

Demand-side Interventions to improve Routine Immunization Coverage in Nigeria

A LITERATURE REVIEW

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**DEMAND-SIDE INTERVENTIONS TO IMPROVE ROUTINE IMMUNIZATION
COVERAGE IN NIGERIA**

A thesis submitted in partial fulfilment of the requirement for the degree of
Master of Science in Public Health

BY

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Nigeria**

DECLARATION

Where other people's work has been used (from either a printed source, internet or any other source), this has been carefully acknowledged and referenced following departmental requirements.

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TABLE OF CONTENTS

DECLARATION	i
TABLE OF CONTENTS.....	ii
ACKNOWLEDGEMENTS.....	iv
LIST OF TABLES AND FIGURES	v
LIST OF ABBREVIATIONS	vi
DEFINITION OF TERMS	viii
ABSTRACT.....	ix
CHAPTER 1: INTRODUCTION AND BACKGROUND	1
1.1 Introduction	1
1.2 Background information for Nigeria	2
1.2.1 History of RI efforts in Nigeria	4
1.2.2 Recent Vaccine Introductions into Nigeria’s EPI schedule	6
CHAPTER 2: PROBLEM STATEMENT, JUSTIFICATION, AND OBJECTIVES	8
2.1 Problem Statement	8
2.2 Justification.....	11
2.3 Study objectives	12
CHAPTER 3: METHODS AND ANALYTICAL FRAMEWORK.....	13
3.1 Search Method	13
3.2 Analytical Framework	13
CHAPTER 4: STUDY FINDINGS/RESULTS.....	16
4.1 Introduction	16
4.2 Demand-side dimensions of Access to RI	16
4.2.1 Ability to perceive	16
4.2.2 Ability to seek	18
4.2.3 Ability to reach	20
4.2.4 Ability to Pay.....	22
4.2.5 Ability to Engage	23
CHAPTER 5: DISCUSSION.....	29
5.1 Introduction and summary of results	29
5.2 Discussion of results based on the dimensions of access contained in the Levesque Framework.....	30
CHAPTER 6: CONCLUSION AND RECOMMENDATIONS	34
6.1 Conclusion	34
6.2 Recommendations.....	35

REFERENCES	37
ANNEXES	42
Annex a: Key Search terms	42
Annex b: Summary of demand creation interventions assessed in order of the demand side levels of access in the Levesque framework.	43
Annex c: Considerations that led to the ranking of Yes/No/Partially.	44
Annex d: Current EPI Schedule for Nigeria	49

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LIST OF TABLES AND FIGURES

Figures

Figure 1: Global vaccination coverage for 1980 to 2018	page 2
Figure 2: Map of Nigeria showing states and geopolitical zones	page 3
Figure 3: The Nigerian Health system	page 4
Figure 4: 2016 NICS Nationwide Penta1 and Penta3 coverages compared to show dropout situation by state	page 6
Figure 5: Trend of deaths in children under 5 years between 1990 to 2018	page 8
Figure 6: Trend in Vaccination Coverage for 1990 to 2018	page 9
Figure 7: Penta3 coverage rates at State and Zonal levels as of 2016	page 9
Figure 8: Reasons for non-vaccination by state	page 10
Figure 9: Common reasons for non-vaccination	page 11
Figure 10: The Lévesque Conceptual framework of access to health care	page 14
Figure 11: Most common sources of information about RI	page 17

Tables

Table 1: Ranking of interventions concerning the Ability to Perceive	page 18
Table 2: Ranking of interventions concerning the Ability to seek	page 20
Table 3: Ranking of interventions concerning the Ability to Reach	page 22
Table 4: Ranking of interventions concerning the Ability to Pay	page 23
Table 5: Ranking of interventions concerning the Ability to Engage	page 25
Table 6: Interventions Descriptive table	page 26

LIST OF ABBREVIATIONS

AFRIN	Accountability Framework for Routine Immunization Service Providers
bOPV	Bivalent Oral Polio Vaccine
BMGF	Bill and Melinda Gates Foundation
CCT	Conditional Cash Transfers
CES	Community Engagement Strategy
CGPP	Core group partners project
CHIPS	Community Health Influencers, Promoters and Services
CHW	Community Health Worker
cMYP	Comprehensive EPI multi-year plan
DPT	Diphtheria, Pertussis and Tetanus
EPI	Expanded Programme on Immunization
FCT	Federal Capital Territory
FIC	Fully Immunized Child
FMoH	Federal Ministry of Health
GVAP	Global Vaccine Action Plan
GRISP	Global Routine Immunization Strategic Plan
HTR	Hard-To-Reach
HSDF	Health Strategy & Delivery Foundation
I-MOP	Integrated Medical Outreach Programme
IRISS	Immunization Reminder and Information SMS system
IDP	Internally Displaced persons
JTF	Joint Taskforce
LGA	Local Government Areas
LIDs	Local Immunization Days
LQAS	Lot Quality Assurance Sampling
MCV	Measles Containing Vaccine
MICS	Multiple indicator Cluster Survey
NDHS	Nigeria Demographic Health Surveys
NICS	National Immunization Coverage Survey
NERICC	National Emergency Routine Immunization Coordinating Centre
NPHCDA	National Primary Health Care Development Agency
NPI	National Programme on Immunization
NRISP	National Routine Immunization Strategic Plan
NSHDP	National Strategic Health Development Plan
NSIPSS	Nigeria Strategy for Immunization and PHC System Strengthening
NPEEP	National Polio Eradication Emergency Plan
NTLC	Northern Traditional leader's council
OIRIS	Optimized Integrated Routine Immunization Sessions
PEI	Polio Eradication Initiative
PHC	Primary Health Care
RED	Reaching Every District
RES	Reach Every Settlement
REW	Reaching Every Ward
RIC	Reach Inaccessible Children
RI	Routine Immunization
RIWG	Routine Immunization Working Group
SIA	Supplementary Immunization Activities
SDG	Sustainable Development Goals
SPHCDA	State Primary Health Care Development Agency
SURE-P	Subsidy Reinvestment and Empowerment Programme
UHC	Universal Health Coverage

UNICEF	United Nations Children's Fund
VCM	Voluntary Community Mobilizers
VIR	Vaccine Indicator Reminder
WHA	World Health Assembly
WHO	World Health Organization

DEFINITION OF TERMS

- ❖ **Under-five mortality rate:** Probability of dying between birth and exactly 5 years of age, expressed per 1,000 live births.
- ❖ **Infant mortality rate:** Probability of dying between birth and exactly 1 year of age, expressed per 1,000 live births.
- ❖ **Neonatal mortality rate:** Probability of dying during the first 28 days of life, expressed per 1,000 live births.
- ❖ **Probability of dying among children aged 5–14:** Probability of dying at age 5–14 years expressed per 1,000 children aged 5.
- ❖ **Demand:** the action to seek, support, and or advocate for vaccines and immunization services.

ABSTRACT

Introduction

Immunization is recognised as the most successful intervention against infectious diseases and prevents about 2.5 million deaths annually; however, inequalities in RI coverage remain in countries like Nigeria.

Nigeria has the most unimmunized children (4.3 million) in the world despite efforts put in place to improve immunization over time. Recently, the 2016 National Immunization Coverage Survey placed the DPT3 coverage at 33%. Subsequently, efforts were directed at improving the supply of RI services, which need to be matched with demand. Unawareness, poor health-seeking behavior, and lacking faith in immunization have hindered demand for Routine Immunization (RI) and are top three reasons accounting for the 33% coverage.

Methods

This study featured a literature review of demand generation interventions to identify how well they address the barriers to accessing RI. Analytical frameworks were used to review dimensions of access to RI and to score the interventions based on 5 Community engagement criteria; Ownership, Sustainability, responsiveness, Community Participation and Accountability.

Results

Seventeen interventions were identified from the search, discussed, and scored; it was observed that most of the interventions had the potential to drive demand, and also some interventions were able to address more than one demand barrier. Some interventions were deemed to have more potential to raise demand more effectively, while concerns were raised about how well some interventions met the ownership, sustainability, and responsiveness criteria.

Conclusion

The interventions discovered, if implemented efficiently could potentially increase demand for RI but few required more thought, especially because they are meant to be owned and implemented by communities eventually. To ensure the sustainability of interventions, it was evident that there is a need to sustain collaborations with non-health actors and also strengthen advocacy for increased financing to cover interventions that are to be scaled up after evidence of successful pilots, and finally, more research is required to measure the impact of interventions for more efficient decision making.

Keywords: *Immunization, Nigeria, RI demand, community engagement, interventions.*

Word Count: *13,177 words*

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 Introduction

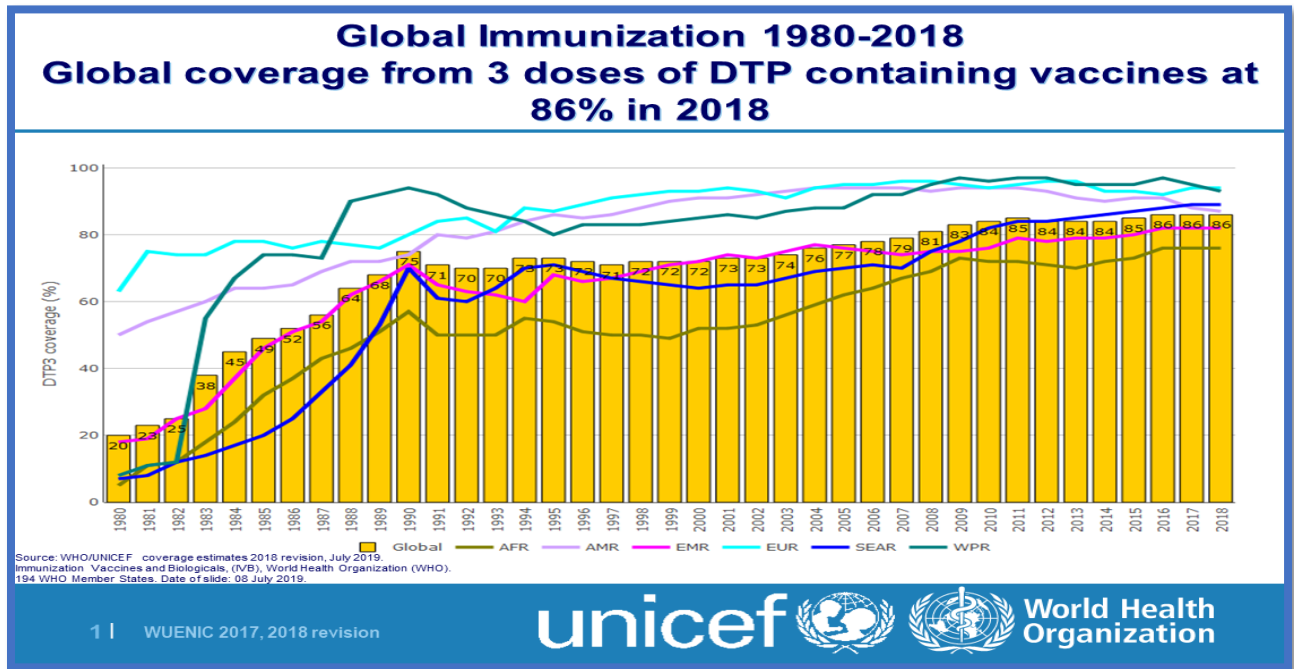
The World Health Organization (WHO) defined Routine Immunization (RI) as “*the sustainable, reliable and timely interaction between the vaccine, those who deliver it and those who receive it to ensure every person is fully immunized against vaccine-preventable diseases*”(1). Immunization, as a health intervention, is described as the most cost-effective and successful intervention developed (2). About 2.5 million deaths of under5 children are said to be averted annually through immunization (3).

In recognition of the benefits conferred by vaccines, the World Health Assembly (WHA) comprising of key stakeholders in public health came up with a roadmap, the Global Vaccine Action Plan (GVAP) that ensures there is worldwide access to immunization (4). The plan is meant to ensure that all countries of the world are able to enjoy the full benefits that come with vaccination. Evidence shows that immunization is a successful and cost-effective intervention for better health outcomes; a recent example is seen in the progress made to address the incidence of polio cases around the world (4).

It is also notable that despite the plan and the subscription to it, some countries still battle with the inequalities in access to basic vaccines. It is stressed that these underserved populations need to be reached as they tend to bear greater burdens of disease (4). The GVAP is hinged on six key guiding principles; country ownership, shared responsibility and partnership, equity, integration, sustainability, and innovation. Countries that subscribed to the plan are required to translate them into the local context. The GVAP targets to have no lower than 90% and 80% national and district vaccination coverage. This is measured by the coverage of the vaccine preventing Diphtheria, Pertussis, and Tetanus (DPT) that has been received to completion (4)(5). In addition to the GVAP, the Global Routine Immunization Strategies and Practices (GRISP) also seeks to achieve better immunization outcomes in all countries; it advocates for renewed and sustained efforts to yield improvement in the quality and spread of RI service delivery, ensuring equity in the process and covering under-served populations (2).

The global coverage of the DPT3 vaccine is seen in Figure 1; it shows a steady rise in coverage and accordingly, fully immunized children. However, this does not translate to an equal rise in the coverage as Africa seems left behind at a much slower climb and lower coverage.

