THE COVERAGE OF PNEUMOCOCCAL CONJUGATE VACCINE (PCV) AND ROTAVIRUS VACCINE (RV) WITH THE SUPPLY-SIDE FACTORS IN SELECT HEALTH CENTRES OF CHILANGA AND CHIRUNDU DISTRICTS OF LUSAKA PROVINCE IN ZAMBIA: A MIXED METHODS STUDY

By

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A dissertation submitted to the University of Zambia in partial fulfilment of the requirements for the degree of Master of Public Health in Population Studies

THE UNIVERSITY OF ZAMBIA

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DECLARATION

I, Rhoda Chabaputa, hereby do declare that this dissertation is my original work and it has been produced in accordance with the guidelines for Master of Public Health dissertation for the University of Zambia. It has not been submitted elsewhere for a degree at this or another University.

Signed…….**Date**……

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APPROVAL

The University of Zambia approves this dissertation of **Rhoda Chabaputa** in partial fulfilment of the requirements for the award of the degree of Master of Public Health in Population Studies.

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ABSTRACT

Zambian children under age 5 continue to face multiple obstacles with respect to their survival and development. Specifically, beyond the neonatal period, Pneumonia, and Diarrhoea are leading contributors to the high under-5 mortality rate. While vaccinations have been introduced to counter these conditions, a serious weakness of the new vaccines has been identified in their poor coverage. Essentially, data indicate that delivery of Pneumococcal Conjugate Vaccine (PCV) and Rotavirus Vaccine (RV) have remained lower than existing vaccines in the Zambian immunisation schedule. This study aimed at establishing the coverage of Pneumococcal Conjugate vaccine (PCV) and Rotavirus vaccine (RV) and exploring supply-side factors in select health centers of Chilanga and Chirundu districts of Lusaka province in Zambia.

This study used an embedded mixed method study design that combined a cross sectional design to compute quantitative data on immunisation coverage rates for the year 2017 and an exploratory case study to obtain a qualitative component that contextualised the results of the quantitative data. 4 health facilities were included in the study. Using complete enumeration of children under age 1, Chilanga health center and Makeni health center from Chilanga district provided a total sample 770 and 822 respectively. Chipepo health center and Lusitu health center from Chirundu district provided total samples of 664 and 1531 correspondingly. 6 In-depth interviews were included.

Chilanga health center recorded coverage rates of 124%, 127% and 127% for RV 2 PCV 3 and DPT 3 respectively. The percentages of over 100 came as a result of the facility servicing populations outside its catchment thereby inflating the numerator. In the same order of vaccines, Makeni Konga recorded 44%, 47% and 47%. In Chipepo health center 71%, 73% and 73% were the coverage rates for RV 2, PCV 3 and DPT 3. In Lusitu health center, the immunization coverage rates for RV 2, PCV 3 and DPT 3 were recorded at 14%, 14% and 14% respectively. A further analysis of the ratio of PCV, representing new vaccines, and DPT, representing the older vaccines, obtained a ratio of 1.00 for all 4 health facilities. Since every child being given a dose of PCV is expected to also receive a corresponding dose of DPT, the ratio of 1.00 implied that the delivery of the new vaccines was in tandem with the older vaccines. The major supply side factors that are affecting the progress of the program are community engagement as a result of limited transportation, fuel and meal allowances for field workers. The shortage of staffing is also a challenge.

Out of the 4 health facilities under investigation, only 1 is above the set national target of 90% per specific antigen when it comes to DPT, PCV and RV coverage rate. The supply side factors that seem to explain the observed coverage rates are community engagement and staffing.

Comparison of new vaccines and traditional vaccines found them to be equally distributed. For these facilities, there are no supply issues that are influencing only the new vaccines. Resource allocation to alleviate lack of transport, fuel and allowances for field workers must be put in place to improve immunization coverage rates.

Keys words: Supply-side, Pneumococcal Conjugate Vaccine (PCV) and Rotavirus Vaccine (RV)

DEDICATION

This dissertation is dedicated to my daughter Maxene Alumbwe Mwila. Knowing you were coming gave me a greater drive to come as far as writing this dissertation. I know sometimes the things you will desire to have and to achieve will not come easy. As a matter of fact, they say it's a man's world. I say, as far as I have observed the lives of the successful, it's a world for the persistent. Yes, persistence will give you what others could only dream of my child.

Also, I dedicate this dissertation to every child in the world. May you live to see a long healthy life.

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ACRONYMS

BCG	Bacillus Calmette-Guerin
CIDRZ	Centre for Infectious Disease Research in Zambia
DCMO	District Community Medical Office
DHO	District Health Office
DPT1	Diphtheria Pertussis Tetanus
EPI	Expanded Programme on Immunisation
Hib	Haemophilus Influenza type b
HepB	Hepatitis B
IHME	Institute for Health Metrics and Evaluation
GAVI	Global Alliance for Vaccines and Immunisations
GRZ	Government of the Republic of Zambia
MCDMCH	Ministry of Community Development Mother and Child Health
MSD	Measles Second Dose
MMC	Mansa Municipal Council
OPV	Oral Polio Vaccine
PAED	Programme for Awareness and Elimination of Diarrhoea
PCV	Pneumococcal Conjugate Vaccine
SDG	Sustainable Development Goal
UNZA	University of Zambia
VPD	Vaccine Preventable Disease
WHO	World Health Organisation

CHAPTER ONE: INTRODUCTION

1.1 Background

Immunisation is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine. Vaccines stimulate the body's own immune system to protect the person against subsequent infection or disease (WHO, 2016).

Immunisation remains one of the most important public health interventions and a cost effective strategy to reduce both the morbidity and mortality associated with infectious diseases (WHO, 2012, UNICEF, 2012). Globally, it is estimated that 2-3 million deaths are averted annually through vaccinations. However, an estimated 22.8 million infants worldwide do not access basic vaccines and could be responsible for 25 % of the 10 million deaths occurring annually among children under five years of age. This is partly related to the fact that an increasing number of infectious diseases can now be classified as vaccine-preventable (WHO, 2010).

With the availability of new vaccines, such as those against rotavirus and pneumococcal diseases, and further improvements in vaccine coverage, a much larger proportion of children can now be protected against a broader range of infectious diseases (WHO, 2010, UNICEF, 2010). Comprehension and assessment of the full benefits offered by vaccines and their optimal deployment, will facilitate development of comprehensive strategies to reduce the burden of infectious diseases paralyzing countless communities in low and middle income countries, and consequently directly and significantly contribute to achievement of SDG3 which is to "Ensure healthy lives and promote wellbeing for all at all ages" (Rino Rappuoli et.al, 2016).

WHO has further set goals within SDG3 which include to by 2030, end preventable deaths of new-borns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1000 live births and under-5 mortality to at least as low as 25 per 1000 live births **(**WHO, 2017**).**

1.1.1 Pneumococcal Conjugate Vaccine (PCV)

Globally, bacterium Streptococcus pneumoniae, also known as the pneumococcus, is a leading cause of severe disease and deaths in children under five years old. According to WHO estimates, in the year 2000 there were 14.5 million episodes of severe pneumococcal disease and more than 800 000 deaths (of which 88 000 were HIV-related) among children in this age

group. Children under five, people with depressed immune systems, smokers, and elderly people are among the population groups at highest risk of pneumococcal disease. The total number of annual deaths attributable to this bacterium, including adults and children, is about 1.6 million.

In children, pneumonia accounts for about 95% of severe pneumococcal disease episodes and close to 90% of deaths due to the pneumococcus (other major causes of bacterial pneumonia include Haemophilus influenzae type b). Meningitis accounts for less than 1% of cases of severe pneumococcal disease in children, but is responsible for more than 7% of the deaths caused by pneumococcal infection. In addition, the pneumococcus can also cause sepsis, and other invasive diseases such as peritonitis, arthritis, and osteomyelitis (WHO, UNICEF, World Bank, 2009).

In Zambia information presented on the incidence rate of respiratory infection (pneumonia) by province for the three-year period of 2009 to 2011, shows that the national incidence rate of respiratory infection (pneumonia) has been increasing over this three-year period. The indicator increased from 29.3 per 1,000 population in 2009 to 33.0 per 1,000 population in 2010, and to 35.9 per 1,000 population in 2011 (MOH, 2013).

Pneumococcal conjugate vaccine (PCV) is a highly effective intervention to reduce invasive pneumococcal disease and pneumonia. Studies evaluating a 9-valent PCV in South Africa and the Gambia reported a 72 - 77% reduction in vaccine serotype- specific invasive disease in vaccinated children. PCV may also reduce childhood mortality, especially in places with limited access to health care, as shown in a Gambian study in which PCV reduced childhood mortality by 16%. In addition to the direct effects of PCV, there is a substantial reduction in disease burden through indirect protection of non-vaccinated populations (Zar, 2008).

Zambia officially launched PCV on July 9, 2013 (GAVI, 2014). In the current immunisation schedule, three doses of the vaccine (PCV 10) are given at six weeks, and every after 4 weeks for two doses.

1.1.2 Rotavirus Vaccine (RV)

Globally, rotavirus causes more than 450,000 deaths each year in children under five and is responsible for millions of hospitalizations and clinic visits. Nearly a quarter of a million African children die from the dehydrating diarrhoea caused by rotavirus infection every year,

accounting for more than 50 percent of the global total of rotavirus deaths (Parashar et al, 2009). The vast majority of countries with the highest child death rates from rotavirus are in sub-Saharan Africa (Black et al, 2015).

Diarrhoea is a leading killer of children in Zambia causing approximately 9% of deaths in children under five years of age. Rotavirus, takes the lives of over 3,600 Zambian children under five each year and accounts for approximately 40 % of all under five diarrhoeal deaths and hospitalizations in Zambia (PATH, 2013).

Two safe and effective rotavirus vaccines have been licensed since 2006 (Dennehy, 2008). Studies in Africa show that rotavirus vaccines are safe and effective against severe rotavirus disease and are cost-effective (Steele et al , 2010). Rotavirus vaccines are saving lives and improving health in countries where children have access to them. Swift and significant declines in hospitalizations and deaths due to rotavirus and all-cause diarrhoea have been observed in many countries that have included rotavirus vaccines in their national immunisation programs (Gentsch et al, 2011). Research has also found that rotavirus vaccines may protect unvaccinated children and adults by reducing spread of rotavirus - an effect called herd immunity (Lopman et al , 2011).

