Zero-Dose LEARNING HUB

Closing The Immunization Gap: Enhancing Routine Immunization in Nigeria by Reaching Zero-Dose and Under-Immunized Children in Marginalized Communities: Report of a Rapid Assessment

March 2024

Gavi The Vaccine Alliance

AFRICA HEALTH BUDGET NETWORK

AFENET African Field Epidemiology Network
A healthier Africa

Gavi Zero-Dose Learning Hub (ZDLH)

Funded by Gavi, the Zero-Dose Learning Hub (ZDLH) serves as the global learning partner and is led by JSI Research & Training Institute, Inc. (JSI) with two consortium partners, The Geneva Learning Foundation (TGLF) and the International Institute of Health Management Research (IIHMR). Together, the consortium enables sharing and learning across four Country Learning Hubs (CLHs) in Bangladesh, Mali, Nigeria, and Uganda to advance the uptake of evidence by synthesizing and disseminating key learnings. The ZDLH also focuses on improving immunization equity and reducing the number of zero-dose (ZD) and under-immunized children globally by facilitating high-quality evidence generation and uptake. In Nigeria, the ZDLH is being implemented by the African Field Epidemiology Network (AFENET) and The Africa Health Budget Network (AHBN) as a sub-partner.

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AEFI	Adverse Event Following Immunization
AFENET	African Field Epidemiology Network
AHBN	Africa Health Budget Network
ANC	Antenatal Care
BAU	Bauchi
BCG	Bacillus Calmette-Guérin vaccine
BeSD	Behavioural and Social Drivers of Immunization
BON	Borno
CHAI	Clinton Health Access Initiative
CHAN	Christian Health Association Of Nigeria
CHEW	Community Health Extension Workers
CHIPS	Community Health Influencers Promoters & Services Program
CGK	Community Gatekeeper
CLH	Country Learning Hub
CMAM	Community Management of Acute Malnutrition
DHIS2	District Health Information System II
DOR	Drop Out Rate
DTP	Diphtheria, Tetanus, and Pertussis vaccine
DQIP	Data Quality Improvement Plan
ENG	English
EPI	Expanded Programme on Immunization
FCT	Federal Capital Territory
FGD	Focus Group Discussion
FGN	Federal Government of Nigeria
FP	Focal Person
Gavi	Global Alliance for Vaccines and Immunization
GIS	Geographic Information System

GK	Gatekeeper
GMB	Growth Monitoring
GNJ	Ganjuwa
HCW	Health Care Workers
HF	Health Facility
HW	Healthcare Worker
HZI	Helmholtz Centre for Infection Research
IDI	In depth Interview
IDPs	Internally Displaced Persons
IDSR	Integrated Disease Surveillance and Response
IMCI	Integrated Management of Childhood Illnesses campaign
IPV	Inactivated Poliomyelitis Vaccine
IRMMA	Identify, Reach, Monitor, Measure, and Advocate
IVAC	International Vaccine Access Centre
JCHEW	Junior Community Health Extension Workers
JR	Jere
JSI	John Snow, Inc.
KII	Key Informant Interview
KN	Kano
KMB	Kumbotso
LGAs	Local Government Areas
LH	Learning Hub
MCV	Measles-Containing Vaccine
M & E	Monitoring and Evaluation Officer
MNCH	Maternal, Newborn and Child Health
MMC	Maiduguri Metropolitan Council
MOV	Missed Opportunities for Vaccination
NCDC	Nigeria Center for Disease Control
NDHS	National Demographic Health Survey

NERICC	National Emergency Routine Immunization Coordination Centre
NFELTP	Nigeria Field Epidemiology and Laboratory Training Program
NHMIS	Nigeria Health Logistic Management Information System
NNHREC	Nigeria National Health Research Ethics Committee
NPHCDA	National Primary Health Care Development Agency
NSIPSS	Nigeria Strategy for Immunization and Primary Health Centre Systems Strengthening
ODK	Open Data Kit
PAPA LQAS	Performance Assessment for Programme management and Action - Lots Quality Assurance Sampling
PCCS	Post Campaign Coverage Survey
PCM	Paracetamol
PHC	Primary Health Center
Raise for Sahel	Reaching & Adapting Immunization Services Effectively to Reach Zero-Dose Children in the Sahel
REW	Reaching Every Ward
RFP	Request For Proposal
RMNCH+N	Reproductive, Maternal, Newborn, Child and Adolescent Health and Nutrition
RI	Routine Immunization
RISS	Routine Immunization Supportive Supervision
SARA	Service Availability and Readiness Tool
SD	Standard Deviation
SIA	Supplementary Immunization Activities
SML	Sumaila
SMS	Short Message Service
SOD	Special Outreach Days
SOK	Sokoto
SORMAS	Surveillance, Outbreak Response Management and Analysis System

TMW	Tambuwal
UNICEF	United Nations Children's Fund
USAID IHP	United States Agency for International Development Integrated Health Program
US CDC	United States Center for Disease Control and Prevention
USD	United States Dollar
VCM	Voluntary Community Mobilizers
VM1A	Vaccine Utilization Form
WMK	Wamakko
WHO	World Health Organization
ZD	Zero-Dose
ZDLH	Zero-Dose Learning Hub
Z Drop Plan	Zero-dose plan

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We declare that we have no known competing financial interests or personal relationships that could have influenced the work reported in this report.

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06/03/2024

EXECUTIVE SUMMARY

Background: Despite advancements, identifying and reaching zero-dose children in marginalized communities remains a challenge. These communities face limited access to healthcare, low socioeconomic status, and cultural barriers hindering routine immunization coverage. Nigeria has the highest number of zero-dose children on the African continent, highlighting the urgency of addressing this issue. Understanding barriers to reaching zero dose is crucial to develop targeted interventions and bridge the immunization gap.

Objectives: This rapid assessment aims to investigate factors hindering routine immunization and improve the national immunization program by targeting zero-dose children and neglected communities. The study reviewed existing literature on factors influencing routine immunization in Nigeria. Furthermore, evaluation of the completeness and efficiency of immunization data reporting systems, particularly for identifying and reaching unvaccinated children was done. The study also assessed the quality of care provided at healthcare facilities, including staffing, service availability, and data tools. A household vaccination survey was conducted to understand caregivers' perspectives on immunization. Finally, the study analysed primary data on various factors related to zero dose and unimmunized children. Based on the findings, context-specific action plans were developed to inform evidence-based decision-making for program improvements.

Methods: The study was conducted in eight LGAs (Bauchi, Ganjuwa, Maiduguri, Jere, Kumbotso, Sumaila, Wamakko and Tambuwal) across four states (Bauchi, Borno, Kano and Sokoto) in Nigeria. A mixed method approach was employed, which included an evaluation of routine immunization systems, health facility assessment, household vaccination survey, and qualitative interviews (key informant and in-depth interviews). The brief methods employed were as follows;

- ***Evaluation of routine immunization reporting systems:*** An assessment of the completeness, accuracy, and accessibility of data on routine immunization in Nigeria.
- ***Health facility assessment:*** An assessment of the availability of qualified healthcare providers, vaccines, and cold chain facilities at health facilities in Nigeria.
- ***Household vaccination survey:*** A survey of caregivers in Nigeria to identify their reasons for vaccination or not vaccinating their children.
- ***Barriers and Enablers:*** Qualitative Interviews with healthcare providers, community leaders, and caregivers in Nigeria to gain a deeper understanding of the challenges of routine immunization.

Findings: The findings from the rapid assessment were as follows;

1. Evaluation of routine immunization reporting systems:

- DHIS2: Open source with customization potential but faces data quality and timeliness issues.
- PAPA LQAS: Identifies zero-dose cases but has huge resource implications and doesn't show performance at the ward level.
- RI SMS Reporting: Accessible with data capture and dashboards but does not identify zero-dose children.
- RISS Checklist: Guides supervision efforts and provides peer to peer learning but may have scalability issues.
- SORMAS: Effective for outbreak reporting but limited access hampers the ability to capture routine immunization data.

