses administered, and survey responses pre and post intervention implementation were calculated using proportion tests, 95% confidence intervals, and p-values (significant difference if <0.05) and Chi-square tests were used to

ascertain if there were improvements that could be associated with intervention implementation.

5.2.12.2 Qualitative analysis

Key themes and changes in perspectives post-intervention implementation were identified from the interviews and focus groups with clinic staff, community care workers and parents/guardians. Sub-themes were also identified from the core themes, and any patterns that emerged from the coded data were analysed using NVivo.

5.2.12.3 Process evaluation

The implementation process was evaluated based on parent/guardian and service provider interviews and focus groups. Service providers identified how interventions changed during the implementation period compared to the initially planned interventions, and detailed what adjustments were made to interventions and why. Parents/guardians identified what they liked or did not like about interventions, and what additional information they needed.

5.3 Results

This section details the quantitative findings of changes in parents'/guardians' knowledge, attitudes, and beliefs about immunisation, and qualitative findings of changes in both parents/guardians and staff knowledge, attitudes, and engagement related to immunisation services. These findings also include the evaluation of interventions implemented.

5.3.1 Estimation of change in vaccine doses provided by clinics

Estimation of changes in vaccination activity at each clinic was limited to the average number of specific vaccine doses administered per month, averaged over a 3-month period compared to the baseline number of vaccines administered. As outlined above, data were collected on vaccines administered at 14 weeks (DTP3), 6 months (MCV1), 9 months (PCV3), and 12 months (MCV2).

Overall, the total number of vaccine doses administered per month remained quite similar before and after intervention implementation with minor increases or decreases in % difference per vaccine administered. There was some increase seen in the total number of vaccines administered per month, and an increase in MCV2 at all clinics ranging from a 6-12% increase, indicating there may have been some emphasis placed on this particular vaccine dose timepoint for improvement at the clinics. These minimal differences reflect a number of factors identified by clinic management that may have accounted for the lack of change. The most notable is data quality as there were a number of issues associated with the way immunisation data were collected at the clinics as detailed in Chapter 3. Therefore, the data presented below in **Tables 5.2** to **5.4** may not be an accurate representation of vaccine doses administered at the clinics. There was also quite high staff turnover during the implementation period that resulted in new staff needing to be trained, and data collection not being a very high priority.

Table 5.2. Kuyasa Clinic – Vaccine doses administered pre and post intervention implementation

Vaccines administered	Pre-intervention (total # vaccines administered/month = 222) n (%)	Post-intervention (total # vaccines administered/month = 232) n (%)	Total (total # vaccines administered/month = 454) n (%)	Difference % (95% CI)	P value (Chi square test)
DTP3 (14 weeks)	49 (22)	62 (27)	112 (25)	5 (4, 5)	0.475
MCV1 (6 months)	56 (25)	47 (20)	103 (23)	-5 (-5, -4)	0.456
PCV3 (9 months)	67 (30)	44 (19)	112 (25)	-11 (-12, -10)	0.117
MCV2 (12 months)	49 (22)	78 (34)	128 (28)	12 (11, 12)	0.109

Table 5.3. Nolungile Clinic – Vaccine doses administered pre and post intervention implementation

Vaccines administered	Pre-intervention (total # vaccines administered/month = 325) n (%)	Post-intervention (total # vaccines administered/month = 371) n (%)	Total (total # vaccines administered/month = 696) n (%)	Difference % (95% CI)	P value (Chi square test)
DTP3 (14 weeks)	92 (28)	103 (28)	195 (28)	-1 (-1, -1)	0.991
MCV1 (6 months)	89 (27)	92 (25)	181 (26)	-3 (-3, -3)	0.781
PCV3 (9 months)	82 (25)	82 (22)	165 (24)	-3 (-3, -3)	0.659
MCV2 (12 months)	62 (19)	94 (25)	156 (22)	6 (6, 7)	0.366

Table 5.4. Town II Clinic – Vaccine doses administered pre and post intervention implementation

Vaccines administered	Pre-intervention (total # vaccines administered/month = 131) n (%)	Post-intervention (total # vaccines administered/month = 140) n (%)	Total (total # vaccines administered/month = 271) n (%)	Difference % (95% CI)	P value (Chi square test)
DTP3 (14 weeks)	36 (27)	37 (26)	73 (27)	-1 (-1, -1)	0.869
MCV1 (6 months)	35 (27)	36 (26)	71 (26)	-1 (-1, -1)	0.885
PCV3 (9 months)	35 (26)	30 (22)	65 (24)	-5 (-5, -4)	0.564
MCV2 (12 months)	25 (19)	37 (26)	62 (23)	8 (7, 8)	0.298

5.3.2 Changes in immunisation facilities and procedures

Following intervention implementation, all three clinics had fast-tracked immunisations for children due for their 9-month immunisation which was an outcome of the nurse working groups described in Chapter 4. Overall; however, clinic procedures remained the same (summarised in **Figure 5.4**). All clinics still had appointment systems which more parents/guardians seemed to take advantage of; however, most parents/guardians that brought their children in for immunisations post-intervention were walk-ins. 58% of parents/guardians reported that waiting times at the clinic had been reduced and that the appointment system had made things easier for them and more accessible as reflected in the surveys and focus groups with parents/guardians. Before intervention implementation, the average clinic cycle time was 2.5 hours; however, this was not formally measured post-intervention due to interviewers being unavailable during this period.

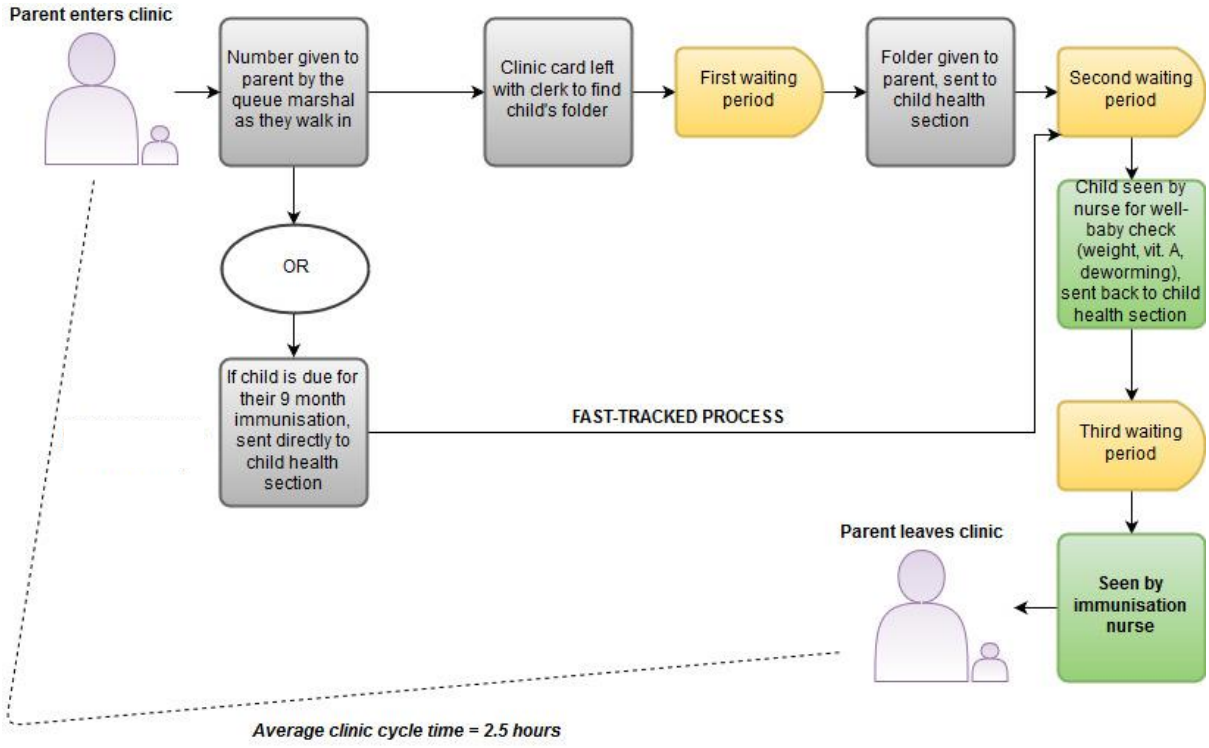


Figure 5.1. Clinic process for child immunisation visits

5.3.3 Changes in attitudes, beliefs and concerns of service users

This section details both the quantitative and qualitative findings of the parents/guardians evaluation.

5.3.3.1 Quantitative findings

5.3.3.1.1 Socio-demographic characteristics of survey participants

The socio-demographic characteristics of survey participants are detailed in **Table 5.6**. Demographics were very similar to those of study one with the majority being female (95%), with an age range of 14 to 64 years old. Most were aged between 20 to 34 years old (72%) and half were single mothers (50%). As in study one, 55% of the participants were born in Eastern Cape province, and the majority of participants had completed secondary school (51%). Most parents/guardians had one child (44%), with the majority aged between 5-9 months old (39%). Excluding the gender ratio of participants of this study, the demographic make-up of the study cohort was very similar to that of the sub-district of Khayelitsha as detailed in data from the most recent South African census in 2011 [16].

Table 5.5. Socio-demographic characteristics of survey participants (n = 352)

Variable	N (%)
Gender	
Female	**335 (95)**
Male	11 (3)
Other	1 (0.3)
Age (years) **Range = 14-64** **Mean 27.68 (SD 6.85)** **Median = 27**	
<20	15 (4)
20-24	**79 (22)**
25-29	**94 (27)**
30-34	**81 (23)**
35-39	55 (16)
40-44	17 (5)
45-49	5 (1)
≥50	1 (0.3)
Marital status	
Father of the child does not live with you, but supports you or the child	28 (8)
Father of the child lives with you	28 (8)
Married	104 (30)
Mother of the child does not live with you, but supports you or the child	2 (0.6)
Mother of the child lives with you	2 (0.6)
Single father	5 (1)
Single mother	**177 (50)**
Widow	3 (1)
Province/Country of birth	
Eastern Cape	**192 (55)**
Free State	1 (0.3)
Gauteng	14 (4)
KwaZulu-Natal	6 (2)
Northern Cape	2 (0.6)
Western Cape	120 (34)
Zimbabwe	15 (4)
Language(s) spoken at home	
English	2 (1)
isiXhosa	**341 (97)**
isiXhosa & isiZulu	1 (0.3)
isiXhosa & Sotho	3 (1)
isiZulu	3 (1)
Shona	13 (4)
Sotho	5 (2)
Highest level of education	
Never attended school	3 (1)
Preschool	2 (1)
Completed primary school	10 (3)
Completed secondary school	**178 (51)**
Some secondary school	107 (30)
University/further education	46 (19)
Type of dwelling	
Backyard dwelling	34 (10)
Brick house	**155 (44)**
Shack	**158 (45)**
Other	2 (0.6)

Number of children and adults living at the same dwelling	
2	11 (3)
3	77 (22)
4	**103 (29)**
5	60 (17)
6	32 (9)
7	30 (9)
8	20 (6)
9	6 (2)
≥ 10	6 (2)
Number of children	
1	**155 (44)**
2	102 (29)
3	66 (19)
4	20 (6)
5	3 (1)
6	1 (0.3)
21	1 (0.3)
Age of youngest child **Range = 2 months-12 years**	
0-4 months	19 (5)
5-9 months	**138 (39)**
10-14 months	95 (27)
15-19 months	51 (15)
20-24 months	37 (11)
2-4 years	8 (2)
10-14 years	1 (0.3)

5.3.3.1.2 Changes in parent/guardian attitudes towards immunisation

As parents'/guardians' attitudes towards vaccines and immunisation were very positive and there were minimal safety concerns identified prior to intervention implementation, the evaluation study did not focus on this component. It was ascertained that parents'/guardians' views on the importance of the EPI program (see **Table 5.7**) were predominately supportive of the immunisation program (99%), and almost all (99%) participants agreed that vaccines were important for their child.

Table 5.6. Attitudes about immunisation

	Pre-intervention (n = 427) n (%)	**Post-intervention (n = 352) n (%)**	**Total (n = 779) n (%)**	**Difference % (95% CI)**	**P value (Chi square test)**
			Support		
What do you think about childhood vaccination?	418 (98)	348 (99)	766	1 (1, 1)	0.942
			Very important		
How important do you think the immunisation program is?	418 (98)	348 (99)	766	1 (1, 1)	0.942

5.3.3.1.3 Changes in community engagement with clinic services and clinic staff

The second section of the survey consisted of questions designed to determine if there were changes in community engagement with clinic services and clinic staff following the intervention implementation. **Table 5.8** shows parental/guardian report of interaction with clinic staff. There was a significant improvement post-intervention implementation of parents/guardians reporting that they felt comfortable with the way they were treated at the clinics (78% vs 50%; % difference = 29%; p-value = 0.01). There was also a significant decrease in parents/guardians who felt uncomfortable (44% vs 13%; % difference = -31%; p-value = <0.0001). The interventions appear to have had a positive impact on parents/guardians and staff interaction and improved parent/guardian-staff rapport.

Table 5.7. Parental/guardian report of interaction with clinic staff, post-intervention

	Pre-intervention (n = 427) n (%)	**Post-intervention (n = 352) n (%)**	**Total (n = 779) n (%)**	**Difference % (95% CI)**	**P value (Chi square test)**
Parents comfortable with the way they are treated at the clinic					
Yes	213 (50)	276 (78)	489 (63)	29 (27, 30)	**0.01**
No	185 (44)	46 (13)	231 (30)	-31 (-32, -28)	**<0.0001**
Unsure	25 (6)	27 (8)	52 (7)	2 (2, 2)	0.576
Reasons parents are comfortable with the way they are treated at the clinic					
Friendly staff	154 (36)	173 (49)	327 (42)	13 (12, 14)	0.156
Helpful staff	174 (41)	196 (56)	370 (47)	15 (14, 16)	0.128
Clinic is welcoming	136 (32)	127 (36)	263 (34)	4 (4, 4)	0.608
No concerns about confidentiality	153 (36)	70 (20)	223 (29)	-16 (-17, -15)	**0.033**
Clear explanation received from staff	137 (32)	118 (34)	255 (33)	1 (1, 2)	0.859
Other	4 (1)	6 (2)	10 (1)	1 (1, 1)	0.637
Reasons parents are not comfortable with the way they are treated at the clinic					
Unfriendly staff	112 (26)	19 (5)	131 (17)	-21 (-22, -20)	**<0.0001**
Unhelpful staff	101 (24)	16 (5)	117 (15)	-19 (-20 -18)	**0.0003**
Clinic is not welcoming	116 (27)	13 (4)	129 (17)	-23 (-25, -22)	**<0.0001**
Concerns about confidentiality	46 (11)	11 (3)	57 (7)	-8 (-8, -7)	**0.040**
No clear explanation received from staff	89 (21)	17 (5)	106 (14)	-16 (-17, -15)	**0.002**
Other	9 (2)	11 (3)	20 (3)	1 (1, 1)	0.657

Compared to pre-intervention responses, some slight improvement can be seen in parents'/guardians' awareness of clinic linkages (see **Table 5.9**). There was a reduction in the proportion of parents/guardians who reported that they had not been referred to these services (78% vs 89%; % difference = -30%), and over half of the parents/guardians stated that they were provided with information about vaccines and immunisation services at the clinics (59% vs 55%; % difference = 7%). However, despite seeing some improvement in awareness of these services, changes were not statistically significant. It may be that staff were still either not referring parents/guardians to these services, or parents/guardians were still unaware that they had access to these services if required even though they were being promoted in the daily health talks as services parents/guardians could access when relevant topics were discussed.