A two-dose oral rotavirus vaccine (Rotarix) was launched in Zambia in November 2013, about four months after the simultaneous launch of PCV and MSD (GAVI, 2015). According to WHO guidelines, the first dose is to be administered from 6 weeks but not later than 15 weeks of age. The subsequent second dose is to be given 4 weeks later but not after 32 weeks of age (WHO , 2013). Prior to a national rollout, a pilot was conducted in January 2012, in three districts of Lusaka province. The pilot study informed the subsequent national introduction of rotavirus vaccine (GAVI, 2015).

The Reaching Every District (RED) approach was developed to increase and sustain high levels of routine immunisation. The World Health Organisation (WHO) and United Nations Emergency Children's Fund developed the Global Immunisation Vision and Strategy 2006-2015 which envisions a world in which every child, adolescent and adult has equal access to immunisation services (MOH, 2014).

This RED is considered an effective approach to reach the un-reached and the missed opportunities in immunisations of children against preventable diseases through strengthening health provider capacity, engaging communities to participate in their children's health,

intensifying technical support supervision, establishing community immunisation posts for outreach, and management and utilization of data at all levels. The approach was introduced as one of the recommendations at the 1997 Expanded Program on Immunisation (EPI) review (GRZ, 2014).

Just looking at the national level, trends in immunisation coverage generally point to progress. But at the district level, a wide range of trends, with progress, stagnation, and troubling declines in coverage is seen (IHME, 2014).

The aim of this study is to establish the coverage of Pneumococcal conjugate vaccine (PCV) and Rotavirus vaccine (RV) and explore supply-side factors in select health centres of Chilanga and Chirundu districts of Lusaka province in Zambia

In so doing, it is intended for the study to provide information to understand the seeming lag of the new vaccines in percentage coverage. Studies that have focused largely on the new vaccines in the schedule especially in the Zambian context are limited and this study is directed at filling that gap.

1.2 Statement of the problem

Zambian children under age 5 face multiple obstacles with respect to their survival and development. Beyond the neonatal period, pneumonia, and diarrhoea are leading contributors to the high under-5mortality rate (CSO, 2013-14). While vaccinations have been introduced to counter these conditions, a serious weakness of the new vaccines has been identified in their poor coverage. PCV and RV coverage lags behind DPT-HepB-Hib for both the first dose and for the completed series. DPT-HepB-Hib 1 and DPT-HepB-Hib 3 are at 79% and 70% in that order while PCV1 and PCV3 are at 73% and 60%. Rota1 was at 69% while the second dose of Rota was at 61% (GAVI, 2015). Put another way, data indicate that delivery of PCV and rotavirus vaccine have remained lower than existing vaccines in the Zambian immunisation schedule (GAVI, 2015) .

This new vaccine coverage performance in Zambia falls short of set targets under which countries are aiming to achieve vaccination coverage of at least 90% nationally and at least 80% in every district by 2020 (WHO, UNICEF, World Bank, 2009). Specifically, the Zambian immunisation programme calls for a target of 90% coverage in all antigens (MOH, 2014). The ultimate consequence of the failure to reach the set targets is increased morbidity and mortality

especially in the under 5 populations.

Since, PCV and rotavirus vaccines were introduced into the routine immunisation schedule in 2013, there have been no activities specifically directed at increasing the coverage of these new vaccines. Nonetheless, the two have continued to benefit from general activities and investments such as investments in the cold chain and the ongoing Reach Every Child (REC) per District strategy which was adopted in 2003 (GAVI, 2015).

Studies have attempted to outline the possible contributing factors of low coverage of vaccines in general and what they have found include client related factors such as the mother/caretakers socio-economic and demographic characteristics, knowledge of the vaccine and its schedules, perceptions relating to the vaccine, residence, exposure to mass media and cultural beliefs. On the other hand, service related factors such distance to the facility, stock outs of the vaccine, shortages of skilled personnel, transport challenges, cold chain management challenges and so forth could also explain the problem of low immunisation coverage rates.

Since the supply side category of factors are the interest of this study, the conceptual framework depicted in Figure 2.3 attempts to portray how the supply side factors in particular might be related to the low coverage's of Pneumococcal Conjugate vaccine (PCV) and Rotavirus vaccine (RV).

1.3 Justification

There is limited evidence of the analysis of health indicators in the Ministry of Health in Zambia with a focus on understanding rural or urban health centre level performance. This is not different for immunisation programme indicators. Therefore, in an effort to improve what has been identified as poor immunisation coverage rates of the newly introduced vaccines in Zambia and immunisation in general, it is necessary to carry out a local health facility level study of the unique factors affecting new vaccine immunisation and understand which factors in particular can explain their lagged coverage in comparison to traditional vaccines in the immunisation schedule. This effort might be useful in contributing to designing well packaged implementation programs targeted at building on the good practices of better performing health centres and district health medical offices and finding solutions for the improvement of less performing entities.

It is further hoped that the information produced from this study would provide

recommendations for policy formulation in similar settings. Moreover, because limited research has been carried out to understand the factors associated with the reported low coverage rates of the new vaccines at facility level, the proposed study may be useful in adding to the existing body of knowledge.

The negative impact of infectious disease like diarrhoea and pneumonia on Zambian children is intensified by the weak health system infrastructure and the lack of human and financial capacity. These include: the low doctor and nurse to population ratio; insufficient vaccine cold chain capacity; erratic access to essential medicines; and poor public awareness of appropriate behaviours for lifesaving measures against diarrhoea (CIDRZ, 2016). Therefore, enhancing the prevention opportunities through vaccination is an opportunity to reduce the rates of morbidity and mortality. The findings of this research are hoped to serve as evidence that can inform action for this noble cause of enhancing the quality and quantity of the life of children especially under 5 years old.

CHAPTER TWO: LITERATURE REVIEW

2.1 Literature review

Fortunately, a number of studies have been directed to find out the barriers to access childhood immunisation in Zambia, in other developing countries and developed countries alike. The findings that have emerged from such research could be broadly grouped into two categories; supply side barriers and demand side barriers (Barman et al, 2009).

Demand side barriers to access immunisation services are related to the issue of acceptability and affordability. Acceptability of childhood immunisation has been seen to have its roots in the individual characteristics attached to the norms or culture, religion, exposure to education and socio-economic status (Wan and Gary 1978, Tangerose et al 1984, Steele et al 1996, Koenig et.al 2001, Patra 2006, Bawah et. al 2006, Perry et.al. 2007). Studies have identified an important role of gender disparity particularly in South Asian countries to pose barriers against immunisation uptake of female children (Gwatkin and Deveshwar-Bhal, 2001). A strong demand side predictor that facilitates uptake of childhood immunisation services has been mother's exposure to education (Srivastava and Saksena 1988, Koeing et.al 2001, Bawah et.al 2006). Studies have shown that acceptability of vaccination increases with proper exposure to community education and also gets influenced by the synergy between various public health services (Kravdal, 2004).

Supply side barriers relate to a very significant aspect involving service availability. Such barriers in the delivery system encompass a large number of aspects linked to equipment, human resources and their management. Improper vaccine storage practice, poor cold chain management, inadequate/non-availability of refrigerating facility given interrupted power supply, irregular functioning of an immunisation centre are a few to name. Along with it, non-availability or absenteeism of efficient health workers, their incomplete knowledge about vaccination is also an important constraint in efficient service delivery (Gupta 1993, Nyarko et al, 2001, Perry et al, 2007).

In spite of a wide range of literature on demand and supply side barriers to access childhood vaccination, there are not many studies focusing on what may be affecting the newly introduced vaccine coverage's. The focus of this study will be to look at supply side factors that are affecting the coverage of particularly the pneumococcal conjugate vaccine (PCV) and rotavirus vaccine (RV) to understand possible reasons for the coverage's being lower than traditional

vaccines. Thus, the following part of the review of literature focuses on supply side factors affecting immunisation coverage.

2.1.1 Factors affecting traditional vaccine coverage

From a relatively broad perspective of writing on the subject, Favin and others analysed 126 documents from the global grey literature to identify reasons why eligible children had incomplete or no vaccinations. Apart from checking mothers' characteristics and perspectives on the vaccination process, many studies noted that vaccine stock-outs and/or cold chain problems caused unavailability of vaccination. When parents miss work, travel long distances, wait for long hours, and then are denied service, they are naturally less likely to return for vaccination. Vaccine stock-outs are caused by lack of funding or storage capacity, or poor ordering and distribution skills and systems. One document reported a vicious cycle in Guinea in which public facilities lacked drugs, driving most people to private providers. People in Somalia and Kenya became less likely to seek vaccination because of health facilities' frequent stock outs of medicines or failure to offer curative and other services at the time and place of vaccination (Favin et al, 2012). This study also intended to find out whether the unavailability of the vaccines of interest affects their coverage.

Owing to the fact that Zambia's ability to achieve immunisation targets was hindered by low immunisation coverage in some rural districts, a routine performance assessment by the Gwembe district community medical office (DCMO) in Southern province in February 2013 identified that: most of the 13 rural health centres in the district had an immunisation coverage rate of 56% to 70%, lower than the Ministry of Community Development Mother and Child Health (MCDMCH) minimum target of 80%. Contributing to the low immunisation coverage were: human resource shortage constraints, leading to interruptions in under five clinic services, the practice of avoiding wastage by not opening the BCG vial without a minimum of 20 children requiring this immunisation, resulting in mothers and children turned away from immunisation services, logistics problems (that is transport, timely vaccine ordering) preventing consistent monthly outreach services, lack of clinical skills of some staff to be able to correctly administer the BCG vaccine and inadequate and inconsistent supervision, preventing the resolution and/or mitigation of challenges (WHO, 2014).

2.1.2 Factors affecting new vaccine coverage

Studies focusing on the apparent low coverage of Pneumococcal Conjugate vaccine (PCV) and Rotavirus vaccine (RV) at national and lower administrative levels are limited. WHO statistics however show that the number of countries using new vaccines such as rotavirus (81 countries) and pneumococcal conjugate vaccine (128 countries) has increased, but global coverage remains low at 23% and 32%, respectively. Vaccine introduction is especially lagging in middle income countries. The reason given for this is that countries are often not able to finance introduction with national resources, while they generally do not have access to external funding sources. Low income countries have largely been able to close the gap in coverage with high income countries with assistance from GAVI, the Vaccine Alliance (WUENIC, 2015).