2. Health facility assessment: This assessment revealed the following information;

- ***Facility distribution:*** Most of the health facilities (62.5%) are located in rural areas.
- ***Human resources:*** Facilities have a high proportion of volunteer staff (46.7%) and a limited number of doctors (2%).
- ***Service availability:*** Most facilities offer routine vaccinations (93.8%), but some do not offer essential vaccines like the Hepatitis B birth dose vaccine (3.1%).
- ***Zero-dose children:*** Most facilities (90%) have strategies to reach zero-dose children, but session frequency and duration are insufficient.
- ***Infection prevention and control:*** Essential supplies, like safe disposal boxes for syringes, are often missing (100% lacking).
- ***Cold chain management:*** Temperature monitoring is inconsistent, with some facilities experiencing stockouts (24%) and temperature expulsions (24%).
- ***Data management:*** Microplanning tools are sometimes unavailable (19%), and data loss due to stockouts is a concern (53%).
- ***Training:*** Most facilities in urban areas received training in the past two years (95%), while participation in rural areas is lower (67%).
- ***Vaccination dropout rates:*** Dropout rates for some vaccines exceed the acceptable 10% threshold in certain months.

3. Household vaccination survey: The survey revealed the following information

- ***High confidence in vaccines***: Over 90% of caregivers believed vaccines are important and safe for their children, and also 95% trust healthcare workers who administers them.
- ***Social support for vaccination:*** Most caregivers reported receiving support for vaccination from family, friends, religious and community leaders. However, urban

areas (85% for Urban and 95% for Rural) showed lower confidence and higher influence from family and friends compared to rural areas (96% for Urban and 89.5% Rural).

- ***Intention to vaccinate:*** Around 90% of caregivers expressed intent to vaccinate their children.
- ***Practical challenges:*** Most caregivers (90%) know where to get vaccines, but affordability remains a concern in both urban (62%) and rural areas (70%). Moreover, long waiting times and other service-related issues contribute to dissatisfaction.
- **Zero-dose children:** We identified a significant number of zero dose children (32.8%) with the highest prevalence in Sokoto and Kano states. Urban settings in Sokoto and Borno states showed higher numbers of zero-dose children compared to rural areas.

4. Barriers and Enablers: The following were key findings;

- ***Health workers:*** Play a crucial role in immunization programs, providing dedicated service delivery, communication, and education. However, they face challenges like caregiver reluctance and geographical barriers. Their recommendations include financial support, addressing rumors, and improving systems.
- ***Caregivers:*** Demonstrate commitment to child vaccination but face challenges like spousal approval and gender roles. Facilitators include early arrival and clinic proximity, while barriers include delayed arrival and household responsibilities. Recommendations focus on awareness, spousal support, and addressing social dynamics.
- ***Community gatekeepers:*** Play a vital role in promoting immunization through community mobilization, media outreach, and collaboration with health workers. They face challenges like adverse reactions (AEFIs) and economic difficulties but offer solutions like improved communication, stronger community relationships, and incentivizing participation.

Conclusion/Recommendations: The following conclusions/recommendations were arrived at from the various components of the rapid assessment;

- ***Evaluation of routine immunization reporting systems:*** Evaluation of routine immunization reporting systems in Nigeria reveals common challenges. Strengthening these systems is imperative for data-driven decision-making. Recommendations include training for data entry and validation, improving internet connectivity, promoting real-time reporting, advocating for dedicated zero-dose fields, and integrating systems like SORMAS. Specific recommendations for each system include house-to-house enumeration for PAPA LQAS, addressing staffing shortages for RI SMS Reporting, incorporating technology for RISS Checklist, and establishing collaborations for SORMAS.

- ***Health facility assessment:*** The health facility assessment highlights challenges in routine immunization provision, including understaffing and inadequate infection control. Recommendations include increasing qualified staff in rural areas, ensuring proper disposal of syringes, enhancing cold chain management, providing training for

healthcare workers, strengthening data management systems, and improving the frequency and duration of immunization sessions. Gender-sensitive scheduling and accessibility considerations are also recommended to enhance coverage and reduce zero-dose children.

- ***Household vaccination survey:*** Despite high confidence in vaccines and positive social support, we identified the need for a multi-pronged approach to address the issue of zero dose children in Nigeria. We recommend the strengthening of community engagement activities and improving service delivery. Affordability and other service-related issues could be addressed by improving of the supply side RI factors. Long waiting times could be overcome by increasing the work force and offering outreach sessions to bring the RI services to the doorsteps of the caregivers.

- ***Barriers and Enablers:*** The three groups interviewed all highlighted the need for collaborative efforts to achieve higher immunization coverage and reduce ZD children. Financial support, improved communication, and addressing social and logistical barriers are crucial for success. We recommend context specific tailored interventions to address the specific challenges noted by each group.

1.0 INTRODUCTION

1.1 Background

Childhood immunization has long been recognized as one of the most important and cost-effective public health interventions. It helps to eradicate several deadly infectious diseases, prevent morbidity and mortality associated with several other diseases, and forestalls over four million deaths every year.[1] In recognition of the importance of childhood vaccines in public health, the World Health Organization (WHO) in 1974 established the Expanded Programme on Immunization (EPI) to ensure that all infants have access to four recommended vaccines (bacillus Calmette-Guérin vaccine [BCG], DTP, Polio, and MCV) to protect against six diseases (tuberculosis, diphtheria, tetanus, pertussis, poliomyelitis, and measles).[2] These alongside other vaccines and doses constituted the routine immunization programme.

In Nigeria, the National Primary Health Care Development Agency (NPHCDA) established in 1992 is the coordinating agency responsible for the Expanded Program on Immunization (EPI). The NPHCDA works in collaboration with various stakeholders, including international partners, state governments, and local communities, to achieve optimum immunization coverage.[3] The routine vaccination schedule in Nigeria follows the guidelines of the World Health Organization (WHO) and includes vaccines against several diseases such as tuberculosis (BCG vaccine), poliomyelitis (oral polio vaccine and inactivated polio vaccine), measles (measles vaccine), diphtheria, pertussis, tetanus, hepatitis b vaccine and haemophilus influenza type b (Pentavalent vaccine), pneumococcal diseases (pneumococcal conjugate vaccine), and rotavirus (rotavirus vaccine). Additionally, there are catch-up campaigns for specific target groups or in response to disease outbreaks. The coverage of the third dose of pentavalent vaccine (Penta 3) in Nigeria for the year 2021 was 56%.[3] Despite coordinated efforts of various stakeholders at subnational and national levels, including intergovernmental and multinational agencies, aimed to improving vaccination coverage, there exists a growing number of surviving infants who did not receive a single dose of Pentavalent vaccine in the routine national immunization schedule during the first year of their lives; the zero-dose

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[1]. WHO. Immunization. Vol. 2, Africa COVID-19 vaccines dashboard. 2023 p. 199–207. Available from: https://www.afro.who.int/health-topics/immunization. Accessed on 21/05/2023. (Accessed on 02/06/2023).

[2]. Haeuser E, Nguyen JQ, Rolfe S, Nesbit O, Fullman N, Mosser JF. Assessing Geographic Overlap between Zero-Dose Diphtheria – Tetanus – Pertussis Vaccination Prevalence and Other Health Indicators. *Vaccines.* 2023;11(802).

[3]. National Primary Health Care Development Agency. Available from https://nphcda.gov.ng/(Accessed on 02/06/2023).

children.[4, 5] This demographic remains vulnerable to and may precipitate outbreaks of vaccine-preventable diseases in the future.[4]

According to the 2019 morbidity and mortality weekly report on routine vaccination coverage, the number of zero-dose children has increased on the African continent between 2010 and 2019.[6] The increased number of zero-dose children in Africa may be attributed to hesitancy and resistance by parents, fueled mainly by rumors about the safety of vaccines and partly by religious and cultural considerations. [7,8] Furthermore, population growth exerts a strain of the capacity of the health systems to adequately cater for this growing number of children. Socioeconomic status of the parents, accessibility to healthcare, maternal education, and area of residence in the country are some factors that have been identified to contribute to vaccine resistance. [9,10]

The Global Immunization Agenda and Gavi 5.0 strategy place significant emphasis on reaching zero-dose children, under-immunized populations, and missed communities in

[4]. Mahachi K, Kessels J, Boateng K, Eudes A, Baptiste J, Mitula P, *et al*. Zero- or missed-dose children in Nigeria: Contributing factors and interventions to overcome immunization service delivery challenges. *Vaccine.* 2022;40(37):5433–44.