Table 5.8. Links with community, other health services and resources

	Pre-intervention (n = 427) n (%)	Post-intervention (n = 352) n (%)	Total (n = 779) n (%)	Difference % (95% CI)	P value (Chi square test)
Referred to other community health services such as social services, the nutrition unit, or non-profit organisations					
Yes	40 (10)	38 (11)	78 (10)	1 (1, 1)	0.823
No	372 (89)	273 (78)	645 (83)	-30 (-31, -29)	0.393
Unsure	7 (2)	39 (11)	46 (6)	9 (9, 10)	**0.012**
Peer-to-peer support or information sessions					
Yes	39 (9)	57 (16)	96 (12)	7 (7, 7)	0.163
No	368 (87)	278 (79)	646 (83)	-8 (-8, -8)	0.535
Unsure	16 (4)	15 (4)	31 (4)	1 (0, 1)	1
Information about vaccines & immunisation services provided					
Yes	235 (55)	206 (59)	441 (57)	3 (3, 4)	0.706
No	181 (43)	115 (33)	296 (38)	-10 (-11, -10)	0.250
Unsure	9 (2)	28 (8)	37 (5)	6 (6, 6)	0.059
Type of information provided					
Posters	104 (24)	70 (20)	174 (22)	-4 (-5, -4)	0.547
Pamphlets	100 (23)	45 (13)	145 (19)	-11 (-11, -10)	0.100
Community outreach activities	82 (19)	18 (5)	100 (13)	-14 (-15, -13)	**0.005**
Nurse provides information	205 (48)	131 (37)	336 (43)	-11 (-11, -10)	0.233
Community care workers provide information	89 (21)	77 (22)	116 (21)	1 (1, 1)	0.874

5.3.3.1.4 Evaluation of interventions implemented

The next section of the survey consisted of questions designed to evaluate the individual interventions that were implemented (see **Table 5.10**). Overall, just under half of parents/guardians reported that they had listened to the radio sessions presented by the clinics (42%), heard health talks in the clinics (43%), and seen the health promotional materials (44%). The only intervention that parents/guardians did not seem to be aware of, were the immunisation feedback forms (2% had seen them), indicating that they were not highly utilised in the clinics. This is consistent with what was observed by the primary researcher during the intervention implementation period, as well as during the evaluation period where forms only seemed to be distributed during a 1 to 2-month period. Of parents/guardians that had been exposed to all four of these interventions during the relatively short 4 to 6-month implementation period, it was encouraging to note that the large majority responded positively and thought the clinics should continue using them.

Table 5.9. Parents' opinions about interventions that were implemented

	N (%)
Heard about immunisation on the radio	
Yes	**146 (42)**
No	89 (25)
Unsure	110 (31)
Thought radio sessions were useful	
Yes	**142 (97)**
Unsure	1 (0.6)
Thought clinics should continue presenting radio sessions	
Yes	**141 (97)**
Unsure	1 (0.6)
Heard health talks about immunisation in clinics	
Yes	**152 (43)**
No	142 (40)
Unsure	49 (14)
Thought health talks were useful	
Yes	**149 (98)**
No	1 (0)
Unsure	2 (1)
Thought clinics should continue presenting health talks	
Yes	**149 (98)**
No	1 (0)
Unsure	1 (0)
Seen posters/pamphlets about immunisation in clinics	
Yes	**154 (44)**
No	124 (35)
Unsure	64 (18)

Thought posters/pamphlets were useful	
Yes	**149 (97)**
No	1 (0.6)
Unsure	1 (0.6)
Thought clinics should continue using posters/pamphlets	
Yes	**145 (94)**
No	5 (3)
Unsure	1 (0.6)
Seen Immunisation Feedback Form in clinics	
Yes	8 (2)
No	**318 (90)**
Unsure	22 (6)
Thought feedback forms were useful	
Yes	**8 (100)**
Thought clinics should continue using feedback forms	
Yes	**7 (88)**
No	1 (12.5)

The majority of parents/guardians felt that they had sufficient knowledge to make decisions about immunising their child (75%) (see **Table 5.11**). Compared to results from study one, there was an increase in parents/guardians who agreed with this statement following intervention implementation (% difference = 18%; p-value = 0.118)), and the proportion of parents/guardians that did not feel that they had enough knowledge decreased (% difference = -30%; p-value = 0.283). While these changes were not statistically significant, the trend was consistent with other findings that indicate that interventions may have had a positive impact on parents'/guardians' knowledge about immunisation or the immunisation program.

Table 5.10. Parent opinion on knowledge to make decisions about immunisation

	Pre-intervention (n = 427) n (%)	Post-intervention (n = 352) n (%)	Total (n = 779) n (%)	Difference % (95% CI)	P value (Chi square test)
Parents feel they have enough knowledge to make good decisions about vaccinating their child					
Agree	239 (57)	265 (75)	504 (65)	18 (17, 19)	0.118
Disagree	107 (25)	62 (18)	169 (22)	-30 (-30, -30)	0.283
Unsure	76 (18)	20 (6)	96 (12)	-12 (-13, -12)	**0.013**

5.3.3.1.5 Changes in accessibility and parent/guardian satisfaction

There were quite a few differences pre and post intervention implementation regarding clinic communication and parents'/guardians' satisfaction (see **Table 5.12)**. Over half of the

parents/guardians surveyed said that they felt waiting times at the clinics had been reduced (58%), and there was some change seen in communication or follow-up with parents/guardians (% difference = 4%; p-value = 0.384), and in the proportion of parents/guardians that reported services were delivered appropriately and effectively (% difference = 13%; p-value = 0.194). The largest difference seen was in overall parents'/guardians' satisfaction with 89% of parents/guardians reporting that they were very satisfied compared to 51% pre-intervention (% difference = 39%; p-value = 0.001), and 5% of parents/guardians were unsatisfied compared to 41% pre-intervention (% difference = -36%; p-value = <0.0001). However, despite the significant improvement in parents'/guardians' satisfaction with services, there was also an increase in the proportion of parents/guardians who felt they were unable to let clinics know if they felt unsatisfied with services (59% vs 20%; (% difference = 39%; p-value = <0.0001. This correlated with the overall decrease in the proportion of parents'/guardians' preferred methods of feedback.

Table 5.11. Clinic service delivery: Accessibility and parent/guardian satisfaction

	Pre-intervention (n = 427) n (%)	Post-intervention (n = 352) n (%)	Total (n = 779) n (%)	Difference % (95% CI)	P value (Chi square test)
Communication from clinics to remind parents of appointments or follow-up when appointments are missed					
Yes	37 (9)	45 (13)	82 (11)	4 (4, 4)	0.384
No	385 (91)	293 (83)	678 (87)	-30 (-30, -30)	0.544
Unsure	1 (0.2)	10 (3)	11 (1)	3 (2, 3)	0.09
Feel that waiting times have been reduced					
Agree	N/A	205 (58)	N/A	N/A	N/A
Disagree		115 (33)			
Unsure		22 (6)			
Service delivered appropriately and effectively					
Yes	186 (44)	200 (57)	386 (50)	13 (13, 14)	0.194
No	183 (43)	109 (31)	292 (37)	-12 (-12, -11)	0.162
Unsure	55 (13)	37 (11)	92 (12)	-2 (-2, -2)	0.666
Satisfaction with immunisation services provided at the clinic					
Very satisfied	216 (51)	314 (89)	530 (68)	39 (37, 41)	**0.001**
Unsatisfied	174 (41)	17 (5)	191 (25)	-36 (-38, -34)	**<0.0001**
Unsure	34 (8)	15 (4)	49 (6)	-4 (-4, -4)	0.252
Able to let the clinic know if they are not satisfied with the service provided					
Yes	308 (72)	93 (26)	401 (51)	-46 (-48, -43)	**<0.0001**
No	84 (20)	208 (59)	292 (37)	39 (37, 41)	**<0.0001**
Unsure	34 (8)	46 (13)	80 (10)	5 (5, 5)	0.276

Parent preferred methods of providing feedback					
Complaints box	254 (60)	65 (19)	319 (41)	-42 (-44, -39)	**<0.0001**
Immunisation Feedback Form	N/A	2 (0.6)	N/A	N/A	N/A
Talk to nurse	119 (28)	54 (15)	107 (14)	-13 (-13, -12)	0.048
Talk to doctor	53 (12)	28 (8)	202 (26)	-4 (-4, -4)	0.371
Talk to facility manager	174 (41)	18 (5)	54 (7)	-36 (-38, -34)	**<0.0001**
Talk to receptionist	36 (8)	21 (6)	72 (9)	-2 (-2, -2)	0.592
Talk to Community Care Workers	51 (12)	23 (7)	74 (9)	-5 (-6, -5)	0.243

5.3.3.2 Qualitative findings

This section describes the qualitative findings of the service users from the evaluation study. Focus groups with parents/guardians attempted to determine if parents/guardians had noticed any changes in the clinic service, if they were aware of the interventions that had been implemented, and what they thought of them.

A combination of priori and emergent coding of data were used, and many of the main themes that emerged from these focus groups were similar to those of the assessment study, as listed below:

1. Acceptability of vaccine program and services at the clinic: the importance of immunisation, parents/guardians-staff interaction, and waiting times.
2. Immunisation strategy and program: the effectiveness of services.
3. Self-management: parents'/guardians' knowledge about immunisation and clinic processes.
4. Links with community, other services and resources: awareness of non-profit organisations, or other health services.
5. Quality improvement of program: satisfaction with service provided, awareness of interventions that had been implemented.

5.3.3.2.1 Socio-demographic characteristics of focus group participants

Seventeen parents/guardians participated in three focus groups that were conducted at the three clinics. All participants were female, with ages ranging from 23 to 53 years old. Demographics

were similar to those of study one, with the majority of participants being single mothers (71%), from the Eastern Cape (65%), with isiXhosa the language spoken at home for all participants. One participant completed university or further education while the rest of the participants had a secondary school level education. Of the 23 participants, 47% had one child, with the majority aged between 5-9 months old (48%) (see **Table 5.10**).

Table 5.12. Demographic information of focus group participants (parents/guardians)

Age	Gender	Marital status	Province of birth	Language spoken at home	Highest level of education	Highest grade/ level completed	Number of children	Age group of youngest child
36	Female	Married	Eastern Cape	isiXhosa	Secondary school	Grade 12	3	10-12 months
24	Female	Married	Eastern Cape	isiXhosa	Secondary school	Grade 11	2	5-9 months
43	Female	Single mother	Eastern Cape	isiXhosa	Secondary school	-	2	19 months-6 years
23	Female	Single mother	Eastern Cape	isiXhosa	University or further education	3rd year	-	13-18 months
35	Female	Single mother	Eastern Cape	isiXhosa	Secondary school	Grade 12	2	5-9 months
35	Female	Single mother	Eastern Cape	isiXhosa	Secondary school	Grade 11	1	5-9 months
25	Female	Married	Eastern Cape	isiXhosa	Secondary school	-	1	5-9 months
53	Female	Single mother	Western Cape	isiXhosa	Secondary school	-	1	10-12 months
24	Female	Father of the child does not live with you, but supports you or the child	Western Cape	isiXhosa	Secondary school	-	1	0.4 months
34	Female	Married	Eastern Cape	isiXhosa	Secondary school	-	3	13-18 months
31	Female	Single mother	Western Cape	isiXhosa	Secondary school	Grade 11	2	10-12 months
26	Female	Single mother	Western Cape	isiXhosa	Secondary school	Grade 12	2	19 months-6 years
23	Female	Single mother	Eastern Cape	isiXhosa	Secondary school	Grade 12	1	5-9 months
26	Female	Single mother	Western Cape	isiXhosa	Secondary school	Grade 10	1	5-9 months
33	Female	Single mother	Eastern Cape	isiXhosa	Secondary school	Grade 12	2	5-9 months
25	Female	Single mother	Eastern Cape	isiXhosa	Secondary school	-	1	13-18 months
25	Female	Single mother	Western Cape	isiXhosa	Secondary school	-	1	0-4 months

5.3.3.2.2 Acceptability of vaccine program and services at the clinic

The importance of immunisation

As with parents/guardians who participated in study one, most parents/guardians who were involved in the evaluation focus groups thought that immunisation was important:

> *I…think that child immunisation is important… because immunisation protects children from diseases. If your child is sick and she wasn't vaccinated, they* [nurses] *first check her* [the child's] *card to see if she got all the vaccines. It is very important. I always make sure that I don't miss any date* **(KP4)**.

Similarly, most parents/guardians stated that they felt it was important to protect their child from diseases (mainly referencing measles or polio), and to keep them healthy.

Parents/guardians and staff interaction

In comparison to study one, many parents/guardians had quite positive comments about how the clinic staff treated them, and mentioned that they had noticed improvements:

> *There's a difference, since there's one consultant, which is the nurse who vaccinates the children. Because we used to go in* [to the immunisation room] *and she would be busy with her phone. Now that there's a new nurse, things are different. We would wait for five to six minutes whilst she was busy with her phone. Now the nurse comes and does their work* **(KP1)**.

The same parent/guardian also mentioned that they thought the facility manager was more visible and willing to help when there were misunderstandings with nurses:

> *Before when you had a problem with the staff, the clinic manager wouldn't be available. But now you can find her and she helps you same time when you report the nurse. Sometimes there are misunderstandings, the nurse might not be happy if you skip the date when the child is supposed to come and the other one might say 'no go back to the seat* [waiting area], *I'm expecting people who are supposed to come on today's date* [clients with appointments rather than walk-ins]*', and you try to explain yourself. They* [the nurses] *don't want to understand, because she wants things to go accordingly, so the manager can solve that, and she's always available. In the past few months it was hard to get hold of the manager. They would say the manager is away on a meeting, but recently she's always available* **(KP1)**.

In general, parents/guardians did not seem to have a problem with their interaction with staff: "*I haven't experienced any problem when I come for vaccination, the nurses are nice and friendly. You are free when you are with them and you can ask whatever you want"* **(KP4)**.

Waiting times

Waiting times were still highlighted as a problem by parents/guardians, with some mentioning that even if they have an appointment, this did not necessarily reduce the waiting time:

> *I think the appointment system doesn't help, because you make an appointment for 9 o'clock, then when you come, they don't help during that time at 9 o'clock. You just come here and the nurse who does vaccination will not be available. The appointment system doesn't work* **(TTP1)**.

Many parents/guardians mentioned; however, that there had been improvements in reducing waiting times: *"We no longer spend a lot of time here. We used to leave here at 3 o'clock"* **(KP3)**, with some crediting this improvement to the appointment system:

> *I think the reason for doing the appointment* [system] *is because people used to spend a lot of time* [in the clinic]. *The note on the door says if 3 hours passes without getting any help, go back to the window* [reception area where the clerk sits], *but we used to go back to the window and we would not get any help. The appointment helps a lot because the clinic will not be full; we don't come here at the same time. If you come for* [a] *vaccination appointment, you don't queue with the children who are sick, it's different. You weigh your child, and vaccinate, and leave. You don't stay long like we used to before* **(KP1)**.

This perceived improvement in waiting times seemed to validate the survey findings where over half of the parents/guardians surveyed felt that waiting times had reduced.

5.3.3.2.3 Immunisation strategy and program

Effectiveness of services

Data quality: Parents/guardians mentioned that there were still some issues regarding missing files, and being told to come back to the clinic on another day:

> *I came here for 6* [month immunisation], *and they told me they can't find my child's file. They told me to go back* [home], *and I came* [to the clinic] *yesterday, and they said they can't find it. Then I was told to come today again. It's very wrong for my child to miss vaccination* **(NP3)**.

However, many parents/guardians said that they had noticed changes that seemed to make the clinic more accessible:

> *I have noticed the changes in appointment*[s]. *It makes things easier…When they* [the nurses] *are done helping you, you go to the reception and make an appointment for the next month, and you don't queue when you come for your appointment. You just tell them* [the clerks] *that you have an appointment, and*

you find your file ready at room five where they weigh the children. You just go to the room and weigh your child. Everything is easy now **(KP4)**.

Other parents/guardians also mentioned that there is a bit more follow-up on appointments: *"They remind you when you finish* [the immunisation session]. *They tell you when you should come again, and they give you a date…That's the reminder. Sometimes they call"* **(NP1)**.

5.3.3.2.4 Self-management

Parents'/guardians' knowledge about immunisation and clinic processes

Some parents/guardians were aware about the immunisation schedule but for many parents/guardians, immunisation visits were treated as a routine activity with limited understanding, i.e. parents/guardians came to the clinic because they knew they had to, with limited understanding: *"I don't know, I only know when they should get immunisation 9 months, 14 weeks. I just come. I don't know what the vaccination is for"* **(NP2)**. Another parent/guardian expressed the same sentiment and said that nurses did not explain to them why immunisations were necessary: *"I don't understand anything. I just come because I have to come. They don't tell us what kind of immunisation my child will be getting. Even at the hospital where I gave birth, they didn't tell us what is the injection for. They don't explain"* **(KP4)**. This was not a commonly held perspective; however, and was similar to what was found pre-intervention implementation where most parents/guardians had some knowledge but wanted a bit more information provided.

5.3.3.2.5 Links with community, other health services and resources

Awareness of non-profit organisations, or other health services

As with the study one, the majority of parents/guardians said that they were not referred to other services. This may have been because these parents/guardians did not require the additional services, therefore nurses did not refer parents/guardians to them but this seems unlikely. Quite a number of parents/guardians though, were aware of the outreach services: *"Most parents are working, so they give an option to take your child to the clinic or sign the*

form so that your child gets vaccinated at crèche or school. If you don't sign the form, they can't vaccinate your child" **(KP2)**. Another parent/guardian mentioned that there was a meeting/workshop held at their child's school:

> *They once called a parent's meeting at my child's school and there was a guy from Kuyasa clinic and a lady from Maphungwane* [Swaziland]. *They were asking us about how they treat us at the clinic. You know they write down if you have a complaint, so they were asking us how we feel about that. They were asking the same questions as yours. They didn't write down our names they just want to know how we are treated. They also asked us about the importance of vaccination and* [told us that] *if there's a vaccine that is available, you must take your child to the clinic…for vaccination* **(KP2)**.