The vaccine alliance summarised the routinisation of vaccines – expressed as the ratio of new vaccine doses delivered to existing vaccines in the system (represented by pentavalent vaccine) – in the four full country evaluation (FCE) countries Bangladesh, Mozambique, Uganda and Zambia. As covered in its 2015 report, delivery rates of PCV and rotavirus vaccine in Uganda and Zambia remained lower than that of traditional vaccines. According to HMIS data, these problems persist to this day (GAVI, 2016). In contrast to Uganda and Zambia, PCV in Mozambique was quickly scaled up (in approximately six months) to the level of pentavalent vaccine delivery. Rotavirus vaccine and measles second dose in Mozambique, however, have experienced suboptimal routinization to date. Initially, lower third-dose PCV coverage was recorded in Bangladesh (as a result of a separate visit that was scheduled to avoid multiple injections in the same visit). Subsequently, all doses of PCV in Bangladesh were well routinized in 2016.

The underlying root causes of introduction and routinization challenges were found to be variable across the FCE countries. In Uganda, challenges in routinization in 2014 and 2015 were driven by vaccine stock outs. In 2016, process evaluation findings suggest that the discrepancy in delivery between PCV and pentavalent vaccine might have been due to reporting issues at the facility level, with pentavalent vaccine being better recorded as it is a performance indicator for facilities in Uganda. Based on subnational data collection, no stock outs of PCV were observed in facilities visited. This potential root cause highlights data quality issues in administrative and HMIS data and suggests that a population-based coverage survey

or data quality audit would be necessary to confirm the discrepancy between PCV and pentavalent vaccine delivery in Uganda (GAVI, 2017).

In Mozambique, rotavirus vaccine was yet to be fully routinized because its delivery was interrupted by national stock shortages and subnational stock outs during the first quarter of 2016. While PCV suffered similar stock outs in some provinces, the PCV to pentavalent vaccine delivery ratio did not suffer since PCV was already available in the health system and thus was cushioned by buffer stocks during the first quarter when suboptimal stocks were available in the country (Ibid. 19)

In Zambia, a national level evaluation revealed that **l**ow routinisation of the new vaccines is attributable to several factors. Firstly, there have been reports of stock-outs in some districts. While interviews with the national logistician indicated that there have been no national-level stock-outs, it was confirmed that logistical challenges in getting vaccines from national to district level have caused stock-outs of PCV and rotavirus vaccine in some districts. It was also pointed out that PCV and rotavirus vaccine supplies by UNICEF are based on an anticipated 60% coverage in year 1 and about 80%-90% in year 2, which has not since been updated and could also contribute to stock-outs at the district level. Another factor contributing to this has been challenges with getting accurate target population figures – while government supplies of pentavalent vaccine are given according to requested demand, supplies of PCV and rotavirus vaccine from UNICEF are according to CSO official figures, which are often underestimated. The government has since communicated to UNICEF to request more PCV and rotavirus stocks to meet the shortfall (GAVI, 2015).

However, it is unclear why logistical challenges such as bottlenecks in the distribution system would affect new vaccines more than older vaccines. It has not yet been established whether health staff are simply choosing not to give PCV along with Pentavalent. The Child Health Unit has confirmed that there has been suboptimal routinisation of PCV and rotavirus vaccine relative to pentavalent vaccine (GAVI, p. 20).

In 2003, the Government of Zambia adopted the Reaching Every District (RED) Strategy as an effective way to reach the un-reached and missed opportunities (MOH/CBOH, 2005). The RED approach aims to build capacity of the districts and health facility level to address common obstacles to improving immunization services. This district planning and monitoring approach promoted by the World Health Organisation is based on five operational approaches

or components that all specifically aim at improving coverage in every district (Duclos et al, 2009). These five approaches include Re-establishing outreach vaccination – regular outreach for communities that are under-served as well as supportive supervision which encompasses on-site training by supervisors. There is also the approach of encouraging links between community and service through regular meeting between the community and health staff. Fourth is Monitoring and use of data for action which includes but is not limited to mapping populations for each health facility. The fifth component is better planning and management of resources that covers better management of both human and financial resources (Ryman et al, 2011).

2.2 Conceptual Framework

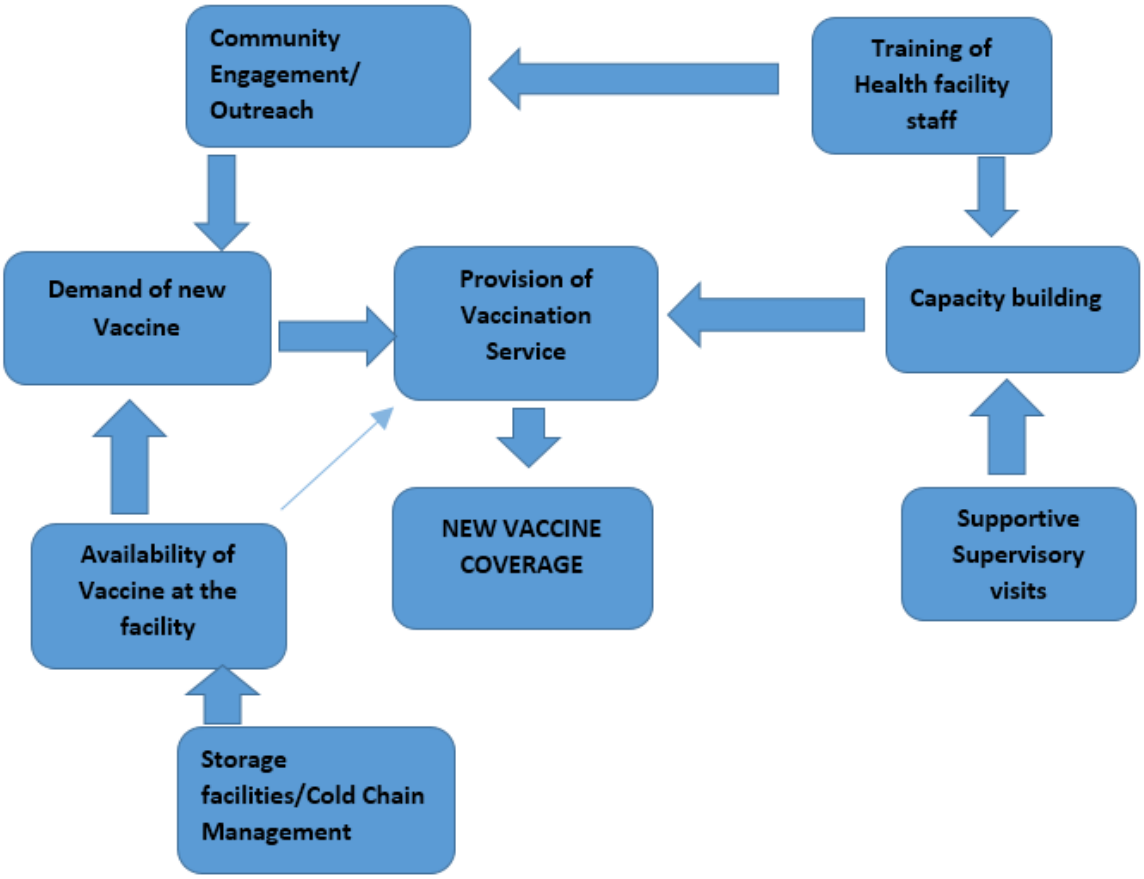

Figure 2.1: Conceptual Framework of the supply-side factors that explain vaccine coverage rates

SOURCE: Researchers ideas.

To understand the factors that might be affecting the coverage of PCV and RV, variables have been picked from the review of literature to construct the conceptual framework depicted in Figure 2.1 above.

The model explains that the coverage of the new vaccines is likely to be influenced by the nature of the training that the staff in vaccine administering centres are exposed to. The training impacts on the overall capacity building for administration and management of vaccines and this could influence perceptions of the staff towards vaccination service delivery.

Further, capacity building could also be considered a function of the supervisory support that is provided. Literature shows that the availability of storage facilities which includes a viable cold chain management system could have a bearing on the availability of a vaccine and this could in turn affect the demand for the vaccine and its provision. The demand for the vaccine can also be an outcome determined by the execution of community engagement through outreach by the health facility to the surrounding communities.

2.3 Research questions

1. What is the coverage of Pneumococcal Conjugate **v**accine (PCV) and Rotavirus **v**accine (RV) in select health centres of Chilanga and Chirundu districts?

2. What supply side factors can explain the coverage of Pneumococcal Conjugate **v**accine (PCV) and Rotavirus **v**accine (RV) in select health centres of Chilanga and Chirundu districts?

2.4 Objectives

2.4.1 General Objective

To establish the coverage of Pneumococcal Conjugate vaccine (PCV) and Rotavirus vaccine (RV) and explore the supply side factors in selected health centres of Chilanga and Chirundu districts of Lusaka province.

2.4.2 Specific Objectives

1. To determine the coverage rate of 2nd dose rotavirus vaccine (RV 2), 3rd dose Pneumococcal conjugate vaccine (PCV 3) and 3rd dose Diphtheria Pertussis Tetanus (DPT 3) vaccine at health facility level.
2. To compare the coverage rates of PCV to DPT
3. To determine the nature of health facility staff training, supportive supervision, staffing, vaccine and stock management, cold chain management and community engagement related to vaccination service provision.

CHAPTER THREE: METHODOLOGY

3.1 Study Design

The study used an embedded mixed method design. This design combined a cross sectional study, focused on carrying out quantitative computations that were based off of health centre records on the number of children immunised per vaccine of interest. The quantitative strand of data also made use of statistics on the health centre catchment area populations of those under age 1 (< 1 year), since these are the target population for the vaccines the study was concerned with.

The qualitative side was an exploratory case study. It derived data from interviewing health care providers to obtain information pertaining to the provision of the delivery of the immunisation service, and their perceptions of how supply-side factors are affecting coverage rates.

The mixed methods approach was implemented during the analysis where the qualitative and quantitative data was combined for further understanding. Additionally during the discussion, the qualitative method explained factors underlying the vaccine coverage rates and the relationship between old and new vaccines in the quantitative study. This use of mixed methods was in line with the writings Bryman (1992) and caracelli (1993).

The implementation of the selected designs is now discussed in detail in the narration that follows.

3.2 Study site and population

Chilanga and Chirundu districts in Lusaka province, formed the inclusion of the study site. The two districts have 7 and 8 health facilities respectively. The study purposively selected 4 health facilities based on the health centre coverages of PCV and RV vaccination. The choice of facilities included 2 health facilities from Chirundu and 2 health facilities from Chilanga. In each district, a relatively poor performing and relatively good performing health facility in terms of the PCV and RV coverage (from the district HMIS) was included.