[5]. Hogan D, Gupta A. Why Reaching Zero-Dose Children Holds the Key to Achieving the Sustainable Development Goals. *Vaccines.* 2023;11(781):1–10.

[6]. Chard AN, Gacic-dobo M, Diallo MS, Sodha S V, Wallace AS. Routine Vaccination Coverage — Worldwide, 2019. *Morb Mortal Wkly Rep.* 2020;69(45):1706–10.

[7]. Bawa SB, Shuaib F, Braka F, Corkum M, Isa HK. Use of Dedicated Mobile Teams, Polio Volunteer and Community Mobilizers to Increase Access to Zero-Dose Community. *J Infect Dis*. 2017; 216:267–72.

[8]. Shearer JC, Nava O, Prosser W, Nawaz S, Mulongo S, Mafuta E, *et al*. Uncovering the Drivers of Childhood Immunization Inequality with Caregivers, Community Members and Health System Stakeholders: Results from a Human-Centered Design Study in DRC, Mozambique and Nigeria. *Vaccines.* 2023;11(689):1–15.

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[10]. Arambepola R, Yang Y, Hutchinson K, Mwansa FD, Doherty JA, Bwalya F, *et al*. Using geospatial models to map zero- - dose children: factors associated with dose vaccination status before and after a mass measles and rubella vaccination campaign in Southern province, Zambia. *BMJ Glob Heal.* 2021;6(e007479):1–13.

the Horn of Africa and Sahel region, encompassing 12 Gavi-eligible countries.[11,12] These regions face a particularly high burden of disease, making it crucial to prioritize immunization efforts and ensure that vulnerable populations receive the necessary vaccines. [11] Nigeria bears a significant share of this burden, housing over 2.2 million (around 47.8%) of the 4.6 million zero-dose children residing in the targeted 12 Gavi-eligible countries and accounting for 26% of the global burden. [13, 14,15] In alignment with the global movement towards immunization equity, Nigeria has formulated a three-year national strategic plan as an extension to the Nigeria Strategy for Immunization and PHC Systems Strengthening (NSIPSS 2.0), with the objective of reducing the number of zero-dose children to less than 10% of the target cohort by 2024.[16] Following a comprehensive analysis conducted by key stakeholders, 100 local government areas (LGAs) across 18 states have been identified as high-burden locations and prioritized for targeted interventions to optimize routine immunization and primary healthcare services.

The African Field Epidemiology Network (AFENET) and the Africa Health Budget Network (AHBN) consortium is implementing a country learning hub in Nigeria for immunization equity with funding from Gavi and technical support from the Gavi-contracted global learning hub (the JSI-led consortium). The learning hub is also being simultaneously implemented in Bangladesh, Mali, and Uganda. The objective is to establish a structured framework for countries to promptly generate evidence from the implementation of a set of interventions known as the "identify, reach, monitor, measure, and advocate" (IRMMA) framework to inform programme implementation, policy formulation and promote accountability as well as sustainability, while building local capacity to implement key

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[11]. GAVI. Zero-Dose Funding Guidelines Guidance on Use of Gavi Support to Reach Zero Dose Children and Missed Communities. 2021. Available from: https://www.gavi.org/sites/default/files/support/Gavi_Zerodose_FundingGuidelines.pdf. (Accessed on 05/06/2023).

[12]. WHO. Immunization agenda 2030 . 2022. Available from: https://www.who.int/immunization/ia2030_Draft_One_English.pdf?ua=1. (Accessed on 05/06/2023).

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[14]. Perin J, Mulick A, Yeung D, Villavicencio F, Lopez G, Strong KL, *et al.* Global, regional, and national causes of under-5 mortality in 2000 – 19: an updated systematic analysis with implications for the Sustainable Development Goals. *Lancet Child Adolesc Heal*. 2022;6(2):106–15.

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[16]. Federal Ministry of Health. Nigeria Vaccine Policy 2021. 2021. Available from: https://www.health.gov.ng/doc/Nigeria-Vaccine-Policy-2021.pdf. (Accessed on 10/06/2023).

monitoring, evaluation and learning activities. [17] The implementation of this hub in Nigeria involves close collaboration with the Federal Government of Nigeria (FGN), specifically through the National Primary Health Care Development Agency (NPHCDA), the Federal Ministry of Health (FMoH), and various partners involved in the governance and implementation of routine immunization (RI). The overall aim is to provide a structured framework for Nigeria to promptly generate evidence from the implementation of the IRMMA interventions to inform programme implementation, policy formulation and promote accountability as well as sustainability, while building local capacity to implement key monitoring, evaluation, and learning activities on the zero-dose situation.

[17]. Gavi (2021). Gavi_Zero-dose_Funding Guidelines. Available from the https://irp.cdn-website.com/44236788/files/uploaded/Gavi_Zero-dose_FundingGuidelines.pdf. (Accessed on 29/06/2023).

1.2 Problem Statement

Prior to the COVID-19 pandemic, there were notable advancements in routine immunization coverage, but a concerning obstacle persists in effectively reaching and vaccinating zero-dose children residing in marginalized communities. These marginalized and vulnerable communities, characterized by limited healthcare access, low socioeconomic status, and cultural barriers, encounter formidable obstacles in accessing routine immunization services. [9, 10] Consequently, a distressing number of children in these communities remain entirely unvaccinated, rendering them highly susceptible to a range of vaccine-preventable diseases.

Out of the over 18 million global unvaccinated or under-vaccinated children in 2021, Nigeria accounts for (2.2 million) alongside India (2.7 million), Indonesia (1.1 million), Ethiopia (1.1 million), Philippines (1 million), and the Democratic Republic of the Congo (0.7 million) accounting for more than half of all zero-dose children, placing Nigeria as the country with the highest number of zero-dose children on the African continent. [5, 13, 18] However, during the first half of 2020, there was a decrease in the number of doses of the diphtheria-pertussis-tetanus-containing vaccine (DTP3) and the first dose of the measles-containing vaccine (MCV1) that were administered globally. The World Health Organization (WHO) regional offices reported significant disruption to regular vaccination sessions (majorly in outreach sessions but also in fixed sessions) in April 2020, which was attributed to reduced demand for vaccines, limited supply, and a decrease in available healthcare workers. These were mainly due to the impact of COVID-19 pandemic. The decrease varied across regions, ranging from 9% in the WHO African region to 57% in the South-East Asia region. However, the situation started to improve by June 2020 and continued to recover throughout the latter part of the year. [19] The most recent evidence is that of the 2022 WHO/UNICEF estimates of national immunization coverage (estimate as at July 2nd 2023) which ranks Nigeria ahead of Ethiopia and India.[20]

Consequently, identifying and addressing the underlying factors contributing to low routine immunization coverage among zero-dose children in marginalized communities is necessary. A comprehensive understanding of these barriers is crucial to formulate targeted interventions that can effectively bridge the immunization gap.

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[19]. Impact of the SARS-CoV-2 pandemic on routine immunization services: evidence of disruption and recovery from 170 countries and territories. *The Lancet Global Health* 2022; 10(2): e186-e194.

[20]. WHO/UNICEF. Progress and Challenges with Achieving Universal Immunization Coverages. The 2022 WHO/UNICEF Estimates of National Immunization Coverage. Available from https://data.unicef.org/wp-content/uploads/2023/07/progress-challenges_wuenic2022.pdf (Accessed 25/02/2024).

1.3 Justification

The necessity to address the gap in vaccine inequity cannot be overemphasized in order to prevent re-emergence of vaccine preventable diseases. Recent UNICEF data showed that the rates of vaccine uptake have been substantially impacted negatively (lowest levels in three decades) by the COVID-19 pandemic which caused nearly 67 million children globally to miss out on the routine vaccines. The result of a geospatial surveillance from Nigeria of the zero dose estimates with aggregate measles case data during 2018 – 2020 showed that there is a strong correlation between measles case counts and MCV routine immunization (RI) zero-dose estimates. [21] While the number of zero-dose children have increased globally due to disruption of vaccine delivery occasioned by COVID-19, Nigeria is disproportionately affected. In the year 2022, an estimated 2.2 million zero-dose children reside in Nigeria out of the 22.7 million global estimates. [13, 22] To identify appropriate targets and interventions to curtail the rising number of zero-dose children, there is urgent need to institute measures to increase vaccination coverage, specifically a broad understanding of the causes of zero-dose children and strategically design a programme to identify, reach and vaccinate the zero-dose and under-immunized children in Nigeria.