This seemed to indicate that clinics had expanded their outreach activities, and were more engaged with parents/guardians following intervention implementation.

5.3.3.2.6 Quality improvement of program

Satisfaction with service provided

Post-intervention implementation there was an improvement in overall parents'/guardians' satisfaction with services provided at the clinics: *"I give them 100%"* **(KP2)**. Another parent said: *"I'm happy with child immunisation services because I haven't been told that there's no vaccination. I'm happy about their services and immunisation is very important until the age of 12 years"* **(TTP1)**. There was general satisfaction with the way nurses treated them; however, they mentioned that there was still a problem at reception regarding waiting times, and missing folders. There was also a parent/guardian who mentioned some problems she had when trying to bring up these issues with staff, and offered a suggestion:

> *I think there must be a separate room where you can go to lay a complaint about child immunisation. I think it would be better, don't go to the manager. Sometimes the manager will give you run around, and not help you, then you just end up leaving. It's like when you go to the manager, and complain about the queue. She'll just say the queue is none of her concern* **(TTP1)**.

Awareness of interventions that had been implemented

When parents/guardians asked about the specific interventions that were implemented, there was mostly positive feedback. The majority of parents/guardians who participated in focus groups were aware of the radio session, and could briefly mention what the sessions were about:

> *I listen to the radio a lot. All the diseases that affect children I heard about them from there. There are people who come there in the morning to* [do] *talks about such things, so that working parents can also know about them, because they don't get a chance to listen to the radio when they are at work* **(KP1)**.

Another parent/guardian said that it was a good way to promote awareness to those who may not have attended the clinic: *"They are useful because there are people who don't come to the clinic so it might encourage them to come to the clinic"* **(TTP5)**.

Some parents/guardians had heard immunisation health talks at the clinics and could describe the sessions, and mentioned that nurses or community care workers used materials to illustrate talks: *"She* [the nurse] *was talking about the importance of immunisation and what you must do if you are bringing your child for immunisation. She even showed us a chart talking about the effects of not immunising your child"* **(NP5)**. These parents/guardians were shown the health promotion materials implemented, with a number of parents/guardians reporting that they had seen the materials in the clinics.

The interventions were received well by parents/guardians, and they reported that the clinics should continue to run them. The only intervention that had limited impact with parents/guardians were the Immunisation Feedback Forms, with all of them reporting that they had not seen them before. Many clinics ran out of them and were unable to replenish supply and thus the forms were only distributed for a few months and the cohort of parents/guardians who participated in the focus groups had most likely not attended the clinic during that period.

5.3.4 Change in knowledge and attitudes of service providers

5.3.4.1 Qualitative findings

This section describes the qualitative findings from the service providers (i.e. community care workers, clinic staff, sub-district management, and radio staff) component of the evaluation study. The main themes that emerged from these focus groups were as follows:

1. Acceptability of vaccine program and services at the clinic: the importance of immunisation, parents'/guardians' concerns about immunisation, parents/guardians and staff interaction, and waiting times.
2. Immunisation strategy and program: the effectiveness of services.
3. Self-management: parents'/guardians' knowledge about immunisation.
4. Links with community, other services and resources: outreach services, relationship between community care workers and clinic staff.
5. Quality improvement of program: perceptions of interventions that had been implemented.

5.3.4.1.1 Acceptability of vaccine program and services at the clinic

Importance of immunisation

Most service providers thought that parents/guardians felt that immunisation was important for their child. Quite a few community care workers said that parents/guardians were 'concerned' about immunisation (in this context 'concerned' meant 'interested' for these community care workers):

> *They are concerned, because they get educated about how important is immunisation and then they are concerned that immunisation is very important. They have to immunise the child, because sometimes if you do not immunise the child then when your child is sick you will not know if the child is about that immunisation* [i.e. sick due to being infected with a vaccine-preventable disease] *or is just sick* [i.e. generally unwell]. *So, if you immunise your child then you know that no, this is not about immunisation… so they are really concerned now about that* **(NCCW2)**.

However, there were some that disagreed: *"…if they are defaulting it, they can think it is not necessary"* **(TTCCW4)**.

Parents'/guardians' concerns

Parents/guardians did not have concerns about the safety of vaccines and immunisation according to service providers. One community care worker said that this was because they educated parents/guardians about potential side effects, and made them feel more comfortable:

> *They are aware that if the child is not well or their temperature is going up, so they will be going back to the clinic again. So, they are aware of that there is a side effect. So, they are aware, because we usually talk about there is a side effect because each and every medication have a side effect* **(NCCW1)**.

Parents/guardians and staff interaction

Service providers indicated that their relationship with parents/guardians seemed to improve post-intervention implementation. Parents/guardians became familiar with the service providers, and were willing to go to them for help if needed:

> *The patients also they know us already by now, so if they have this problem and they see one of the CCW's* [community care workers]*, they will ask a question. So, by being in the community, they* [parents] *know already some have defaulted as they are scared to come to the clinic, then maybe she meets me there* [the clinic]*, then I will say 'oh, she missed the CCW's'. They* [clerks] *will say go to the TB room, and they* [parents] *will ask for me, then we can be able to help* **(TTCCW1)**.

Another service provider said that *"If the staff treat them well, they feel safe. If the staff treat them bad, they feel unsafe. If the staff is happy, the parents are also happy"* **(TTCCW5)**.

Waiting times

During the assessment study, most service providers acknowledged that waiting times were a problem but seemed to think that this was just something that parents/guardians needed to accommodate. Opinions were slightly different during the evaluation; however, with service providers being a bit more understanding of parents'/guardians' frustration: *"Sometimes they do not make appointments, then they have to wait for the whole day. Because the people are saying they did not make appointment, that means you must wait for the whole day. Some people would give up on that"* **(TTCCW1)**. Many service providers also said that the appointment system had improved waiting times: *"Going back to that question about*

appointments, everyone waits for a long time. That irritates them. Here at Town II, one can make an appointment and leave early. They do not take long, that's what makes them happy" **(TTCCW3)**. Another service provider said that parents/guardians no longer had to stay at the clinic the whole day because of the appointment system:

> *…because the people now are not staying at the clinic the whole day, just for a few minutes and finish…And because of that appointment, they will come to the clinic for immunisation…they do not want to sit there in front for the long time, so now they are given the time so they come maybe 2pm or 2:30pm… so there is a big difference* **(NCCW4)**.

It was clear that waiting times were still an issue and needed addressing; however, as compared to findings from the study one, there had been some improvement with more parents/guardians who were aware of the appointment system.

5.3.4.1.2 Immunisation strategy and program

Effectiveness of immunisation services

Service providers mentioned that there seemed to be an increase in the number of clients attending the service, and one community care worker said that clinic staff seemed more conscious of following up on clients:

> *On that side of the immunisation, I notice that there is a lot of queue, and I have noticed that they taking much care now because we as the CCW's are having a lot of recalls of the immunisations which we did not have much of that before* **(TTCCW1)**.

Another servicer provider said that the appointment system had made service delivery easier, and parents/guardians adhered to their designated times:

> *They stick to their time, to their schedule. Especially now, we introduced an appointment system with times, now they know, because they would be given dates in the past, to come on a certain date, they will come any time. But now we specifically say that between eight and nine, maybe four of them or five of them* [should come]. *They are based on blocks, they come in blocks. It's fair and it's nice. They know they can choose their time, which time they want, it is helpful for them* **(TTDFM)**.

Many staff once again brought up the issue of staff shortages, and the problems that this created. At Town II Clinic in particular, they had to change immunisation processes due to staff shortages:

> *Another thing that was lacking, there was no person in Room 17, immunisation room, because of the shortage of staff, we have to move a person from there to there. Then we decided to dismantle the* [separate] *immunisation* [room] *last year; every* [nurse needed] *to have cooler box in their rooms. We avoided a situation whereby a PN* [professional nurse] *would be seeing the sick child, and* [if] *the sick child is due for immunisation, they will send* [them] *back to immunisation room. Then now, we have said now, everyone* [nurses] *must do immunisation. Then that led to not have a specific person now that is doing immunisation. Then it hindered us a lot on our statistics, and the person who was looking after the fridge, after the immunisation, there would be a lot of shortages. So, we went back again, the person who was there, the* [immunisation nurse] *who is doing that… From September until March, there were three of them that are doing immunisation in their rooms, their respective rooms. We are trying to create a one stop shop kind of...now we are back to have a person who is doing just Well Baby and immunisation…at the beginning of April* **(TTDFM)**.

One community care worker thought that they had to do less recalls which to them indicated that the clinic staff was doing their job:

> *…recalls is not more than nowadays. There are home based carers working with nurses immunisations so now there is not a lot of recalls for the children, so which means they come in the clinic…Which means that the nurses are working and the assistant nurse are also working hard with the immunisation* **(KCCW1)**.

There was also more follow up with reminder phone calls in some cases: *"…other nurses, they phone the parent they say you must remember ... next week you must come with the child, maybe on* [the day] *before the date, and when the parent forget the date they also sometimes ...phone"* **(KCCW3)**. The Nolungile community care workers' role also seemed to have expanded to include other forms of follow up in addition to home visits that were already in place:

> *Now you* [the community care workers] *are given the opportunity to go to managers office and then you check on the list of the immunisation, and those who did not come to the clinic for immunisation then we phone them. Then if we do not get any phone number there then we note it down, then we give the mentor mother to go and find the client… So, we phone, we make a list of them, then we distribute to the mentor mothers, then they [mentor mothers] go and find those mothers and they recall them to the clinic* **(NCCW1)**.

Nolungile community care workers were also able to access PREHMIS to check which children were fully immunised, and who needed to be followed up on:

> *I think sometime last year or end of last year, we were introduced to the system, so those* [children] *who do not have* [immunisations, i.e. have missed appointments] *we call the mother. We just go in the system* [PREHMIS] *then we click there, show the numbers* [vaccine dose administered] *and then everything appears, and then we get* [i.e. see] *if the child is fully immunised or not* **(NCCW1)**.

It was mentioned by community care workers in the assessment study that they felt under-utilised, and at Nolungile clinic at least, it seems that dialogue had improved between clinic staff and community care workers to the point where more responsibility was given to community care workers.

While for the most part there had been improvements regarding effectiveness of services, a problem that community care workers still encountered was that the clerks were not keeping updated records of clients' contact details:

> *…what they* [the clinic] *can do better at least they can update the addresses* [of the parents] *every time. It is giving us a hard time, we as the CCWs because we must go to their homes and they are not there because they do not stay at that address…Going to their houses and then finding out that this person is not staying in this house so everybody is looking at you…so at least the clerks can update their system every time when the patient comes in if it is 6 months or 3 months* **(TTCCW3)**.

5.3.4.1.3 Self-management

Parents'/guardians' knowledge about immunisation

Many service providers said that they had noted improvement in parents'/guardians' knowledge, as well as more interest in general post-intervention implementation:

> *…now people know, they are even interested to know the routine. Most of the times in the past, they didn't know, it's six weeks, ten weeks, fourteen weeks, and they will just come there every month. Or sometimes they just don't come, because they didn't pay attention on the card. Now they are paying attention on the card, it's the routine, when is the follow up and when is the immunisation? It's there on the date, six weeks, nine months, and the importance of having their child immunised. I think now they are more aware* **(TTDFM)**.

5.3.4.1.4 Links with community, other services and resources

Outreach services

As in the study one, it was found that clinics did have outreach services in collaboration with the community care workers but there seemed to be much more engagement on the part of the community care workers in carrying out their tasks: *"CCW they educate about the immunisation when are we done course because we tell the parents more about immunisation, and it is important because parents do ask if there's something they don't understand about immunisation"* **(TTCCW3)**. There was also a closer relationship between community care workers and parents/guardians as they were assigned specific children to follow up on:

> *Some of us ... have maybe two children. They are referred to us from the hospital from birth, so we will look after that child until 6 months. So, we educate that mother, sometimes the mothers are so young. So many young mothers, so we give education to those mothers so that she can always bring the child to the clinic* **(KCCW2)**.

Relationship between community care workers and clinic staff

In the study one, it was found that there was some contention between community care workers and clinic staff. This improved post-intervention and some community care workers were happier about their job: *"We are not working only here [in the clinic] we are working in the community, this is our job and we are happy about that and here we are doing what we are doing in the community so we are happy about that"* **(NCCW1)**. However, there were a few community care workers who had some issues with the lack of cooperation from clinic staff while carrying out their role and wanted them to be more understanding, not only of them but of the parents/guardians:

> *…sometimes when we call people and when they get here, they are being shouted and all that and being turned away so they* [the nurses] *can at least cooperate with us. We are taking all our efforts to go and recall those people and then when you get there we are putting ourselves at risk because if the person is pushed out of the clinic…like they do not push them, but they will tell them you have to wait because you did not come, you defaulted, then the person will end up going home and then it is more risky for me that I am going to go and recall that person again…So they can at least cooperate with us and with the patients. Some are defaulting because they do not have food to eat, not all of them are defaulting for the wrong reasons* **(TTCCW2)**.

5.3.4.1.5 Quality improvement of program

Post-intervention, there did seem to be an increase in quality improvement activities at the clinic in addition to what was implemented. One community care worker mentioned noticing changes in the clinics after carrying out yearly evaluation surveys at the clinics: *"…the other thing that I noticed, there was a survey that was done… there is a lot of changes since that time after that survey…we are doing the yearly surveys for City of Cape Town to see how is the clinic operating"* **(TTCCW1)**. When asked about these surveys, it was found that the community care worker was actually referring to the Parent Immunisation Feedback forms that were implemented.

Community care workers were able to discuss all the changes implemented in the clinics during the 6-month period and reported that the main aim was to educate parents/guardians on the importance of immunisation:

> *…they are changing their appointments for the children and the times and date. It is the changing. We also educate them and give them the relevant information about how important is immunisation and the causes of if the mother does not come to the clinic so they are the causes of not immunisation of the children, and also show them those posters they have got different diseases then we show them* **(NCCW2)**.

Service providers also mentioned changes that they had made in Nolungile Clinic regarding waiting areas to improve the impact of health talks:

> *We were mixing sick babies and the immunisation babies* [in the waiting area], *but now we divided them. The sick babies went on the other side and then the immunisations. Then we can have the talks with only the immunisation babies. Because when they are mixed all together, they don't listen. So, at least they changed now…We started that in December* **(NIN2)**.

There was also greater commitment from service providers to improve services:

> *We've been having meetings and giving out ideas on how to improve our service, and taking care of our complaints. The clients used to complain that they are not being helped immediately. Now we help them according to the times that we're giving them, and then the service, it's been improved* **(NIN1)**.

One staff member also mentioned how she had made changes in the way she carried out her job: *"…now I explain every bit of step that I'm doing to their children. So, I do reassure more*

than I used to do, now that I've been involved in this study. I'm quite aware of many things now…And then I've been reading more stuff" **(NIN1)**. There seemed to be a lot more emphasis placed on quality improvement by service providers, and while one staff member made suggestions on how things could improve, they also talked about how the clinics should focus on the quality of the service provided, rather than on the quantity, i.e. reaching the targets set by the sub-district for number of clients seen for certain services:

> *Invest in more clerks. Try to send them maybe to training, sign language, give them more resources. Give* [the] *clinic more resources, don't limit them, give them more, don't pressurise them, but try to elevate them and encourage them so that we can be able to do our job peacefully. Let us not rush for numbers, let us not go for quantity…we must stop going for quantity…Because if we are doing everything with quality, I don't mind, for me if it's ten people a month, as long as we treat those people with a great quality, and then if next month it's 20. Because if you are going baby steps nicely, it will be easy for us to reach that 100 maybe they want. Yes, quality and understanding. If you can teach two or three a day it's fine by me than to teach 200, because if you teach less our information will be able to be transmitted nicely than to teach 300 people, you see. But with City* [City of Cape Town], *they must stop harassing, they need to cool down and let us do our job, supply us with greater resources so that we'll be able to put everything nicely done straight to the bed. That is my opinion* **(KC1)**.

Perceptions of interventions that had been implemented

As with the parents/guardians, service providers had mostly positive feedback about the interventions that were implemented. All service providers were aware of the radio sessions, and very receptive to them. Many mentioned that when they did home visits, parents/guardians or caregivers would mention that they heard about immunisation on the radio. These parents/guardians seemed quite knowledgeable, and were encouraged to find out if their child was up to date with their immunisations:

> **TTCCW1:** *Because sometimes when you visit a house and then you discuss any topic you know you see that that person is aware of that topic and then you ask him where do you get this information from the CCW's and the radio stations.*

> **TTCCW2:** *And some granny's when they hear about immunisation they come with a card and their grandchildren maybe the mothers have left the children then they want to find out because I have heard on the radio, they were talking about this I want to see how far is the grandchild.*

There were others that said parents/guardians were encouraged to come to the clinics because of radio sessions:

> *…some of them* [the parents] *when I come* [to the clinic], *when they are coming they said 'I overheard from the radio' which means there is something that is important there, so they say 'I overhear from the radio that immunisation is very important that is why I came here'* **(NCCW2)**.