Figure 1: Global vaccination coverage for 1980 to 2018

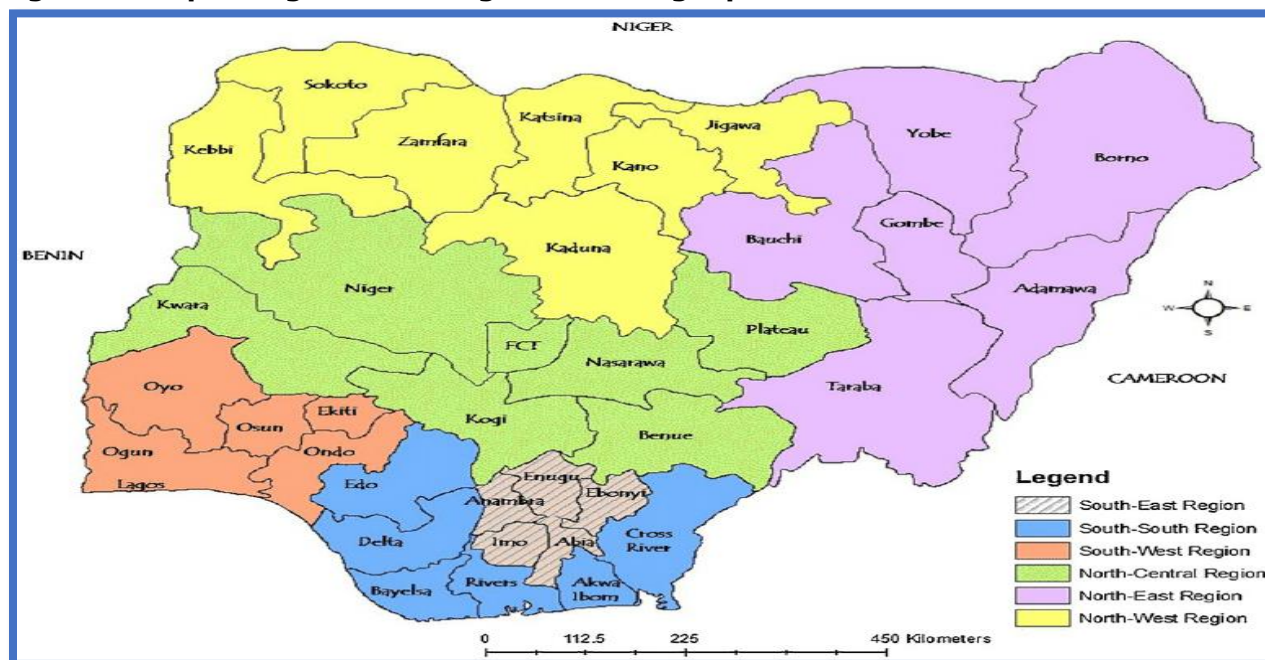


Source: https://www.who.int/gho/immunization/immunization_005.PNG?ua=1

1.2 Background information for Nigeria
Geographic information

Nigeria is a Federal Republic that consists of 36 states and the Federal Capital Territory (FCT), which fall under six geopolitical zones (Figure 2). There are 774 Local Government Areas (LGA) also that fall under all states and 9,565 political wards have been derived from these LGAs (6). With an estimated 250 ethnic groups in the country, Nigeria is a culturally diverse nation; however, the major languages spoken are Yoruba, Hausa, and Igbo, with the official language being English. The population of Nigeria is estimated to be about 202,000,000 (7). All ethnic groups have leaders or authority figures that they look up to; some of these are Emirs, Chiefs, and Obas. Religion-wise, the country’s inhabitants can be largely categorized into two; Christianity and Islam, with a little proportion subscribing to other religions. Surrounding countries include Benin Republic, Niger, Cameroon and Chad (figure 2).

Figure 2: Map of Nigeria showing states and geopolitical zones



Source: https://www.researchgate.net/figure/Map-of-Nigeria-showing-the-six-6-geopolitical-zones-For-interpretation-of-the_fig1_51795009

Socio-economic information

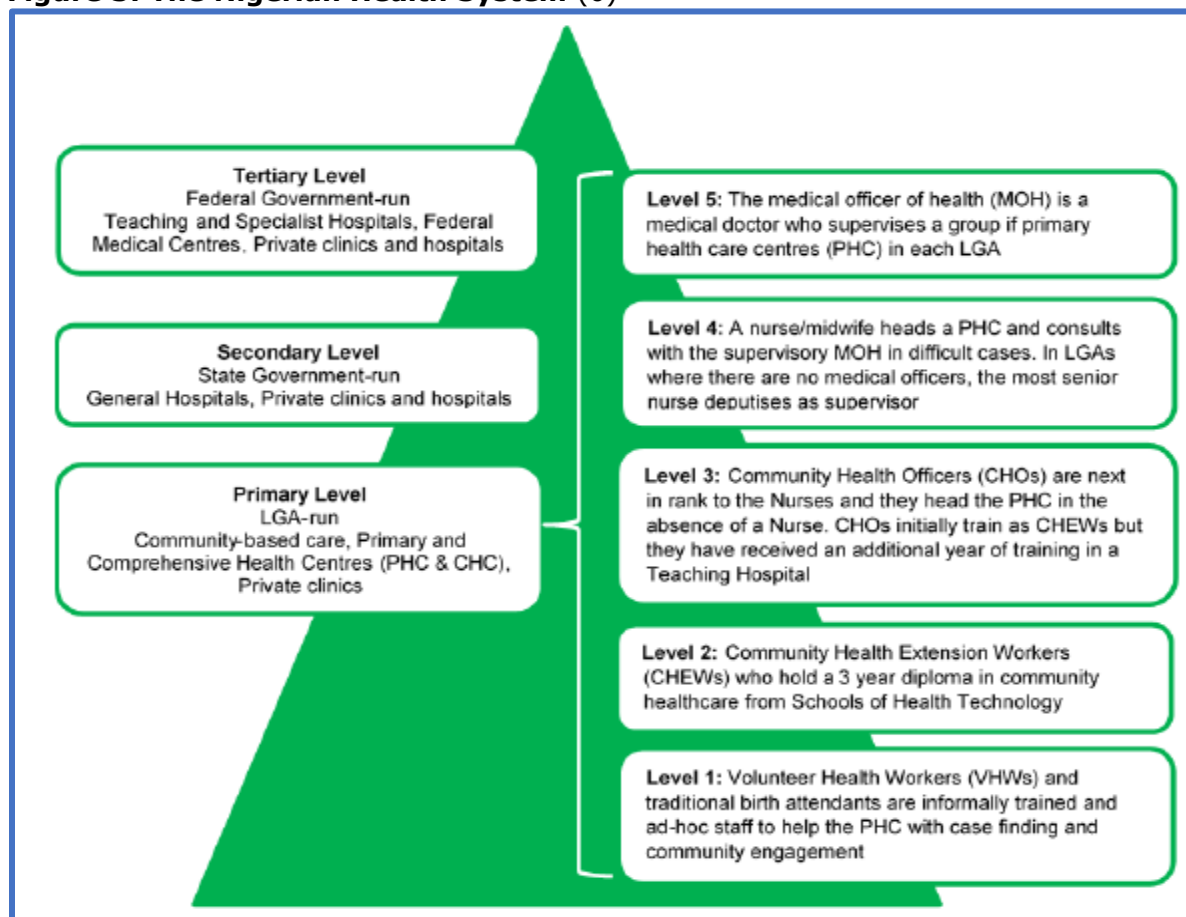
Nigeria, based on income level, is categorized as a lower-middle-income country (8). The country rich in crude oil, on which the economy is heavily reliant; it is also ranked as the largest producer of oil in Africa and 6th largest globally (9). Despite the abundance of these resources, Nigeria faces developmental challenges and stands ranked 152nd out of 157 countries on the World Bank Human Capital index of 2018 (7). Poverty is a major concern and contributes to the wide range of inequality seen amongst the populace and this sees them at a disadvantage where access to basic services is lacking (7). This economic situation also poses some health financing implications due to overdependence on the allocation from the Federal Government (6). Some Northern states of the country (examples are Borno and Yobe) are also faced with humanitarian crisis due to attacks by a militant insurgent group known as “boko haram”, as well as attacks by Fulani herdsmen around the middle belt; which has set back economic progress and created even greater barriers to healthcare access for the communities affected (6).

Health Sector Information

As of 2017, Nigeria was estimated to have about 34,173 hospitals, which are owned publicly (22,850) and privately (11, 323); these are located across the country (10). The health care system (Figure 3) is structured at Primary Secondary and Tertiary care levels (6). The health system faces challenges in its efforts to deliver the needed care to the populace and these stem from inadequacy related to funding constraints, primary health care (PHC) facilities, availability of qualified human resources; and also illiteracy and insecurity (10). There is a range of communicable and non-communicable

diseases that constitute the disease burden of Nigeria; and these include vaccine-preventable diseases (3). Amongst the under5 deaths annually, it is said that about 70% of this totality is caused by diseases that can be prevented or treated, such as malaria, diarrhoeal diseases, measles, HIV/AIDS(10).

Figure 3: The Nigerian Health System (6)



1.2.1 History of RI efforts in Nigeria

The Reaching Every District (RED) approach was developed and introduced in 2002 by WHO, UNICEF and partners for the aim of raising RI coverage (11)(12), and Nigeria made a contextualized adaptation into what is known as Reaching Every Ward (REW) in 2004 (12). The REW field guide was developed and disseminated in 2006, followed by training in 2007. The REW provided key components for the RI service delivery in Nigeria which were, “Planning and management of resources, improving access to immunization services, supportive supervision, monitoring for action and linking services with communities” (12). The microplanning process is also outlined in the REW operationalization document – deemed important because from it, stems the RI work plans that would drive demand and supply for RI services (11).

In addition to the development of the REW, Nigeria also embarked on a journey to where it currently stands regarding RI service delivery to Nigerians. From 1979, the Expanded Program on Immunization (EPI) was established and in 1996 Polio Eradication Activities (PEI) started;

the EPI was restructured and made the mandate of the National Program on Immunization (NPI) in 2007, due to a reform in the health sector. The NPI was merged to become the National Primary Health Care Development Agency (NPHCDA) in 2007, there was an intensification of the REW approach and new strategies were included in the plan such as Local Immunization Days (LIDs) and Community Health Workers (CHWs). In 2008, the National Strategic Health Development Plan (NSHDP) was developed and in 2010, the NSHDP included activities to improve RI; the bivalent Oral Polio Vaccine (bOPV) was introduced for Polio Eradication Initiative (PEI) campaigns in 2010 (13).

A National Immunization policy was developed and revised in 2009; it stipulated the free provision of vaccines to at-risk populations and also highlighted the collaboration between the Government and partners to attain the set targets in RI coverage (13). An RI working Group (RIWG) was formed at the National level, to coordinate the RI activities at the state and LGA levels. In recent times, due to the country's acceptance of the 2017 National Immunization Coverage Survey (NICS) results which placed the National Penta3 coverage at 33%(14), a state of emergency was declared and led to the morphing (for the emergency period) of the RIWG into a National Emergency Routine Immunization Coordination Centre (NERICC) in 2017 (15). The NERICC's main aim is to strengthening the RI program implementation and resolve gaps that have held the country back from attaining good RI coverage nationwide (15). NERICC was set up at a time that PEI efforts were gaining the desired success and the country was headed towards a polio-free declaration (10) and thus, the NERICC benefitted from PEI lessons and resources. The renewed efforts and determination to transform the RI landscape in the country by Government and Partners led to the development of the Nigeria Strategy for Immunization and PHC system Strengthening (NSIPSS) 2018 – 2028 (10). The NSIPSS seeks to have achieved 84% penta3 coverage nationally by the year 2028 (10), an estimate realistically derived from the current 33% coverage contained in the 2017 NICS report (14).

While vaccination coverage was low according to the NICS, there was also the issue of dropouts, of which the Penta1 – Penta3 dropout is regarded as a key indicator of the level of functionality of the health system (14). Figure 4 shows a comparison between the coverages for Penta1 and Penta3 vaccines, depicting non-completion of the antigen across the states; it shows over 80% coverage for penta1 in some states and not as much coverage for the third dose (penta3) in all states, with no state having up to 80% coverage for Penta3.

promote wellbeing for all ages” and targets Immunization as one of the means of achieving this (21). Demand generation intervention requires a multi-sectoral stakeholder collaboration in both the public and private sectors (22)(21). In Nigeria, efforts to reduce or eliminate barriers to immunization have required this multi-sectorial support which has not always been readily available in the intensity needed; hence, requiring regular advocacies.

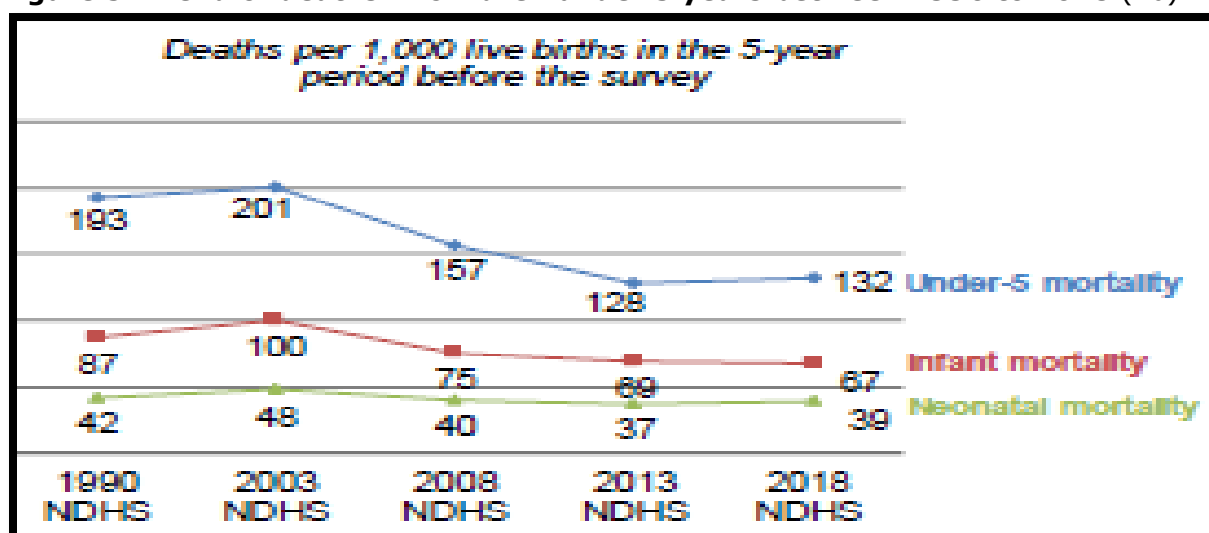
CHAPTER 2: PROBLEM STATEMENT, JUSTIFICATION, AND OBJECTIVES

2.1 Problem Statement

Immunization is one of the most impactful and gainful health interventions to prevent diseases (21); while it saves lives, it also saves costs that would have been incurred from treating the illnesses that are vaccine-preventable (23). Despite the opportunity for better health outcomes, it has been estimated that on a global level, as of 2018, 19.4 million children did not get the RI services due to them (24). 10 countries account for about 60% of this number, of which Nigeria is included (24). Nigeria, in 2018, was ranked as the country with the most unimmunized children worldwide, estimated at 4.3 million eligible children (10).

In Nigeria, child mortality rates are high and translate to low odds of children surviving past their 5th birthday in comparison to children from upper-income countries (25). The trend over time from the 2018 Nigeria Demographic Health Surveys (NDHS) has revealed that the mortality rate for infants was 67/1,000 live births and for under5 children was 132/1,000 live births (26) figure 5).