Zero-dose and under-immunized children usually reside in communities with poor maternal and child health indicators, facing recurrent vaccine-preventable disease outbreaks due to various factors including health system gaps, socio-economic challenges, conflict, migration, gender barriers, low vaccine confidence, and limited community trust.[9, 10] Inefficient microplanning, missed opportunities for vaccination (MOV), weak integration, coordination problems, accountability gaps, stockouts, understaffing, and insufficient funding, among other service delivery issues further exacerbate the situation.[23] To reach these children effectively, tailored strategies driven by government and community involvement are needed to address entrenched barriers. Robust monitoring, evaluation, and learning capacities are essential, along with evidence-based practice, to inform targeted interventions and improve program implementation. Through the recently launched "Reaching Zero Dose Children initiative", Gavi has established new partnerships to reach systematically missed communities and zero-dose children in fragile and conflict settings in prioritized countries including Nigeria. The initiative is based on a five-step framework called Identify-Reach-Monitor-Measure-Advocate (IRMMA), which is

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[22]. Mahachi K, Kessels J, Boateng K, Jean Baptiste AE, Mitula P, Ekeman E, Nic Lochlainn L, Rosewell A, Sodha SV, Abela-Ridder B, Gabrielli AF. Zero- or missed-dose children in Nigeria: Contributing factors and interventions to overcome immunization service delivery challenges. *Vaccine*. 2022;40(37):5433-5444.

[23]. Adetokunboh O, Iwu-Jaja CJ, Nnaji CA, Ndwandwe D. Missed opportunities for vaccination in Africa. *Curr Opin Immunol.* 2021; 71: 55-61.

a systematic approach to reaching zero-dose and under-immunized children, guiding them towards full immunization and primary healthcare services. IRMMA serves as the key intervention hypothesized to enhance output and outcomes, working towards the global goal of reducing zero-dose children by 25% by 2025 and 50% by 2030. [11, 12]

1.4 Goal

This rapid assessment study aims to investigate and identify factors mitigating against the routine immunization coverage in Nigeria with a view to improve and strengthen the national immunization programme by targeting zero dose children and marginalized/missed communities.

This rapid assessment study is part of an overall approach for the country learning hub (LH),[24] Nigeria that includes a national level stakeholder engagement, learning agenda and implementation research. Furthermore, this rapid assessment is intended to inform other activities that the country learning hub (CLH) will implement such as improved monitoring of the zero dose (ZD) situation and design on implementation research.

1.5 Objectives of the Rapid Assessment

The specific objectives for this rapid assessment are;

- Evaluate the available systems for reporting and monitoring routine immunization in terms of its availability, quality, completeness in the identification, reach and monitoring of zero dose children.
- To examine the quality of care provided at the health facility level.
- To conduct a household vaccination survey for caregivers from the prioritized subnational areas to determine the thinking, feeling and motivation to vaccinate children.
- Perform primary data (quantitative and qualitative) collection and analysis examining caregiver demographics, information sources, community participation, of zero dose children as well as demand side barriers from the prioritized subnational areas.
- Evaluate the completeness, timeliness, and trends in routine immunization data reporting, specifically focusing on the number of children reached and vaccinated in zero-dose prioritized Local Government Areas (LGAs) using administrative data.
- Develop context-specific action plans at the sub-national level based on the findings, aiming to inform evidence-based decision-making processes and establish key indicators for monitoring and programmatic improvements in timely reporting for use at state, national and at international levels.

[24] The LH states are Bauchi, Borno, Sokoto and Kano (This is further explained in Table 1 and page 6).

2.0 METHODS

2.1 Study Setting and General Sampling Methodology

The study was conducted in Nigeria within eight (8) local government areas (LGAs) across four states: two states in the northwest (Kano and Sokoto) and two from the northeast (Borno and Bauchi). In 2021, the National Emergency Routine Immunization Coordination Center (NERICC) with support from Southampton University identified 100 LGAs with the highest number of ZD children, spread across 18 NERICC priority states. Bauchi, Borno, Sokoto, and Kano, being part of the 18 NERICC priority states contributing the highest number of ZD children have been selected.

The LGAs in the selected four (4) states have been ranked based on their ZD burden and two (2) LGAs out of the hundred (100) LGAs with the highest burden of ZD children were selected given special considerations for LGAs in urban, rural, internally displayed persons (IDPs), and fragile settings (Table 1).

TABLE 1: SELECTED STATES AND LGAS FOR STUDY INCLUSION BASED ON HIGHEST NUMBER OF ZERO DOSE CHILDREN FROM NERICC PRIORITIZATION

		Prioritized LGAs	Estimated population of Zero Dose children	Urban	Rural	IDPs Camps	Fragile
1	Bauchi	Bauchi	20,554	✓			
		Ganjuwa	15,039		✓		✓
2	Borno	Maiduguri	28,513	✓		✓	✓
		Jere	25,831	✓		✓	✓
3	Sokoto	Wammako	9,548	✓			✓
		Tambuwal	11,836		✓		✓
4	Kano	Kumbotso	12,650	✓			
		Sumaila	8,043		✓		✓

2.2 Overview of General Study Design

The study design employed a mixed method approach. These routine immunization systems evaluation, health facility assessment, household coverage survey and a primary field data collection (qualitative and quantitative). All this will help to enhance the understanding of contextual issues within the framework of Identify, reach, monitor, measure, and advocate (IRMMA) framework for action. Table 2 below outlined the different study designs, key objectives data sources for the methods we employed for the rapid assessment.

TABLE 2: DIFFERENT STUDY TYPES, KEY OBJECTIVES AND DATA SOURCES FOR THE RAPID ASSESSMENT

S/N	Study Type	Key Objective	Source of Data
1	Systems Evaluation	To examine the overall performance of the various immunization system in collecting data on a variety of factors, to address the quality, the efficiency of the system, and the satisfaction of the users for better measurement and monitoring of zero dose children. This will also help in the identification and reach aspects for the zero dose children.	Desk review. Key informant interview with Immunization stakeholders at national and subnational levels (States and LGAs).
2.	Health Facility Assessment	To examine the quality of care provided at the health facility level. Data will be collected on a variety of factors, i.e., human resources for health, service availability and availability of data tools, vaccine & supplies.	Primary data collection through the use of checklist and observation at the health facility.
3.	Household Vaccination Survey for Caregivers	To determine the thinking, feeling and motivation to vaccinate children by their caregivers.	Primary data collection to identify and eventually reach zero dose children and to also guide further advocacy. This will also provide baseline template for measurement and monitoring effectiveness of interventions.
4.	Barriers and Enablers Analysis Qualitative Interviews with; KII with Healthcare workers at the health facility level KII at Community level with Traditional leader, religious leader, or community leader, IDI with Caregivers	Interviews will be done to collect in-depth information about people's experiences, beliefs, and attitudes with the routine immunization. Participants will be allowed to tell their stories in their own words.	Primary data collection to understand demand side barriers and facilitators. This will also provide baseline template for measurement and monitoring effectiveness of interventions in reaching zero dose children in the prioritized areas.

2. 3 Evaluation of Routine Immunization Reporting Systems in Nigeria

2.3.1 Description of the systems evaluated

The various systems used in routine immunization reporting and monitoring to reach zero dose and unimmunized children in Nigeria were evaluated. The focus of the evaluation is to access data availability, data access, data use for action and interconnectivity of data in reaching zero dose children. The goal of the evaluation is to make recommendations for identifying, reaching, measuring, and monitoring data on zero-dose and unimmunized children at both the national and subnational levels. We excluded the Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) from this evaluation because they typically focus on broader health indicators and demographic data collection rather than specific immunization-related metrics. Even though they provide valuable insights into overall health and demographic trends, they lack the granularity required for detailed analysis of immunization coverage, particularly at subnational levels. Furthermore, DHS and MICS are often conducted at more extended intervals (e.g., every five years), which may not provide timely or frequent updates needed for real-time decision-making in immunization programs.