One staff member also said that radio sessions impacted their relationship with the crèches they did outreach with in a positive way:

> *Post the introduction of the radio slots, there was a few invites from the crèches. It was the first time we are getting those, reminding us, 'when are you coming, to give the [deworming] and immunise…Vitamin A and others?' So, it did work* **(TTDFM)**.

Another staff member said that parents'/guardians' knowledge improved, and highlighted the trust the community placed on the radio station: *"Yes, the parent…became more informed. They knew everything from that radio station and they are so good, but they know that no one will just give that information if it is not true, on the radio"* **(KFM)**. Radio sessions were valued as a tool to reach more people with the same information that service providers were providing at the clinics:

> *They are very important because they are spreading the message that we are spreading, and they assist us you see, because the media is all over, so the media goes to where we cannot… The person that you cannot reach…And even those who do not want to come to the clinic, if you are there, you are listening the radio then they get the message you see* **(NCCW1)**.

One service provider also appreciated the sessions as a way to improve services based on the feedback received from parents/guardians who called in to the radio station:

> *That was amazing, they are so amazing because we used to get a good feedback of the kinds of things but we also used to get the bad feedback. Which is, it's very important for us to get the bad feedback, that's where we're going to try to raise our socks up. And for me it's better when I get a bad feedback than a good feedback so that I will try to raise the bar, yes. So those radio sessions were just amazing* **(KC1)**.

Another community care worker mentioned how excited they were that parents/guardians seemed to respond well to the sessions, and participated by calling the station with questions:

> *I think they are very informative. I remember one day we were listening also. We were so excited because the people were calling in, and people were encouraged and they were happy with the services that we are rendering in the clinic and the way we treat them. They didn't complain. There were a lot of them asking questions also, which were answered by the nurses. So, I think it's quite interesting. I think when they are having the radio, they are not just talking to the people in this area only. They are talking about the community at large, so at least we can reach each and every home, wherever there is a radio, then we can reach them. So, I think it's good* **(NC1)**.

Many service providers talked about how they thought the session benefitted the community, and affected the clinic positively: *"Oh, they benefitted the community, and the clinic. They* [parents] *been* [were] *aware* [of radio sessions] *because our numbers went up. Because they come with information from the radio"* **(KFM)**. In support of this, majority of service providers thought that the clinics should continue to present the radio sessions as a means to educate the community, and provide information that the community can then share with each other:

> *I'd love to get the clinic to get more slots on the radio. I think it's faster to get to them because some, they are listening, and some they are listening with people who have got at least a little bit of an idea and one can educate. And the older ladies who are listening to radio they are listening to the radio the whole day. Our parents are listening to the radio the whole day, they are not going anywhere because they are old, they are no longer working…So it's better if you give people like that information through radio so that they can teach our sisters how to maintain and, you know, how to look after kids* **(KC1)**.

Especially in Nolungile clinic, there seemed to be a more enthusiastic and participatory environment when it came to radio sessions. Staff seemed to genuinely enjoy being a part of them:

> *…it was a nice feeling to have the staff from this facility going to the radio, you know, the clients feel so good because they know this person who speaks on the radio. You know, on that Tuesday, on the Tuesday that she's going to do the talks,* [the nurse] *was standing there* [in the waiting area] *and telling them* [the parents] *that 'I'll be doing the talk on the radio, you must listen'. And, you know, the others are coming with their earphones in case they are still here by that time, they would listen. And at some point, we had one of our clients, she opened the radio and then she puts on the mic, and that way everybody would listen when she talks. So, it made us feel so great. And there was a time when we also had compliments from the community that Nolungile is one of the best clinics when it comes to immunisation. So, it makes us feel so good. This programme has been, I don't want to lie, I liked it, you know, for the radio and the appointment system, because we wouldn't have started with the appointment system if we did not have this opportunity* **(NFM)**.

The intervention seemed to encourage service providers and boost their confidence in providing information to the community. As a result, there was more of an awareness of how education and services could be improved. The radio station staff were also very positive about the radio session presented by the nurses. They noted that while there was a lot of health information presented on their station, immunisation seemed to be overlooked, and sessions were therefore considered to be valuable:

> *…most of our clients, we have NGOs that are dealing with the other diseases like your HIV, TB, cancer and other ones, but immunisation it's very rare to find organisations that are dealing with that. So, it was really helpful for our people, and we know that in black communities some parents may not take it seriously, that they have to take their kids for immunisation to the clinics of which there are a lot of clinics around Khayelitsha. So, they need to know that information which is going to be helpful for their kids so their kids may also be not be exposed to some illnesses and stuff like that. So, we would really love to have you back* **(RS1)**.

They also thought it would be a good idea to expand the radio sessions to other clinics from different areas, as while they were based in Khayelitsha, their listeners were from all over Cape Town:

> *I think also this idea of rotation from different clinics can help, also from other places, not only Khayelitsha. Because the questions that they used to ask whereby these nurse that they used to come here they were not able to tackle other issues because they are not working there* **(RS2)**.

Service providers were overwhelmingly supportive of the radio sessions; however, there were a minority, particularly from one clinic that did not agree, and thought it was beyond their role:

> *…some of them, I have been talking to some of them, they don't see it as their role, to go to the radio. They think that their role for professionals is to come to the clinic and give information, not to go in public. Obviously, that is wrong. So that is their view, that I have gathered from there. So, they feel like there should be somebody who is doing that. Maybe it is their role, maybe it's not. I think it deviates for them, so they must get prepared. I think that adrenaline to go on the radio in public, from work and then go back to work, maybe that's one of the reasons that they think this* **(TTDFM)**.

It was also noticed that staff from this clinic were not as engaged with radio sessions and unwilling to do them as compared to staff from other clinics:

> *Our staff were not 100% involved. I think by choice, because people were invited, all of them could only go, for example. So, they just wanted to disengage*

> *by choice. So, I think* [the nurse] *…she did it, not by her heart. She was just doing it because she has to. But she was preparing before [the session]. I could feel, she was complaining, all the time when I was taking her, 'oh, this radio, oh, I have got this radio', it looked like, as compared to others, just from other clinics who were very enthusiastic about the radio slot. They would even remind the managers. But for us, we were the ones that were supposed to remind all the time. Remember, Tuesdays, Tuesday, all the time. So, they were not involved. I think personalities, I don't think it has to do with radio per se, or the programme or the topic. It has to do with staff themselves willing to deliver the mandate. You know, people are always looking for incentives, anything, but it's part of their jobs to educate the public. So that is the feeling* **(TTDFM)**.

The community care worker mentioned that immunisation health talks were a big component of their role:

> *The CCW they do a big job, because every morning they make a topics, talks around the clinic whilst the people are waiting there then we educate them…and when we are standing there in front of them you speak about any topic, they communicate with you, they ask you a lot of questions* **(TTCCW1)**.

They also said that these health talks were a good way for parents/guardians to overcome the stigma of HIV, and get to know each other while being informed about immunisation:

> *Because people ask questions, they want to know and at the same time... she knows [more] now… And I think they know even on the stigma as well, because when they standing there they do not talk to each other about their sicknesses, but the minute you stand there they are getting a chance to ask, and then they know each other more that is giving them a chance to know each other so it is working on the stigma as well* **(TTCCW2)**.

Compared to parents'/guardians' attitudes pre-intervention implementation, service providers felt they were more engaged with health talks, and took more of an interest in ensuring the people they knew had immunised their child as well:

> *They ask the question, and then we answer those questions, and they are useful, because if your neighbour is here, or know that there is a child that are not immunised, they are used to talk to us to visit those people for those child who are not updated with their immunisation. So, it is useful, it is useful because if we stand in front of the people then they are reminded that 'oh the child is not, did you see the child ever since she or he is born come to the clinic?'. Even the seniors, they are the seniors that hear the information, so they go back to their homes with that information that are given at the clinic* **(NCCW1)**.

There were positive responses to the health promotion materials from all service providers, and they said that they had seen parents/guardians with them in the clinics: *"I have seen this, I*

remember they were there by the security and each and every parent was taking from there, and to their road to health cards there are others that are stapled on their cards" **(TTCCW4)**.

Service providers mentioned that they tried to distribute them to all mothers who were coming to the clinic to provide them with more information:

> *We did provide more pamphlet so that each and every mother who is going out of this clinic, we give them this so that they have got the information, and I think on that pamphlets there is the sign and symptoms that shows if the child has defaulted on that immunisation, this could happen to the child. So, I think it is, the parents are getting more information from that* **(NCCW2)**.

Another service provider thought that the materials were an ideal way to present information to parents/guardians:

> *I think that is a good thing. And those in colour. Sometimes* [parents] *are lazy to read if it just a black and white. So, because there were nicely printed in colour and they've got the pictures as well, so they were well presented. Even if you don't like to read, but the colour will draw you to just watch and read. And the information inside there was very good and it was simple and anyone can understand. So, whoever did it, did it very well. Didn't use big names, they* [can't] *say 'oh, I don't understand because it is a big'…They* [designer of materials] *used simple English, so I think they were well presented* **(KFM).**

While the staff checklists, and Parent Immunisation Feedback Forms did not seem to have been utilised effectively at the clinics, most of the service providers thought that they were a good idea and that the clinics should keep using them:

> *I think we must get more immunisation forms, because today there are those parents and the forms then tomorrow is another one so they must all get everyday so that we know the statistics…it is where we get the information that the mothers knows that the importance of immunise the child so it is a research…That is where we know that they are well informed about this immunisation, that is when they have signed those forms we know, we also give them chance to answer questions* **(NCCW1)**.

Some also thought that if parents/guardians were given feedback forms that day, services were more efficient:

> **TTCCW3:** *If there's a survey being* [done] *the sisters don't take long, everything goes accordingly. If you are going to see a sister for sugar diabetes you spend 15 minutes. You leave early*
> **TTCCW1:** *…it is good because it is like a link between a clinic and the person so whoever is doing the survey will take it to the facility manager, and when there is this survey the clinic is going very quick with these forms, so it is good.*

Clinics used the parent feedback forms slightly different from how they were originally intended, i.e. as a way for parents/guardians to provide feedback independently with facilitation by community care workers if necessary. Town II Clinic, and Nolungile Clinic; however, used them more of checklists at each stage of the immunisation process:

> *The CCW's will stand there by the door, that is how they use it, when the parent is coming in the parent will sign and take the form and go do the rounds like take it to the sister, and the sister, if she is done that* [completed the immunisation session, and completed the form], *and she* [the nurse] *signs, and when she* [the parent] *had come back* [to the waiting area to see the CCW] *with that comment at the bottom, then you will ask the client how does she feel, that is where you will know* **(TTCCW2)**.

Kuyasa used the checklists differently to the other two clinics. Rather than using the community care workers as facilitators, they used the nurses, and parents/guardians were given the forms in the immunisation room:

> *Because the, our* [community care worker] *is not like a nurse. They were at the nurse supposed to do the immunisation. The parent will wait in the waiting area, have the talks and stuff, so when the parent comes to the nurse for immunisation that is when she was given the* [form]*…That information, I think, is too much for her* [the community care worker]*. So, it was ideal for the nurse to…Yes, the nurse gave the mother the form, yes. And then the mother was answering the questions…Because the mother has heard the talk already in the waiting area, from me, from any PN* [professional nurse] *and then...* [have a] *better view. So, when she comes to the nurse's room, she should be able to answer the question and the nurse will either, if she feels she doesn't know, she doesn't know then just for us to say you need to put a* [cross or 'x'] *on this document* **(KFM)**.

Some service providers thought the checklists were very useful as it allowed them not only to evaluate the service but also let them know which areas they should focus their attention to improve things:

> *I think it was a good thing so that you can have feedback of what we are doing. Initially, when they* [the parents] *were asked do you know, the site, do you know the injection and stuff, they didn't know and I found that, 'okay, this is the area where I should put emphasis on with the education'. So that, okay, these few that are saying no, they didn't know, the others at least will have an idea. And those feedbacks, even, they help us to know where we should focus our talks…it was one of our tools to evaluate this* [information] *that we are giving out, does it sink well or need to put more… you know, emphasis on that certain topic. Yes, so I think it a good thing to evaluate. Because whatever we are doing there should be evaluation* **(KFM)**.

One service provider; however, acknowledged that the checklists were not used to their full

capacity as they were not mandatory for parents/guardians to use them, and there was not always someone to facilitate them:

> *They were not utilised effectively. I think that it's not mandatory, from the officers, you have to do it, people don't take it seriously. I think that is the main reason. Or if there is no one that is monitoring it, that is making sure you tick, please, you return the forms* **(TTDFM)**.

Two other service providers had negative opinions about the checklists. **TTN1** said the checklists were a lot of work for the staff, and that some clients could not read them (either in English or isiXhosa), that they were time-consuming and prolonged the stay of the client as staff had to help the clients by interpreting and writing for them. Because of this, they thought the clinics should not continue using them. Another service provider also thought they delayed services, and seemed to see them as part of the research project only, not as an intervention that could aim to improve quality: *"our nurses should not have been focussed on the research project, their focus should have been services delivery"* **(PHCM)**.

Findings from the focus groups and interviews with service providers showed that as with the parents/guardians, the immunisation program remained an important component of clinic services. Much improvement in parents/guardians-staff interaction, and quality of services was seen both as reported by service users as well as service providers. Interventions were quite positively received and both service users and service providers seemed keen for them to continue in the clinics.

5.4 Discussion

The evaluation described in this chapter aimed to determine how effective the implemented interventions were in improving service delivery and vaccine delivery at the clinics, and what the perspectives of both service users and service providers were regarding these interventions.

Following intervention implementation, there was some improvement in accessibility of services with more parents/guardians being aware of the appointment system, and fast-tracked 9-month immunisations at all clinics. Parents/guardians indicated that these two systems had made things easier for them, and that they felt that waiting times had been reduced, which is consistent with findings from a study completed in Cape Town that assessed changes in waiting times and factors that may have influenced reduction [117]. Parents'/guardians' attitudes towards vaccines and immunisation remained highly positive, and there was a significant improvement in parent/guardian-staff interaction and engagement, particularly in perceptions of staff friendliness and helpfulness. There was some improvement seen in parents'/guardians' awareness of clinic linkages with other services, the majority of parents/guardians still mentioned that they were not being referred to these services. Overall, interventions were well received by both parents/guardians and service providers, who thought that the clinics should continue with them. They seemed to have had a positive impact on the improvement on parents'/guardians' knowledge about immunisation, and the significant increase in parents'/guardians' satisfaction with immunisation services provided at the clinic. Service providers also seemed to have a much greater commitment to improving immunisation services through greater follow-up on missed appointments, increased outreach services, and collaboration between clinic staff and community care workers.

There was no major difference seen in vaccine doses administered at the clinics post-intervention. However, it is difficult to attribute these limited changes directly to intervention implementation as clinics have a major problem with data collection and quality. From what

was observed in the clinics, data issues were consistent with those reported in earlier studies completed in South Africa, such as clinic staff not having sufficient time to collect and record data in addition to their daily tasks, duplication of data in multiple formats (paper and electronic), limited training, and the lack of sufficient electronic medical records beyond the data collection system PREHMIS [80, 81]. Therefore, it is highly likely that the recorded number of vaccine doses administered at the clinic was inaccurate. There was quite high staff turnover during the entire study period which also affected the clinics' ability to prioritise vaccine data collection, as new staff required training, and staff were shifted between different departments. As mentioned, clinics do have an electronic data collection system but this was not utilised effectively due to the use of other paper-based data recording as an initial stage of data collection which is then transferred to PREHMIS creating a lag in data recording in the central database. Interventions to improve data quality were beyond the scope of this study; however, what is needed is a single method of data collection, solely through the use of electronic systems, and eliminate paper-based records which cause data duplication and inaccuracies (further discussed in Chapter 6). Another factor that could account for the limited change seen in vaccine doses administered was that interventions that specifically addressed clinic service delivery barriers were not implemented as they were only suggested by one cohort during the information collections phases of the study.

The parent/guardian cohort in the evaluation study was representative of the sub-district of Khayelitsha, with demographic data comparable to the most recent South African census data. Demographics were also very similar to those of the study one cohort. Half of the residents had migrated from the Eastern Cape were a relatively young population mostly below 30 years of age and there were a high number of single mothers with one child [16]. Parents'/guardians' perspectives did not change substantially regarding the importance of immunisation post-intervention as they remained mostly favourable with almost no vaccine hesitancy or vaccine

concerns detected. However, parent/guardian-staff engagement, accessibility of services and parents'/guardians' satisfaction all improved post-intervention.