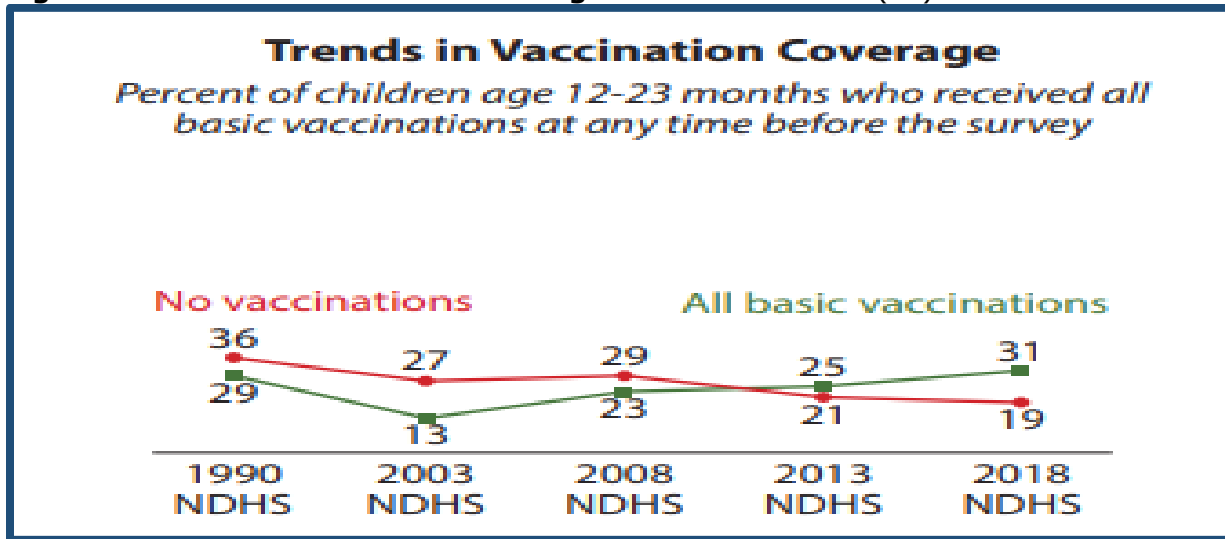
Figure 5: Trend of deaths in children under 5 years between 1990 to 2018 (26)



Although a large percentage of these deaths are avoidable, the NICS for 2017 has shown an under-5 mortality rate of 109/1000 live births and estimated that about 40% of these could have been avoided (14)(27). Apart from the Child Mortality, there is also the accompanying morbidity that reduces the quality of life of many children and also has financial implications for caregivers who have to pay for healthcare to see that the sick child returns to full health: as at 2017, about 75.15% of disease burden due to communicable, neonatal, maternal and nutritional diseases are borne by under-5s (28).

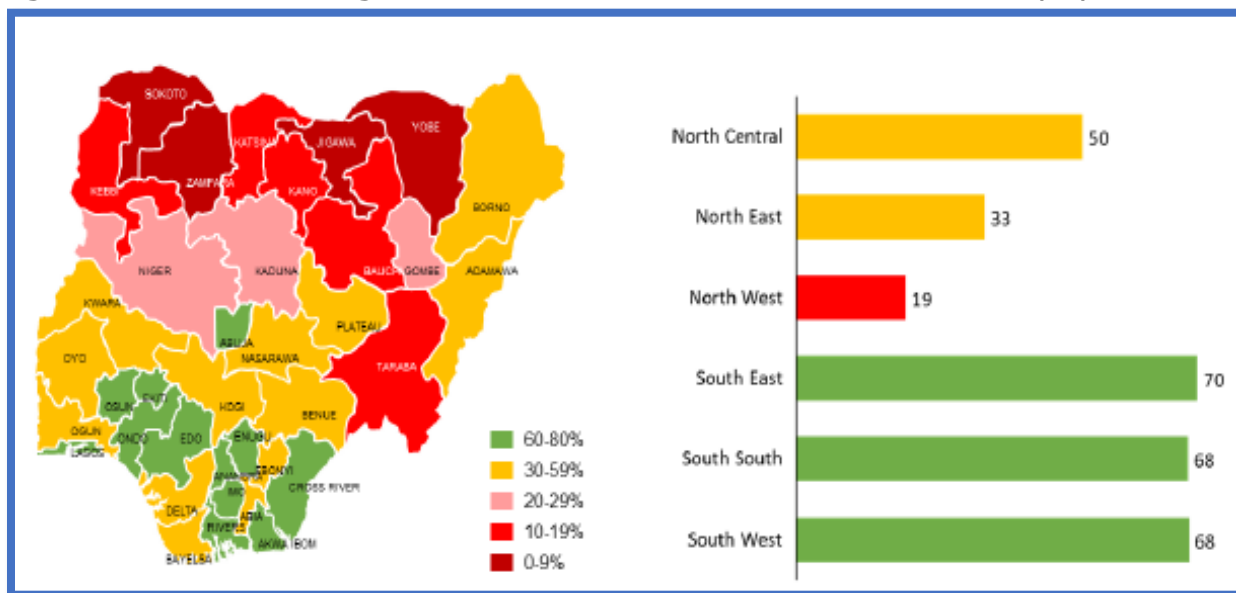
Despite the Primary Health Care (PHC) approach to bringing Routine immunization services close to the communities, not much success has been recorded so far. From the 2016 NICS, the fully immunized child (FIC) for infants in Nigeria was estimated at 17% and the NDHS (Figure 6) estimated that 31% of children surveyed had received all basic vaccinations. This shows that many children either have not been immunized at all (19% from the NDHS) or did not get the full complement of vaccines due to them (26). The trend in Figure 6 indicates that some gaps need to be filled to ensure that every child is reached with necessary vaccines.

Figure 6: Trend in Vaccination Coverage for 1990 to 2018 (26).



Some relatively better RI coverage performance is seen in the South compared to the North, with most Northern states falling below 50% coverage for Penta3 coverage (the North West having the lowest coverage of 19%) and the southern states having up to 70% coverage (10). This is displayed in Figure 7;

Figure 7: Penta3 coverage rates at State and Zonal levels as of 2016 (14).



These differences are said to be largely due to factors ranging from cultural to socio-economic and the personal beliefs that impact the health-seeking behaviour of caregivers (10). On the supply side, the country has faced logistical and structural weaknesses of the RI system; common factors comprise poor accountability, blamed on ineffective governance, inadequate systems in place for monitoring and evaluation and not enough political support for RI at state levels and lower (29). Logistics-related issues faced also border on insufficiencies in the cold chain and its transportation. Also, funding availability and its disbursement to all levels have

been a challenge (29). The low demand for RI services has generally been attributed to a lack of awareness about RI, poor health-seeking behaviour, a lack of faith in immunization, and poor community involvement in RI activities (27). These issues require tailor-made interventions for a greater chance of overcoming them. To successfully deliver on the demand generation interventions, the NSIPSS has estimated the sum of \$54.9 million for the period of 2018 to 2028 and borne by the federal and state levels and also partner/donor support (10).

The quarterly RI Lot Quality Assurance Sampling (LQAS) is a “population-based survey to monitor the impact of interventions on RI performance and to guide programmatic decision making at the state and LGA levels” (30). Introduced in 2017 with three key objectives; “to estimate LGA-level RI performance, to identify key reasons for non-vaccination of eligible children and to identify primary sources of vaccination information for caregivers” (30). The RI LQAS is a means to gauge the quality of the RI programme and it is done independently, for neutrality. Some examples of these reasons for non-vaccination (Figure 8) are unawareness about the need for immunization and the EPI schedule, religious concerns, security challenges, no felt need, fear of side reactions, and many more. These reasons apply to and abound in the states in varying proportions as some reasons could be more profound in some states than others; for instance, the reason of “awareness about the need for vaccination” seemed to be more profound in Sokoto state than in Lagos state (31); this then, would mean that more awareness creation interventions are necessary to drive demand in Sokoto State. Figures 8 and 9 visually depict what reasons for non-vaccination abound in the country.

Figure 8: Reasons for non-vaccination by state (31).

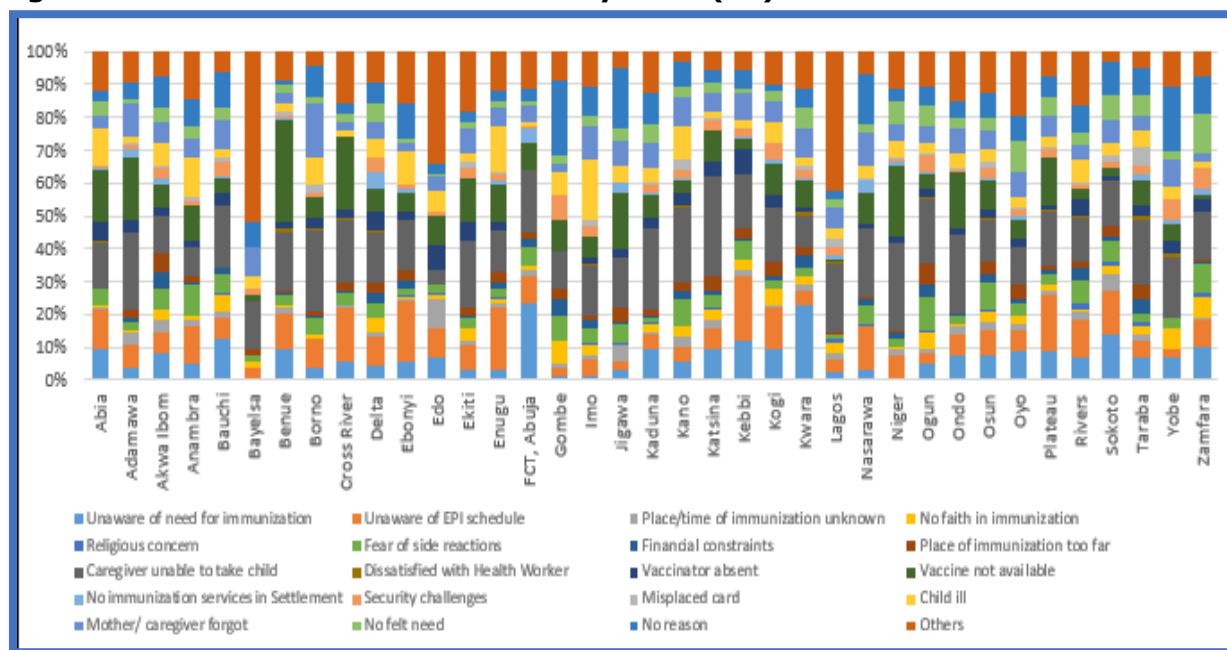
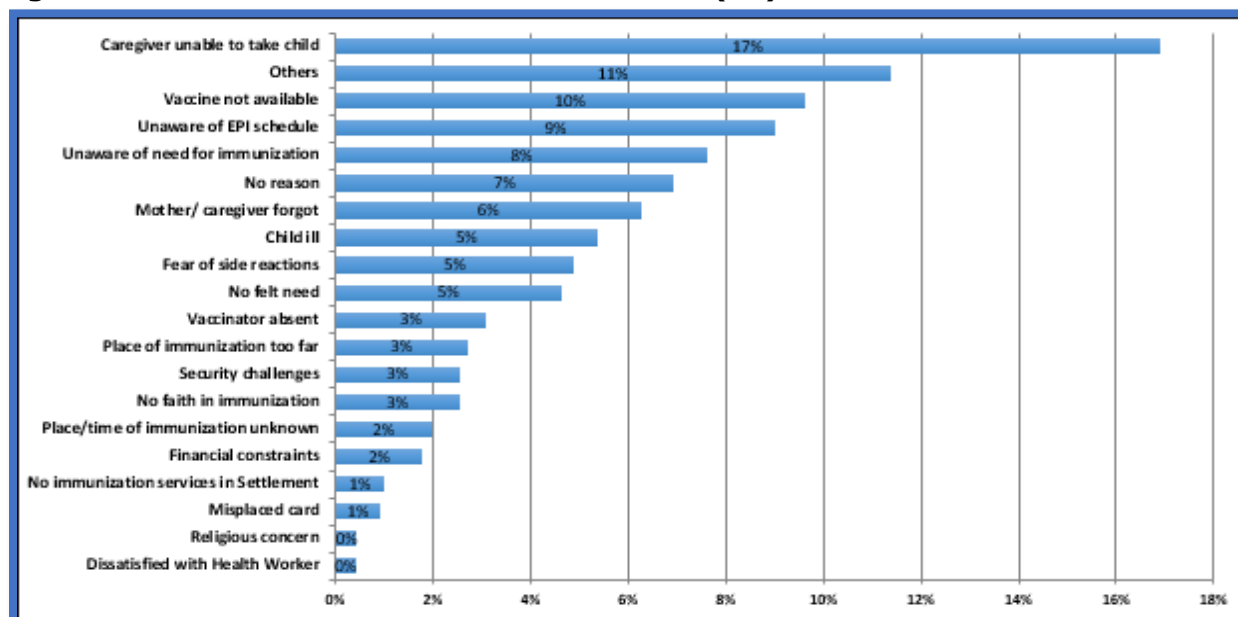


Figure 9: Common reasons for non-vaccination (31)



Addressing demand generation gaps requires a mix of human, financial, and material resources to come up with and implement the right interventions. This needs to be backed with a strong sense of accountability from all stakeholders in the RI programme to ensure everyone involved does what they are scheduled to do and at the right time; this is, fortunately, backed by the country's renewed focus on accountability at all levels of implementation (10).

2.2 Justification

Relevance: All challenges outlined have hindered the attainment of high vaccination rates. The Penta3 coverage has declined from 52% to 33% between 2014 and 2016, thereby translating to about 3.2 million children under 12 months left vulnerable to disease outbreaks (10). The quarterly RI LQAS also points out some key demand gaps that need to be addressed to achieve increased RI coverage. Failing to focus on these issues would mean that the incidence of childhood disease will be on the rise, especially with the rapidly growing population of the country; also, child mortality will be on the increase. To have a chance at addressing these gaps, the community structures with the right influence on the end-users of RI services need to be engaged; demand generation interventions present the right channel for these collaborations. These justify the need to identify interventions that can be implemented or scaled up to improve demand for RI services in Nigeria, and also for greater chances of success, to also review the interventions in the light of the barriers to demanding RI services that are faced by caregivers (also bearing in mind the common reasons for non-vaccination provided by the quarterly RI LQAS).

These demand-side interventions are expected to help reduce the poor RI coverage in Nigeria, which leads to high child mortality and Morbidity. This work is expected to contribute to the body of knowledge supporting efforts to achieve the goal of the National Health strategic plan; which seeks to "increase the utilization of essential package of health care services..", under which immunization is categorized (6).

This work focuses on efforts to improve demand for RI and not much focus on the supply side efforts; this is because there have been recently renewed efforts by the NPHCDA and the Federal Ministry of Health (FMOH), to ensure the supply of RI services. It has been recognised that there has recently been strong support for interventions to improve supply, as seen in the health facility survey, but not much for demand (14). The vaccine availability, for instance, has shown improvement from about 30% to 80% between 2014 and 2018 (10). The financial commitments also backing efforts to improve the supply of RI services (10) necessitate a review of the efforts being made to ensure that there is demand and also that current demand generation efforts address the various barriers faced by caregivers in accessing RI services.

Contribution to the knowledge gap: Carrying out this research also contributes to the body of knowledge that focuses on the current state of the RI landscape in Nigeria. While these studies may have been done for parts of the country, this research is intended to be country-wide and take examples from any part of the country. The recommendations based on these findings would also potentially draw the attention of the NPHCDA to additional interventions that would support the attainment of the goals of the NERICC. A landscape analysis was done in 2012 that identified key challenges in RI and also designed some intervention packages (29). This, however, was a long time ago and with current RI trends, it shows that not much progress has been achieved in RI; this also justifies the value that would be added by a more recent review of interventions that can address the current barriers to accessing RI services.