Consequently, the systems we evaluated were;

- **District Health Information System II (DHIS2):** Also referred to as administrative data is an electronic platform of the health management information system (HMIS) upon which service delivery data is reported monthly. The platform mimics the National Health Management Information.
- **Performance Assessment for Programme management and Action - Lot Quality Assurance Sampling (PAPA LQAS):** This is a population-based survey that adopts the Lot Quality Assurance Sampling strategy and is implemented quarterly by NPHCDA. The assessment is used by the government to assess the quality of RI and the reproductive, maternal, newborn, child and adolescent health and nutrition (RMNCH+N) performance across three cohorts of children (0-11 months, 12-23 months and 0 - 5 years) and inform intervention strategies.
- **Routine Immunization Short Message Service (SMS) Reporting:** This is an electronic database designed to aggregate routine immunization implementation across 18 NERICC priority states in Nigeria in real time. The health facility level database adopts simple alphanumeric texts to report selected immunization antigens. The database aggregate planned versus conducted fixed and outreach sessions, Penta1, Penta 3, supervision of conducted sessions and vaccine stockout on a weekly basis.
- **Routine Immunization Supportive Supervisory (RISS) checklist**: An open data kit (ODK) based supervisory checklist. It facilitates the identification of gaps or areas

for improvement in routine immunization (RI). It aids in the identification of strengths and weaknesses, provides on-the-spot feedback, and develops action plans to address any identified issues. The checklist contains caregivers' satisfaction surveys and community surveys.

- **Surveillance, Outbreak Response Management and Analysis System (SORMAS):** The SORMAS was developed after the Ebola outbreak in Nigeria. The SORMAS is a disease surveillance platform used by NCDC and NPHCDA to track and respond to measles and other vaccine-preventable outbreaks, including real-time data collection and post-vaccination surveys to assess program effectiveness.

2.3.2 The Evaluation Approach

Qualitative research method (key informant interview) was employed to evaluate the five major data systems used in routine immunization in Nigeria using the tool in Appendix IIIA. Stakeholders from national and state level, working for either government or partners were invited for a key Informant interview to get their opinion on the various systems available, gaps and how to improve the systems using an interview guide. A total of 28 stakeholders were interviewed and a thematic analysis of the transcript was conducted focusing on these thematic areas: Data Quality, Timeliness, Limitation, Strength, Zero Dose Measurement, Mitigation and Recommendation. Qualitative data analysis was facilitated by NVIVO software (version 14) for transcription management and analysis. An inductive-dominant coding approach was employed, allowing themes and patterns to emerge directly from the data. This ensured openness to new insights, enriching the findings. Codes were then systematically linked to corresponding quotations from the transcripts, anchoring each code in participants words for transparency and traceability. Appendix V is the codebook for Routine Immunization Systems Evaluation used in this study.

Additional desk review of description of the various routine immunization system in terms of purpose, where they are domiciled, access/availability and resources used to operate them was carried out to improve understanding of the system.

The evaluation aimed to improve understanding of how data systems help in the identification and reach aspects for the zero dose children. The study objectives are to examine the overall performance of the various immunization system in collecting data on a variety of factors and to address the quality, the efficiency of the system, and the satisfaction of the users for better measurement and monitoring of zero dose children.

2.4 Health Facility Assessment

In each of the eight-learning hub LGAs, four (4) health facilities offering RI services were purposively selected (focusing on difficulty in access) using the list of health facilities (HFs) offering RI services across the LGAs as a sampling frame. The selection of HFs focused on those with high PENTA 1 dropout rate (2022 Annual data), those that have reported outbreak of cVDPV2 or Measles/Diphtheria in the last six weeks to the assessment. A triangulation was done to verify that these HFs were also designated as catchment for zero dose (ZD) children using the zero-dose reduction (Z Drop) plan. This makes a total of 8 health facilities (HFs) per State and 32 HFs overall across the four learning hub states. Appendix IIIB was the questionnaire that was used for the HF assessment. The questionnaire was adapted from the WHO Service Availability and Readiness Assessment tool (SARA).[25]

The questionnaire is organized into ten sections covering the following areas: a) Facility identifies and facility type, b) Human resources for health in terms of quality and quantity, c) Service availability at the HF, d) Infection Prevention and Control of the HF, e) Equipment's e.g. syringes and cold boxes, f) Cold chain (availability and functionality), g) Vaccines availability and quality, h) Data tools (presence and availability), i) Support for quality services, j) Data extraction for Penta 1, 3 and MCV on SMS and DHIS2 section which was validated for some selected months (January to June) in 2023. Data were collated from the following tools: Updated Reaching Every Ward (REW) Microplan with operational targets, Immunization Tally sheet, NHMIS Monthly summary and Vaccine Utilization Form (VM1A). Facility in-charges and where not available the RI focal persons (FP) were utilized as the main respondents in addition to observations of the HFs.

The health facility assessment and survey tools were programmed in the Open Data Kit (ODK) software and downloaded on android-based devices which were then used to electronically collect data. Data was thereafter uploaded to a server accessible only to authorized personnel. Data analysis was done using Microsoft Excel. Descriptive statistics were employed to summarize and present key characteristics of the datasets.

2.5 Household Vaccination Survey

We leveraged the existence of an in country zero dose reduction (Z drop) plan which ranked "missed" as 1 to identify and select one (1) missed settlement within the catchment area of the selected health facilities for household interviews. The missed settlements were identified by government and partners based on triangulation of data and noting low

[25]. WHO Service availability and readiness assessment (SARA). Available from https://www.who.int/data/data-collection-tools/service-availability-and-readiness-assessment-(sara) (Accessed on 06/10/2023).

coverage of Penta based on the Settlements register of the Mai Unguwa's and also the occurrence of outbreaks of Diphtheria or Measles of VDPV. This missed settlement was further validated through a method that involves interviews with the LGA team, heads of facilities and triangulation with admin (DHIS-2) and survey (LQAS) data sources. Ten (10) households were randomly selected to ensure equal representation of various particular geography and from there we identified caregivers with children less than two years old for interviews using the questionnaire in Appendix IIIF (Childhood vaccination survey for caregivers). A total of 320 respondents was therefore interviewed across the 32 settlements (4 settlements per each of the 8 LGAs across the 4 states). The questionnaire was adopted from the WHO validated Behavioural and Social Drivers of Vaccination (BeSD).[26] The questionnaire is divided into five sections organized; Section A: Demographic Information of Respondents, Section B: Motivation (Intention to get Vaccinated), Section C: Thinking and Feelings About Vaccines, Section C: Thinking and Feelings About Vaccines, Section D: Thinking and Feelings about Vaccination and Section E: Practical Issues Involved in Seeking and Receiving Vaccination. The childhood vaccination survey tool was programmed in the Open Data Kit (ODK) software and downloaded on android-based devices which were then used to electronically collect data. Data was thereafter uploaded to a server accessible only to authorized personnel. Data analysis was done using Microsoft Excel. Descriptive statistics were employed to summarize and present key characteristics of the datasets.

2.6 Barriers and Enablers Analysis

2.6.1 Participants Selection, tools used and pilot test

To elicit responses at the health facility and community levels. One key informant interview (KII) presented as (Appendix IIIC) was conducted at the health facility level, targeting RI providers or facility in-charges. Another KII (Appendix IIID) targeted community gatekeepers (community/traditional or religious leaders). Healthcare workers and community gatekeepers (identified by AHBN) were targeted for KIIs. An in-depth interview (IDI) was also conducted for caregivers (Appendix IIID). Hausa translation was provided for KII with community gatekeepers (Appendix IIIG) and IDI with mothers (Appendix IIIH) for those not literate in English. The decision to use Hausa or English was left at the discretion of the interviewer based on their assessment of the literacy level of the respondents. The questionnaires were adapted from the WHO validated tool of social and behavioural drivers of vaccination. [26]

Data collection tools were pre-tested across non-project LGAs of the selected states. Findings from the pre-test aided in the standardization of the data collection tools in

[26]. WHO. Behavioural and social drivers of vaccination: tools and practical guidance for achieving high uptake. Available from https://www.who.int/publications/i/item/9789240049680. (Accessed on 10/07/2023)

preparation for the assessment. The community gatekeepers and caregivers were selected from the missed settlement identified and described in section 2.6 above.