Based on national targets whereby the Zambian immunisation programme calls for a target of 90% coverage in all antigens, poor performing health facilities were purposively selected from those that were below the national target in terms of PCV and RV while good performing health facilities were in the reverse chosen from those that have achieved, or are close to the set

targets. The data to form the basis of this decision was extracted from the national Health Management Information System (HMIS). In Chilanga district, Chilanga health centre and Makeni Konga health centre were selected. In Chirundu district, Chipepo health centre and Lusitu health centre were identified. These selections represented relatively good performing and relatively poor performing health centres in that order.

3.3 Selection of participants, sampling methods and sample size

The quantitative strand of data was obtained through Total population sampling. Specifically, per catchment area of interest every child under age 1 (< 1 year) in the year 2017 was included. The source of these figures was the Central Statistical Office (CSO). For Chilanga health centre the sample size translated into 770 children under age 1. The sample size was 822 in Makeni health centre. Chipepo and Lusitu health centres had a 664 and 1,531 under 1 children respectively. Typically, the population of children under 1 year of age is a figure given by the Central Statistics Office. It reflects 4% of the total catchment area population.

For the qualitative strand of data 3 health care providers were interviewed per district. Firstly, health care providers were interviewed at the facility level. These respondents were purposively selected based on their involvement in the immunisation service delivery at the facility.

Finally, an interview with an officer at the district medical office was carried out to get an in-depth standpoint from a higher administrative level. This translated into an inclusion of 6 key informants in the study overall.

3.4 Data collection plan and tools

To obtain the quantitative strand of data, the study extracted figures through paper based records on immunisation activities at the centre. Particularly, the Health Centre Service Delivery form (HIA2) was used as the major form of summarized data to establish the coverage of DPT, PCV and RV. In order to standardise the reference time of the data collected, in both districts Chilanga and Chirundu, figures were extracted from the first to the fourth quarter of the year 2017 as summarised in Appendix 5.

Key informant interviews to contextualize and support our interpretation of the quantitative component were carried out with health centre personnel. Per facility, one nurse, involved with vaccination service delivery at the facility was interviewed. At a higher level, the study also included one officer from the district health office. An interview guide with questions adapted

from the Reach Every Child in Every District Strategy (RED/C) Health Centre Handbook was used for the interview processes. The questions asked during the study were contextualised to the established immunisation coverage's.

3.5 Data management and storage

Following extraction from the HIA2, quantitative data was entered and stored in a secured Excel software work sheet. Computations to answer to the first two objectives were also made in Excel.

The qualitative strand of data obtained from interviews was recorded using a digital audio recorder with the permission of the interviewees to ensure intense and accurate analysis of information gathered. The transcriptions were made verbatim. Each interview was assigned a code on the recorder and placed on the computer where it was stored using a password.

3.6 Data analysis

The quantitative data was analysed first. The coverage's of the vaccinations of interest were computed by dividing the number of immunized children per vaccine, over the number of the catchment area population of children under 1 year of age. Deriving of the coverage as described was completed in Excel software.

Thereafter, using the established health centre coverage of DPT and PCV, the paired proportions of the two vaccines were compared by way of the arithmetic operation of division. This is because the coverage of the two are correlated. In other words, a child receiving the DPT vaccine should in the ideal sense also receive PCV because of the corresponding delivery schedules of the two vaccines.

The qualitative component of the data was analysed using thematic analysis of the responses from healthcare providers on the nature of health facility training, supportive supervision, staffing, vaccine and stock management, cold chain management and community engagement related to vaccination service provision. This helped to give meaning to the quantitative variables during the discussion.

Data Integration

After data from the quantitative and the qualitative components were collected, checked for accuracy and analyzed separately, the results were then integrated at the discussion stage.

3.6 Ethical considerations

Ethical approval was sought from the University of Zambia Biomedical Research Ethics Committee (UNZABREC). Following that, permissions to carry out the study were gotten from the Ministry of Health (MOH) and specifically from the Lusaka Provincial Medical Office (PMO) and Chilanga and Chirundu District Medical Offices (DMOs).

There was minimal risk to the participants in taking part in the study. However, the study acknowledged that health centre personnel may be uncomfortable to share the barriers they are faced with at the centre because they might have been concerned about the confidentiality of the interview. Additionally, personnel needed to take some time off their work to answer to the in depth interview. Benefits to be acquired may directly accrue to participants and to the communities in the health facility population through positive alterations to immunisation programme operations as recommendations from the study are escalated to higher offices through this report.

The risk to the participants was further minimized by ensuring that before beginning face to face interviews, individual written informed consent was sought from all the respondents and other stakeholders that participated in this study and all information was treated as confidential.

Once completed, findings of this current study will be made available for dissemination to the MoH in Zambia and other relevant stakeholders as requested by the institutions.

3.7 Limitations

The In-depth qualitative data collection used in the study, relies heavily on key informant interviews that are prone to recall and respondent bias.

The study made much use of the Health centre delivery form HIA2 Health Management Information Systems which are established Zambian administrative data sources. This quantitative secondary data could not be validated for quality as it was already collected before the study begun.

Further, the inclusion of health facilities did not extend to outside Lusaka province hence transferability was limited as the facilities may have been representative of limited social

contexts in the country. Since this information was acquired in government facilities, the private institutions may have had some insights that may not have been captured.

Since previously done program evaluation results implied the existence of sub optimal routinisation of the new vaccines PCV and RV, more studies can be done to include health facilities from different provinces and indeed to investigate whether the new vaccines PCV and RV have been adequately synchronized into the immunisation schedule across those provinces of Zambia.

CHAPTER FOUR: RESULTS

The specific objectives of this study were threefold. Firstly, the study intended to determine the actual coverage of 2nd dose RV, 3rd dose PCV and 3rd dose DPT vaccination at health facility level. Second was the comparison of the coverage rates of PCV to DPT. In order to aid understanding of the results obtained in objective 1 and 2, the third specific objective was set to determine the nature of health facility training, supportive supervision, staffing, vaccine and stock management, cold chain management and community engagement related to vaccination service provision in the selected health facilities.

The results of the study, are organised in 2 parts beginning with the results of the quantitative cross sectional study, followed by the findings of the qualitative case study.

4.1 Cross-Sectional Study

4.1.1 The coverage of RV 2 PCV 3 and DPT 3

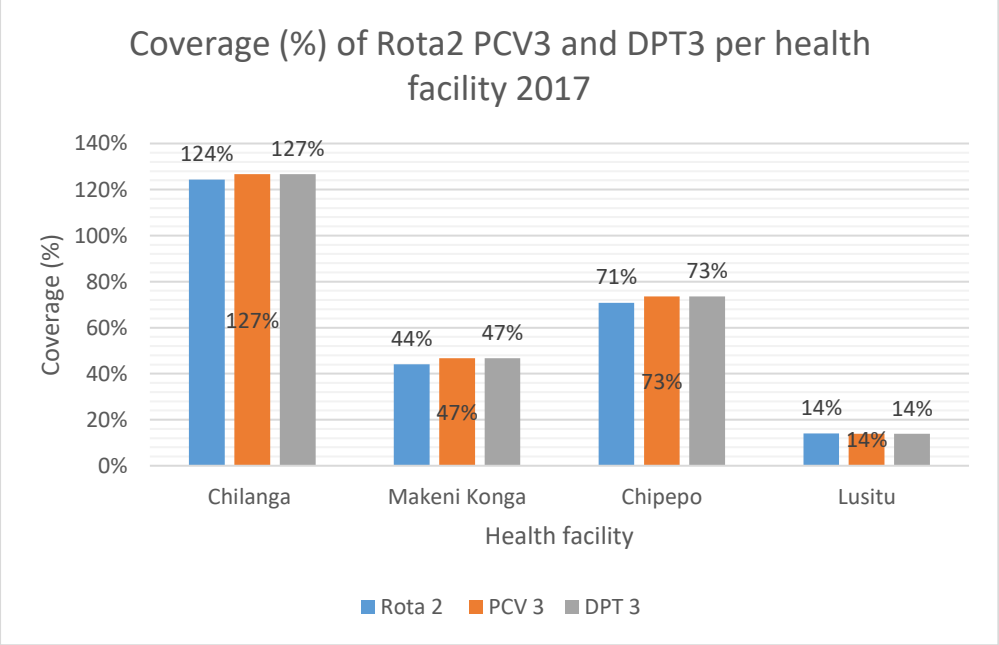

Figure 4.1: The percentage coverage of 2nd dose RV, 3rd dose PCV and 3rd dose DPT

In order to establish the primary objective of the study, raw numbers relating to the vaccines of interest were extracted from each of the facilities HIA2 form. The numerator in each case was the number of children vaccinated per vaccine of interest, divided by the target population which is the number of the population of children under age one (< 1 year). The obtained proportion was then multiplied by a hundred (100) to obtain the percentage coverage. The

period of interest was the year 2017.

Figure 4.1 depicts the obtained percentage coverage rates for RV 2, PCV 3 and DPT 3. The X axis reflects the name of the facility, while the Y axis reflects the percentage coverage computed for each vaccine.

In Chilanga district, Chilanga health centre recorded coverages of 124%, 127% and 127% for RV 2 PCV3 and DPT 3 respectively. The percentages of over 100 imply that Chilanga health facility is recording numbers of child immunisations that are higher than those prescribed by the Central statistics office target population for its catchment area. Explanations from the in depth interviews revealed that this is occurring because Chilanga health centre often services populations outside its catchment area for mainly two reasons. Firstly, Freedom compound which is in fact in Lusaka district, is very close to the facility which prompts its populations to obtain services there. Secondly, the vicinity of the health centre being along the Kafue road, makes it relatively accessible to many. This also makes it a preferred health facility to obtain services for convenience sake and for the fact that it is closer to other amenities such as grocery shops. Consequently, the numerator used in the calculation for immunisation coverage rate is inflated.

Makeni Konga, also in Chilanga district recorded 44%, 47% and 47% for RV 2 PCV3 and DPT 3 in the same order. Chirundu district recorded 71%, 73% and 73% as coverages for RV 2, PCV3 and DPT 3 in Chipepo health centre. Lusitu health centre recorded coverages for RV 2, PCV3 and DPT 3 at 14%, 14% and 14% correspondingly.