2.3 Study objectives

Overall Objective: To review demand generation interventions aimed at improving demand for Routine Immunization coverage in Nigeria, in order to identify how well the barriers to accessing these services are addressed by the interventions.

Specific Objectives:

- ❖ To describe access barriers to demanding RI services in Nigeria.
- ❖ To identify the demand-side interventions being planned or implemented to improve RI coverage in Nigeria.
- ❖ To analyse the design of demand-side interventions being planned or implemented and assess whether they are tailored towards addressing the barriers to demanding RI.
- ❖ To make recommendations for stakeholders of the Nigerian immunization program to implement and improve demand for RI in Nigeria.

CHAPTER 3: METHODS AND ANALYTICAL FRAMEWORK

3.1 Search Method

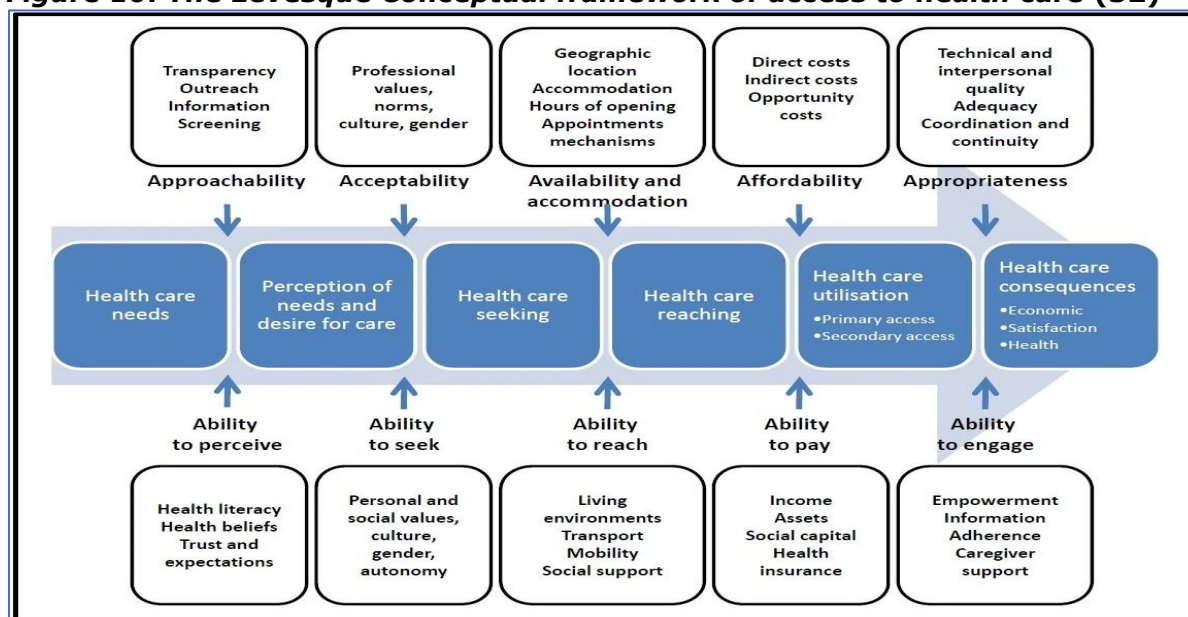
This research was based on a review of relevant literature containing insights into the RI coverage performance of Nigeria, the description of access barriers to demanding RI, and a review of demand-side interventions planned and implemented to improve RI coverage in Nigeria. Resources based on barriers to access and possible interventions were found using search strings derived from the keywords of the Levesque conceptual framework of access to health care, as well as variations of some of the terms to widen the search. Both peer-reviewed, published and grey literature was accessed while considering the credibility of the source of the literature. These were sourced from the internet through search engines, databases, and websites of relevant health organizations (some of which are the NPHCDA, Federal Ministry of Health, and WHO), and a timeline of 10 years (2011-2020) was applied to search criteria for inclusion. Also, the document on the REW approach in Nigeria from 2009 was selected because it provided some historical perspective prior to 2011. Snowballing was done through the references of resources found in some cases. Most of the search led to the discovery of research done about the barriers to access and mostly offered recommendations about how to bridge the gaps. Intervention studies were not widely available in the public domain and form part of the recommendations.

To find the RI demand generation interventions in Nigeria, the starting point was the 2018 Nigeria Strategy for Immunization and PHC system Strengthening (NSIPSS) document. This was because, as the most recent national RI plan, it served as a good source for identifying the interventions the RI programme was implementing or considering for demand generation. Also, it helped with ideas for searches about other interventions beyond the document. It should be noted that these interventions were not all described fully in all cases and so the general knowledge of how they typically work, was used in the assessment of how they fit into the ranking criteria. Impact evaluation for the interventions was searched for as well, in a bid to gather available evidence of successes of these interventions. Boolean operators were used to form search strings and the sub-selection of keywords that yielded relevant literature include *Immunization, Nigeria, RI demand, community engagement, interventions, polio eradication, awareness, defaulter, reach, economic factors*. The table showing the search word combinations is seen in annex a.

3.2 Analytical Framework

The Lévesque conceptual framework of access to health care (Figure 10) was selected as it neatly packed the factors that affect demand and supply for health care into five categories and so would make for less cumbersome analysis and literature search. It also made it possible to easily group insecurity as a barrier to accessing health care (i.e. under the 'ability to reach'); this was deemed important because some parts of the country face security constraints that impact demand for RI. Since the focus of this research is demand generation, only the demand-side barriers from the framework were used.

Figure 10: The Lévesque Conceptual framework of access to health care (32)



The review covered the Ability of clients to perceive their health needs, seek care, reach the point of service provision, pay any associated costs for the services received and engage with the health system satisfactorily (32). These were discussed in the Nigerian context for RI, while keeping in mind the common reasons for non-vaccination as collected in the RI LQAS (31). The Levesque framework was essential in determining the approaches yielding increased demand or have the potential to do so. Each dimension was presented in the same pattern to show the description of that dimension as it relates to RI in Nigeria, the Situational analysis, the interventions being implemented to address barriers in each dimension and then the ranking of the interventions followed.

The interventions identified through the literature review were assessed based on a set of criteria applied to a ranking framework and this was also based on the design of the interventions as not many relevant impact studies are widely accessible. The criteria used are Ownership, Accountability, Sustainability, Responsiveness, and Community participation. These criteria were derived from the Nigerian community engagement strategy document (27), which outlines them as "Guiding principles for implementation of community engagement in Routine Immunization". These principles were chosen because research has revealed that the most factors responsible for sub-optimal demand for RI services could be more easily addressed through effective collaboration with the community structures; making it important to see how well interventions were suited to these principles.

Community engagement has been described as a process whereby organizations and people build lasting relationships with communities towards accomplishing a vision that would profit the community (33). It is also defined as getting communities involved in making decisions, as well as planning, designing, and participating in the governing and delivering services (34). This strategy dates far back as the Alma Ata declaration of 1978, where community engagement was declared to be a key element of PHC (35). Community engagement is recognized as a strategy with great potential for achieving health promotion; this is because largely, the planning and delivery of health services are done in collaboration with the community, hence, are more likely to be tailored to their needs, and thus successful (36). Nigeria recognizes this as important and since the literature review is about raising demand for RI in Nigeria, it is logical to adopt the community engagement criteria from Nigeria's

community engagement strategy document. The National RI Strategic plan of 2013 – 2015 acknowledges community engagement as a way to enhance community awareness and knowledge about health care, have more trust in the health system and increasing demand for RI (37) – raising demand for RI is the aim of this research, thus it is befitting to use community engagement criteria to assess the interventions. The criteria will henceforth, be referred to as “community engagement criteria” in this document.

This research also adopted the exact definitions for the community engagement criteria as provided by the community engagement strategy document (27) and used for the ranking of interventions:

- ❖ **Ownership:** To empower communities to feel responsible for and in control of the RI Program.
- ❖ **Accountability:** To engender acknowledgement and responsibility for RI activities among existing community structures
- ❖ **Responsiveness:** To support communities to seek, identify, and react timely and positively to RI activities and gaps.
- ❖ **Community involvement and participation:** To involve a variety of community stakeholders.
- ❖ **Sustainability:** To aid communities to identify and utilize community resources in resolving immunization gaps.

Sustainability of these demand generation interventions largely relies on enablers or barriers being given the due consideration they deserve (38). Some known enablers to sustainability include (38); Community ownership; Optimization of existing resources, whether financial, material, or human; Community buy-in, which is important because the end-users of the interventions are the community and so its acceptance and sustainability depends on the level of buy-in; availability of a sound infrastructure to deliver the interventions; Some barriers to sustainability include (38) weaknesses in the health system, poor level of financial commitment (38)(39), insufficient personnel to support the implementation and insufficient education.

How the ranking was done: In the ranking, the interventions were assigned a “Yes”, “Partially” or “No” response indicating how much each community engagement criterion is inculcated in their design or how well they fit into these criteria. These responses were also color-coded for some visual appreciation; Green for Yes, Yellow for Partially, and Red for No. Also, because interventions may not fully fit under a Yes or No categorization, the third response, “Partially”, was introduced.

- ❖ **Yes:** Alignment with the criteria is easily seen.
- ❖ **No:** Alignment with the criteria is not seen.
- ❖ **Partially:** Alignment with the criteria is not absent but also not strong enough to be categorized as a “yes” and this may be due to some extra considerations, which if put in place, would allow the intervention fit with the criteria more easily.

A description table has also been included to highlight summarily, the interventions with quick descriptions about them. Any gaps in the approaches to addressing shortcomings in the dimensions of access were highlighted and discussed, after which the recommendations were made based on the findings.

CHAPTER 4: STUDY FINDINGS/RESULTS

4.1 Introduction

In this chapter, there will be a review of the strategies planned or used to generate demand for RI in Nigeria. However, it is imperative to keep in mind the most common reasons for non/incomplete vaccination from the 2019 Quarter 2 LQAS (31), this is because these are also root causes that when addressed, can improve caregivers' demand for RI services.

Having looked at what the most common reasons for non-vaccination are in the country, the demand generation strategies for RI in Nigeria will herewith be discussed as categorized by the Levesque framework. Some interventions address more than one barrier to accessing the RI services by caregivers.

4.2 Demand-side dimensions of Access to RI

4.2.1 Ability to perceive

This highlights any intervention aimed at improving the ability of caregivers to know fully well that vaccinations are beneficial to their children. It generally encompasses health literacy seen in the level of awareness about needed vaccines and the benefits they provide. This lack of awareness could bring about a lack of trust in the benefits or safety of the vaccines, and expectations that caregivers may have, which sometimes, are other needs/felt needs (probably some other health services) which they seem to value over vaccinations (32). This points to the fact that the limitations that shape perceptions about vaccination for children need to be addressed, also noting that perception will be negative where the caregiver is unaware of the opportunity to give their children better chances at survival. Some LQAS common reasons for non-vaccination (Figure 9) are reflected here in scenarios like unawareness of the need for immunization, unawareness of EPI schedule, no felt need, no faith in immunization, (31); any interventions addressing these reasons for non-vaccination would also address barriers to the ability to perceive.

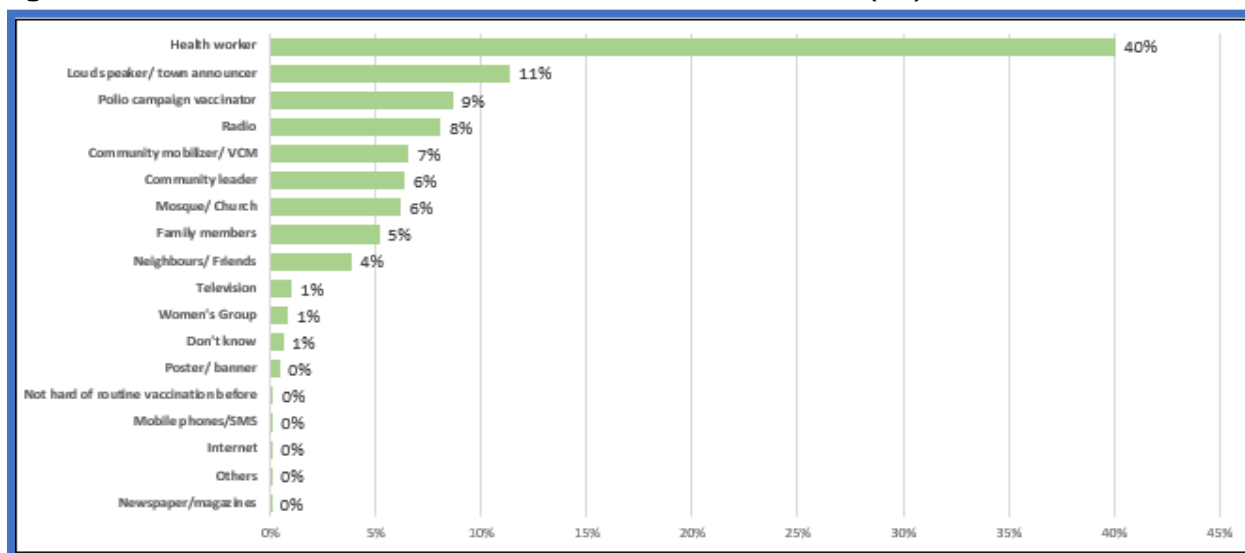
Situational Analysis

The level of caregivers' awareness about vaccinations is still low in Nigeria, with up to 46% of respondents of the 2016/2017 Multiple Indicator Cluster Survey and National Immunization Coverage Survey (MICS/NICS) stating a lack of awareness as a reason for not vaccinating their children as appropriate (10). A study carried out in Jigawa State, Nigeria revealed that lack of knowledge was the most common reason for non-vaccination, amidst other reasons (40). The same study highlighted, through bivariate analysis, the factors that impacted the receiving of full immunization and they found knowledge about RI, education level, the mother having attended antenatal care sessions, and having delivered in a facility were part of the factors that needed attention (40). This, however, is not restricted to Northern Nigeria alone, as some studies in the South also show that perceptions about immunization are not optimal, with some mothers preferring not to immunize their children because of perceptions that vaccines could cause harm (41). These factors raise the need to address gaps in demand for RI in communities; equipping mothers with the right amount of information on RI would empower them to make the right decisions and get children immunized.

The most common source of information for caregivers about RI (Figure 11) from the 2019 Q2 LQAS was through the health workers first, and then community structures such as town announcers, Supplementary Immunization Activities (SIAs) vaccinators,

radio jingles, and community mobilizers (31). Several means have been adopted to generate demand for RI services, such as radio jingles, which, in a study (42), accounted for the source of RI information amongst about 62% of study participants in Kaduna State. While only 16% of these participants had been fully immunized at the time of the study, a greater proportion (64%) of participants had unsatisfactory knowledge and poor perceptions (55.4%) about RI (42). These also present avenues to shape the perceptions about RI amongst caregivers.