TABLE 3: PARTICIPANTS FOR THE QUALITATIVE SURVEY

S/N	Type of Interview	Target Audience	Objective	Number Interviewed
1.	Key Informant Interview (KII)	Healthcare Workers (Facility In-Charges / RI Provider)	Deep dive into responses on supply-side barriers to immunization at health facilities.	32
		Community Gatekeepers (Religious/Traditional/Community Leaders)	Deep dive into responses on demand-side barriers to immunization at the community level.	33
2.	In-Depth Interview (IDI)	Caregivers of eligible children	Deep dive into responses on demand-side barriers to immunization from the caregivers' perspective.	32

2.6.2 Data Cleaning and Analysis Technique

A rigorous approach was adopted for the analysis of qualitative data gathered through KIIs and IDIs. Following the data collection phase, a systematic process was implemented for comprehensive analysis as described below.

The first step involved the transcription of all recorded KII and IDI sessions, ensuring an accurate representation of the spoken content. Subsequently, a validation process was undertaken to cross-verify the transcriptions against the original audio recordings, aiming to maintain fidelity to participants' expressions. To facilitate a thorough exploration of the qualitative data, NVIVO software, version 14, was employed for transcription management and analysis.

The coding process utilized an inductive-dominant approach, allowing for the emergence of themes and patterns directly from the data. This method ensured that the analysis remained open to new, unanticipated insights, enhancing the richness of findings. During the coding phase, the generated codes were systematically linked to the corresponding quotations derived from the transcriptions. This meticulous linking process aimed to anchor each code in the participants' actual words, contributing to the transparency and traceability of the analysis. Additionally, relevant quotations were extracted during this process, serving as illustrative examples and evidence for each code. Lastly The

behavioural and social drivers of vaccination qualitative framework was used in reporting the findings from the analysis.[26] The codebook is attached as Appendix VI.

2.7 Data Management and Security

Electronic versions of the instruments were developed and pre-loaded on android tablet devices using Open Data kit (ODK) for quantitative instruments while paper printed interview guides were used for qualitative instruments. The ODK software allows constraints and restrictions to improve quality and completeness as well as facilitate timely submission of records to the central server for prompt feedback. The central server located in AFENET office in Abuja is secured with biometric doors in addition to system passwords and encryption codes while android phones will be passworded to allow access to only authorized personnel.

Qualitative interview guides were printed. Data were collected using a voice recorder and note taker summarized daily. Recordings and transcriptions were submitted to the server and validated for accuracy by the research team. All data were fully backed up on a shared folder and tape drive, with either additional incremental or differential backups being performed daily to an offsite server.

All collected data (electronic and hard copy) will be stored for a period of five years after the end of the study, herein known as the 'retention period.' Once the retention period expires, the data will be deleted. This will be conducted in a secure manner, ensuring that all copies of the data are permanently erased to prevent unauthorized access or unintended data recovery.

2.8 Field Data Collection Methods

We recruited the Nigeria Field Epidemiology and Laboratory Training Program (NFELTP) graduates with in-depth knowledge of RI and research skills for data collection. Experienced community health influencers promoters & services program (CHIPS) agents and/or voluntary community mobilizers (VCMs) were engaged to work with the data collection team where available. However, in settlements where neither the VCMs nor CHIPS agents are available, an influential female from the community were considered. Data collectors had a two-day training on data collection and research ethics using the guidelines approved by the Nigeria National Health Research Ethics Committee (NNHREC) attached as Appendix IA while approvals from the four states institutional review boards were attached as Appendix IB, IC, ID and IE. Data collectors were made to sign non-disclosure confidentiality agreements (Appendix IV) prior to field work. For each team, we ensured that there is a female team member for easy access to households.

Field data collection was done over a period of five days. Teams were equipped with additional android tablets in case of tablet system malfunction, failure, or equipment loss in addition to paper copies of the data tool. Completed paper forms were submitted to the

AFENET study team. All tape recordings and notes from KIIs and IDI were transcribed in English language by the trained data collectors and validated by team leads. All transcriptions were further validated by the respective supervisor prior to coding. Personal identifiable characteristics such as names, contact details, house markings and other verifiable details were not documented except geo-coordinates and health facilities names. All recordings will be deleted upon the expiration of the retention period described in section 2.8.

2.9 Ethical Considerations

2.9.1 Ethical Review and approval**:** The study was conducted in compliance with national and international IRB guidelines. The protocol was submitted to National Health Research Ethics Committee (NHREC) and State Institutional Review Board for evaluation and approval. The approvals are attached as Appendix IA-IE. Prior to participation, written informed consent enumerating the objective of the assessment, potential risks and benefits was sought voluntarily from participants. All consent forms were duly archived for reference purposes.

2.9.2 Consent forms: Consent forms for Stakeholder working on routine immunization and healthcare workers at health facility (Appendix IIA), community gatekeepers (Appendix IIB) and caregivers (Appendix IIC) has been provided. Hausa translation of the consent forms has been provided as Appendix IID and IIE.

2.9.3 Voluntariness of the study: Participation were made to be voluntary, and if at any point of the study, participants want to stop participating in the study they are free to do so.

2.9.4 Risks & Benefits: This study pose no risk to the participants. Individuals did not receive any compensation for participation. However, findings from the study may benefit communities/households and the government in future on policy regulations, vaccine logistics, demand generation and other routine immunization activities.

2.9.5 Confidentiality: All research assistants and other staff were trained in ethical protection of participants and were required to sign a confidentiality agreement prior to data collection. No personally identifiable information was collected. Names and designation collected during KIIs and IDIs were documented during transcription and consent forms archived were only accessed with approval after due consultation.

3.0 FINDINGS

The four (4) States selected were Borno, Bauchi, Kano, and Sokoto States with the highest number of ZD based on NERICC zero dose estimation and prioritization analysis. Across the selected states, local government areas (LGAs) prioritized by NERICC were stratified into urban and rural settings and eight (8) were selected as shown in Figure 2.