4.1.2 Comparison of the PCV to DPT

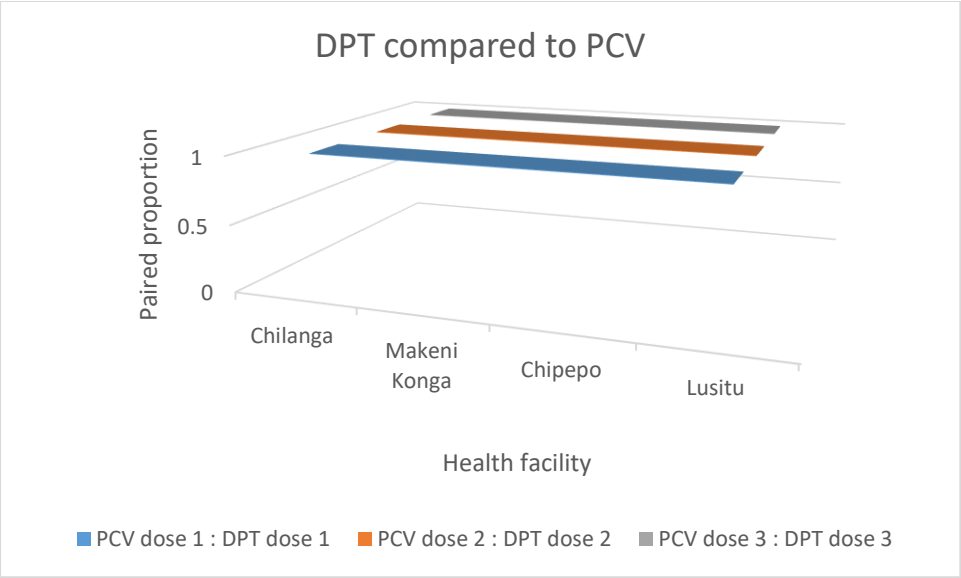

Figure 4.2: The comparison of the coverage rate of PCV to DPT

In the current immunisation schedule, every child being given a dose of PCV is expected to also receive a corresponding dose of DPT. Therefore, PCV and DPT were considered as paired proportions to answer to specific objective number 2. The coverage proportion (before multiplying by 100 to get a percentage) obtained for each dose of PCV, was divided by the corresponding coverage proportion obtained for DPT. In this expression, the ratio of PCV, represented the performance of the new vaccines, while existing vaccines in the system were represented by pentavalent vaccine or DPT.

Figure 4.2 above summarizes a comparison of the coverage rate of PCV to DPT for all 3 doses of the vaccine in the 4 selected health facilities. All 4 health facilities reflected a ratio of 1.00 when PCV was compared to DPT for the all doses 1 to 3.

4.2 Case Study

Key informant interviews to contextualize and support the interpretation of the quantitative component of the results obtained in objective 1 and 2 were carried out. The intention was to understand health facility training, supportive supervision, staffing, vaccine and stock management, cold chain management and community engagement related to vaccination service provision. Other factors that emerged were also considered as themes for analysis and discussion.

The following is a description of the results of the case study beginning with a description of

the respondents that were included in the study.

4.2.1 Description of study Participants

Number	Type	Location
IM001	Nurse	Chilanga Health Centre
IM002	Nurse	Makeni Health Centre
IM003	Nurse	Chipepo Health Centre
IM004	Nurse	Lusitu Health Centre
IM005	District Officer	Chilanga District
IM006	District Officer	Chirundu District

Table 4.1: Description of study participants for case study

Staffing

Respondents were asked what profession of personnel are functional at the facility and following that which ones of the functional are involved in immunisation activities. It was then asked what the role of each of the involved personnel in the process of providing the immunisation service is.

At Makeni konga health facility, the composition of the staffing is such that they have 4 Registered mid wives 2 Registered nurses, 2 Enrolled midwives, 4 Enrolled nurses and 1 Certified mid wife. All of these 13 personnel are involved in the immunisation process which involves a package of services including health talks to mothers, weighing children, entering the data in the registers, checking the nutritional status and administering the actual vaccinations and all such services. It was expressed that the low numbers of staff proved to be a challenge that created a lot of pressure for the workers available and making it difficult to separate roles in the immunisation service delivery.

"*The duties are general, anybody is found anywhere because it's not all the time when you find them on duty because we are in shifts being a 24hr clinic. When some are on night others are on day duty. The following week, the groups rotate."* No 2, Nurse (Chilanga)

The structure of Chilanga health centre staff is 2 Registered midwives 8 Enrolled mid wives, 3 certified mid wives, 8 registered nurses, 6 enrolled nurses, 5 clinical officers, 1 pharmacist, 1 EHT and 14 support staff which include Security officers, Registry officers and Data clerks. The enrolled midwife and the 2 registered nurses form the mother and child health (MCH) department which is solely responsible for providing the immunisation service. The roles in the immunisation service provision do not differ among the 3 officers in the department.

Chipepo health centre has 2 Clinical officers, 1 Enrolled nurse, 1 Registered nurse, 1 EHT, 1 Data Clerk, 1 Nutritionist, 1 Security officer, 1 Lab technician and 2 Classified daily employees. The nurses and the EHT were said to be full time immunisers while the Clinical officers were only made to join the immunisation service delivery when the need arose as a result of shortage of man power. The EHT is responsible for tallying and updating of the registers while the nurses take up the family planning, antenatal and immunisations.

In Lusitu, the staff composition is that of 1 Registered midwife, 4 Registered nurses, 2 lab technicians, 1 EHT, 1 Nutritionist, 1 Data clerk, 1 Classified daily employee 1Security guard and 4 Community health assistants. Involved in the immunisation are those that are in the MCH department specifically the mid wife, nurses and the Nutritionist. There was no clear separation of the roles of each in the provision of services. It was also noted that the facility has a challenge of providing accommodation. Therefore, while more staffing was necessary, there would not be enough room to house any new staff.

Supportive Supervision

To gain an appreciation of the nature of supportive supervision, respondents were asked if there had been any quarterly supportive supervisory visits conducted at the facility in the last quarter by the District/Province or National level MOH office. Respondents were further asked if they saw the visit or lack of thereof, as having contributed to the performance of the immunisation programme.

In Makeni konga health facility, the first question was answered in the affirmative highlighting further that District and Provincial level visitors were received in the facility 1 week prior to the interview date. It was perceived that such supervision visits allowed higher level officials to respond better to the challenges of the facility because it enhanced a sense of collaboration. Generally speaking, it was felt that for the Makeni konga health facility, improving the performance of the immunisation service lay outside of supportive supervisions. Instead, the reason for the recorded low immunisation coverage percentages, had a lot to do with the catchment area population preferring to use immunisation services elsewhere.

"*We have done our research as to why the numbers are low. What has been discovered is that this is a farm area and Makeni is a new facility so people are already used to go to other health facilities some do not want to change they have continued to go there. There is a facility called Makeni Ecumenical it's not far from here so people who are in our catchment area they are*

closer to that facility so they go that side. This one is one is Makeni GRZ, the other one is just Makeni and it is Lusaka District. So there is that sharing of clients. They are in our catchment area, but we can't force them to come here which is far, they are spending money so they go to the facility which is nearer to them. Some are still going to towns. It's a farm area like I said, if the people used to stay in woodlands, they still want to continue going there. Makeni GRZ has been in existence since 2012 and if you look at the figures comparing where we are coming from and where we are now, its rising up. When we started the numbers were quite low." No 2, Nurse (Chilanga)

Chilanga health centre had received a district and provincial level supervisory visit. While these visits were seen as beneficial for encouraging facility staff to work hard in order to present an improved picture at the next visit, it was perceived that the current level of supervision was sufficient as the facility was able to identify and find solutions to its own challenges.

"More supervisory visits are not necessary. Quarterly visits are okay because when we come here we know what we are doing. And periodically we sit down and review our records… When the coverage goes down, we'll sit down and discuss why this has happened. And then we'll find a solution on our own." No 1, Nurse (Chilanga)

Lusitu health centre was also said to have received supervisory visits from time to time from the district and the province. The visits were considered to have contributed to improvements in performance where the health centre was lagging behind. Specifically, the district provided support through giving direction on how to target children for immunisation, as well as logistical support for transport and fuel. This was based on the back ground of the facilities motorbike breaking down frequently. In dealing with the persistent transport challenge, the district would facilitate for the facility to borrow a motorbike from another facility or from the district. This level of supportive supervision was considered enough.

Chipepo health centre was said to have been visited by the district as per the quarterly routine and had also received visits from the province and National level. They affirmed the benefit of such visits stating that it was a result of such visits that immunisation coverage had maintained above the threshold of 80% for fully immunised through 2017. The current level of supportive supervision was deemed enough for the performance of the immunisation program though more visits were still desirable.

"*In 2016 actually, in our first 2 quarters our immunisation coverage wasn't good. So we had*

a lot of visits from the districts, we even had more outreach posts. At first we had 8, so we had to open other outreach posts and it actually improved the immunisation coverage." No 3, Nurse (Chirundu)

Training

In order to gain an appreciation of the training aspect, respondents were asked if there are any personnel trained in immunisation at the facility. In a case where training took place, respondents were asked to provide details of who provided the training and in which component of the immunisation programme the training was.

At Makeni konga health centre, it was pointed out that there had been no training in that regard since the MCH staff were sent there in 2012. However, since the staff were sent there from other facilities when the clinic was opened, it was possible that they had received some training at their former work stations.

It was shared that apart from the training that was received from their tertiary level training, largely no one in the department had received training specific to immunisations. Even through the acknowledging of an orientation to the measles Rubella vaccine when it was first introduced, and the growth monitoring that the district sometimes carries out in the area of immunisation such trainings were not considered necessary for improving performance.

Lusitu health centre had one staff who was sent for a provincial level training. The training was said to include the ordering of vaccines, the storage and such. It was stated that periodically there are in-house trainings or sensitisation trainings before the child health week that is meant to remind everyone what they are supposed to do.

In Chipepo health centre it was said that no trainings had taken place in the recent past though some staff were trained from school in areas like family health nursing for instance. Preparatory orientations hosted by the District Health Office were acknowledged as taking place prior to every child health week. This training was described as including the schedule, the age groups and even the sites for immunisation.

Stock Management

As regards stock management, respondents were asked who usually carries out the ordering of vaccine stocks and how often it was done. It was further inquired if the health facility

experienced any stock-out of any antigen in the last 3 months before the interview. Similarly, it was queried if the facility experienced auto-disable syringe stock-out of any antigen in the last 3 months? The facility was then requested to show updated vaccine stock cards including wastage.

Makeni konga health centre was said to order vaccines through the MCH coordinator on a monthly basis. They had neither experienced shortages of antigen nor auto-disposable syringes. Updated vaccine stock cards were made available for viewing. There were no wastages of vaccines recorded.

The ordering of vaccine stocks in Chilanga health centre was reported as achieved through anyone of the 3 in the MCH department. Though routinely done on a monthly basis, it was explained that the ordering was still carried out before the end of the month if any stock ran out. The centre had not experienced any shortage of antigen or auto-disable syringes. The centre made available updated vaccine stock cards on request. There were no wastages of vaccines recorded.