Service providers appeared to become more aware of the impact of clinic services, more engaged with finding ways to improve clinic services, more understanding of parents/guardians and enthusiastic about the interventions that were implemented. Pre-intervention, service providers reported that waiting times were inevitable, that parents/guardians needed to be patient and educated about why they needed to wait. However, post-intervention they acknowledged long wait times were a problem that they were actively trying to solve. Furthermore, the clinics appeared to improve dialogue with community care workers to find out how best they could work together to improve immunisation services. Pre-intervention, community care workers reported feeling under-utilised and thought that they could they could do more in the clinic. Post-intervention, at Nolungile Clinic in particular, community care workers' role seemed to have expanded to being able to access the electronic database PREHMIS to see records of children who had missed appointments so they could complete phone recalls in addition to their home visits, health education in the clinics, and facilitation of the parent feedback forms. The capacity building of community care workers which resulted from their increased role at the clinic was a key aspect that led to an improved rapport not only with the clinics they were working in but also with parents/guardians. As they were more involved and had greater responsibility, they were more committed to improving services, and this had an impact on how successful quality improvement was. This was consistent with other studies in low-and-middle income settings where community health workers had involvement in community education, health promotion, and acted as a link between the clinic and the community; resulting in sustainable improvements in health outcomes and behaviours [46, 109, 110].

In general, Nolungile Clinic seemed the most engaged with the study overall, and most invested in the interventions as compared to the other clinics. The radio sessions were the intervention that had most impact, both on service users, and service providers. Parents/guardians mentioned that they had heard the nurse on the radio, and therefore came to the clinic. It also seemed to encourage parents/guardians and other caregivers to ask nurses for more information about immunisation. Service providers seemed very enthusiastic about this intervention and felt that they had a positive influence on parents'/guardians' knowledge, awareness, and engagement with the clinic, i.e. utilisation of clinic services. These findings are consistent with previous studies that have evaluated the effectiveness of radio campaigns on improving health services and health outcomes in low- and middle-income countries. While most of these studies attempted to determine if radio campaigns were able to reduce child mortality, generally it was found that radio was able to improve a wide range of health behaviours, for example 'episodic behaviours' like immunisation, and utilisation of health services [118-120]. This study additionally found that radio sessions seemed to improve dialogue between parents/guardians and service providers, not only through the question and answer component of the radio session but in clinics where parents/guardians felt more comfortable to ask nurses for information as they had heard them on the radio.

Health talks were also positively received with many parents/guardians saying that they had heard them while they were at the clinics. Service providers also seemed very committed to providing health education about immunisation to parents/guardians. The collaboration between the nurses and the community care workers in providing these sessions had a positive impact on parents/guardians as not only did they seem more informed but they were more familiar with service providers, and felt more comfortable to ask questions. Service providers also said that parents/guardians got to know each other better and acted as health advocates to their community. These parents/guardians would share information, and also let community care workers know if there were families in their area who may not have been reached, and

possibly needed to be encouraged to come to the clinics. Studies have shown that health education, or knowledge translation interventions can have positive impact on immunisation outcomes as well as on parents'/guardians' knowledge [46, 47, 121]. It was also found that community based education interventions could be more effective than health facility based education [122]. While it is difficult to say if this intervention improved immunisation outcomes such as number of vaccines administered, it can be said that parents'/guardians' knowledge improved with more parents/guardians aware of why immunisation was important for their child, and what to expect post-immunisation. In addition to this, the combination of both a community based, and health facility based educational intervention led by community care workers taking the initiative to make every opportunity an educational opportunity during home visits, seemed to be key in improving the relationship between the clinics and the community. This emphasises the importance of effectively utilising community care workers to improve service delivery [46].

The health promotion materials that were implemented were not designed to be used as a standalone intervention but to complement the other interventions, and reinforce the information being provided. When utilised in this way: as a visual aid for health talks, a prompt to facilitate further discussion with service providers, and as reminders that were stapled to the child's Road to Health Booklet as some clinics were doing; this is when the materials seemed to have the most impact. Some service providers who distributed the postcards randomly to parents/guardians and therefore ran out very quickly, did not seem to see the benefit of the materials. This is consistent with other research where health promotion materials were shown to be well received, and may have had an impact on community engagement and knowledge in combination with other educational interventions [122-125].

Staff checklists and parent feedback forms were the most under-utilised intervention. Many parents/guardians who participated in the evaluation study had not seen the parent

immunisation forms but the majority of service providers still thought they were useful as a way to gauge where they should place emphasis on to improve education of parents/guardians. Some service providers also said that if the feedback forms were being distributed in the clinic for that day, services ran quicker. Staff checklists did not generally seem to have been used; however, both the staff checklist, and parent feedback forms were another intervention that evolved to suit the needs of the clinic as the health talks did. Rather than as solely a way for parents/guardians to provide feedback independently, parents/guardians were given feedback forms after entering the clinic by the community care workers who acted as facilitators, and nurses signed off on parent feedback forms as the parents/guardians went through the immunisation process to ensure that all the 'steps' were being done. It did seem that the parent feedback forms seemed to replace the usage of the staff checklists. Forms were somewhat used as staff planning tools for identifying areas of improvement, there was some accountability on the part of the service providers, and in addition, service providers said that parents/guardians seemed to appreciate the opportunity to provide feedback to the clinics. Not all service providers saw the benefit of the checklists; however, with two saying that they took too long, caused delays in parents'/guardians' clinic visit, and thought they were just 'for the research project' which detracted from the clinic duties. These findings slightly differed from those of the study completed in Myanmar that this intervention was based on, where the checklists were used as separate service provider, and user formats, found to be feasible in a low-resource setting, and there was quite a high participation rate [58].

Overall, despite the short implementation period, there was an improvement seen in community engagement and knowledge, and quality of care. Clinics also seemed to be more committed and mindful of improving the quality of immunisation services. There was no appreciable improvement in vaccine doses delivered in the three clinics but this was not unexpected given the major issues that existed with data quality which were beyond the scope of this study to explore.

6 Summary, Recommendations and Conclusion

6.1 Summary of findings

The overall aim of this study was to strengthen immunisation service delivery for children under 24 months at the clinic level in Khayelitsha, Western Cape. This was achieved through:

1. Development of an adaptable and flexible approach based on established systems assessment approaches to assess EPI vaccine delivery;
2. Identification of barriers to immunisation service delivery;
3. Development of interventions designed collaboratively with key stakeholders and clinic staff that targeted identified barriers; and
4. Evaluation of the effectiveness of intervention in improving immunisation service delivery.

The major barriers to service delivery that were found through the assessment study mainly related to clinic service delivery, community engagement and knowledge, and quality of service. This included major issues with data quality, including poor recording of vaccine activity by the clinics leading to inaccuracies in data, clinic statistics, and clinic vaccine targets. It was found that there were limited parent/guardian concerns about the necessity, safety or effectiveness of vaccines. Predominantly, parent/guardian concerns related to access or practical barriers to immunisation, and the convenience of services. A small proportion of parents/guardians had limited knowledge or awareness regarding the potential severity of vaccine-preventable diseases, and thought that children receive too many vaccines in the first two years of life. There were also issues with parents/guardians and staff interaction and clinic friendliness. These identified barriers affected parents'/guardians' opinion on how satisfied they were with clinic services despite being happy with medical service provided.

Interventions that addressed community engagement and knowledge, and quality of service (interventions that addressed clinic service delivery were not implemented as they were not

prioritised by all cohorts) were designed collaboratively with key stakeholders in a relatively short period (approximately 3 months). An additional positive outcome from this development and implementation period was the improved communication between the service providers of the three clinics.

Following implementation, there was an overall improvement in parents'/guardians' knowledge about immunisation, parent/guardian-staff interaction, and satisfaction with services provided, despite the interventions only being in place for 4-6 months before evaluation. Importantly, there was also increased staff awareness of the need to improve immunisation services. Interventions received a positive response from both service users and service providers, apart from the parent and provider clinic checklists which poses questions about long term sustainability of such interventions and the need for long term buy in from clinic staff regarding service delivery and improvement. It was clear that the level of engagement service providers had with each other, and their commitment to improving immunisation services had the biggest impact on whether interventions were successful. Despite improvements in these areas of community engagement and knowledge, and quality of service, the interventions had limited measurable impact on vaccine activity (i.e. number of vaccine doses administered). This lack of change in vaccine activity; however, was most likely due to substantial issues with data collection in the clinics, and that no interventions that specifically addressed clinic service delivery barriers were implemented at the clinics.

6.2 Strengths of the approach

This study described a holistic approach to immunisation systems strengthening which combined both assessment and implementation of interventions that directly related to the findings of assessment. The approach combined elements from a number of different systems strengthening approaches, policy and evaluation frameworks, and assessment tools such as the (1) WHO 'building blocks' approach, (2) WHO Global routine immunisation strategies and

practices approach, (3) WHO Tailoring immunisation programmes to reach underserved groups (TIP) approach, (4) implementation research and development science, (5) a Canadian analytical framework for immunisation programs, (6) One21seventy Systems Assessment Tool, (7) EquiFrame, and (8) experience based co-design (EBCD) [28, 30, 31, 38, 41-43, 86, 89, 126-128]. These approaches were adapted to be applied at the clinic level in a way that was flexible, context-specific, accounted for the perspectives of all relevant local stakeholders including service users, and collaboratively addressed identified barriers.

While the TIP approach was not used to inform this study, it has the most similar methodology, and assumes that intervention development will progress naturally from the assessment phase and does not include an evaluation component [33-37]. A strength of this study was that it described a clear process for intervention development and implementation, as well as a process for evaluation. Additionally, the current study was completed in approximately 18 months and included all three study phases (assessment, intervention implementation, and evaluation) which was much shorter than similar studies using the TIP approach [33-37].

Another strength of this study was the participation of staff, community care workers and parents/guardians in the co-design process used to develop clinic-led, relevant and targeted interventions that were well received by all cohorts. What this study shows is that once clinics are aware of where the barriers to service delivery are, and are engaged with the process of developing interventions to address these barriers, they become more invested in providing a good quality service, and improvements can be seen that are highly achievable at the clinic level. As in two other studies carried out in South Africa that utilised either EBCD or a participatory framework in chronic or mental health contexts, this study showed engagement of staff in ongoing quality improvement, greater understanding between service providers and users, and capacity building of those involved [89, 90]. The partnerships that were developed between different stakeholders including individuals from the Western Cape Department of

Health, the City of Cape Town, the WHO, clinics, and third-party suppliers (such as the radio station and the graphic designer) were also a benefit of the approach. Overall, the study was not high cost, and could be scaled down to be used by senior immunisation staff as a routine monitoring and evaluation process.

6.3 Limitations of the approach

Limitations of the study were that, even though there was a relatively short study period, it was still difficult to maintain high engagement of the service providers throughout the study. While the aim was for the interventions to be primarily clinic-driven to ensure they were acceptable and sustainable, there was a need for interventions to be somewhat researcher-driven.

Another limitation of this study was the use of the number of vaccine doses administered at clinics as an indicator of vaccine uptake rather than vaccine coverage rates. This was due to the difficulties of determining an accurate denominator for the clinic catchment area due to a highly fluid and transitory population [79]. There were also major vaccine data issues at the clinics which included the data collection process, as well as data quality that were consistent with issues identified in previous studies [80, 81]. This made estimation of vaccine activity at the clinics extremely difficult as the data were most likely highly inaccurate. Addressing these data problems; however, was beyond the scope of this project.

Also, as the parent/guardian cohort was recruited from within the clinics, results may not have captured all of parental determinants for non-vaccination as while these parents/guardians identified barriers to immunisation delivery, they were still willing to bring their child to the clinics for immunisation whether timely or not.There were also other external factors that had an impact on the study. Throughout the duration of the study, there was high staff turnover which not only affected clinic services but also affected the study process, as not all staff who were involved in the assessment study were still at the clinics during the time of the evaluation study. This made determining the change in service provider opinions difficult, as some had

not been in the clinic long enough to make a judgement. It was also a problem during the intervention development and implementation period, as new staff were not fully informed about the study by clinic management. The clinics were also under-resourced with periodic vaccine stockouts occurring, and there was limited funding for any other activity beyond basic clinic duties (no funding for promotional materials, basic printing etc.).

There were additional environmental challenges such as safety in Khayelitsha which affected service providers who may have needed to go to dangerous areas to follow-up on clients, and parents/guardians who lived in the area. During the evaluation period, staff mentioned that there were periodic clinic break-ins where computers and medication were stolen which affected services. There was also a period were the primary researcher and the interviewers were unable to go to the clinics due to violent strikes that occurred. During the study period, Cape Town was also experiencing a severe water shortage with water restrictions in place which may have had an effect on clinic services.

6.4 Refining the approach for future application and recommendations

The approach used in this study was novel as there was a rigorous local assessment process followed by tailored interventions which aimed to improve immunisation service delivery. The large participatory component in intervention development was key in designing interventions that were context-specific, and appropriate. In relation to the key findings of this study, the following recommendations are made for further research to improve immunisation service delivery at the clinic level.

1. Within South Africa ongoing assessment and evaluation of immunisation services in Khayelitsha is needed and can be facilitated using the approach undertaken in this study. It was found during the intervention development and implementation component of the study that a ‘project champion’ was needed to ensure improvement

and commitment to the project, provide support to the clinics to ensure sustainability. This was in line with findings of previous research that found that local stakeholders such as community care workers, and other service providers need to take greater responsibility in order for projects to be sustainable long-term [109-111]. As discussed in Chapter 4, the 'project champion' would ideally take responsibility for overall funding, development and implementation of interventions, as well as monitoring and evaluation of immunisation service delivery. This 'project champion' would be a newly created role within either the clinic, or the sub-district Health Department, and could be expanded to an 'implementation team' integrated into standard clinic or sub-district policy and practice whose role would be to periodically assess the clinics in their designated area, develop and implement interventions, and evaluate effectivity. The current sub-district health promoter would fit under this team. For this approach to be successful, there would need to be buy-in from the City of Cape Town Department of Health, the Provincial Department of Health, as well as the Provincial EPI Manager in order for appropriate funding to be allocated, and a commitment to ongoing monitoring, evaluation, and improvement of immunisation services. This approach could also be expanded to include other clinic services in addition to immunisation services such as HIV/TB care.

2. Broader use in other low-and-middle-income (LMIC) settings similar to the urban immunisation toolkit developed by UNICEF [129] to identify and address the needs of an urban population that may not be accessing immunisation services. The methods from this study could be modified and developed into a simplified 'toolkit' that would assist clinics or implementation teams to use the approach to improve immunisation service delivery or other preventative, chronic, or mental health services in other regions in South Africa or other LMIC settings. The general approach would be scaled down as compared to that used in this study (as illustrated in **Figure 6.1**). The primary

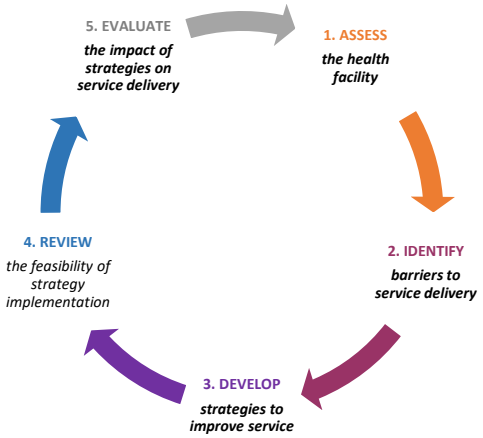
assessment tools could include a short survey for service users and providers to ascertain the barriers and enablers to immunisation service delivery, supplemented by a focus group with service users and providers if needed. A short period of observation of clinic activity would be recommended to triangulate the approach. The data could then be used to design interventions appropriate to the setting with all key stakeholders, and implemented quickly. Guidance on how to conduct a short, targeted evaluation to inform ongoing strategies would also be provided. If the assessment/evaluation occurred periodically, the barriers would be easier to identify, and an intensive intervention development process may not be necessary. The working groups could be scaled down and consist of the implementation team and a representative of the targeted clinic. Interventions appropriate to the scope and budget of the clinic that do not require external funding could be developed, in order to ensure the process is sustainable and feasible for the clinics. A number of potential interventions were suggested in this study which varied in how much development was required for implementation. However, in some cases, it may be possible to make minor modifications to interventions that are already in place, such as through better usage of the road to health booklet [130], or integration of SMS reminders and additional immunisation health promotion messages with the MomConnect mHealth system [131].