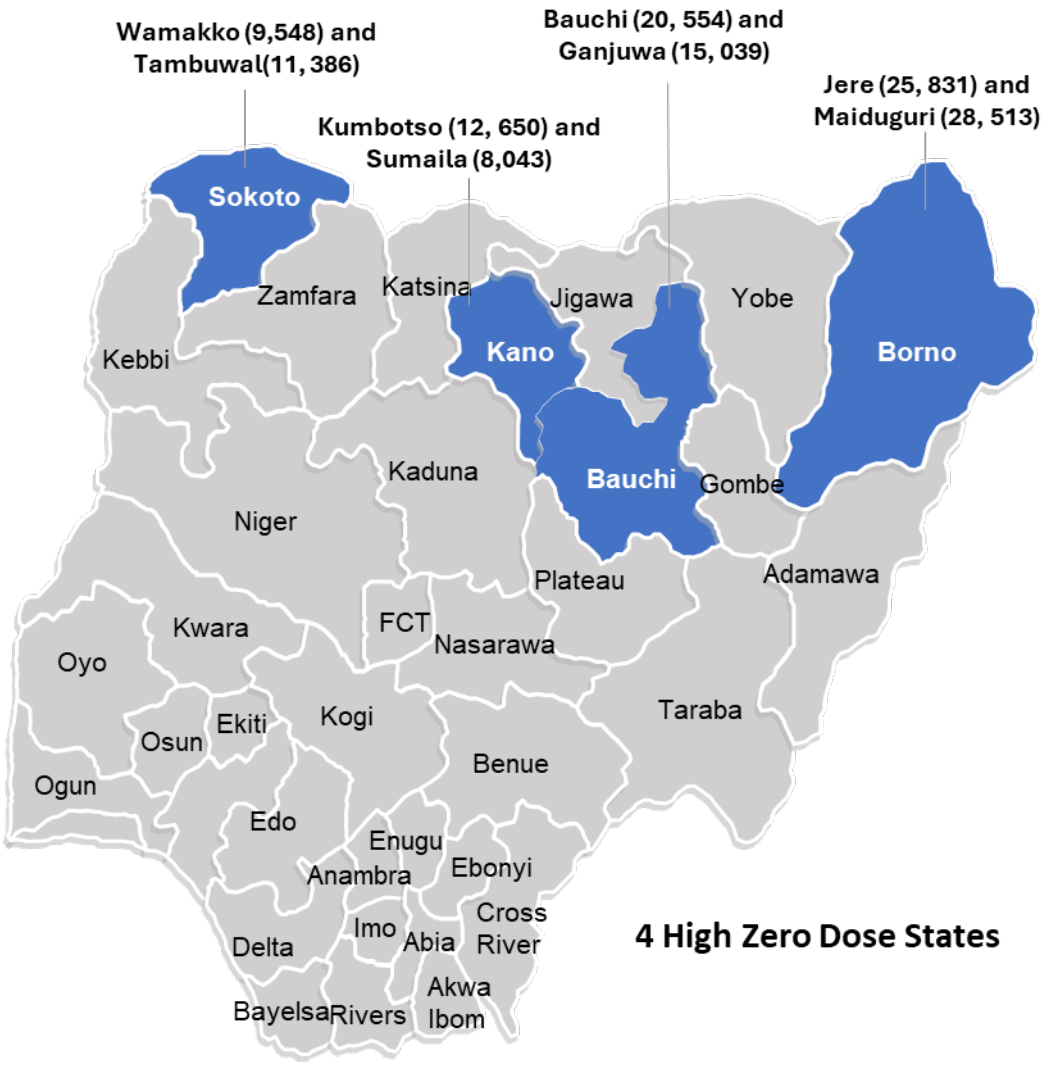

FIGURE 1: MAP OF THE STUDY AREA SHOWING THE FOUR STATES AND EIGHT LGAS WITH THE CORRESPONDING NUMBER OF ZERO DOSE BASED ON NERICC PRIORITIZATION

3. 1 Evaluation of Routine Immunization Reporting Systems in Nigeria

3.1.1 District Health Information System II (DHIS2)

Overview: Health Information Systems (HIS) have become pivotal tools, playing a crucial role in enhancing healthcare management and decision-making. Among them, the District Health Information System 2 (DHIS2) stands out. This open-source platform empowers healthcare systems with the ability to collect, analyze, and visualize crucial health data. Developed in South Africa, DHIS2 has gained widespread adoption due to its flexibility and open-source nature, catering to diverse health information needs.[27]

The story of DHIS2 begins in 1994 with research conducted at the University of Oslo.[28] Its mission was to streamline data collection across public health facilities within a country, allowing for efficient analysis of health services, prediction of future needs, and performance evaluation of healthcare workers. The system aimed to establish a centralized database with reporting capabilities at individual health centers, standardize local and national reporting formats, and connect service delivery data with other health system inputs. Initially, a basic version of DHIS2 ran on Microsoft Office Access, proving useful as a decentralized database program. This technology facilitated monthly data collection and analysis at local, states (provinces), and LGA (districts) levels in various countries, with individual installations on multiple computers across regions.[29]

Nigeria embarked on its journey towards improved immunization data management in 1999 with the establishment of the National Health Management Information System (NHMIS). In 2006, DHIS 1.4 was introduced to strengthen the NHMIS platform. Recognizing the need for a more advanced and user-friendly system, Nigeria transitioned to DHIS2 in 2010 as its national platform for reporting primary healthcare data, including vital routine immunization information. Initial challenges like limited user training and internet connectivity in remote areas were gradually overcome through collaborative

[27]. Epizitone A, Moyane SP, Agbehadji IE. A Systematic Literature Review of Health Information Systems for Healthcare. Healthcare (Basel). 2023 Mar 27;11(7):959. doi: 10.3390/healthcare11070959.

[28]. Al-Nashy SAT (2015) Managing scaling of HIS: implementation of DHIS2 in Sudan. Master thesis, University of Oslo, pp. 105. Available at: https://www.duo.uio.no/bitstream/handle/10852/43905/1/Al-Nashy-Master.pdf

[29]. Dehnavieh R, Haghdoost A, Khosravi A, *et al*. The District Health Information System (DHIS2): A literature review and meta-synthesis of its strengths and operational challenges based on the experiences of 11 countries. *Health Information Management Journal*. 2019;48(2):62-75.

efforts of the government and its partners.[30] By 2013, DHIS2 became the sole platform for nationwide immunization data reporting, replacing various parallel systems. In 2014, a pilot project further strengthened DHIS2's capabilities in managing immunization data. Spearheaded by the US Centres for Disease Control and Prevention (CDC), AFENET Nigeria, and the Nigerian government, a DHIS2 RI Module and Dashboard was developed and tested in Kano State. This pilot project demonstrated significant improvements in data quality and timeliness, paving the way for nationwide implementation.[31]

Data Quality: Ensuring data quality is critical for any health information system, including DHIS2. While collecting data from numerous health facilities, DHIS2 faces challenges due to human error, incomplete reporting, and limited technology access in remote areas. This can affect data accuracy, completeness, and consistency. Research by Manoj *et al.* [32] underlines the importance of consistent training, standardized data entry, and regular validation checks to improve data quality. Learning from other countries shows that successful DHIS2 implementation requires both adequate data quantity for reporting and high-quality data. While data quality issues exist globally, some countries face more significant challenges than others.

The key findings from the qualitative interviews we conducted in this study regarding data quality highlight both strengths and challenges in the DHIS system. One of the strengths is the acknowledgment that ***"DHIS 2 is a reliable and valid platform for sending the data" (LIO Borno State)."*** However, the reliability of data is contingent on the technical capacity of the person entering the data, as emphasized in the statement, ***"the quality of the data depends on the technical capacity of the person entering the data" (KII, WHO National Staff).*** The use of forms is suggested to enhance reliability, as stated, **"using ad-hoc forms to validate data reliability" (State Partners Sokoto).** The limitation of the system lies in its monthly analysis, restricting the time available for corrections. As expressed, ***"DHIS 2 is analyzed most of the time on a monthly basis, so it does not give enough time to make adequate corrections within that month" (KII, WHO National Staff).*** Moreover, data entry errors, falsification, and underreporting pose significant challenges, with concerns raised about the DHIS containing ***"falsification that went to the DHIS2" (State Partners Bauchi)***

[30]. Akwataghibe NN, Ogunsola EA, Broerse JEW, Popoola OA, Agbo AI, Dieleman MA. Exploring Factors Influencing Immunization Utilization in Nigeria-A Mixed Methods Study. *Front Public Health.* 2019 Dec 20;7:392.

[31]. Federal Ministry of Health, Nigeria. (2023). Nigeria Health Sector Development Plan (2020 - 2025). Available from https://www.health.gov.ng/.

[32]. Manya A and Nielsen P (2015) The use of social learning systems in implementing a web-based routine health information system in Kenya. In: Proceedings of the 13th international conference on social implications of Computers in developing countries, Negombo, Sri Lanka, May 2015, pp. 552–560.

and the need to improve the ***"reliability and reliability in terms of actually getting it higher" (State Partners Borno).***

Timeliness: Timely data is crucial for effective public health decisions. While DHIS2 allows real-time entry and aims for near-instant data availability, factors like infrastructure limitations and user compliance hinder this goal.[33, 34] Targeted interventions are needed to ensure prompt data entry and reporting. The system's ability to capture data at the health facility level can potentially improve quality, timeliness, and completeness. Furthermore, DHIS2 offers data quality checks, report feedback features, and non-reporting facility identification tools, further encouraging data accuracy and timeliness. However, delays in entry, validation, and transmission can still compromise the system's ability to facilitate rapid response and intervention.[35]

Based on results of qualitative analysis from this study, timeliness is a crucial aspect of data reporting and analysis. Reports on the DHIS-2 server for the penultimate month are not usually available till mid-month of the succeeding month. The system faces challenges related to untimely reporting, ***"late reporting hinders the understanding of what is going on in the facility" (LGA M&E Ganjuwa LGA, Borno).*** Despite stipulated submission times, the bottleneck is emphasized by stating, ***"there is a timeliness issue, before the 14th of any month, you cannot have the data complete" (State Partners Sokoto).***

Strengths: Despite limitations, DHIS2 boasts several strengths. Its open-source nature allows for customization and accessibility, while its potential for scalability can make it adapt to various health systems. The platform's data visualization tools (dashboards and reports) enhance its versatility. Even though dedicated fields for zero-dose children are not currently available, DHIS2 has potential for future customization options to improve data capture and analysis specific to this crucial population on an individual case basis. This can be achieved by integrating micro-plan enumeration at sub national level with immunization record from both facility and community registers to improve identification and estimation of missed settlements. Thereby enabling tracking of zero dose children.