Figure 11: Most common sources of information about RI (31)



These perceptions also determine the willingness of mothers to accept support in form of reminders about RI sessions; a study carried out in Ibadan State had found that out of 614 participants who owned cell phones, about 98% were fine with giving their contact details to the RI facility staff and 95% of them were interested in getting reminder messages about RI sessions (43). This could be adopted for reducing dropouts in urban areas, where the use of cell phones is higher and also points to the value of adopting interventions in collaboration with caregivers.

Interventions addressing the dimension

In Nigeria, the interventions under this dimension have been largely focused on awareness creation through social mobilization and communication. Drawing lessons learned from the polio eradication program, the Polio Voluntary Community Mobilizers (VCMs) are being transitioned into a mobilization network for RI and PHC, known as Community Health Influencers, Promoters and Services (CHIPS) Programme, which was launched in February 2018 by the Federal Government. The CHIPS will work as promoters and mobilizers for RI and PHC services in communities, and this way, raise awareness, strengthen demand and contribute to improved perceptions of the importance of RI and PHC (10). This intervention is relevant to addressing issues around perception because the VCMs would raise awareness, address misconceptions about vaccinations as well as tracking new-borns and following up on their vaccination progress (44)(45). One key advantage of this intervention is that the women are engaged to work in their communities, this way, they are known, respected, and have little or no problems carrying out their tasks (45).

In Northern Nigeria, through an Immunization Reminder and Information SMS system (IRISS), under the “Tunar da ni” project, information about immunization and its benefits, as well as reminders to caregivers about subsequent RI sessions have been shared with caregivers and mobile subscribers in targeted locations (46). This was aimed at improving demand and bridging gaps in information about RI amongst caregivers. This 2-year (Jan 2018 to Dec 2019) project targeted individual messaging and also broadcast messaging too. As for the effectiveness of the intervention, a study showed that the SMS reminders implemented in regions were instrumental to increasing uptake of RI services, although, not as stand-alone interventions in many cases – this was also not just particular to Nigeria but other African countries such as Kenya, Zimbabwe, Burkina Faso and Senegal (47).

These Interventions are summarized and outlined in Table 1, to show which appear more viable options to bridge gaps in the caregivers’ ability to perceive.

Table 1: Ranking of interventions concerning the Ability to Perceive

SN	Demand Generation Interventions	Criteria for ranking: Ability to Perceive (Yes – Green; No – Red; Partially - Yellow)				
		O	A	S	R	C
1	Awareness creation through VCMs/CHIPs	Yes	Yes	Yes	Yes	Yes
2	IRISS (SMS reminders); “Tunar da ni” ** Project	Yes	Yes	Yes	Yes	Yes

* **O= Ownership; A=Accountability; S=Sustainability; R=responsiveness; C=community participation**

** **“Tunar da ni” means “Remind me” (in the Hausa language).**

4.2.2 Ability to seek

This highlights the extent to which demand for immunization is impacted by the caregivers’ personal and social values; or culture, that leads to caregivers seeking health care in alternative sources or not seeking care at all; gender roles (more pronounced in Northern Nigeria) also play a big part as in many cases, women are culturally dependent and require the permission of the household heads to let their children be immunized or even to accept other health care services (10)(32). Some LQAS common reasons for non-vaccination (Figure 9) are reflected here in scenarios like Caregiver unable to take child, fear of side reactions, place or time of immunization unknown (31); any interventions addressing these reasons for non-vaccination would also address barriers to the ability to seek.

Situational Analysis

From the NDHS 2018 results, it was seen that more children were vaccinated where the mothers had higher levels of education (62%), compared to mothers with no education (15%); this same picture was seen when mothers were categorized by wealth quintiles, 59% vs 15% respectively (26); these disparities are also seen across rural vs urban areas with 23% vs 44% respectively, and also Northern and Southern states of Nigeria. These also can be attributed to factors that could empower a woman to make decisions on her own about vaccinating the child.

A study about gender-inequalities revealed the higher likelihood of a woman with more decision-making power or autonomy to have a fully immunized child than one who needs to consult her spouse or some authority figure before making decisions such as

immunizing the child. This was also tied to the woman's earning ability in the household and level of empowerment (48). These are also socio-economic (usually cultural and financial) driven power dynamics in the household that affect decision making; they contribute in some measure to the inequities in vaccination across in the North and Southern parts of the country, as these issues seem more predominant in the North (26).

Interventions addressing the dimension

These social hindrances are most likely to be addressed at the community level, and interventions implemented here are also would normally encompass those targeted at improving the ability to perceive the importance of immunization. It can be seen as saying that many times, the ability to perceive can shape the ability to seek immunization services. The Nigeria Strategy for Immunization and PHC System Strengthening (NSIPSS) (10) plans to raise awareness and change health-seeking behaviour of caregivers through community interventions by the following measures;

- a. **Engaging immunization ambassadors to engage targeted communities and raise awareness.** This is a plan contained in the NSIPSS (10) and has the potential for success when the ambassadors are selected based on their level of influence and relevance to the communities they are to influence. An example from Jigawa state shows that in 2019, health ambassadors were engaged (as part of a community engagement project) as focal persons in community health issues. They actively participate in RI activities; such as keeping records of the immunization status of all children in the community and ensure complete vaccination of the children. They were instrumental in improved coverage in the state that previously had low RI coverage (49).
- b. **Introducing immunization-themed books for children** to the curriculum at primary school – this is aimed at shaping behaviour towards immunization early so that there are no hindrances to having the right perception or seeking care in the future.
- c. **Engagements via the social media platforms;** data from sources such as the 2018 NDHS indicate the suitability of this intervention to urban communities, it is important to note that despite the relatively better performance of the urban communities or the richer or more educated as presented in the 2018 NDHS, these populations also could benefit from some demand generation interventions (26). The NPHCDA currently has an active social media presence through which relevant healthcare information is shared with the populace via Twitter, Facebook, and Instagram.
- d. **Production and dissemination of materials containing information about the benefits of the vaccines to the children.** These are to be targeted to communities they are needed and likely to make an impact – they would also be in print, radio, local plays, and a host of other forms of communication that resonate with the communities in question. These definitely would equip communities with the right information and also enhance their ability to seek RI services.
- e. **Inter-personal engagement involving traditional and religious leaders.** These would seek to address the issues regarding the perceptions that shape decision making about RI for children and hinder caregivers or mothers from seeking RI services. A 2013 impact study recognised this intervention as impactful for bridging bottlenecks in communities (50). As part of this intervention, household heads are also engaged by community leaders to seek consent for immunization sessions, announcements about immunization to also

encourage uptake are passed in places of worship and has contributed to uptake (50);

These Interventions are summarized and outlined in Table 2, to show which appear more viable options to bridge gaps in the caregivers' ability to seek.

Table 2: Ranking of interventions concerning the Ability to seek

SN	Demand Generation Interventions	Criteria for ranking: Ability to Seek (Yes – Green; No – Red; Partially - Yellow)				
		O	A	S	R	C
3	RI Ambassadors to raise awareness in communities	Yes	Yes	Yes	Yes	Yes
4	Early start of behaviour shaping through proposed immunization-themed books for children	Yes	Yes	Partially	Partially	Yes
5	Social media engagements	Yes	Yes	Yes	Yes	Yes
6	Dissemination of materials containing RI information	Yes	Yes	Yes	Yes	Yes
7	Engagement of communities through traditional and religious leaders.	Yes	Yes	Yes	Yes	Yes

* **O= Ownership; A=Accountability; S=sustainability; R=responsiveness; C=community participation**

4.2.3 Ability to reach

This covers challenges in getting to points of immunization service delivery (32), some which are reflected in the LQAS reasons for non-vaccination that mention issues such as “place of immunization too far” or “security issues”, and “no immunization services in the settlement” (31). It is about the nature of the living environments considering the distance to facilities and also security constraints, the transportation system in place considering nature of the roads or being able to pay transport fares to get to the facility, mobility or social support (32) that either enable the ability to reach or serve as a hindrance. Any interventions addressing these reasons for non-vaccination would also address barriers to the ability to reach.

Situational Analysis

In Nigeria, Hard-To-Reach (HTR) areas have gained special attention, in a bid to ensure nobody is left behind in accessing healthcare. Lessons for RI can be drawn from the HTR Project where Mobile outreach services were offered to targeted communities and, most importantly, planned with the involvement of the community (51).

Some caregivers also express difficulty in reaching the health facilities due to the long distances they have to cover (52) and it is for cases like these that outreach sessions are planned. In the light of security challenges faced in parts of the North East due to the insurgency attacks and the recent community attacks by Fulani herdsmen (6), some communities do not have access to healthcare so, demand for RI is affected.

Interventions addressing the dimension

While outreach sessions are not new to the REW strategy, a new initiative called Integrated Medical Outreach Programme (I-MOP) has been developed and was flagged off in March 2020 (53) in Nigeria. The Federal government, through the NPHCDA, seeks to provide free medical services (including RI) to targeted hard-to-reach communities in the country, for three rounds per year. Its relevance is underpinned to the fact that it is an intervention for underserved (including the internally displaced) and HTR communities (53). While its implementation was delayed due to the Covid19 pandemic, it is a potential avenue for bridging gaps in the ability of caregivers to reach health care service delivery points.

The integration of RI and other PHC services with polio eradication activities has shown promising results and presents an avenue to bridge demand gaps and increase RI coverage for as long as the polio activities continue (54); this was shown in an implementation research with positive results. The integrated package of interventions (vaccines, medical consultations, and treatment for illnesses such as malaria, diarrhoea) was delivered through mobile outreaches to hard-to-reach communities and showed improvements in the baseline and end-line comparisons (54).

Some states (such as Borno, Yobe, Bauchi, Gombe, Benue, Nasarawa, Taraba, and Adamawa) and Communities also face security challenges that limit inhabitants to reach health care. The demand for RI services in these areas is low because they cannot reach service delivery points; so, the intervention is about taking the vaccines to the caregivers (54). To mitigate these challenges in the Polio Eradication Program, the NPHCDA has liaised with the Nigerian Military, Police and Civilian Joint Taskforces (JTF) to get vaccinations to the communities (10) (55); two key strategies under which these collaborations happened are Reach Every Settlement (RES) and Reach Inaccessible Children (RIC) (10). The RES is an intervention where health workers are accompanied to administer vaccines in security compromised areas and the RIC is the intervention where the military personnel receive some training and administer the vaccines themselves in inaccessible areas (56). A 2018 impact study on engaging security operatives for polio activities such as the REC and RIS, as well as the "hit and run" Strategy where vaccinators go into communities during "safe periods" (few hours) to immunize quickly and leave before the window closes; the results have been said to be positive (57), and the RI programme is taking these lessons. For RI, such collaborations are still being considered in the 2018 NSIPSS. Internally Displaced persons (IDP) are being reached with RI services through outreach sessions in IDP communities as well (55).

To support caregivers by covering transportation costs to the health facilities, conditional cash transfers (CCT) are provided as incentives for vaccination. An international organization known as New Incentives has implemented a project where these CCTs were given for RI in collaboration with the state governments of Katsina, Zamfara, and Jigawa states since 2016 (58). In 2013, a CCTs programme under the government's Subsidy Reinvestment and Empowerment Programme (SURE-P), was implemented to increase the uptake of Maternal Neonatal and child health services amongst women in rural areas and a 2014 study indicated an increase in uptake of services during this time, but no clear impact evaluations are seen; the study however, pointed out the need to track retention as well so there are no caregivers lost to follow up (59).

These Interventions are summarized and outlined in Table 3, to show which appear more viable options to bridge gaps in the caregivers' ability to reach.

Table 3: Ranking of interventions concerning the Ability to Reach

SN	Interventions	Criteria for ranking: Ability to Reach (Yes – Green; No – Red; Partially - Yellow)				
		O	A	S	R	C
8	Outreach sessions	Yes	Yes	Yes	Yes	Yes
9	I-MOP	Yes	Yes	Yes	Yes	Yes
10	Engagement of security personnel for immunization	Yes	Yes	Partially	Yes	Yes
11	Conditional cash transfers (CCT)	Partially	Yes	No	Yes	Yes
12	Effective integration of RI service delivery with Polio campaign activities (and other SIAs)	Yes	Yes	Partially	Yes	Yes

* **O= Ownership; A=Accountability; S=sustainability; R=responsiveness; C=community participation**

4.2.4 Ability to Pay

This generally relates to what extent caregivers can pay for or access healthcare services (RI in this case) without suffering financial hardships – considering factors like their income level or value of assets owned or subscription or non-subscription to health insurance (32). One RI LQAS common reason for non-vaccination (Figure 9) is reflected here in scenarios like “financial constraints” (31); any interventions addressing this reason for non-vaccination could also address barriers to the ability to pay.

Situational Analysis

In a bid to achieve Universal Health Coverage (UHC), the Vaccine components of the RI schedule are offered at no financial charge to caregivers in Public health facilities of the country (10)(60). However, not all caregivers are aware of this, and so the assumptions about having to pay for RI services tend to hinder some caregivers from accessing these services. The financial constraints could also present as a lack of transportation fare to the health facility to access the services.

There are also indirect costs to consider, for instance, the opportunity cost of going to the RI session over earning the day's income from any ventures the caregivers may be involved in; or, ability to cover transportation costs. Due to this financial concern, the likelihood of higher demand for health care services lies with the more financially stable or well-to-do households (61); the immunization completion categorized by wealth quintiles shows this probability is higher with richer households (26).

Interventions addressing the dimension

The 2018 NSIPSS plans to disseminate targeted and clear messaging on vaccines, also emphasizing that it is free of charge (10)(60). For public accountability purposes, the NPHCDA has also come up with toll-free lines which the general public can call and seek clarity on immunization concerns or make reports about any payments demanded in exchange for RI services (62). Any interventions required here will be aimed at

ensuring the health facilities do not burden caregivers with payments for RI services, which are supposed to be free. Hence, it will be more accountability interventions and strong engagement with the facilities and their coordination bodies to maintain the status quo.

CCTs are sometimes used to address barriers relating to transport costs to the facility and back to places of residence, as well as attempting to make up for the day’s income that may be lost in time spent at the facility (58). This is a point where CCTs could potentially address gaps relating to the ability to reach and the ability to pay.

These Interventions are summarized and outlined in Table 4, to show which appear more viable options to bridge gaps in the caregivers’ ability to perceive.