3. New technology to improve data quality and immunisation service delivery need to be further explored. This was not a focus of the present study but it is recognised that there is an urgent need to improve data quality to more accurately determine immunisation coverage rates. Future research may include the use of blockchain technology to improve not only data quality but also service delivery. A blockchain is a secure, decentralised, peer-to-peer database that was originally developed for storing financial transactions but has many applications to healthcare. Many studies that utilise the technology relate to the sharing of clinical data or medical records between clinicians,

institutes, and patients [132-134]. Studies that use the technology in immunisation are still in testing phases and are mainly to do with vaccine supply chain, and reducing fraud and waste [135]. In the context of health systems strengthening and improving immunisation outcomes, blockchain could be used to improve the data collection process, and eliminate duplication of data through the use of a shared network that would be visible at request to all relevant stakeholders (individual clinics, sub-district, provincial, and national health departments) rather than a centralised database where data are routinely uploaded on a monthly basis. This would allow for real-time data quality checking, and transparency of data. Blockchain could also supplement the approach used in this study by creating a peer-to-peer repository of identified barriers in specific settings, protocols for the design and implementation of interventions to address specific barriers, as well as assessment and evaluation tools. This information would be sourced from multiple researchers, organisations, or institutes, and would essentially provide guidelines for an entire assessment, intervention development, and evaluation process that could then be accessed and adapted to suit the needs of the targeted area.

6.5 Concluding Remarks

This project was intended to reflect the current reality of immunisation service users and service providers at the clinic level in Khayelitsha, Western Cape. Through the development of the approach used in this study, the aim was to improve engagement between clinic staff and parents/guardians so that there was a mutual commitment to strengthen immunisation services in the community. Finally, it is hoped that this study could be used as a 'whole-of-system' approach that would contribute to and inform further research by not only improving immunisation service delivery but other health services in the Western Cape, and other under-resourced settings.



ASSESS the health facility	IDENTIFY barriers to service delivery	DEVELOP strategies to improve service	REVIEW the feasibility of strategy implementation	EVALUATE the impact of strategy on service delivery
Clinic data assessment ***Clinic process observation*** ***Focus groups and surveys***			***For each potential strategy:***	***Clinic data assessment*** ***Clinic process observation*** ***Focus groups and surveys***
Components that will be assessed:				*Components that will be assessed:*
▪ **Immunisation strategy and program** *Clearly outlined strategy and consistent description of processes?*			*Does the facility have sufficient provincial/sub-district support to implement the strategy?*	**Immunisation strategy and program**
Information systems and decision support ▪ *Suitable information systems in place for patient management?* ▪ *Adherence to evidence-based guidelines to inform decisions?*				**Information systems and decision support**
▪ **Self-management** *Promote and support self-management for clients, i.e.* processes in place that assist and support parents/guardians in maintaining their/their child's health, and parental knowledge?			*Does the facility have the financial resources to support the strategy?*	**Self-management**
Links with community, other health services and resources ▪ *Allow for communication and cooperation with other health centres, community-based organisations and programs?*	***Based on the outcome of assessment***	***Based on identified barriers***		**Links with community, other health services and resources**
▪ **Feasibility of program** *Program implementation feasible given existing resources and external influences?*			*Does the facility have sufficient staff to support the strategy?*	**Feasibility of program**
▪ **Quality improvement of program** *Aspects of the program monitored and evaluated to improve the quality of service delivery?*				**Quality improvement of program**
▪ **Acceptability of vaccine program** *High level of demand or acceptability exist for the immunisation program?*			*Does the facility have the necessary additional resources to implement the strategy?*	**Acceptability of vaccine program**
				Effectiveness of individual strategies implemented

Figure 6.1. Summary of the approach used in this study

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Appendix 1: Assessment tools

Pilot Interview Guide – Micro-hypothesis generation

Clinic Staff

Melbourne School of Population & Global Health
Faculty of Medicine, Dentistry & Health Sciences

Project: ***Strengthening clinic level immunisation service delivery in Western Cape Province, South Africa***

PARTICIPANTS: Clerks, Nurses, Pharmacists, Facility Managers

INTERVIEW DURATION: 30-40 minutes

The purpose of this interview is to gather information to better understand:

- the attitudes and knowledge that managers and community health leaders have regarding service delivery of the EPI
- the strengths and challenges involved with providing this service to the community

DISCUSSION POINTS:

1. Tell me what you think about the immunisation program that is delivered at the clinic?
2. What makes it difficult or easy for parents to access the service?
3. What would you like to see changed in how the service is delivered at the clinic?
4. What has changed in the last 5 years in how families have accessed the clinic?
5. In terms of providing a good service for families, what things support you in doing this, and what barriers do you encounter?

Interview Guide

Clinic Staff

Melbourne School of Population & Global Health
Faculty of Medicine, Dentistry & Health Sciences

Project: ***Strengthening clinic level immunisation service delivery in Western Cape Province, South Africa***

PARTICIPANTS: Sub-district Health Managers, Health Facility Managers, Nurses, Clerks, and Pharmacists

INTERVIEW DURATION: 30-40 minutes

The purpose of this interview is to gather information to better understand:

- the attitudes and knowledge that managers and community health leaders have regarding service delivery of the EPI
- the strengths and challenges involved with providing this service to the community

THEMES:

- Knowledge ▲
- Attitudes ▲
- Access ▲
- Confidentiality ▲
- Integration of services ▲
- Effectiveness of services ▲
- Acceptability of services ▲
- Non-discrimination ▲

QUESTIONS:

Components of program	Elements for Discussion
Immunisation strategy and program ▲▲▲	**1.** Can you please tell me how the immunisation program delivered? 1. Who is involved in providing the service? How many people are involved? – includes support staff as well as vaccinator 2. When are immunisations offered? 3. Where are immunisations offered? i.e. are there outreach services? Are they offered at crèches/schools etc.? How are the outreach services structured? How does staff get there? How do you plan outreach services? What proportion of planned outreach does not happen and why? 4. Is anything else offered alongside the immunisation program? i.e. nutrition, vitamin A etc. 5. Have there been any differences in what has been planned in delivering the immunisation program and what has been carried out? 6. Tell me about the process a parent goes through when they bring their child to the clinic for immunisation?
Information systems and decision support ▲▲▲	**2.** What information systems does the clinic use to support patient management, service planning and delivery, and data collection? 1. How are children registered in the clinic? Are there any links with birth registration or is there any active effort to determine what births occur in the area? 2. How are children monitored and followed up on?

Self-management ▲▲	**3.** Do parents know about what immunisations their child needs to be given and when? How are parents made aware of this? **4.** How do you inform parent about stock-outs?
Links with community, other health services and resources ▲▲	**5.** How does the program communicate and cooperate with other health centres, community-based organisations, programs, and crèches? 1. What is the process for parents to be referred to these services if appropriate? **6.** Does the clinic provide any community-based health promotion or health education activities? If so, what does this involve? 1. Specific activities – posters, pamphlets etc., outreach activities to churches etc.
Feasibility of program ▲▲▲▲	**7.** What are the limitations in implementing the immunisation program at the clinic? 1. Are there barriers due to existing resources or external influences? 2. How do you ensure that vaccines are readily available and is that there a long-term supply? 3. Do you have sufficient resources to provide immunisation either at the clinic or during outreach services? - Safety boxes, equipment gloves Etc. 4. Is there sufficient funding for the immunisation program, and how is funding obtained? *To ask upper management only – Virginia de Azevedo, Shariefa Patel-Abrahams, and Bukelwa Mbalane*
Acceptability of vaccine program ▲▲▲▲▲	**8. How important do you think the immunisation program is compared to the other programs delivered in the centre?** **9. What do parents think of the immunisation program?** **1. Do you think they have concerns about vaccines and immunisation?** **2. Do you think parents have challenges in accessing the clinic?** **10. How do you ensure that parents are comfortable with the way they and their child are treated at the clinic?** **1. Non-discrimination on the basis of distinguishing characteristics (i.e. disability, age, ethnicity, proximity to services), respectful of ethical principles and culturally appropriate health service)** **11. How do you ensure parents are comfortable with their child being given multiple injections or the pain involved when immunising?** **12. What processes are in place for parents to provide feedback about the service provided at the clinic?**
Quality improvement of program ▲▲▲	**13.** How is the immunisation program monitored and evaluated to improve the quality of service delivery? How often does it occur? **14.** What training opportunities do staff have access to that are specific to delivery of the program, and addressing the health needs of their patients? 1. How often does this happen? 2. Was there any training for staff when the immunisation schedule changed? **15.** What changes have you seen in the immunisation program/clinic in the past five years? Why do you think that change has happened? 1. Have there been any campaigns? **16.** What do you think determines whether the immunisation program is of good quality? What things could be done better? **17.** How do you think the community could be involved in improving immunisation? **18.** How do you think health services as a whole could promote immunisation? 1. Cooperation between other parts of the clinic, youth clinic etc.

Focus Group Guide

Community Health Leaders

Melbourne School of Population & Global Health
Faculty of Medicine, Dentistry & Health Sciences

Project: ***Strengthening clinic level immunisation service delivery in Western Cape Province, South Africa***

PARTICIPANTS: Community Health Leaders
FOCUS GROUP DURATION: 45-60 minutes
The purpose of this focus group is to gather information to better understand:

- the attitudes and knowledge that nurses have regarding service delivery of the EPI
- the strengths and challenges involved with providing this service to the community

THEMES:

- Knowledge ▲
- Attitudes ▲
- Access ▲
- Confidentiality ▲
- Integration of services ▲
- Effectiveness of services ▲
- Acceptability of services ▲
- Non-discrimination ▲

QUESTIONS:

Components of program	Elements for Discussion
Acceptability of vaccine program ▲ ▲ ▲ ▲ ▲	**1.** How important do you think the immunisation program is compared to the other programs delivered in the centre? **2.** What do parents think of the immunisation program? 1. Do you think they have concerns about vaccines and immunisation? 2. Do you think parents have challenges in accessing the clinic? **3.** How do you ensure that parents are comfortable with the way they and their child are treated at the clinic? 1. Non-discrimination on the basis of distinguishing characteristics (i.e. disability, age, ethnicity, proximity to services), respectful of ethical principles and culturally appropriate health service)
Immunisation strategy and program ▲ ▲ ▲	**4.** Can you please tell me how the immunisation program delivered? 1. Who is involved in providing the service? How many people are involved? – includes support staff as well as vaccinator 2. When are immunisations offered? 3. Where are immunisations offered? i.e. are there outreach services? Are they offered at crèches/schools etc.? How are the outreach services structured? How does staff get there? How do you plan outreach services? What proportion of planned outreach does not happen and why? 4. Is anything else offered alongside the immunisation program? i.e. nutrition, vitamin A etc. **5.** Tell me about the process a parent goes through when they bring their child to the clinic for immunisation?

Information systems and decision support ▲▲▲	**6.** How does the clinic communicate with parents regarding immunisation services? 1. Phone calls, text messages, emails, mail etc.
Self-management ▲▲	**7.** Do parents know about what immunisations their child needs to be given and when? How are parents made aware of this?
Links with community, other health services and resources ▲▲	**8.** How does the program communicate and cooperate with other health centres, community-based organisations, programs, and crèches? 1. What is the process for parents to be referred to these services if appropriate? **9.** Does the clinic provide any community-based health promotion or health education activities? If so, what does this involve? 1. Specific activities – posters, pamphlets etc., outreach activities to churches etc.
Feasibility of program ▲▲▲▲	**10.** What are the limitations in implementing the immunisation program at the clinic? 1. Are there barriers due to existing resources or external influences?
Quality improvement of program ▲▲▲	**11.** What training opportunities do you have access to that are specific to delivery of the program, and addressing the health needs of your patients? 1. How often does this happen? **12.** What changes have you seen in the immunisation program/clinic in the past five years? Why do you think that change has happened? 1. Have there been any campaigns? **13.** What do you think determines whether the immunisation program is of good quality? What things could be done better? **14.** How do you think the community could be involved in improving immunisation? **15.** How do you think health services as a whole could promote immunisation? 1. Cooperation between other parts of the clinic, youth clinic etc.

Survey Guide

Parents/Guardians
Melbourne School of Population & Global Health
Faculty of Medicine, Dentistry & Health Sciences

Project: ***Strengthening clinic level immunisation service delivery in Western Cape Province, South Africa***

PARTICIPANTS: Parents/guardians of children aged under 24 months old
SURVEY DURATION: 15-20 minutes
The purpose of this survey is to gather information to better understand:

- the attitudes, beliefs and concerns of parents/guardians towards immunisation
- the strengths and challenges involved with parents/guardians accessing this service in the community

QUESTIONS:

Name of interviewer
Where this survey is being completed? • Nolungile • Kuyasa • Town II

Demographic information
What is your date of birth?
What is your gender? • Male • Female • Other: If other, please provide further details.
What is your marital status? • Single mother • Father of the child lives with you • Father of the child does not live with you, but supports you or the child • Widowed
What province were you born in?
What language(s) do you speak at home?
What is the highest level of school you attended? • Never attended school • Preschool • Primary school • Secondary school • University or further education
What is the highest grade/year you completed at that level?
What type of dwelling do you live in? • Brick house • Shack • Backyard dwelling • Other: If other, please provide details.
How many children and adults in total live with you?
How many children have you had?
How many children do you have that are living?
What is the date of birth of your youngest child?

Attitudes, knowledge and concerns about immunisation

1. What do you think about childhood vaccination?
   - Support
   - Oppose
   - Unsure
2. Below are a series of statements about how you feel about your child and vaccines. Please indicate your agreement or disagreement with each of these statements. (Options: Disagree, Unsure, Agree)
   - Vaccines are important for my child
   - I worry that vaccines will do my child more harm than good
   - It is difficult to get my child vaccinated
   - The current recommended vaccines and the times they are given is appropriate for my child
   - Vaccines are safe for my child
   - Vaccines are effective for my child
   - Vaccines are necessary to protect my child
   - The current recommended vaccines and the times they are given are designed by people who care about children's health
   - It is important for my child to be vaccinated in order to protect others in the community
   - Because other children are vaccinated, it isn't necessary to have my child vaccinated
   - My child's immune system is more sensitive than most
3. Below are some concerns about vaccinations that people sometimes report. Please indicate your agreement or disagreement with each of these statements. (Options: Disagree, Unsure, Agree)
   - Children's immune systems could be weakened by vaccines
   - Children get too many vaccines during the first 2 years of life
   - Vaccines contain ingredients that can cause serious harm
   - The pain of vaccine needles is too great for my child to bear
   - Vaccines are given to children to prevent diseases that are not serious
   - Vaccines are given to children to prevent diseases that are not common
   - It is better for children to get diseases rather than get protection from diseases through vaccines
   - Vaccines can cause social, behavioural or developmental problems
   - Vaccines can cause allergies
   - There are better ways to protect children against disease than vaccines
   - Serious side effects from vaccines are too common for me to accept
   - I do not have any concerns about immunising my child
4. How important do you think the immunisation program is?
   - Very important
   - Not important
   - Unsure
5. Are you comfortable with the way you and your child are treated at the health service?
   - Yes
   - No
   - Unsure
6. If yes, please check all reasons that apply:
   - Clinic staff are friendly
   - Clinic staff are helpful
   - I feel welcome at the clinic
   - I do not have concerns about my child's health information being kept private
   - I receive a clear explanation from clinic staff about my child's clinic visit
   - Other

   If other, please provide further details.
7. If no, why not? (check all reasons that apply)
   - Clinic staff are not friendly
   - Clinic staff are not helpful
   - I do not feel welcome at the clinic
   - I have concerns about my child's health information being kept private
   - I do not receive a clear explanation from clinic staff about my child's clinic visit
   - Other

   If other, please provide further details.
8. Do you feel that your child receives inadequate care because of discrimination?
   - Yes
   - No
   - Unsure

9. If yes, please check all responses that apply.
- Due to disability
- Due to my age
- Due to gender
- Due to ethnicity
- Due to religion
- Due to how far away I live from the clinic
- Other

If other, please provide further details.

10. Have clinic staff referred you to other community health services such as social services, the nutrition unit, or non-profit organisations?
- Yes
- No
- Unsure

11. If yes, please provide further details

12. Does the clinic provide you with opportunities to share and listen to other parents' experiences with the immunisation program?
- Yes
- No
- Unsure

13. If yes, please provide further details.

14. Does the clinic provide you with information about vaccines and immunisation services?
- Yes
- No
- Unsure

15. If yes, please check all responses that apply.
- Posters
- Pamphlets
- Outreach activities to the community
- The nurse provides me with information
- The community care workers provide me with information
- Other

If other, please provide further details.

16. I feel that I currently have enough knowledge to make good decisions about vaccinating my child.
- Agree
- Disagree
- Unsure

17. Which information sources would you use to gain knowledge about vaccines and immunisation services? (check all that apply)
- General practitioner(s)
- Clinic nurse(s)
- Traditional healer(s)
- Internet
- Department of Health website
- Media (TV, radio or magazines)
- Social media
- Groups opposed to vaccination
- Family and friends
- Other:
- None of the above

18. Do you feel that your child is able to easily access immunisation services at the clinic?
- Yes
- No
- Unsure

19. If no, why not? (check all that apply)
- Clinic is too far away
- Do not have transport to clinic
- I cannot afford to pay for transport to the clinic
- Immunisations are offered at the clinic during times that I cannot attend
- I have to wait too long in the clinic for my child to receive vaccinations
- Clinic staff are unfriendly or unhelpful
- I do not feel welcome at the clinic
- I do not know when I have to bring my child back to the clinic for vaccinations
- I have no time to come to the clinic

- I have to take a day off work to come to the clinic
- Other:

If other please provide further details.