At Lusitu the ordering of vaccines was said to be carried out by the MCH coordinator a midwife at the facility, also on a monthly basis. The facility did not experience any shortages of any sort as regards immunisation stock and could hardly recount any wastages.

"It's difficult to account for wastages because it's very rare that we would have… there was only one time we experienced measles having expired that's the only time we recorded a wastage and apparently we didn't even have a lot in stock, it was just about 30-40 doses. Because we order according to the demand so it's very rare that we have wastages." No 4, Nurse (Chirundu)

In Chipepo, the nurse who is in charge of the MCH is also in charge of the vaccinations stock management. The facility had a constant supply of vaccines with no stock outs. As per the required procedure, a monthly report is submitted to the district and only then is a new consignment of vaccines sent through.

Cold chain management

It was questioned if the Health Facility has a functional cold chain in place and if the facility was able to show evidence of an updated Daily Temperature Monitoring Chart (+2^{o}C to +8^{o}C).

Makeni health centre was able to show evidence of both the requested elements. In Chilanga health centre, the cold chain was also managed through a chart which was stuck on the fridge surface. The picture was similar in Lusitu health centre which apart from an electrical fridge to manage the cold chain, also had a solar powered fridge that was donated to the facility by well-wishers. It was further given that the facility routine was for the nurse who was on duty on the weekend to also ensure that the fridges are monitored routinely.

Chipepo has a vaccine fridge which is monitored on a daily basis, every morning and evening. Having a separate deep freezer for icepacks, it enables the facility to have the vaccine fridge solely dedicated to the right storage of vaccines in the light of temperature.

Community engagement

To facilitate for an understanding on community engagement as regards immunisation service provision, respondents were asked if target populations for outreach sites are defined and further if the facility has been able to reach its target. Lastly, it was asked if community engagement activities allowed the facility to create demand for child vaccines among mothers/caregivers.

It was given that Makeni health centre has got targeted populations in each of its 8 (eight) zones though they were not able to reach the target for outreach due to limitations on the monetary resources required to carry through the process. This restricted the facility to only reach out to populations that are more than 5 kilometres from the facility. This limitation was based on the premise that those that are less than 5 kilometres from the facility have the capability to come to the facility using their own means of transportation. Even with efforts to only reach populations further than 5km, it was admitted that Makeni facility was yet to reach some populations that are much further.

"*You can only go out for outreach when you have got some funds so there are times when maybe we have not received imprest in that month so it's difficult to go for outreach because we need lunch allowance, we need fuel especially*." No 2, Nurse (Chilanga)

Generally speaking, outreach was said to be the reason that more populations were getting to know about the facility translating into improved numbers in immunisation over time.

In Chilanga, targets for outreach were defined as monthly goals. However, the facility had been

facing challenges in reaching the targets because of the fact that some populations live in hard to reach areas. Also, the reliability of the contribution of the community health workers who should be making available information of impending outreaches to the community was doubted in that sometimes the turnout at the outreaches is low.

Similar to Chilanga facilities, Lusitu health centre also has monthly targets set out for immunising children and it was admitted that the facility was through its outreach activities able to reach more children than at the facility. Even with such progress, logistics were also a challenge and were keeping the facility from reaching its targets.

Chipepo has 10 zones in which 2 volunteers have been identified per zone. A schedule for community outreach is set out for the entire year and given to the volunteers. A reminder is also sent to these volunteers a week before outreach activities. Outreach activities are said to have attracted a good response from care takers particularly mothers. Noteworthy, It was pointed out that fathers were not involved much in the bringing children to immunisation.

"*The response is quite good. Whenever we go out, we find mothers in numbers. It's only that usually its only women taking children for immunisations men don't participate fully, there are only a minority who take their children for immunisation….. We would want men to be involved as well and what we usually do if a man brings a child for children's clinic we usually attend to them first. Actually we would want men to be bringing their children so that they can also learn what is happening at the immunisation session.*" No. 3, Nurse (Chirundu)

Challenges in providing new vaccine service

Respondents were asked if there had been a difference in the requirements to provide new vaccines compared to traditional vaccines and if the facility experienced any challenges in providing the PCV and RV vaccine in particular. In Makeni, apart from increasing the number of injections that needed to be administered per child, there was no perceived difference to the facility on what was needed to provide the new vaccines and the facility did not face challenges specific to the provision of the new vaccines. Chilanga health centre could not identify any challenges that were being faced in the provision of the new vaccines in particular either.

In Lusitu health centre, it was said that there were not any specific differences in the requirements for provision of the new vaccines as well. The only instance where the facility experienced a stock out of new vaccines was when Measles Rubella vaccine was introduced.

This was specifically because the old Measles vaccine expired as a result of a directive to wait for the new vaccine instead of administering the old vaccine that was in stock. There was no challenge in supply related to the PCV and RV vaccine.

"*When a new vaccine is introduced you integrate it into the old one. There aren't so many issues. Though people may ask 'why are you giving this?' but with a good explanation they accept and they are part of the routine….there was no time when we ran out of vaccines the supply was there all the time*". No.4, Nurse (Chirundu)

It was revealed however, that the Lusitu health facility had faced immense challenges with transport which were alleviated by the DHO office which would ask on the facilities behalf for the neighbouring facilities to lend them a motorbike. The DHOs office then provided fuel once motorcycles were secured.

It also came out that because of lack allowances for staff to be able to effectively carry out outreach, it was difficult to carry through community engagement. Because the facility receives a monthly amount of imprest that is not considered enough and does not come consistently, the facility was having challenges in meeting the requirements for outreach.

"*Imprest is supposed to come every month but you find that like the last time we received is July so July upto date, we have not received so we are stuck.*" No 2, Nurse (Chilanga)

In Chipepo, it was similarly stressed that there were no peculiarities associated with the provision of new vaccines compared with the old vaccines. Both the demand and supply side of the new vaccines were said to be pointing towards progress.

"*I don't think there is any difference because when these vaccines were introduced, we actually went flat out sensitising the community about the introduction of the new vaccines. And this time around we have even introduced the Injectable Polio vaccine so before rolling it out we first went flat out in the community in teaching people about these vaccines so there isn't any difference and people are not even defaulting from taking their children for immunisations….We have never had a shortage, usually DHOs office would rather go and get from other facilities Chipepo being the highest populated facility in the district so they are usually given more than enough".* No. 3, Nurse (Chirundu)

CHAPTER FIVE: DISCUSSION

This dissertation aimed at establishing the coverage of Pneumococcal Conjugate vaccine (PCV) and Rotavirus vaccine (RV) and exploring supply-side factors in select health centers of Chilanga and Chirundu districts of Lusaka province in Zambia.

5.1 The Coverage of PCV and RV

The Zambian immunisation programme calls for a target of 90% coverage in all antigens through the implementation of the Reaching Every District (RED) approach. The coverage's of second dose rotavirus vaccine (RV 2), third dose pneumococcal conjugate vaccine (PCV 3) and third dose Diphtheria Pertussis Tetanus (DPT 3) vaccine was established to be lower than 90% for all but one of the health facilities. This data might be indicative of missed opportunities for vaccination among the under one population which has not been captured in the health facility distribution of antigens.

This failure to reach set national targets rhymes with the results of the routine performance assessment carried out in February 2013 by the Gwembe district community medical office (DCMO) in Southern province Zambia. The assessment identified that for health centres in the district which had an immunisation coverage rate of 56% to 70%, contributing to the low immunisation coverage were: human resource shortage constraints, leading to interruptions in under five clinic services (WHO, 2014). Discussions with keys informants in this study, pointed to the likelihood that staffing also is a contributing factor to the observed performance in both Chilanga and Chirundu districts. The staffing condition is relevant to the immunisation process as it has implications on the number of children that can be reached and also to what extent a facility can separate the roles during the delivery of the service to enhance quality. It is noteworthy that the best performing facility among those considered, Chilanga health centre, recorded the highest coverage rates which could be attributed to the fact that it also had the highest number of staff at over fifty (50).

Commendably, supportive supervision visits were confirmed as taking place for both good performing and poor performing health facilities. While the visits were acknowledged as being useful for encouraging improved performance and problem resolution in the facility, it was generally felt that the current level of supervision, which is mainly coming from the district level on a quarterly basis, is sufficient and there was no need for more district level visits, nor

visits from a higher administrative level. However, health facility staff pointed to other challenges affecting coverage rate which included the sharing of clients. This challenge results from target group populations that should be receiving the vaccine service from one centre, preferring to go to another. Consequently, this reduces the numerator for calculating their coverage rate causing the health facilities in question to fail to reach their targets of 90%.

Another challenge that arose is the need for logistical support in terms of transportion vehicles and fuel. This was also the case in the Gwembe assessment. Thus, we can conclude that client preference for other facilities and logistical challenges which particularly encompass vehicles and fuel are important themes that must be highlighted as challenges inhibiting the observed immunisation coverage rates.

The implementation of supportive supervision visits in all the health centers of the study agrees with the findings of Mwanamwenge *et al* (2016), who through the evaluation of the implementation of the RED/C strategy in Lusaka district, concluded that supportive supervision is the best implemented component of the RED strategy in Lusaka district, Zambia. Availability of this supportive supervision at points of health care delivery has the potential to improve the quality of the RED implementation of services. The success of the RED strategy hinges on many aspects such as regular staff orientation, managerial capacity building, on the job training and training on immunisations. It is therefore vital that these are strengthened in tandem with supportive supervision in the RED strategy. Considering the fact that supportive supervision visits are taking place consistently but some of the coverage rates are still below set national targets, it can be concluded that perhaps not much is being done during the supportive supervision visits to directly have an influence on the immunisation coverage rates to increase them. Since supportive supervision is already taking place it can be an area that is invested in further to achieve positive results in the immunisation service provision.

Stemming from the discussions on community engagement, the critical role of logistics in general, which includes vehicles and fuel in particular came out rather emphasized and must be given attention. To be able to carry out community engagement, the facilities need to be empowered with the means to move from the health facility into the communities. However, the health facilities have found themselves without vehicles, fuel or even allowances to give officers to be able to reach the populations that are far off. This observation in line with studies carried out in Benin, Cameroon, Democratic Republic of Congo, Ethiopia, Ghana, Madagascar,

Sierra Leone, Togo and Uganda (WHO, 2007). The studies in these countries were implemented separately and combined into one report. The aim was to assess the implementation of the RED strategy. Fuel shortages and lack of transport (transport unavailable or broken down) are often cited by immunisation programmes as key reasons for cancellation of outreach/mobile services in these countries. This handicap in terms of logistics explains why the facilities in this study are seemingly failing to reach set targets for immunisation coverage.