Table 4: Ranking of interventions concerning the Ability to Pay

SN	Demand Generation Interventions	Criteria for ranking: Ability to Pay (Yes – Green; No – Red; Partially - Yellow)				
		O	A	S	R	C
13	Accountability mechanisms (toll-free lines) to report any charges on RI.	Yes	Yes	Yes	Yes	Yes

* **O= Ownership; A=Accountability; S=sustainability; R=responsiveness; C=community participation**

4.2.5 Ability to Engage

This pertains to how well caregivers are involved in decisions around receiving RI services and ensuring the completion of antigens on the RI schedule (32) – i.e. how much they are empowered and have the right information about RI services, and that they are free, also knowing where and when to go for RI sessions, perception of the quality of service delivery, adhering to the schedule and accepting caregiver support in forms such as defaulter tracing, town announcements or community reminders about RI sessions. Some LQAS common reasons for non-vaccination (Figure 9) are reflected here in scenarios like unawareness of EPI schedule, Mother/caregiver forgot, no immunization services in the settlement (31); any interventions addressing these reasons for non-vaccination would also address barriers to the ability to engage.

Situational Analysis

It has been noted that even when some caregivers make it to the health facility for the first RI session, a substantial number do not return for subsequent sessions; these are called defaulters. The 2016 – 2020 Comprehensive EPI multi-year plan (cMYP) recognizes the non-constant nature of the demand for immunization as it notes the dropouts and seeks to reduce penta1-penta3 as well as BCG-MCV1 dropout to less than 10% (63). The cMYP also seeks to put in place defaulter tracing mechanisms to reach these caregivers. The 2016 NICS Nationwide Penta1 and Penta3 coverages compared (Figure 4) to show the dropout situation by the state also indicates that some caregivers who accessed RI services failed to return to complete the vaccination (14).

In recent times, the need for defaulter tracking has led to the revision of the child health cards into a triplicate presentation, where the health facility, the community leader, and the caregiver have one copy each. The information in all three copies has to align and where that is not the case, the caregiver is tracked and missing antigens

administered, and records updated in the triplicates (10). Mobile phone reminders have also been identified as effective in reducing dropouts in immunization; a study in Abakaliki, Ebonyi state revealed a reduction in missed immunizations were these reminders were sent to caregivers about upcoming RI sessions (64).

This can also be linked to the most common sources of RI information (Figure 11), where the health worker is identified as the most common (31). This points to the key role health workers play in sustaining RI demand and calls for conscious efforts to strengthen the quality of their service delivery.

Interventions addressing the dimension

Recognizing the need to empower communities, give them the right information and support, as well as ensure adherence to RI services, the Community Engagement Strategy (CES) was developed in 2019 (27) to enhance community ownership of programs at the PHC level and address factors (both demand and supply-related) that lead to poor performance. This strategy was born of the success recorded in the polio eradication programme through the involvement of the Northern Traditional leader's council on health (NTLC) (65) and the potential for great strides in RI through the strategic engagement of the traditional leaders, as planned for in the 2018 National Polio Eradication Emergency Plan (NPEEP) (66) and subsequent PHC strategic plans such as the NSIPSS. The fourth strategic objective of the CES is aimed at increasing community demand for RI to achieve the target coverage of $\geq 85\%$ in states and local government areas of Northern Nigeria. Northern Nigeria is prioritized because they have had consistently high under-immunization figures, compared to the South (27). Additionally, with careful contextualization of the CES, the southern states can implement and benefit from it as well.

The CES shows the way caregivers and new-borns are identified, registered, tracked, and referred to health facilities to access RI and other services. This system gives the support needed to complete the RI schedule as it ensures defaulters and left-outs are tracked. It also leverages on the interrelationship between the traditional leadership hierarchy and the health system, and also the religious systems and community-based structures (27).

Also, drawing from the HTR project described earlier, a study was conducted to see how well the community engagement component contributed to the increase in demand for vaccines (51). With the conclusions drawn from it, the study only serves to emphasize the importance of community engagement for the success of interventions – there was an improvement in the satisfaction of caregivers and also vaccination coverage for the Polio and the Pentavalent vaccines. Linking this to the Levesque framework, there was the provision of sufficient information to clients and also town announcements and household mobilization, and the RI program can strategically incorporate such strategies in areas of identified need. The study also pointed out the need for community structures to be engaged in ways fitting to the context; the results showed, for instance, that town announcers had greater reach in some states than others (51).

To also improve the Ability to Engage, the RI team has developed the Optimized Integrated Routine Immunization Sessions (OIRIS), which is aimed at the rapid improvement of equity in RI coverage across Nigeria. It involves an improved way of working, a greater sense of urgency for RI prioritization by stakeholders, and also is an improvement on the Reaching Every Ward (REW) strategy (67). The OIRIS also has

a clear stipulation that effective community engagement is done, and line lists of under1 children are developed so that defaulters are traced and brought up to speed on any vaccinations for which they may have fallen behind (67). This way, caregivers receive the support they need and someone follows up to ensure vaccinations are not missed. The beauty of the OIRIS is that it ensures all strategies are optimized and implemented strategically with specific end goals in mind and also have spelt out goals for all stakeholders in the RI structure; supportive supervision is also taken seriously, along with the implementation of the recommendations of these supervisory activities.

A research project (in Kebbi state) on an intervention to potentially drive demand and sustain compliance with RI schedule is the Vaccine Indicator Reminder (VIR) band. It was meant to play the role of constantly reminding caregivers about upcoming RI sessions and so this intervention, if scaled up, could be a point to strengthening the ability of caregivers to engage favourably with the health system and dropouts will potentially be reduced too (68). The band features a dye blister that is released with time and on reaching the endpoint, is an indication that the time for the next RI antigen is due (68). Researchers also conclude that it was well-received by caregivers and there was impressive compliance with the use of the band; also, it was deemed a relatively cost-effective means of providing the reminders to caregivers about RI sessions compared to having health workers have to visit homes to remind caregivers about RI sessions (69).

These Interventions are summarized and outlined in Table 5, to show which appear more viable options to bridge gaps in the caregivers' ability to perceive.

Table 5: Ranking of interventions concerning the Ability to Engage

SN	Demand Generation Interventions	Criteria for ranking: Ability to Engage (Yes - Green; No - Red; Partially - Yellow)				
		O	A	S	R	C
14	Town announcements and household mobilization	Yes	Yes	Yes	Yes	Yes
15	CES	Yes	Yes	Yes	Yes	Yes
16	OIRIS	Yes	Yes	Yes	Yes	Yes
17	VIR Bands	Yes	Yes	Partially	Yes	Yes

* **O= Ownership; A=Accountability; S=sustainability; R=responsiveness; C=community participation**

Considerations that led to the ranking of interventions under Yes/No/Partially are contained in annex c. All highlighted/mentioned interventions discussed in this work and the same order provided by the Levesque Framework, are summarized in Table 6. They are summarized to also see what barriers to access may be neglected and require more attention. The descriptive table also mentions whether impact evaluations were found for the interventions or not; while no official evaluation reports were seen, some studies were found that gave some insight about how useful the interventions are and made a case for implementing them where needed. The table also contains supporting information about the interventions regarding sources, the scope of implementation, timelines, and funding sources.

Table 6: Interventions Descriptive table

Sn	Dimension of Access	Intervention	Year	Scope/ states	Funder	Comments
1	Ability to Perceive	Awareness creation through VCMs/CHIPS	2013 2014	Northern States	United Nations Children’s Fund (UNICEF) Core group partners project (CGPP)	Both organizations sponsored the engagement of VCMs. Information was gotten from their websites. VCM positive impact mentioned in studies but official evaluation not found.
2		IRISS (SMS Reminders) (“Tunar da ni” Project)	2018 - 2019	Kebbi State (pilot - 14 LGAs)	Bill and Melinda Gates Foundation (BMGF)	Impact evaluation not seen, but studies describe it as impactful.
3	Ability to Seek	RI Ambassadors to raise awareness in communities	2018	Nationwide	Government and Partners	Planned for in the 2018 NSIPSS Done in Jigawa with good results in 2019
4		Early start of behaviour shaping through proposed immunization-themed books for children	2018	Nationwide	Government and partners	Planned for in the 2018 NSIPSS No impact evaluation yet, it is a proposed/new intervention.
5		Social media engagements	2018	Nationwide access to the accounts	NPHCDA	Social media accounts were set up with the setting up of NERICC No impact evaluation found.
6		Dissemination of materials containing RI information	<i>This is a long-time intervention</i>	Nationwide	NPHCDA SPHCDA Partners	<i>It is hard to pin a specific start date for this.</i> No impact evaluation found.
7		Engagement of communities through traditional and religious leaders.	2009	Nationwide	NPHCDA SPHCDA Partners	<i>Using the date of publication of the NTLC operational guidelines as a start date</i> Impact evaluation found.

8	Ability to reach	Outreach Sessions	<i>Long-time intervention</i>	HTR areas and IDP communities	Government and Partners	Outreaches have always been part of the REW strategy
9		I-MOP	Launched March 2020	Targeted/underserved communities	Government (NPHCDA/FMoH)	Roll-out delayed due to covid19 pandemic shortly after launch No impact evaluation yet.
10		Engagement of security personnel for immunization	2016	Security compromised areas, especially Borno and Yobe states	Government and Partners	Impact evaluation found from the PEI.
11		Conditional cash transfers (CCTs)	2016	Jigawa, Katsina and Zamfara states	Give Well/ Good Ventures	www.newincitvies.org No impact evaluation found.
12		Effective integration of RI service delivery with Polio campaign activities (and other SIAs)	June 2014 – Sept 2015	Bauchi, Borno, Kaduna, Kano, Katsina, and Yobe (3,176 settlements)	BMGF in support of the Global PEI	This was reported in a study by the PEI team on the impact of the integration of services. A post-implementation study considered here as an impact evaluation.
13	Ability to Pay	Accountability mechanisms (toll-free lines) to report any charges on RI.	2018	Nationwide	NPHCDA	States also encouraged to have state toll-free lines for the same purpose No impact evaluation.
14	Ability to engage	Town announcements and household mobilization	<i>Long-time intervention</i>	Nationwide	Government and partners	This is implemented in areas that need it. More recently seen in polio eradication efforts. No impact evaluation found.
15		CES	2018	Nationwide	Government	To be scaled up to the entire country No impact evaluation found.
16		OIRIS	2018	RI priority states	Government and Partners	The priority states need more technical support

						No impact evaluation found
17		VIR Bands	January 2016 to August 2018	Kebbi State (Bunza LGA)	A grant from the International Initiative for Impact Evaluation (3ie) to Health Strategy & Delivery Foundation (HSDF).	Implemented as a project and not scaled up nationwide No impact evaluation found but it was reported as well-received by mothers who used it.

While these interventions exist, their suitability to various communities would differ. A study on parent's preferences about interventions towards improving immunization in Northern Nigeria revealed that some caregivers preferred situations where immunization services were given along with other beneficial packages or service such as nutrition-focused interventions; some even did not favour cash transfers; some were open to household engagements and media campaigns; some did not want to receive SMS reminders (70).

A qualitative study carried out in Bauchi (Northern Nigeria) and Cross River (Southern Nigeria) states about what perceptions caregivers held on the communication strategies, some were seen to have a preference for receiving phone messages, town announcements, as well as announcements in places of worship and over the media (71). There were also some concerns about the level of accommodation received at the points of service delivery such as the nature of the health workers' attitude, whether or not they had to wait long for the service (71).

Although these interventions appear to have merit, it is important to tailor interventions to suit the community and to do this, community engagement is one important means of achieving it.

CHAPTER 5: DISCUSSION

5.1 Introduction and summary of results

This research focused on the barriers to demanding RI services and what interventions are in place or could be put in place and strengthened to address the demand gaps. After an extensive search, 17 interventions for raising demand for RI were identified, with a majority of them categorized under the ability to reach and seek; there were 5 interventions in each category. The interventions under the ability to perceive and seek are most cross-cutting and can address gaps that relate to both dimensions. Most interventions addressed seemed to be targeted at raising awareness about RI, which is justifiable because unawareness has been recognized as one of the top reasons for non-vaccination. With regards to meeting the community engagement criteria, interventions under the ability to perceive, seek and pay met the criteria, while a few under the ability to reach and engage partially or did not meet ownership and sustainability criteria. For CCTs, there was a partial rating on ownership and no strong indication for sustainability; the RES/RIC, integration of RI services, and VIR bands partially met the sustainability criteria. However, the assessment was largely based on the design of the interventions and not the impact, due to the unavailability of quantifiable impact evaluation resources on some interventions in the public domain. Findings also indicated more focus of studies on factors affecting demand but not many studies about interventions and their potential for achieving higher demand for RI; the interventions mainly feature in these studies as recommendations.

Applying the community engagement criteria to these interventions can also serve as an assessment method for the RI programme, as it helps give a picture of the likelihood of success at the community level. Similarly, a positive observation from the findings is that the interventions identified align with the ones recommended in the myriad of studies done about factors influencing RI demand. This could indicate that the RI programme is on a positive trajectory and with proper implementation, be able to achieve its set targets of raising demand for RI.

Demand generation interventions should be aimed at achieving compliance to RI schedules; but, one thing that cannot be overemphasized is that these interactions need to take into consideration, the ideologies that shape the norms; and only through the engagement of the various structures on which these ideologies stand, will the hindrances be removed. It is also good to see Nigeria adopting successful strategies from the Polio Eradication program and leveraging on already established collaborations such as that with the Northern Traditional Leaders and the Military to reach unreachable communities (55)(10). The ability to sustain these collaborations also gives a fair chance that the interventions would continue to yield desired results.

The study findings show well-meaning interventions being planned to drive demand for RI in Nigeria. Also, shaping interventions around the root causes of issues is important, and the targeting of these interventions presents a more effective approach especially since the LQAS shows the variability of challenges by state (31). After a review of these interventions and the nature of their design, they are herewith presented according to the dimensions of access from the Levesque framework, and discussed in relation to how they rank in terms of Community Engagement.

5.2 Discussion of results based on the dimensions of access contained in the Levesque Framework

Ability to Perceive: both interventions seen here fulfil the community engagement criteria and as such, display some potential for success. On the potential for impact, the use of SMS reminders and engagement of VCMs, literature (45)(46) shows that these tend to be successful. Engaging community structures and SMS dissemination to caregivers comes off as a way of making these health interventions household level knowledge and have the potential to be widely accepted and sustained through generations. It is also notable that the SMS dissemination serves to bridge gaps in the ability to perceive and the ability to engage, as it creates awareness and also serves to remind caregivers about upcoming sessions. The top reasons for non-vaccination (31) gotten from the quarterly LQAS also helps with decisions about targeting interventions to areas they are most required, because issues such as lack of awareness are more predominant in some northern states when compared to southern states.

Knowing that perceptions are derived on the amount of information available to caregivers, the interventions are to transcend the basic knowledge about immunization to make sure caregivers have adequate knowledge. It is at this point the main sources of immunization information need to be looked at critically so that the best options are strengthened; for instance, since the health workers are the main source of information about immunization (31), they need to be leveraged on and other dissemination structures such as town announcers, radio, VCM/CHIPs need to be strengthened.