20. Has the clinic ever contacted you to remind you of your child's appointment, or if your child is late for vaccinations?
- Yes
- No
- Unsure

21. How does the clinic communicate with you regarding immunisation services? (check all that apply)
- Phone call
- Text message
- Email
- Mail
- Community care worker visit
- Other:
- The clinic does not communicate with me

If other, please provide further details.

22. How would you prefer the clinic to communicate with you regarding immunisation services? (check all that apply)
- Phone call
- Text message
- Email
- Mail
- Community care worker visit
- Other:

If other, please provide further details.

23. Do you have a Road to Health booklet for your child?
- Yes
- No
- Unsure

24. Do you feel the service is delivered appropriately and effectively?
- Yes
- No
- Unsure

25. If yes, please further details.

26. If no, why not?

27. Do you feel that the clinic provides good quality service?
- Yes
- No
- Unsure

28. If yes, please further details.

29. If no, why not?

30. How satisfied are you with immunisation services provided at the clinic?
- Very satisfied
- Unsatisfied
- Unsure

31. Are you able to let the clinic know if you are not satisfied with the service provided?

32. If yes, please check all responses that apply:
- Complaints box
- Talk to nurse
- Talk to doctor
- Talk to facility manager
- Talk to receptionist
- Talk to Community Care Workers
- Other

If other, please provide further details.

Focus Group Guide

Parents/Guardians

Melbourne School of Population & Global Health
Faculty of Medicine, Dentistry & Health Sciences

Project: ***Strengthening clinic level immunisation service delivery in Western Cape Province, South Africa***

PARTICIPANTS: Parents/guardians of children aged 0-24 months old
FOCUS GROUP DURATION: 45-60 minutes
The purpose of this focus group is to gather information to better understand:

- the attitudes, beliefs and concerns of parents/guardians towards immunisation
- the strengths and challenges involved with parents/guardians accessing this service in the community

THEMES:

- Knowledge ▲
- Attitudes ▲
- Beliefs ▲
- Concerns ▲
- Access ▲
- Confidentiality ▲
- Integration of services ▲
- Effectiveness of services ▲
- Acceptability of services ▲
- Non-discrimination ▲

DISCUSSION POINTS:

Components of program	Elements for Discussion
Acceptability of vaccine program	**1.** What do you think about childhood vaccination? 1. Why do you bring your child for vaccination? 2. Do you worry that vaccination can harm your child? **2.** How important do you think the immunisation program is compared to the other programs delivered in the centre? **3.** Are you comfortable with the way you and your child are treated at the clinic? 1. Non-discrimination on the basis of distinguishing characteristics (i.e. disability, age, ethnicity, proximity to services), respectful of ethical principles and culturally appropriate health service
Immunisation strategy and program	**4.** What have been your experiences when attending the clinic for immunisation? 1. Interaction with any clinic staff, how follow-up occurs etc. 2. Tell me about the steps you go through from receiving the Road to Health booklet at the hospital to getting your child vaccinated at the clinic **5.** What challenges do you have in accessing immunisation services at the clinic?
Information systems and decision support	**6.** How does the clinic communicate with you regarding immunisation services? 1. Phone calls, text messages, emails, mail etc. **7.** Do you have concerns about your child's health information being kept private?
Self-management	**8.** Do you have records of your child's immunisations? Are you aware of what immunisations your child needs and when? How do you check? **9.** Have you ever been to the clinic and been told there is a vaccine stock-out? What did you do? How did you feel?
Links with community, other health services and resources	**10.** Do you know of any community health services or health education activities provided by the clinic? 1. Does the clinic refer you to other services if necessary? 2. Have you heard anyone in the community talk about immunisation? 3. Have you seen posters or pamphlets about immunisation at the clinic, or outside the clinic?
Feasibility of program	**11.** What do you think the limitations or challenges are when accessing immunisation services?
Quality improvement of program	**12.** How satisfied are you with immunisation services provided at the clinic? 1. How do you let the clinic know if you are not satisfied with the service provided? **13.** What do you think a good quality immunisation program looks like? What things could be done better? **14.** How do you think the community could be involved in improving immunisation?

Appendix 2: Training materials used for interviewers

Survey/Focus Group Protocol

Survey

Data collected at 3 clinics: Nolungile, Town II, Kuyasa

Total number of surveys to be completed: 300-500

Approximately 100-167 surveys per clinic

You will spend 5 days (Monday to Friday) at each clinic: 4 hours per day (8am-12pm)

Recruiting participants

Introduction:

> "Hi, my name is _____, I'm from the Khusela Immunisation Study. We are trying to find out what parents and guardians think about vaccines and immunisations provided at clinics so that we can understand what works well and what could be improved for parents immunising their children. Would you like to participate in this study?"

Go through the Plain Language Statement with the parent

Go through Consent Form with parent

→ Start survey using REDCap Mobile App

Focus Group

Data collected at 3 clinics: Nolungile, Town II, Kuyasa

Total number of focus groups to be completed: 3

1 focus group per clinic

5-8 participants per focus group

Recruiting participants

Introduction:

> "Hi, my name is _____, I'm from the Khusela Immunisation Study. We are trying to find out what parents and guardians think about vaccines and immunisations provided at clinics so that we can understand what works well and what could be improved for parents immunising their children. Would you like to participate in this study?"

Go through the Plain Language Statement with the parent

Go through Consent Form with parent

After the parent has agreed to participate, direct them to the area the focus group will take place

→ Start focus group using slides when all participants have been recruited and are in the designated area

Explain the purpose of the focus group

Go through the ground rules

Hand out the demographic information questionnaires to participants to fill out and give back to you

Start focus group questions

Appendix 3: Evaluation tools

Evaluation Interview Guide

Managers, Nurses, Clerks, Pharmacists

Melbourne School of Population & Global Health

Faculty of Medicine, Dentistry & Health Science

Project:* *Strengthening clinic level immunisation service delivery in Western Cape Province, South Africa

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PARTICIPANTS: Sub-district Health Managers, Health Facility Managers, Nurses, Clerks, and Pharmacists

INTERVIEW DURATION: 30-40 minutes

The purpose of this interview is to gather information to better understand:

- the changes in attitudes and knowledge that managers and community health leaders have regarding service delivery of the EPI
- the strengths and challenges involved with providing this service to the community

THEMES:

- Knowledge ▲
- Attitudes ▲
- Access ▲
- Confidentiality ▲
- Integration of services ▲
- Effectiveness of services ▲
- Acceptability of services ▲
- Non-discrimination ▲

QUESTIONS:

Screening questions:

1. How long have you worked at the clinic?

If staff have not worked at the clinic over the last 6 months, do not ask questions relating to change over the last 6 months

STAFF THAT HAVE WORKED AT THE CLINIC FOR LONGER THAN 6 MONTHS

Components of program	Elements for Discussion
Immunisation strategy and program ▲▲▲	**1.** What changes have you noticed in immunisation service, or clinic services in the past 6 months? **2.** Which change do you think is the most significant? **3.** Why did you choose that change? **4.** How do you think that change happened, what steps led to the that change?
Information systems and decision support ▲▲▲	**5.** Have there been any changes in how children are monitored and followed up on? • How do you think that change happened, what steps led to the that change?
Self-management ▲▲	**6.** Do parents know about what immunisations their child needs to be given and when? 1. Have there been any changes in how parents are made aware of this in the last 6 months? 2. How do you think that change happened, what steps led to the that change?
Links with community, other health services and resources ▲▲	**7.** Have there been any changes in how the program communicates and cooperates with other clinics, community-based organisations, programs, and crèches in the last 6 months? 1. What is the process for parents to be referred to these services if appropriate? **8.** What do you think about the weekly radio sessions? 1. Are parents aware of these radio sessions? 2. What topics were discussed? 3. Did you think they were useful? ▪ Why or why not? 4. Have you seen any changes in parent knowledge due to these sessions? 5. What changes were made to how the radio sessions were delivered in the last 6 months? 6. Do you think the clinic should continue presenting these radio sessions? **9.** Have there been any changes in how health talks about immunisation are delivered at the clinic in the last 6 months? 1. What topics were discussed? 2. Did you think these health talks were useful? ▪ Why or why not? 3. Have parents been more engaged in these sessions? Have they asked questions? Do you think their knowledge has improved? 4. Do you think the clinic should continue presenting these health talks?

	10. What do you think about the posters and pamphlets about immunisation in the clinic? 1. Did you think these posters or pamphlets were useful? ▪ Why or why not? 2. How are the pamphlets used in the clinic? 3. Do you think the clinic should continue using these posters and pamphlets? **11.** What do you think about the staff immunisation checklists and parent feedback forms? 1. Did you think these checklists/forms were useful? 2. How are they used in the clinic? 3. Do you think the clinic should continue using these checklists/forms?
Feasibility of program ▲▲▲▲	**12.** What are the limitations in implementing the immunisation program at the clinic?
Acceptability of vaccine program ▲▲▲▲▲	**13.** Have parents' opinion about the immunisation program changed in the last 6 months? 1. Do you think they have concerns about vaccines and immunisation? 2. Do you think parents have challenges in accessing the clinic? 3. How do you think that change happened, what steps led to the that change? **14.** Have there been any changes in how you ensure that parents are comfortable with the way they and their child are treated at the clinic in the last 6 months? 1. Non-discrimination on the basis of distinguishing characteristics (i.e. disability, age, ethnicity, proximity to services), respectful of ethical principles and culturally appropriate health service) **15.** Have there been any changes in what processes are in place for parents to provide feedback about the service provided at the clinic?
Quality improvement of program ▲▲▲	**16.** Has the way the immunisation program is monitored and evaluated to improve the quality of service delivery changed in the last 6 months? How often does it occur? • How do you think that change happened, what steps led to the that change? **17.** Have any other strategies/interventions been implemented in the clinic in addition to the radio session, health talks, promotion materials, and checklist in the last 6 months? **18.** What do you think could be done better?

NEW STAFF THAT HAVE WORKED AT THE CLINIC FOR LESS THAN 6 MONTHS

Components of program	Elements for Discussion
Immunisation strategy and program ▲▲▲	**1.** Can you please tell me how the immunisation program delivered? • Who is involved in providing the service? How many people are involved? – includes support staff as well as vaccinator • When are immunisations offered? • Where are immunisations offered? i.e. are there outreach services? Are they offered at crèches/schools etc.? How are the outreach services structured? How does staff get there? How do you plan outreach services? What proportion of planned outreach does not happen and why? • Is anything else offered alongside the immunisation program? i.e. nutrition, vitamin A etc. **2.** Have there been any differences in what has been planned in delivering the immunisation program and what has been carried out? **3.** Tell me about the process a parent goes through when they bring their child to the clinic for immunisation?
Information systems and decision support ▲▲▲	**4.** How are children monitored and followed up on?
Self-management ▲▲	**5.** Do parents know about what immunisations their child needs to be given and when?
Links with community, other health services and resources ▲▲	**6.** How does the program communicate and cooperate with other clinics, community-based organisations, programs, and crèches? • What is the process for parents to be referred to these services if appropriate? **7.** What do you think about the weekly radio sessions? • Are parents aware of these radio sessions? • What topics were discussed? • Did you think they were useful? ▪ Why or why not? • Have you seen any changes in parent knowledge due to these sessions? • What changes were made to how the radio sessions were delivered in the last 6 months? • Do you think the clinic should continue presenting these radio sessions? **8.** How are health talks about immunisation delivered at the clinic? • What topics were discussed? • Did you think these health talks were useful? ▪ Why or why not? • Have parents been more engaged in these sessions? Have they asked questions? Do you think their knowledge has improved? • Do you think the clinic should continue presenting these health talks? **9.** What do you think about the posters and pamphlets about immunisation in the clinic? • Did you think these posters or pamphlets were useful? ▪ Why or why not? • How are the pamphlets used in the clinic? • Do you think the clinic should continue using these posters and pamphlets?

	10. What do you think about the staff immunisation checklists and parent feedback forms? • Did you think these checklists/forms were useful? • How are they used in the clinic? • Do you think the clinic should continue using these checklists/forms?
Feasibility of program 	**11.** What are the limitations in implementing the immunisation program at the clinic?
Acceptability of vaccine program 	**12.** What do parents think about the immunisation program? • Do you think they have concerns about vaccines and immunisation? • Do you think parents have challenges in accessing the clinic? **13.** How do you ensure that parents are comfortable with the way they and their child are treated at the clinic? • Non-discrimination on the basis of distinguishing characteristics (i.e. disability, age, ethnicity, proximity to services), respectful of ethical principles and culturally appropriate health service) **14.** What processes are in place for parents to provide feedback about the service provided at the clinic?
Quality improvement of program 	**15.** How is the immunisation program monitored and evaluated to improve the quality of service delivery? How often does it occur? **16.** What strategies/interventions been implemented in the clinic in addition to the radio session, health talks, promotion materials, and checklist? **17.** What do you think could be done better?

PHARMACISTS THAT HAVE WORKED AT THE CLINIC FOR LONGER THAN 6 MONTHS

Components of program	Elements for Discussion
Immunisation strategy and program 	**1.** What changes have you noticed in immunisation service, or clinic services in the past 6 months? **2.** Which change do you think is the most significant? **3.** Why did you choose that change? **4.** How do you think that change happened, what steps led to the that change?
Information systems and decision support 	**5.** Have there been any changes in how vaccines are ordered? • How do you think that change happened, what steps led to the that change?
Links with community, other health services and resources 	**6.** Have there been any changes in how the pharmacy department communicates and cooperates with other clinics, community-based organisations, programs etc. in the last 6 months? **7.** Have you heard anything about immunisation on the radio? 1. What did you think about these radio sessions? 2. What topics were discussed? 3. Did you think these radio sessions were useful? ▪ Why or why not? ▪ What further information would you want? 4. Do you think the clinic should continue presenting these radio sessions? **8.** Have there been any changes in how health talks about immunisation are delivered at the clinic in the last 6 months? 1. What topics were discussed? 2. Did you think these health talks were useful? ▪ Why or why not? 3. Do you think the clinic should continue presenting these health talks? **9.** Have you seen any posters or pamphlets about immunisation in the clinic? 5. What were they about? 6. Did you think these posters or pamphlets were useful? ▪ Why or why not? ▪ What further information would you want? 7. Do you think the clinic should continue using these posters and pamphlets? **10.** Have you seen the Immunisation Program Feedback forms in the clinic? 8. Did you think these forms were useful? ▪ Why or why not? 1. Do you think the clinic should continue using these forms?
Feasibility of program 	**11.** What are the limitations in implementing the immunisation program at the clinic from the perspective of the pharmacy department?
Acceptability of vaccine program 	**12.** Do you think parents' opinion about the immunisation program has changed in the last 6 months? 1. Do you think they have concerns about vaccines and immunisation? 2. Do you think parents have challenges in accessing the clinic? 3. How do you think that change happened, what steps led to the that change? **13.** Have there been any changes in what processes are in place for parents to provide feedback about the service provided at the clinic?

Quality improvement of program ▲▲▲	**14.** From the perspective of the pharmacy department, has the way the immunisation program is monitored and evaluated to improve the quality of service delivery changed in the last 6 months? Has the role of your department changed? How often does it occur? • How do you think that change happened, what steps led to the that change? **15.** Have any other strategies/interventions been implemented in the clinic in addition to the radio session, health talks, promotion materials, and checklist in the last 6 months? **16.** What do you think could be done better?

NEW PHARMACISTS THAT HAVE WORKED AT THE CLINIC FOR LESS THAN 6 MONTHS

Components of program	Elements for Discussion
Immunisation strategy and program ▲▲▲	**18.** What is the pharmacy department's role in how the immunisation program is delivered? **19.** Have there been any differences in what has been planned in delivering the immunisation program and what has been carried out?
Information systems and decision support ▲▲▲	**20.** How are vaccines ordered?
Links with community, other health services and resources ▲▲	**21.** How does the pharmacy department communicate and cooperate with other clinics, community-based organisations, programs? **17.** Have you heard anything about immunisation on the radio? 9. What did you think about these radio sessions? 10. What topics were discussed? 11. Did you think these radio sessions were useful? ▪ Why or why not? ▪ What further information would you want? 12. Do you think the clinic should continue presenting these radio sessions? **22.** How are health talks about immunisation delivered at the clinic? • What topics were discussed? • Did you think these health talks were useful? ▪ Why or why not? • Do you think the clinic should continue presenting these health talks? **18.** Have you seen any posters or pamphlets about immunisation in the clinic? 13. What were they about? 14. Did you think these posters or pamphlets were useful? ▪ Why or why not? ▪ What further information would you want? 15. Do you think the clinic should continue using these posters and pamphlets? **19.** Have you seen the Immunisation Program Feedback forms in the clinic? 16. Did you think these forms were useful? ▪ Why or why not? • Do you think the clinic should continue using these forms?
Feasibility of program ▲▲▲▲	**23.** What are the limitations in implementing the immunisation program at the clinic from the perspective of the pharmacy department?