For every facility considered in the study, the ordering of vaccines is managed by a mid-wife and carried out on a monthly basis. This system has been said to prevent the facilities from experiencing stock outs of either antigens or syringes. It is also uncommon for the facilities to experience wastages because the ordering is done based on the projected monthly demand. This is different from what Favin *et al* (2012) found when they analysed global literature on reasons for low coverage of vaccines. Favin found that in Kenya stock outs have a bearing on the availability of vaccines and hence on their supply. Having found out that the facilities are not experiencing any stock outs in this study, makes it unlikely that the reason most of them have not reached set targets is as a result of how the ordering of vaccines is done. It has been implied through this study that the availability of stock is not a challenge at health facility level in the case of the facilities investigated.

The availability of a cold chain at any given facility is a necessary area to look into in understanding the supply side of immunisations. An effective vaccine delivery system is pointless if the vaccines are themselves inactivated as a result of poor handling and storage (Ngoma et al, 2011). The availability of the cold chain has been found to prevent health facilities from having vaccines when they are needed in other studies in India, the United states of America and Bangladesh (Gupta 1993, Nyarko et al, 2001, Perry et al, 2007).This study however found that all facilities whether poor or good performing, had a fridge to store vaccines until they are consumed. It was therefore unlikely that the cold chain had anything to do with the prevailing vaccine coverage's that are below the expected target.

5.2 The routinisation of PCV compared to DPT

When data on the coverage of PCV was compared to DPT for all 3 doses of the vaccine in the 4 selected health facilities, and expressed as a ratio of the 2 antigens, ratios of 1.00 were obtained across all 4 health facilities and across 3 doses of both PCV and DPT3. Because the

2 antigens, PCV and DPT are administered simultaneously in the immunisation schedule, the value of 1.00 obtained from the comparison, provides an understanding that the administration of the vaccines are in fact being made at the same time in all the facilities assessed and for all doses as the case should be. This finding differs from program evaluation process results from the year 2015 which showed that PCV coverage lags behind DPT for both the first dose and for the completed series. In terms of figures, it was given that DPT 1 and DPT 3 were at 79% and 70% in that order while PCV1 and PCV3 were at 73% and 60% (GAVI, 2015). Put in another way, data indicated that delivery of PCV and rotavirus vaccine has remained lower than existing vaccines in the system (GAVI, 2015). The findings of this study indicate otherwise. This shows a positive signal in that there are no supply side issues affecting only the new vaccines.

In depth interviews confirmed that there had been no unique challenges faced in administering the new vaccines compared to the older vaccines in the schedule. Not even resistance from the care givers of the children when receiving the vaccines was cited. The feedback was similar from district health office officials who had not faced any challenges specific to the provision of the new vaccine compared to the old one at district level. However, the general challenge of logistical support in the form of imprest came up in probing. The imprest referred to is the periodic allocation of funds given to the health facilities. It brought to light that whether it is in dealing with new or old vaccines, the general provision of vaccination services is being affected by the inconsistent supply of imprest funds for outreach activities. When the facility does not receive money, it cannot plan to go into the far off communities to provide the vaccination service.

The findings of this study differ from other studies which showed that delivery rates of new vaccines remained lower than traditional vaccines in Uganda, Mozambique and Bangladesh (GAVI, 2015). In these studies, the reasons varied as to the explanation of the differences. It was given that the variations came as a result of a separate visit that was scheduled to avoid multiple injections in the same visits. Differences between new and traditional vaccine coverage rates were said to be driven by vaccine stock outs as well. Reporting issues at the facility level, with pentavalent vaccine being better recorded as it is a performance indicator for facilities in Uganda was another reason. Based on subnational data collection in this study, there were no stock outs or any other reason to cause a difference in the coverage rates for PCV and DPT.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

There is generally strong facility level commitment to the delivery of immunisation services in the health facilities covered in this study. However, results have shown that out of the 4 health facilities under investigation, only 1 is above the set national target of 90% per specific antigen when it comes to DPT, PCV and RV coverage rate. The supply side factors that explain the observed coverage rates are community engagement and staffing. The health facilities have identified the need to reach far off populations through outreach, but have been faced with barriers in meeting the challenge of logistics for the community outreach process. In particular, broken down motor bikes, lack of fuel and lack of finances to cover the efforts of health facility staff through lunch allowances are a common hindrance in providing the vaccination service. This is especially concerning because the health facilities are responsible for servicing catchment area populations that are large and sparsely distributed.

It was generally felt that an increase in the number of staff would be a positive to the immunisation process as facilities are faced with shortage of staff to allow for clear definition of the roles that specific staff play during the immunisation process.

From the comparison of PCV coverage rates to DPT coverage rates, the study further revealed that the delivery of the new vaccines is equal to that of the traditional vaccines. This observation agrees with the findings of the in depth interviews with key informants who confirmed the non-existence of any stock out challenges specific to the new vaccines, or in fact any other challenge that would affect the coverage rate of the new vaccines.

Health facility staff training, supportive supervision, vaccine and stock management and cold chain management are all supply side factors that were described as taking place as they normally should. There were no negative influences on the immunisation program arising from the way these aspects are being handled.

6.2 Recommendations

Policy

Since challenges of availability of logistics to carry out outreach activities to reach the unreached populations has been described as a draw back in reaching immunisation programme goals, and generally, the health facilities see themselves as capable of resolving challenges but for logistics, I thus recommend that the resources that are meant for quarterly supervision visits, are also apportioned towards the logistics for the immunisation programme in order to reach the unreached populations.

Practice

It appears there is a problem of over reporting as reflected by percentages over a 100 which can be misleading to the program managers and health workers The RED strategy aims to increase and sustain high levels of immunisation through a number of focus areas which include management and utilization of data at all levels. In order for data on immunisation to be more useful to the program decision making process, I recommend that the denominator, which is used to calculate the performance of the immunisation service per facility is revised according to numbers that actually reflect the populations that acquire services from the facility. The current targets have over time presented percentages such as those over a 100 for instance which is not useful in giving feedback to the program managers.

Conversely, some facilities have continued to appear as though they are not performing well from their failure to reach the target coverage rates and yet, the populations that they are targeting are routinely going elsewhere to receive services.

In essence, health managers require reliable data for planning purposes. It has been shown that when data are of bad quality, their demand also drops, thereby affecting program effectiveness (Braa et. al, 2012).

Research

More studies can be done to investigate the pattern in the prevalence of Pneumococcal and Rotavirus diseases since the introduction of the vaccinations to assess their effectiveness against observed coverage rates.

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APPENDICES

Appendix 1: Participant Information Sheet and consent form

Participant Information sheet

Title of study: The coverage of Pneumococcal Conjugate vaccine (PCV) and Rotavirus vaccine (RV) with the supply side factors in select Health Centres of Chilanga and Chirundu districts of Lusaka province in Zambia: A Mixed Methods study.

Introduction

You are being invited to take part in a research study to be conducted in Chilanga and Chirundu districts, Zambia under the supervision of Rhoda Chabaputa, Principal Investigator, University of Zambia, School of Public Health, department of Global Health and Development.

Purpose of the study

The purpose of this study, which involves research with individuals working in the provision of immunisation services, is to calculate the coverage of Pneumococcal Conjugate **v**accine (PCV) and **Rotavirus v**accine (RV). Thereafter, we intended to understand why the coverages for PCV and RV are either high or low. Such data would be very useful for improving the provision of vaccination services in your health facility and other similar facilities.

Why you are being asked to participate

This study intends learn lessons from those who are involved in the provision of immunisation services which include health facility level, district level and national level.

Voluntary Participation

Your participation in the study is purely voluntary. You are free to withdraw from the study at any time you wish to do so. You do not have to answer any question you do not want to answer. You have the right to ask or seek any clarification from the researcher whenever you wish to do so.

Risk and benefits

This is a study is in depth meaning it will ask for your explanation and perceptions of the immunisation process. There is no physical risk involved in this research. There are no direct benefits or monetary gain to you by participating in this study. However, the knowledge and information you will give by your participation will potentially help strengthen the delivery of immunisation services to the community.

Will you receive anything for being in this study?

There will be no cost to you for taking part in this study. You will be paid 85 Kwacha to compensate for your lunch cost when participating in this study.

Confidentiality

Data collected from you will be kept strictly confidential and can only be shared with your permission. The reports will be entirely syntheses (data and analysis) such that no participant can be identified. Transcripts and recordings will be kept secure, and will be destroyed at the completion of the project. Any publication or presentation about the results will not use your name or identify you personally.

Consent form

The purpose of this study has been explained to me. I further understand that: if I agree to take part in the study, I can withdraw at any time without having to give an explanation and that taking part in this study is purely voluntary.

I……. consent to participate in the study that has been explained to me.

Signature …….... Date ……

Or thumb print…….....Date……...

Name of witness……signature……Date……

Name of interviewer ……

Signature ……...Date ……

If you wish to seek any clarification, please contact me using the following addresses: -

Ms. Rhoda Chabaputa

UNZA School of Public Health - Dept. of Global Health

Box 50110

Lusaka.

Phone: 0977-391449

For any ethical clarification please contact: -

The Chairperson

The University of Zambia Biomedical Research Ethics Committee

E-mail: unzarec@unza.zm

Research Ethics Committee Fax: +260-1-250753

P.O. Box 50110 Tel. no. 01 256067Lusaka, Zambia

Appendix 2: Data collection tools

In-depth Interview Guide for Health Care Providers

The coverage of Pneumococcal Conjugate Vaccine (PCV) and Rotavirus Vaccine (RV) with the supply-side factors in select Health Centres of Chilanga and Chirundu districts of Lusaka Province in Zambia: A Mixed Methods study.

Instructions:

a. Introduce yourself to the respondents

b. Explain the objective of the research and the benefits to the respondents

c. Obtain consent from the interviewee to proceed with the interview.

SECTION A: STAFFING

1.What profession of personnel are functional at this facility?

2.Which ones of these are involved in immunisation activities?

3.What is the role of each of the involved personnel in the process of providing the immunisation service?

SECTION B: SUPPORTIVE SUPERVISION

4.Have there been any quarterly supportive supervisory visits conducted at the facility in the last quarter by the District/Province or National level?

5.Do you think this has contributed to the performance of the immunisation programme?

6.What would be the ideal nature of supervision for the immunisation programme in your description?