Ability to seek: Interventions discovered under this dimension can be, linked closely with those aimed at shaping perceptions (under the ability to perceive). Most of the interventions are seen to meet the community engagement criteria; however, for the plan to produce children's books on immunization, there is not much clarity on its sustainability and responsiveness of the intervention to improve RI coverage in the next few years. Considering the merit of these interventions, however, strategic collaboration with the necessary stakeholders is required to implement in communities. These interventions, when implemented effectively, could improve the level of awareness (also a major reason for non-vaccination in LQAS (31) results) and address barriers to seeking RI services. There are also points of intersection between the ability to seek and the ability to pay, where the financing implication of going to a health facility for RI services serves as a barrier.

The plan to engage RI ambassadors at the community level, designing early start behaviour shaping through children's immunization-themed books and carrying out social media engagements all serve to also raise awareness, address burning concerns about RI and instil the awareness of the benefits of immunization to children from an early age so that seeking care later in life would be easier. As a new intervention, the book on RI for children appears to have the potential for the long run and projects proactivity on the part of the NPHCDA; thus, not invalidating the potential of the intervention. Concerns on sustainability would need to be carefully considered as well. The CES (27), categorized under ability to engage would also play a good role here as the community structures can help address gaps in this dimension.

While it has also been highlighted in the literature (26) that immunization acceptance and compliance increase with the educational level of mothers or caregivers, and socioeconomic status (reflected in categorizations such as wealth quintiles and areas of residence), the goal of raising demand for RI can be achieved with a collaboration between health and non-health actors that have jurisdiction over addressing the determinants of seeking health care. While Nigeria has collaborations with the traditional system, which has been instrumental to the

success of Polio eradication (54)(50) and has helped push the country to attain its polio-free status in June 2020 (72), these lessons learned are without a doubt, valuable to the RI demand generation drive.

Ability to reach: Five interventions fall under this category and appear to meet most of the community engagement criteria; however, sustainability and ownership are points of concern for some such as the RES and RIC, the CCTs, and the integration of RI with polio and other SIA campaign activities. Many of the interventions seen addressing this barrier are not new, such as outreaches, and CCTs.

The modification of the nature of outreaches for targeted underserved communities, presented as I-MOP (53), is indicative of critical thinking and value placed on prioritization and leaving no community behind. When the rollout is done, it is almost certain that with proper mapping, the health indices of populations in these communities would improve. The integration of RI and PHC services with polio eradication activities (or other SIA) appears to have good potential (54) and can be likened to the planned I-MOP which was recently launched. This shows that the lessons from the polio programme are being used to achieve RI goals and with careful, targeted implementation, would yield positive results. These outreaches also present an opportunity to raise awareness amongst these communities and potentially improve their health literacy and health-seeking behaviour.

Engaging the security operatives (55) is also indicative of a will to reach every child with life-saving vaccines and its sustainability depends on the ability to keep up the engagements and collaboration with the security operatives in the affected communities. Strategically implementing this collaboration provides an opportunity to also save the lives of children born in these communities (57). Any financial requirements also need to be committed to ensuring these collaborations are successful.

For CCTs, while they are deemed able to improve uptake (59), there are considerations about potential negative impacts that could be felt with the incentivization of service acceptance and use (58). These CCTs are cost-intensive, so raise concerns about the source of funds for this purpose and how long they would be available. It has been implemented as a project under an international organization (58) and sustaining the gains may be challenging when the provision of these donor funds ceases. Also, since there is a drive for ownership, communities may not ideally need to be given cash incentives to accept beneficial health services. In lieu of the few considerations around ownership and sustainability of the CCTs, outreaches seem viable where there PHC facilities are far from communities.

Research (16) has also shown that the integration of RI services with Polio campaigns has been reported to be successful and recommended for continued use. This is where leveraging health interventions benefit the RI programme, as such, concerns about sustainability need to be addressed.

Across the dimensions of access to RI services, the interventions appear to be tailored towards ensuring ownership, except for the conditional cash transfers and VIR bands. The conditional cash transfers, while successful as a quick win, in the long run, could pose challenges when these cash transfers are not available. As an externally-funded intervention (58), its sustainability would depend on the willingness of the government to take on the responsibility of making the funds available to make these cash transfers an incentive for RI; probably taking lessons learned from the SURE-P (59) and making improvements for RI, if the RI programme adopts this intervention. Normalizing RI should be the drive, over incentivizing so there is sustained adherence to it.

Ability to pay: The provision of RI services for free reduces the gaps associated with this access barrier, as there are huge financial commitments from the government and donor agencies annually to this end. The intervention categorized here only seeks to ensure these services remain to be offered at no cost, and the widespread dissemination of this information is key to also driving demand in some areas. As an accountability measure, it appears to fit the community engagement criteria and can be seen as a platform for complaints or queries regarding RI services.

Beyond payment for the service, the indirect costs associated with going to the facilities may also be considered; such as transportation costs. Here, any financial-based interventions like CCTs can suffice, where available. This dimension has the least interventions as demand generation so far has been seen to be focused on creating awareness and addressing negative ideology about immunization. Outreaches can also serve to bridge gaps under this dimension, especially where transportation costs are a challenge for communities situated far from facilities.

Ability to engage: Ensuring caregivers can engage favourably with the health system is another factor driving demand for RI. The interventions such as town announcements and household mobilization, CES, and OIRIS have the potential to address gaps in this dimension as they meet the community engagement criteria. The VIR bands, however, while being stated as a viable option for supporting this dimension, bring up concerns about the level of ownership and sustainability as well. Although it has been stated as more cost-effective compared to visits by community health workers (69), it does not appear to supersede the value to be gained through human interaction with the clients.

What gives these interventions such potential is the level of engagement at the grassroots. The interaction with the health system here also points to the supply-side considerations (such as health worker attitude and RI session plans and structure) that would keep enrolled caregivers consistent with the schedule. Here, the supportive supervision ensured by the OIRIS sees that the interaction between the caregivers and the health system is favourable.

The VIR bands need to be purchased (they are not manufactured locally) and have a myriad of logistical implications from procurement to storage and transportation; adding to this is the financial implication of purchasing a new tool and paying for its logistics to ensure it gets to the end-user, who is the child. The country is at a point where it seeks cost-effective and sustainable measures to address gaps, especially with the fragile state of the economy. The VIR bands were piloted on partner funds and so the ability of the government to also take up ownership of this intervention and sustain its funding may present cause for concern. Otherwise, it is an innovative measure and can be scaled up with commitment from the government. Investing in helping caregivers remember to complete RI schedules, ensuring the service delivery conditions (for instance, the attitude of health workers and level of supportiveness, RI session structure and waiting time and the sitting arrangements) do not discourage caregivers are important to sustaining their ability to engage favourably with the health system.

Considering community engagement and how the dimensions ranked, sustainability was a recurring concern, especially where the success of interventions depended on collaborative efforts with non-health actors such as the security operatives, also where incentives were provided (CCTs) or new devices were required (VIR bands). The role of intersectoral collaboration cannot be over-emphasized and stands recommended in studies (40). The community engagement criteria see to it that these interventions stand a high chance of being accepted and so when implemented, would be responsive to gaps, sustained, and make the desired impact. The accountability features of these interventions and the RI programme also

can ensure the success of the interventions. The potential for success is also strengthened when these interventions are used in combination where necessary.

With all the measures listed as interventions to drive demand, it would be beneficial to institutionalize the knowledge about immunization; imparting the community with the right RI information will enable positive health decision making and the need for large scale mobilization may not be requires in the future. This is important because these interventions have cost implications and sustaining them overtime may be uncertain. It is important to also bear in mind that based on the NSIPSS (10), the country plans to slowly transition out of donor support and so it would be beneficial to have addressed all demand gaps before the time comes when the financing of RI is entirely left to the country. While driving up demand, the supply indicators need to stay in focus of the programme.

Study Limitations to note:

As a literature review done by a sole researcher, there are some limitations to this study, presented herewith;

- ❖ **The literature search** mostly yielded resources about factors influencing demand for RI, and not so many focused-on interventions to address these gaps and their impact. The search was limited to available literature and, some grey literature may exist that may not have been found.
- ❖ **The ranking of interventions** was done only by the researcher based on the impression gotten from the resources about the interventions and how well they fit the community engagement criteria. For this reason, a chance of bias exists. Also, not all interventions were fully described in the resources, so the general knowledge about how they typically work was used to guide the assessment of how they fit into the ranking criteria.
- ❖ **Evidence gap:** impact evaluations were unavailable, and is the reason for researching based on the design or nature of interventions. While they may exist, they are not in the public domain and so to my knowledge, impact studies need to be done and/or made available publicly.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The purpose of this research was to review the demand generation interventions aimed at improving RI coverage in Nigeria, to see the level to which they bridge gaps in accessing care, and also how well the interventions met the community engagement criteria. The findings indicate that the current pace of the country has the potential to achieve increased demand for RI in the coming years, especially as spelt out in the NSIPSS document, which it plans to implement between 2018-2028. This is important as the country is expected to slowly phase out of donor support for RI, thereby emphasizing the need to entrench positive health-seeking behaviour to immunization that would translate to optimal immunization coverage in the country that would be sustained over time.

The demand generation interventions reviewed thus far all have the potential for raising demand for RI services in Nigeria, such that the efforts towards improving supply should be matched by the demand for the services. A few considerations about the level of ownership and sustainability of the interventions exist especially where delivery of the services is beyond the ability of the health workers and have to rely on collaborations such as with the security operatives to reach security compromised areas. Another consideration is financial commitments (to help sustain interventions or support scale-up of interventions that have successful pilot results) that require budgetary allocation expansion, which is difficult to achieve, especially amidst the current state of the country's economy and the fleeting nature of external funding (for interventions that have been piloted or implemented with external funds).

As strategic as these interventions may seem, their success, eventually is reliant on the level of planning at the lowest level of implementation, where the interaction that changes behaviour for better towards immunization happens. This is where all resources generated take the final steps to success; hence, emphasizing the need to empower the teams at these levels to deliver adequately on their plans with full accountability.

Supportive supervision, through the OIRIS and its emphasis on the implementation of resultant recommendations, has the potential for improving demand; this is because, with the recognition of areas for improvement, clients also would derive the satisfaction of service delivery and demand would not have to falter. Here, a form of customer accountability mechanism may be valuable as it would provide a redress mechanism for complaints, which if promptly handled, instils some good measure of trust in the health system also.

Gaps also in knowledge about the cost-effectiveness and sustainability of interventions need to be bridged with more research, as the NSIPSS is implemented in the country. These interventions will not only shape behaviour for immunization but other health interventions and general health-seeking behaviour. So, it suffices to say that raising demand for immunization will likely have positive spill-over effects on general health-seeking behaviour of Nigerians.

6.2 Recommendations

The findings of the literature review done and discussed lead to the following recommendations that could contribute to demand generation for RI from the perspectives of recommendations for programme management and stakeholders, for the policy-level, and for further research.

Recommendations for programme management and stakeholders

- ❖ NPHCDA and partners to strengthen the capacity of other community structures besides health workers to improve communities' knowledge about RI: since the health workers are recognised as the main source of immunization information, they need to be leveraged on but also, other dissemination structures such as town announcers, radio, VCM/CHIPs need to be strengthened. This is good for the proportion of caregivers who do not make it to the facility and may need to be enlightened about RI by some other medium.
- ❖ NPHCDA leadership and NERICC should ensure the sustainability of collaborations with non-health actors, beyond the tenures of current officials. This way, the interventions that thrive on these collaborations would remain even with new leadership. These collaborations should also include actors such as potential funders and companies' corporate social responsibilities and ambassadors.
- ❖ NPHCDA should intensify efforts aimed at creating awareness about RI to raise its demand: this should be done by disseminating unified RI messaging to communities so that the right message is received in all communities, the RI messages to be disseminated should be strategic and targeted in terms of content and most viable means that work for each community; for instance, through print media, social media, dramas, town announcements.
- ❖ NPHCDA should leverage avenues for integration of RI with activities of health programmes such as polio campaigns; this way, other needs of caregivers are addressed and the RI demand grows, and the same for RI coverage.
- ❖ NPHCDA should consider applying the community engagement criteria in future assessment of interventions, as it has been seen from this study as a useful way to assess and make decisions about scale-up, roll out and implementation of new interventions.

Policy level recommendation:

- ❖ FMOH and NPHCDA need to strengthen advocacy towards the Ministry of Finance to expand budgetary allocations towards demand generation activities for RI and PHC. This supports the implementation of interventions that have been piloted with donor funds and are to be implemented or scaled up.

Recommendations for further research

- ❖ NPHCDA should ensure impact evaluation of interventions that have been piloted (such as the VIR bands and CCTs) before decisions are made to scale them up or roll out in new locations. This way, sustainability considerations would be addressed and planned for up to a time where the government may need to take over ownership of such interventions along with its financial and material implications.
- ❖ NPHCDA should invest in the conduct of impact studies of demand generation interventions for RI. This way, more objective decisions can be made and this would ensure efficient use of resources committed to demand generation, as the best-fit

interventions would be implemented. The Monitoring and evaluation data and RI LQAS data should be acted on to support this.

I hope that the recommendations of this research be considered by the NPHCDA and support the work being done to ensure the required immunization reaches every Nigerian child.

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ANNEXES

Annex a: Key Search terms

Table showing the detailed chain of key-words and combinations used in the literature database search that yielded relevant literature.

Sn	Search Operators and terms	Platform
1	SMS reminder for immunization Nigeria	Google.com
2	VCMS polio eradication Nigeria	
3	Routine Immunization defaulters Nigeria	
4	Importance of community engagement in health interventions	
5	Immunization AND Perceptions	VU Library
6	Immunization AND Religious Beliefs	
7	Immunization Perception AND Nigeria	
8	Seeking Immunization AND Africa	
9	Immunization AND reach AND Nigeria AND intervention	PubMed
10	Immunization Demand AND Africa	
11	Childhood Immunization knowledge AND Africa	
12	Polio Eradication AND Nigeria AND Routine Immunization	
13	Nigeria AND Immunization AND gender AND intervention	Google Scholar
14	Immunization awareness interventions in Africa	
15	Nigeria AND Immunization AND expectations AND intervention	
16	demand for vaccination Nigeria	
17	Reaching Every Settlement Polio Nigeria	Google Scholar
18	Routine immunization outreaches Nigeria	
19	Ownership of health interventions	
20	Economic factors influencing RI demand in Nigeria	
21	Nigeria immunization health literacy intervention	
22		

Annex b: Summary of demand creation interventions assessed in order of the demand side levels of access in the Levesque framework.