Acceptability of vaccine program ▲▲▲▲▲	**24.** What do parents think about the immunisation program? • Do you think they have concerns about vaccines and immunisation? • Do you think parents have challenges in accessing the clinic? **25.** What processes are in place for parents to provide feedback about the service provided at the clinic?
Quality improvement of program ▲▲▲	**26.** From the perspective of the pharmacy department, how is the immunisation program monitored and evaluated to improve the quality of service delivery? What is the role of your department in this process? How often does it occur? **27.** What strategies/interventions been implemented in the clinic in addition to the radio session, health talks, promotion materials, and checklist? **28.** What do you think could be done better?

Evaluation Focus Group Guide

Community Health Leaders

Melbourne School of Population & Global Health

Faculty of Medicine, Dentistry & Health Science

Project: ***Strengthening clinic level immunisation service delivery in Western Cape Province, South Africa***

PARTICIPANTS: Community Health Leaders

FOCUS GROUP DURATION: 45-60 minutes

The purpose of this focus group is to gather information to better understand:

- the changes in attitudes and knowledge that nurses have regarding service delivery of the EPI
- the strengths and challenges involved with providing this service to the community

THEMES:

- Knowledge ▲
- Attitudes ▲
- Access ▲
- Confidentiality ▲
- Integration of services ▲
- Effectiveness of services ▲
- Acceptability of services ▲
- Non-discrimination ▲

QUESTIONS:

Screening questions:

2. How long have you worked at the clinic?

If CCWs have not worked at the clinic over the last 6 months, do not ask questions relating to change over the last 6 months

CCWS THAT HAVE WORKED AT THE CLINIC FOR LONGER THAN 6 MONTHS

Components of program	Elements for Discussion
Immunisation strategy and program ▲▲▲	**1.** What changes have you noticed in immunisation service, or clinic services in the past 6 months? **2.** Which change do you think is the most significant? **3.** Why did you choose that change? **4.** How do you think that change happened, what steps led to the that change?
Acceptability of vaccine program ▲▲▲▲▲	**5.** Have parents' opinion about the immunisation program changed in the last 6 months? 1. Do you think they have concerns about vaccines and immunisation? 2. Do you think parents have challenges in accessing the clinic? 3. How do you think that change happened, what steps led to the that change? **6.** Have there been any changes in how you ensure that parents are comfortable with the way they and their child are treated at the clinic in the last 6 months? 1. Non-discrimination on the basis of distinguishing characteristics (i.e. disability, age, ethnicity, proximity to services), respectful of ethical principles and culturally appropriate health service)
Information systems and decision support ▲▲▲	**7.** Have there been any changes in how the clinic communicates with parents regarding immunisation services?
Self-management ▲▲	**8.** Do parents know about what immunisations their child needs to be given and when? 1. Have there been any changes in how parents made aware of this in the last 6 months? 2. How do you think that change happened, what steps led to the that change?
Links with community, other health services and resources ▲▲	**9.** Have there been any changes in how the program communicates and cooperates with other health centres, community-based organisations, programs, and crèches in the last 6 months? 1. What is the process for parents to be referred to these services if appropriate? **10.** Have you heard anything about immunisation on the radio? 1. Are parents aware of these radio sessions? 2. What did you think about these radio sessions? 3. What topics were discussed? 4. Did you think they were useful? ▪ Why or why not? ▪ What further information do you think should be presented? 5. Have you seen any changes in parent knowledge due to these sessions?

	6. Do you think the clinic should continue presenting these radio sessions? **11.** Have there been any changes in how health talks about immunisation in the clinic are delivered at the clinic in the last 6 months? 1. What topics were discussed? 2. Did you think these health talks were useful? ▪ Why or why not? ▪ What further information do you think should be presented? 3. Have parents been more engaged in these sessions? Have they asked questions? Do you think their knowledge has improved? 4. What could be done differently? 5. Do you think the clinic should continue presenting these health talks? **12.** Have you seen any posters or pamphlets about immunisation in the clinic? 1. What were they about? 2. Did you think these posters or pamphlets were useful? ▪ Why or why not? ▪ What further information would you want? 3. How are the pamphlets used in the clinic? 4. Do you think the clinic should continue using these posters and pamphlets? **13.** What do you think about the Immunisation Program Feedback forms? 1. Did you think these forms were useful? ▪ Why or why not? 2. How are they used in the clinic? 3. Do you think the clinic should continue using these forms?
Feasibility of program ▲▲▲▲	**14.** What are the limitations in implementing the immunisation program at the clinic?
Quality improvement of program ▲▲▲	**15.** What do you think could be done better?

CCWS THAT HAVE WORKED AT THE CLINIC FOR LESS THAN 6 MONTHS

Components of program	Elements for Discussion
Immunisation strategy and program ▲▲▲	**1.** Can you please tell me how the immunisation program delivered? **2.** Tell me about the process a parent goes through when they bring their child to the clinic for immunisation?
Acceptability of vaccine program ▲▲▲▲▲	**3.** What do parents think about the immunisation program? • Do you think they have concerns about vaccines and immunisation? • Do you think parents have challenges in accessing the clinic? **4.** How you ensure that parents are comfortable with the way they and their child are treated at the clinic in the last 6 months? • Non-discrimination on the basis of distinguishing characteristics (i.e. disability, age, ethnicity, proximity to services), respectful of ethical principles and culturally appropriate health service)

Information systems and decision support 	**5.** How does the clinic communicate with parents regarding immunisation services?
Self-management 	**6.** Do parents know about what immunisations their child needs to be given and when?
Links with community, other health services and resources 	**7.** How does the program communicate and cooperate with other health centres, community-based organisations, programs, and crèches? • What is the process for parents to be referred to these services if appropriate? **8.** Have you heard anything about immunisation on the radio? • Are parents aware of these radio sessions? • What did you think about these radio sessions? • What topics were discussed? • Did you think they were useful? ▪ Why or why not? ▪ What further information do you think should be presented? • Have you seen any changes in parent knowledge due to these sessions? • Do you think the clinic should continue presenting these radio sessions? **9.** How are health talks about immunisation delivered at the clinic? • What topics were discussed? • Did you think these health talks were useful? ▪ Why or why not? ▪ What further information do you think should be presented? • Have parents been more engaged in these sessions? Have they asked questions? Do you think their knowledge has improved? • What could be done differently? • Do you think the clinic should continue presenting these health talks? **10.** Have you seen any posters or pamphlets about immunisation in the clinic? • What were they about? • Did you think these posters or pamphlets were useful? ▪ Why or why not? ▪ What further information would you want? • How are the pamphlets used in the clinic? • Do you think the clinic should continue using these posters and pamphlets? **11.** What do you think about the Immunisation Program Feedback forms? • Did you think these forms were useful? ▪ Why or why not? • How are they used in the clinic? • Do you think the clinic should continue using these forms?
Feasibility of program 	**12.** What are the limitations in implementing the immunisation program at the clinic?
Quality improvement of program 	**13.** What do you think could be done better?

Evaluation Survey Guide

Parents/Guardians

Melbourne School of Population & Global Health

Faculty of Medicine, Dentistry & Health Science

Project: ***Strengthening clinic level immunisation service delivery in Western Cape Province, South Africa***

PARTICIPANTS: Parents/guardians of children aged under 24 months old

SURVEY DURATION: 15-20 minutes

6-MONTH POST-IMPLEMENTATION QUESTIONS:

Name of interviewer
Where this survey is being completed? • Nolungile • Kuyasa • Town II

Attitudes, knowledge and concerns about immunisation
1. When was your child's most recent immunisation visit at the clinic? **2.** How many times have you taken your child to the clinic in the last 6 months? **3.** What do you think about childhood vaccination? • Support • Oppose • Unsure **4.** How important do you think the immunisation program is? • Very important • Not important • Unsure **5.** If not important, why not? **6.** If unsure, why? **7.** Are you comfortable with the way you and your child are treated at the health service? • Yes • No • Unsure **8.** If yes, please check all reasons that apply: • Clinic staff are friendly • Clinic staff are helpful • I feel welcome at the clinic • I receive a clear explanation from clinic staff about my child's clinic visit • Other If other, please provide further details. **9.** If no, why not? (check all reasons that apply) • Clinic staff are not friendly • Clinic staff are not helpful • I do not feel welcome at the clinic • I do not receive a clear explanation from clinic staff about my child's clinic visit • Other If other, please provide further details. **10.** If unsure, please provide further details. **11.** Have you seen any changes in the clinic in the last 6 months? • Yes • No • Unsure **12.** If yes, please provide further details.
13. Have clinic staff referred you to other community health services such as social services, the nutrition unit, or non-profit organisations? • Yes • No • Unsure **14.** Does the clinic provide you with opportunities to share and listen to other parents' experiences with the immunisation program? • Yes • No

- Unsure

15. Does the clinic provide you with information about vaccines and immunisation services?
- Yes
- No
- Unsure

16. If yes, please check all responses that apply.
- Posters
- Pamphlets
- Outreach activities to the community
- The nurse provides me with information during my clinic visit
- The community care workers provide me with information
- Other

If other, please provide further details.

17. Have you heard anything about immunisation on the radio?
- Yes
- No
- Unsure

18. If yes, did you think these radio sessions were useful?
- Yes
- No
- Unsure

19. If yes, why were they useful?
20. If no, why not?
21. If unsure, why?
22. Do you think the clinic should continue presenting these radio sessions?
- Yes
- No
- Unsure

23. Have you heard any health talks about immunisation in the clinic?
- Yes
- No
- Unsure

24. If yes, did you think these health talks were useful?
- Yes
- No
- Unsure

25. If yes, why were they useful?
26. If no, why not?
27. If unsure, please provide further information.
28. Do you think the clinic should continue presenting these health talks?
- Yes
- No
- Unsure

29. Have you seen any posters or pamphlets about immunisation in the clinic?
- Yes
- No
- Unsure

30. If yes, did you think these posters or pamphlets were useful?
- Yes
- No
- Unsure

31. If yes, why were they useful?
32. If no, why not?
33. If unsure, please provide further information.
34. Do you think the clinic should continue using these posters and pamphlets?
- Yes
- No
- Unsure

35. Have you seen the Immunisation Feedback Forms in the clinic?

- Yes
- No
- Unsure

36. If yes, did you think these forms were useful?
- Yes
- No
- Unsure

37. If yes, why were they useful?
38. If no, why not?
39. If unsure, please provide further information.
40. Do you think the clinic should continue using these forms?
- Yes
- No
- Unsure

41. I feel that I currently have enough knowledge to make good decisions about vaccinating my child.
- Agree
- Disagree
- Unsure

42. If disagree, what further information would you want?
43. If unsure, what further information would you want?

44. Has the clinic ever contacted you to remind you of your child's appointment, or if your child is late for vaccinations?
- Yes
- No
- Unsure

45. I feel that waiting times in the clinic have been reduced
- Agree
- Disagree
- Unsure

46. I feel that the service is delivered appropriately and effectively
- Agree
- Disagree
- Unsure

47. If agree, please provide further details.
48. If disagree, why not?
49. If unsure, please provide further details.

50. How satisfied are you with immunisation services provided at the clinic?
- Very satisfied
- Unsatisfied
- Unsure

51. Are you able to let the clinic know what your experience with the immunisation program at the clinic was like?
- Yes
- No
- Unsure

52. If yes, please check all responses that apply:
- Complaints box
- Immunisation Program Feedback form
- Talk to nurse
- Talk to doctor
- Talk to facility manager
- Talk to receptionist
- Talk to Community Care Workers
- Other

53. If other please provide further details.
54. Do you have any other comments you would like to share about immunisation services at the clinic?
- Yes
- No

55. If yes, please provide further details.

Demographic information
What is your date of birth?
What is your gender? • Male • Female • Other: If other, please provide further details.
What is your marital status? • Single mother • Single father • Father of the child lives with you • Mother of the child lives with you • Father of the child does not live with you, but supports you or the child • Mother of the child does not live with you, but supports you or the child • Married • Widowed
What province were you born in?
What language(s) do you speak at home?
What is the highest level of school you attended? • Never attended school • Preschool • Primary school • Secondary school • University or further education
What is the highest grade/year you completed at that level?
What type of dwelling do you live in? • Brick house • Shack • Backyard dwelling • Other: If other, please provide details.
How many children and adults in total live with you?
How many children have you had?
How many children do you have that are living?
What is the date of birth of your youngest child?

Evaluation Focus Group Guide

Parents/Guardians

Melbourne School of Population & Global Health

Faculty of Medicine, Dentistry & Health Science

Project: ***Strengthening clinic level immunisation service delivery in Western Cape Province, South Africa***

PARTICIPANTS: Parents/guardians of children aged 0-24 months old

FOCUS GROUP DURATION: 45-60 minutes

The purpose of this focus group is to gather information to better understand:

- the changes in attitudes, beliefs and concerns of parents/guardians towards immunisation
- if there have been improvements with parents/guardians accessing this service in the community

THEMES:

- Knowledge ▲
- Attitudes ▲
- Beliefs ▲
- Concerns ▲
- Access ▲
- Confidentiality ▲
- Integration of services ▲
- Effectiveness of services ▲
- Acceptability of services ▲
- Non-discrimination ▲

DISCUSSION POINTS:

Screening questions:

3. When was your child's most recent immunisation visit at the clinic?
4. How many times have you taken your child to the clinic in the last 6 months?

*****Priority is to recruit parents that have attended the clinic over the last 6 months***

If this is the first time parents have attended the clinic, do not ask questions relating to change over the last 6 months

Components of program	Elements for Discussion
Immunisation strategy and program ▲ ▲ ▲	1. What changes have you noticed in immunisation service, or clinic services in the past 6 months? • Which change do you think is the most significant? • Why did you choose that change? • How do you think that change happened, what steps led to the that change? 2. What have been your experiences when attending the clinic for immunisation? 17. Interaction with any clinic staff, how follow-up occurs etc.
Acceptability of vaccine program ▲ ▲ ▲ ▲ ▲ ▲	3. What do you think about childhood vaccination? 18. Why do you bring your child for vaccination? 19. Do you worry that vaccination can harm your child? 4. Are you comfortable with the way you and your child are treated at the clinic? 20. Non-discrimination on the basis of distinguishing characteristics (i.e. disability, age, ethnicity, proximity to services), respectful of ethical principles and culturally appropriate health service
Information systems and decision support ▲ ▲ ▲	5. How has the way the clinic communicates with you regarding immunisation services changed in the last 6 months?
Self-management ▲ ▲	6. What do you think about the clinic's appointment system for child immunisation? 7. Have you noticed any changes in the last 6 months in your own understanding of vaccines and immunisation? 21. If yes: ▪ What have these changes been? ▪ Why do you think these changes have occurred?
Links with community, other health services and resources ▲ ▲ ▲	8. Do you know of any community health services or health education activities provided by the clinic? 22. Has the clinic referred you to other services if necessary? 9. Have you heard anything about immunisation on the radio? 23. What did you think about these radio sessions? 24. What topics were discussed? 25. Did you think these radio sessions were useful? ▪ Why or why not?

	▪ What further information would you want? 26. Do you think the clinic should continue presenting these radio sessions? **10.** Have you heard any health talks about immunisation in the clinic? 27. What topics were discussed? 28. Did you think these health talks were useful? ▪ Why or why not? ▪ What further information would you want? 29. Do you think the clinic should continue presenting these health talks? **11.** Have you seen any posters or pamphlets about immunisation in the clinic? 30. What were they about? 31. Did you think these posters or pamphlets were useful? ▪ Why or why not? ▪ What further information would you want? 32. Do you think the clinic should continue using these posters and pamphlets? **12.** Have you seen the Immunisation Program Feedback forms in the clinic? 33. Have you used them? 34. Did you think these forms were useful? ▪ Why or why not? 35. Do you think the clinic should continue using these forms?
Feasibility of program ▲▲▲▲	**13.** What do you think the limitations or challenges are when accessing immunisation services?
Quality improvement of program ▲▲	**14.** How satisfied are you with immunisation services provided at the clinic? 36. How do you let the clinic know if you are not satisfied with the service provided? 37. What do you think about the waiting times in the clinic? ▪ Have waiting times in the clinic been reduced? 38. What do you think could be done better?