7.Which level would you consider more effective in improving performance?

SECTION C: TRAINING

8. Are any personnel trained in immunisation?

9.Please provide details of who provided the training and in which component of the immunisation programme

SECTION D: STOCK MANAGEMENT

10.Who usually carries out the ordering of vaccine stocks?

11.How often is it done?

12.Has the facility experienced any Stock-out of any antigen in Health Facility in the last 3 months (Specify?)

13.Has the facility experienced Auto-disable syringes stock-out of any antigen in the last 3 months?

14.Are you able to show Updated Vaccine stock cards (including wastage)?

SECTION E: COLD CHAIN MANAGEMENT

15.Does the Health Facility Presently have of functional cold chain?

16.Is the facility able to show evidence of an updated Daily Temperature Monitoring Chart ($+2^{o}C$ to $+8^{o}C$)?

SECTION F: COMMUNITY ENGAGEMENT

17.Are target populations for outreach sites defined?

18.Has the Facility been able to reach its target?

19.Have community engagement activities allowed the district to create demand for child vaccines among mothers/caregivers

SECTION G: CHALLENGES IN PROVIDING NEW VACCINE IMMUNISATION

20.Has there been a difference in the requirements to provide New vaccines compared to traditional vaccines?

21.Has the facility experienced any challenges in providing the PCV and Rota Vaccine in particular?

Please elaborate as fully as possible

Appendix 3: HIA2 Antigen Figures for 2017 broken down by Quarter

CHILANGA HEALTH CENTRE			
	Rota 2	PCV3	DPT3
Q1	221	242	242
Q2	242	242	242
Q3	232	218	218
Q4	262	274	274
	957	**976**	**976**
<1 Pop	770	770	770
Coverage (%)	124.29%	126.75%	126.75%

MAKENI HEALTH CENTRE			
	Rota 2	PCV3	DPT3
Q1	67	83	83
Q2	139	125	125
Q3	75	96	96
Q4	81	80	80
	362	**384**	**384**
<1 Pop	822	822	822
Coverage (%)	44.04%	46.72%	46.72%

CHIPEPO HEALTH CENTRE			
	Rota 2	PCV3	DPT3
Q1	96	91	91
Q2	155	148	148
Q3	100	144	144
Q4	119	105	105
	470	**488**	**488**
<1 Pop	664	664	664
Coverage (%)	70.78%	73.49%	73.49%

LUSITU HEALTH CENTRE			
	Rota 2	PCV3	DPT3
Q1	64	75	75
Q2	66	54	54
Q3	46	51	51
Q4	39	32	32
	215	**212**	**212**
<1 Pop	1531	1531	1531
Coverage (%)	14.04%	13.85%	13.85%

Appendix 4: Permission Letters

THE UNIVERSITY OF ZAMBIA

BIOMEDICAL RESEARCH ETHICS COMMITTEE

Telephone: 260-1-256067
Telegrams: UNZA, LUSAKA
Telex: UNZALU ZA 44370
Fax: + 260-1-250753
E-mail: unzarec@unza.zm
Assurance No. FWA00000338
IRB00001131 of IORG0000774

Ridgeway Campus
P.O. Box 50110
Lusaka, Zambia

4th May, 2018. Ref: 042-06-17.

Ms. Rhoda Chabaputa,
UNZA-School of Public Health,
Department of Global Health,
Lusaka.

Dear Ms. Chabaputa,

RE: SUBMITTED RESEARCH PROPOSAL: "THE COVERAGE OF PNEUMOCOCCAL CONJUGATE VACCINE (PCV) AND ROTAVIRUS VACCINE (RV) AND ITS ASSOCIATED FACTORS IN SELECTED HEALTH CENTRES OF CHILANGA AND CHIRUNDU DISTRICTS OF LUSAKA PROVINCE IN ZAMBIA" (REF. No. 042-06-17)

The above-mentioned research proposal was presented to the Biomedical Research Ethics Committee (UNZABREC) on 27th April, 2018. The proposal is approved. The approval is based on the following documents that were submitted for review:

a) **Study proposal**
b) **Questionnaires**
c) **Participant Consent Form**

APPROVAL NUMBER : REF.042-06-17

This number should be used on all correspondence, consent forms and documents as appropriate.

- **APPROVAL DATE : 4th May 2018**
- **TYPE OF APPROVAL : Standard**
- **EXPIRATION DATE OF APPROVAL : 3rd May 2019**
  After this date, this project may only continue upon renewal. For purposes of renewal, a progress report on a standard form obtainable from the UNZABREC Offices should be submitted one month before the expiration date for continuing review.
- **SERIOUS ADVERSE EVENT REPORTING**: All SAEs and any other serious challenges/problems having to do with participant welfare, participant safety and study integrity must be reported to UNZABREC within 3 working days using standard forms obtainable from UNZABREC.
- **MODIFICATIONS**: Prior UNZABREC approval using standard forms obtainable from the UNZABREC Offices is required before implementing any changes in the Protocol (including changes in the consent documents).
- **TERMINATION OF STUDY**: On termination of a study, a report has to be submitted to the UNZABREC using standard forms obtainable from the UNZABREC Offices.
- **NHRA:** Where appropriate, apply in writing to the National Heath Research Authority for permission before you embark on the study.
- **QUESTIONS**: Please contact the UNZABREC on Telephone No. 256067 or by e-mail on unzarec@unza.zm
- **OTHER:** Please be reminded to send in copies of your research findings/results for our records. You're also required to submit electronic copies of your publications in peer-reviewed journals that may emanate from this study.

Yours sincerely,

Dr. S.H Nzala
VICE-CHAIRPERSON

Appendix 4: Permission Letters

THE NATIONAL HEALTH RESEARCH AUTHORITY
Paediatric Centre of Excellence
University Teaching Hospital
P.O. Box 30075
LUSAKA
Telephone: +260 211 250309 | **Mobile:** +260 95 5632726
Email: znhrasec@gmail.com | **Website:** www.nhra.org.zm

17 May 2018

Rhoda Chabaputa
University of Zambia
School of Public Helath
LUSAKA

Re: Request for Authority to Conduct Research

The National Health Research Authority is in receipt of your request for authority to conduct research titled "**The coverage of Pneumococcal Conjugate Vaccine(PCV) and Rotavirus Vaccine (RV) and its associated factors in select Health Centres of Chilanga and Chirundu districts of Lusaka Province in Zambia.**"

I wish to inform you that following submission of your request to the Authority, our review of the same and in view of the ethical clearance, this study has been **approved** on condition that:

1. The relevant Provincial and District Medical Officers where the study is being conducted are fully appraised;
2. Progress updates are provided to NHRA quarterly from the date of commencement of the study;
3. The final study report is cleared by the NHRA before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by the NHRA, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, University leadership, and all key respondents.

Please note this approval does not extend to your request to transfer biological materials. You will receive follow-up guidance after your request to transfer biological materials is reviewed by the National Health Research Ethics Board.

Yours sincerely,

Dr. Godfrey Biemba
Director/CEO
National Health Research Authority

All correspondences should be addressed to the Director/CEO National Health Research Authority

Appendix 4: Permission Letters

All Correspondence should be addressed to the Provincial Medical Officer
Telephone: +260 211 256815
Telefax: +260 211 256814

In reply please quote:

File No. .....

REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH

PROVINCIAL MEDICAL OFFICE
P. O. BOX 32573
LUSAKA

6th November, 2017

Rhoda Chabaputa (2016144864)
School of Public Health
Department of Community and Family Medicine
University of Zambia
Lusaka

RE: REQUEST FOR AUTHORITY TO CONDUCT RESEARCH

Reference is made to the letter dated 25th October 2017 in which you requested for a letter of no objection to carry out the research entitled ***" The Coverage of Pneumococcal Conjugate Vaccine (PCV) and Rota Virus Vaccine and its associated factors"*** in selected health centres of Chilanga and Chirundu Districts of Lusaka Province in Zambia.

Lusaka Provincial Health Office is happy to inform you that we have no objection to your request for you to conduct research in the selected facilities mentioned.

Yours faithfully,

REPUBLIC OF ZAMBIA MINISTRY OF HEALTH PROVINCIAL HEALTH OFFICE LUSAKA
07 NOV 2017
PROVINCIAL MEDICAL OFFICER P.O. BOX 32573 LUSAKA

Dr. Kakungu Simpungwe
Ag/ Provincial Health Director
LUSAKA PROVINCE

cc. Chirundu District Health Director – Chirundu

cc. Chilanga District Health Director - Chilanga

Physical Address: 3 Saise Road, Longacres, Lusaka, Zambia

Appendix 4: Permission Letters

All correspondences
Should be addressed
To the District Medical Officer

In reply please quote

REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH
CHILANGA DISTRICT MEDICAL OFFICE
P.O BOX 350097, CHILANGA

27th October, 2017

The Chairperson
The University of Zambia Biomedical Research Ethics Committee
P.O Box 50110
LUSAKA.

REF: LETTER OF NO OBJECTION TO THE STUDY : RHODA CHABAPUTA (2016144864)

This is to confirm to you that the Chilanga District Medical office has no objection to the study on "The coverage of Pneumococcal Conjugate vaccine (PCV) and Rotavirus vaccine (RV) and its associated factors in select health centres of Chilanga and Chirundu districts" being conducted in the district, as long as it is approved by the ethics committee.

Your assistance in this matter will be highly appreciated.

Dr. Leah Namonje
DISTRICT HEALTH DIRECTOR

REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH
CHILANGA DISTRICT MEDICAL OFFICE
27 OCT 2017
DISTRICT MEDICAL OFFICER
(D.M.O)
P O BOX 350097, CHILANGA, LUSAKA

Appendix 4: Permission Letters

All Correspondence should be addressed to
The District Medical Officer
Tel: +260 211 515355
+260 211 515354

In reply, please

No

REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH

CHIRUNDU DISTRICT HEALTH OFF
P. O. Box CHR
CHIRUN

3rd November 2017

RE: REQUEST TO CONDUCT RESEARCH: RHODA CHABAPUTA (2016144864)

Reference is made to the above subject matter.

We wish to inform you that Chirundu District Health Office has no objection to you conducting the research on the coverage of Pneumococcal Conjugate Vaccine (PCV) and Rota Virus Vaccine and its Associated Factors in selected Health centers in Chirundu District.

We look forward to receiving your findings which will feed into improvement of service delivery in the District.

Yours faithfully
Chirundu District Health Office

Dr. M.K Lembalemba
DISTRICT HEALTH DIRECTOR - CHIRUNDU