SN	Demand Generation Interventions	Criteria for ranking: Ability to Perceive (Yes – Green; No – Red; Partially - Yellow)				
		O	A	S	R	C
1	Awareness creation through VCMs/CHIPs	Yes	Yes	Yes	Yes	Yes
2	IRISS (SMS reminders); "Tunar da ni" ** Project	Yes	Yes	Yes	Yes	Yes
SN	Demand Generation Interventions	Criteria for ranking: Ability to Seek (Yes – Green; No – Red; Partially - Yellow)				
		O	A	S	R	C
3	RI Ambassadors to raise awareness in communities	Yes	Yes	Yes	Yes	Yes
4	Early start of behaviour shaping through proposed immunization-themed books for children	Yes	Yes	Partially	Partially	Yes
5	Social media engagements	Yes	Yes	Yes	Yes	Yes
6	Dissemination of materials containing RI information	Yes	Yes	Yes	Yes	Yes
7	Engagement of communities through traditional and religious leaders.	Yes	Yes	Yes	Yes	Yes
SN	Demand Generation Interventions	Criteria for ranking: Ability to Reach (Yes – Green; No – Red; Partially - Yellow)				
		O	A	S	R	C
8	Outreach sessions	Yes	Yes	Yes	Yes	Yes
9	I-MOP	Yes	Yes	Yes	Yes	Yes
10	Engagement of security personnel for immunization	Yes	Yes	Partially	Yes	Yes
11	Conditional cash transfers (CCT)	Partially	Yes	No	Yes	Yes
12	Effective integration of RI service delivery with Polio campaign activities (and other SIAs)	Yes	Yes	Partially	Yes	Yes
SN	Demand Generation Interventions	Criteria for ranking: Ability to Pay (Yes – Green; No – Red; Partially - Yellow)				
		O	A	S	R	C
13	Accountability mechanisms (toll-free lines) to report any charges on RI.	Yes	Yes	Yes	Yes	Yes
SN	Demand Generation Interventions	Criteria for ranking: Ability to Engage (Yes – Green; No – Red; Partially - Yellow)				
		O	A	S	R	C
14	Town announcements and household mobilization	Yes	Yes	Yes	Yes	Yes
15	CES	Yes	Yes	Yes	Yes	Yes
16	OIRIS	Yes	Yes	Yes	Yes	Yes
17	VIR Bands	Yes	Yes	Partially	Yes	Yes

Annex c: Considerations that led to the ranking of Yes/No/Partially.

Sn	Interventions	Considerations behind "Yes/No/Partially" ranking
1	Awareness creation through VCMs/CHIPs (45)	<p style="text-align: center;">All Yes</p> <p>Ownership: The community is empowered to participate through its members who work as VCMs.</p> <p>Accountability: Monitoring and Supervisory mechanisms are in place at all levels and holds stakeholders accountable.</p> <p>Sustainability: The VCM transition and setting up of the CHIPS (10) program seeks to sustain the gains made by VCMS and the coordination structure, participation of government will see to its sustainability.</p> <p>Responsiveness: They have been noted for successful community mobilization, which will be useful for RI.</p> <p>Community participation: VCMs are selected by and from the community with the help of the community leaders. They are trusted by the community.</p>
2	IRISS (SMS reminders); "Tunar da ni" ** Project (46)	<p style="text-align: center;">All Yes</p> <p>Ownership: The community gets relevant information through the SMS and are thus empowered to take responsibility and partake in the RI services.</p> <p>Accountability: outcome is tied to completion rates for RI antigens as messages are sent to remind caregivers. Health workers are tasked with sending these messages to caregivers (47).</p> <p>Sustainability: due to the expanding number of mobile phone users, is a good opportunity to reach many communities in years to come. Described as cost-effective in comparison to home visits by community health workers.</p> <p>Responsiveness: SMS reminders are said to be effective at raising demand for RI in some communities. Dropouts have been reduced where studies were conducted (47).</p> <p>Community participation: The communities/caregivers are sensitized and have a choice to opt-in for the reminders. Communities are also targeted to receive broadcast messages about RI.</p>
3	RI Ambassadors to raise awareness in communities	<p style="text-align: center;">All Yes</p> <p>Ownership: The health ambassadors serve as focal persons for health issues in their communities.</p> <p>Accountability: A monitoring system is in place and for the Jigawa example, was done by WHO. The activities and contributions of ambassadors are monitored.</p> <p>Sustainability: These community structures will be in place for a long time and makes sustainability achievable.</p> <p>Responsiveness: There was an observed improvement in RI quality (more LGAs has passed LQAS and also dropout reduced from 8% to 6%, which is attributed partly to the intervention, amongst others (49).</p> <p>Community participation: They actively participate in RI activities; such as keeping records of the immunization status of all children in the community and ensure complete vaccination of the children.</p>

4	Early start of behaviour shaping through proposed immunization-themed books for children (10)	<p style="text-align: center;">All Yes</p> <p>Ownership: Communities would be empowered from an early age and make better health-related decisions on RI in the future.</p> <p>Accountability: As a government initiative, there would be monitoring of all activities relating to the production and dissemination of these books.</p> <p>Community participation: The Community structures can be engaged for the dissemination of these books.</p> <p style="text-align: center;">Partially</p> <p>Sustainability: no certainty about the availability of resources needed to sustain the production and dissemination of the books.</p> <p>Responsiveness: This is a long-term measure, aimed at the younger generation and so would not immediately yield results but over time, has the potential to have a generation empowered and adequately knowledgeable about RI benefits.</p>
5	Social media engagements	<p style="text-align: center;">All Yes</p> <p>Ownership: This is an avenue for empowering the community to take responsibility for their RI status.</p> <p>Accountability: There is a monitoring and supervisory mechanism in place and all stakeholders acknowledge responsibility for RI activities.</p> <p>Sustainability: This aids utilization of community resources and structures to address gaps.</p> <p>Responsiveness: This has the potential to drive timely response to gaps and can potentially reach large populations easily.</p> <p>Community participation: The community is actively involved through its stakeholders, as well as through subscribers to these social media platforms.</p>
6	Dissemination of materials containing RI information	<p style="text-align: center;">All Yes</p> <p>Ownership: They empower communities with the right information to help them partake and benefit from RI.</p> <p>Accountability: They serve to make community structures aware of RI responsibilities.</p> <p>Sustainability: This is a strategy used by many health programmes and for their recognized importance, are budgeted and planned for in annual plans.</p> <p>Responsiveness: They can provide timely information on RI which can inform necessary action by caregivers.</p> <p>Community participation: Community stakeholders are also engaged in the dissemination of these materials.</p>
7	Engagement of communities through traditional and religious leaders.	<p style="text-align: center;">All Yes</p> <p>Ownership: The community is empowered to take responsibility for RI through traditional and religious leaders.</p> <p>Accountability: The traditional system has a hierarchy which is respected and so engagement of the leaders, makes it easy to have community leader carry out designated support activities. Monitoring and supervisory mechanisms also exist.</p> <p>Sustainability: This is assured because the community structures are actively involved.</p> <p>Responsiveness: This tends to contribute to the attainment of improved RI status of children in the community, as seen in the case of RI ambassadors (49).</p> <p>Community participation: The community is encouraged to participate in the community structures engaged.</p>
		<p style="text-align: center;">All Yes</p> <p>Ownership: This makes it easier for communities to take advantage of the health benefits of RI and participate.</p>

8	Outreach sessions	<p>Accountability: Monitoring and supervisory systems are in place.</p> <p>Sustainability: The participation of community structures gives this a good chance at sustainability.</p> <p>Responsiveness: The support this provides hard-to-reach communities can bridge gaps and yield improved RI coverage.</p> <p>Community participation: The community stakeholders are engaged to plan for outreaches and engage caregivers to participate.</p>
9	I-MOP	<p style="text-align: center;">All Yes</p> <p>Ownership: This makes it easier for communities to take advantage of the health benefits of RI and participate.</p> <p>Accountability: Monitoring and supervisory systems are in place.</p> <p>Sustainability: The participation of community structures gives this a good chance at sustainability.</p> <p>Responsiveness: The support this provides hard-to-reach communities can bridge gaps and yield improved RI coverage. Great for underserved communities.</p> <p>Community participation: The community stakeholders are engaged to plan for outreaches and engage caregivers to participate.</p>
10	Engagement of security personnel for immunization	<p style="text-align: center;">Yes</p> <p>Ownership: Engaging security agencies in the community entrenches a sense of responsibility for RI.</p> <p>Accountability: Stakeholders are held responsible for monitoring mechanisms.</p> <p>Responsiveness: This can drive RI coverage in security compromised communities.</p> <p>Community participation: Community stakeholders are involved and it is a community-based intervention.</p> <p style="text-align: center;">Partially</p> <p>Sustainability: This relies on collaboration with non-health actors and this has to be kept active.</p>
11	Conditional cash transfers (CCT)	<p style="text-align: center;">Yes</p> <p>Accountability: Stakeholders are held accountable through monitoring mechanisms.</p> <p>Responsiveness: This has the potential to improve caregivers' participation in RI activities. It also makes room for increased RI knowledge.</p> <p>Community participation: Community stakeholders are involved and it is a community-based intervention.</p> <p style="text-align: center;">Partially</p> <p>Ownership: Communities are empowered to partake in the RI program but this is largely driven by financial motivation.</p> <p style="text-align: center;">No</p> <p>Sustainability: Monetary incentives are not always encouraged. This is from experience where they are usually associated with resultant withdrawal when the incentives are no longer available. Also, the motivation for immunization is a concern and may not drive adherence to RI when it is removed (58).</p>
12	Effective integration of RI service delivery with Polio	<p style="text-align: center;">Yes</p> <p>Ownership: State government and local teams are fully involved. Upon dissemination of results, some made commitments to sustain funding. There was the active participation of stakeholders.</p> <p>Accountability: was ensured through monitoring, supervision, and review of data generated for action by partner agencies.</p> <p>Responsiveness: This resulted in improved coverage of services in hard-to-reach communities, so, it was responsive in bridging the access barrier.</p>

	campaign activities (and other SIAs) (54)	<p>Community participation: community leaders and mobilizers were engaged and participated actively. They were vital to the planning process and selection of the hard-to-reach areas, as well as serving as entry points to the community.</p> <p style="text-align: center;">Partially</p> <p>Sustainability: ranked “Partially” because any commitment made has to be backed by the provision of resources needed such as financial, human, and material.</p>
13	Accountability mechanisms (toll-free lines) to report any charges on RI.	<p style="text-align: center;">All Yes</p> <p>Ownership: Communities feel empowered as they can also make contact with the RI programme to address any issues that come up.</p> <p>Accountability: This is a means of encouraging responsibility amongst RI stakeholders.</p> <p>Sustainability: Communities can use this means to seek support so their demand for RI improves.</p> <p>Responsiveness: This has the potential to drive timely reactions to address gaps.</p> <p>Community participation: This is open to all community structures.</p>
14	Town announcements and household mobilization	<p style="text-align: center;">All Yes</p> <p>Ownership: This is a source of providing RI information to communities and as such, empowering them.</p> <p>Accountability: Monitoring mechanisms are in place to ensure a sense of responsibility amongst stakeholders.</p> <p>Sustainability: This is assured because the community structures are actively involved.</p> <p>Responsiveness: This has the potential to drive timely reactions to address gaps.</p> <p>Community participation: Community structures are actively engaged.</p>
15	CES	<p style="text-align: center;">All Yes</p> <p>Ownership: The community is empowered to take responsibility for RI through traditional and religious leaders.</p> <p>Accountability: The traditional system has a hierarchy which is respected and so engagement of the leaders, makes it easy to have community leader carry out designated support activities. Monitoring and supervisory mechanisms also exist.</p> <p>Sustainability: This is assured because the community structures are actively involved.</p> <p>Responsiveness: This tends to contribute to the achievement of improved RI status of children in the community, as seen in the case of RI ambassadors (49).</p> <p>Community participation: The community is encouraged to participate through the community structures engaged.</p>
16	OIRIS	<p style="text-align: center;">All Yes</p> <p>Ownership: This makes room for empowering the community to take responsibility for their RI status.</p> <p>Accountability: There is a monitoring and supervisory mechanism in place and all stakeholders acknowledge responsibility for RI activities.</p> <p>Sustainability: As a paradigm shift to an optimized way of working and engaging the communities, this aids utilization of community resources and structures to address gaps.</p> <p>Responsiveness: This has the potential to drive timely response to gaps.</p> <p>Community participation: The community is actively involved through its stakeholders.</p>

17	VIR Bands	<p style="text-align: center;">Yes</p> <p>Ownership: This empowers communities to be responsible for RI. Mothers also participate by using the bands and adhering to the schedule.</p> <p>Accountability: This encourages a sense of responsibility amongst stakeholders; there is also a monitoring mechanism.</p> <p>Responsiveness: This can support caregivers to make timely decisions to attend subsequent RI sessions.</p> <p>Community participation: community structures are involved and the bands are used by the community as well.</p> <p style="text-align: center;">Partially</p> <p>Sustainability: As a new intervention with its own financial, logistical and technical requirements</p>
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Annex d: Current EPI Schedule for Nigeria



Current EPI Schedule in Nigeria

Minimum Target Age of Child	Type of Vaccine	Dosage	Route of administration	Site
At birth 	BCG	0.05ml	Intra dermal	Left Upper Arm
	*OPV0	2 drops	Oral	Mouth
	**Hep B birth	0.5ml	Intra muscular	Antero-lateral aspect of Right thigh
6 weeks 	Pentavalent (DPT, Hep B and Hib) 1	0.5ml	Intra muscular	Antero- lateral aspect of left thigh
	Pnemococcal Conjugate Vaccine 1	0.5ml	Intra muscular	Antero- lateral aspect of Right thigh
	OPV1	2 drops	Oral	Mouth
	Rota 1	1ml	Oral	Mouth
10 weeks 	Pentavalent (DPT, Hep B and Hib) 2	0.5ml	Intra muscular	Antero-lateral aspect of left thigh
	Pnemococcal Conjugate Vaccine 2	0.5ml	Intra muscular	Antero- lateral aspect of Right thigh
	OPV2	2 drops	Oral	Mouth
	Rota 2	1ml	Oral	Mouth
14 weeks 	Pentavalent 3 (DPT, Hep B and Hib)	0.5ml	Intramuscular	Antero-lateral aspect of left thigh
	Pnemococcal Conjugate Vaccine 3	0.5ml	intra muscular	Antero- lateral aspect of Right thigh
	OPV3	2 drops	Oral	Mouth
	IPV	0.5ml	Intramuscular	Antero- lateral aspect of Right thigh (2.5cm apart from PCV)
6 months	Vitamin A 1st dose	100,000 IU	Oral	Mouth
9 months 	Measles 1st dose	0.5ml	Subcutaneous	Left upper arm
	Yellow Fever	0.5ml	Subcutaneous	Right upper arm
	Meningitis Vaccine	0.5ml	Intramuscular	Antero- lateral aspect of Left thigh
15 months 	Vitamin A 2nd dose	200,000 IU	Oral	Mouth
	Measles 2 dose (MCV2)	0.5ml	Subcutaneous	Left upper arm

*OPV0 must be given before the age of two weeks **Hep B at birth should be given preferably within 24 hours of birth but can be given up to 14 days of birth. BCG should be given within two weeks of birth and can be given up until 11 months.



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