We noted from the qualitative study that despite the challenges, the DHIS system demonstrates strengths in identifying performing health facilities, measuring indicators monthly, and creating social mobilization plans. ***"We know the system is functioning or fully benefiting to the client or caregiver by comparing the performance of the previous***

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[33]. Al-Nashy SAT (2015) Managing scaling of HIS: implementation of DHIS2 in Sudan. Master thesis, University of Oslo, pp. 105. Available at: https://www.duo.uio.no/bitstream/handle/10852/43905/1/Al-Nashy-Master.pdf.

[34]. Kivinen T, Lammintakanen J. The success of a management information system in health care - a case study from Finland. *Int J Med Inform. 2013*; 82(2):90-7. Epub 2012 Jun 15.

[35]. Poppe O (2012) Health information systems in West Africa: implementing DHIS2 in Ghana. Master thesis, University of Oslo, Department of Informatics, pp. 186. Available at: https://www.duo.uio.no/bitstream/handle/10852/34907/1/Mas terxThesisx-xOlavxPoppe.pdf.

month with current month. If the performance is low, we are taking care of that facility with low performance and support them to identify the missed children." **(LGA M&E Sumaila LGA,BauchiState).** The system is lauded for its accessibility and ease of use, allowing stakeholders to easily access administrative data and analyze it at different levels. The system's capacity to identify and locate missed settlements using technology is recognized, and there is an appreciation for the support provided by Community Gatekeepers.

Limitations: Despite its widespread adoption, DHIS2 faces limitations. Challenges include interoperability with other systems like the SORMAS, varying data quality across regions, and user interface complexity. Additionally, the system requires stable internet, adequate hardware, and user training. Even though, DHIS2 promotes real-time reporting, overburdened health workers and data entry burden can hinder accuracy and timeliness.[36] Other reported limitations noted were:

- Lack of collaboration features, leading to confusion and errors.
- Inconsistent data quality due to factors like unreliable denominators (due to delay in the national census) and varying reporting practices.
- Limited documentation on data utilization in decision-making and program planning.
- Absence of dedicated fields for capturing zero-dose children, hindering targeted analysis.

Several limitations impact the DHIS system, including data entry errors, falsification, underreporting, and difficulties in measuring zero-dose children. The system's weakness is exposed in statements such as ***"a lot of falsification that went to the DHIS2" (State Partners Bauchi)*** and ***"it is reliable but underreported" (State Partners Borno).*** Additionally, the challenges in measuring zero-dose children are evident in statements like ***"difficult to measure zero-dose children" (NERICC Data Manager)*** and ***"there's no particular element that collects data on children that have not received Penta 1" (NERICC Data Manager).***

Zero-Dose (ZD) Measurement: The current capacity of DHIS2 has potential to estimate measuring ZD through tracking of Penta 1 coverage and comparing against the number of children who haven't received it exist, even though it is hampered by lack of correct denominator. It can also help in analysis of trends in immunization coverage data to identify areas with persistently low uptake. These methods might not be specific or efficient enough to accurately capture the entire ZD population, potentially leading to underestimation.

Based on the results from the qualitative study, we noted that the DHIS system faces challenges in measuring zero-dose children, with various approaches to denominator

[36]. Farnham A, Loss G, Lyatuu I, Cossa H, Kulinkina AV, Winkler MS. A roadmap for using DHIS2 data to track progress in key health indicators in the Global South: experience from sub-saharan Africa. *BMC Public Health.* 2023; 31: 23(1):1030.

estimation. The use of 20% of the population, 4% of projected population, and the average of the last three rounds are mentioned as methods to estimate the target population. However, unrealistic estimates may lead to high and unrealistic targets, affecting the accuracy of data and increasing estimates of dropouts from Penta 1 to Penta 3, ***"Sometimes they are giving false estimate, and more children are being estimated which increases our drop out because of the high and unrealistic target". (LGA M&E Ganjuwa LGA, Bauchi State).***

Mitigation and Recommendations: Mitigation strategies are suggested to address the identified challenges. ***Recommendations include developing a Data Quality Improvement Plan (DQIP) to enhance reliability and validity (NERICC Data Manager)*** and ***establishing a better accountability structure for health workers (KII, WHO Staff).*** Training and increased remuneration for health workers are proposed as solutions to address limitations in technical capacity and incentivize accurate data reporting. Additionally, recommendations include the ***"engagement of data staff in facilities, house-to-house enumeration for accurate population estimates, and the deployment of an individual case-based system to track zero-dose children (NERICC Data Manager)."***

The recommendations for improvement are;

- Implement training programs for health workers on data entry and validation.
- Ensure internet connectivity in remote areas and provide technical support.
- Encourage real-time reporting and address any bottlenecks in data transmission and validation processes.
- Consider integrating DHIS2 data with household surveys or community-based monitoring systems to triangulate information and improve ZD measurement.

3.1.2 Performance Assessment for Programme management and Action - Lot Quality Assurance Sampling (PAPA LQAS)

Overview: The Performance Assessment for Programme Management and Action (PAPA) Lot Quality Assurance Sampling (LQAS) methodology arrived in Nigeria as a valuable tool for strengthening immunization programs. The core concept of LQAS originated in the early 20th century within the industrial sector, its application to public health programs like PAPA LQAS emerged later.**Error! Bookmark not defined.** PAPA LQAS was first piloted in Nigeria in November 2009 and has been conducted quarterly since then, initially focusing on Routine Immunization (RI) indicators like coverage for specific vaccines. The scope later expanded to include broader Reproductive, Maternal, Neonatal, Child, and Adolescent Health + Nutrition (RMNCAH+N) and malaria indicators, making it a comprehensive assessment tool. [37]

Data Quality: The evaluation conducted in this study was aimed at providing insights into the data quality aspect of the PAPA LQAS. However, the information is limited, and the analysis of the interviews conducted didn't offer a clear explanation of the data quality measures adopted. Lack of specific details on data collection methods, validation processes, and potential sources of error poses a challenge in assessing the reliability of the gathered information.

Strength: The strength of the program lies in its ability to identify LGAs with a high burden of zero-dose cases. According to the provided quote, ***"We have been able to identify a lot of them, especially in terms of the local communities that have the high burden for these kinds of issues" (State Partners Bauchi),*** highlights the success in pinpointing areas of concern. Additionally, the quarterly tracking mechanisms, and the scorecard, provide a systematic approach to monitoring and evaluating the reach and effectiveness of the RI program.

Zero-Dose (ZD) Measurement: The evaluation indicates efforts to measure zero-dose cases through house-to-house enumeration in selected wards. The use of GIS mapping is also proposed for a better estimate of eligible children. According to the quote, ***"I think using also the GIS is going to be very critical using technology to have a better estimate of how many kids we think in the settlement so that we can properly target them" (State Partners Bauchi).*** This outlines the strategies for ZD measurement. However, the specific GIS tools and methodologies are not detailed, leaving room for ambiguity.

Limitation: One of the identified limitations is the challenge related to human resources, as mentioned in the quote, ***"Human resource is a big, big challenge. A lot of the facilities***

[37]. Gavi Zero-Dose Learning Hub. 2023. "Nigeria Zero-Dose Situation Analysis." https://zdlh.gavi.org/.

have been manned by volunteers. And volunteers are not. You cannot hold us responsible" (State Partners Bauchi). This suggests a potential gap in the workforce, raising questions about the sustainability and accountability of immunization program. Further details on the specific issues faced by volunteers would be valuable for a comprehensive understanding of this limitation.

Mitigation and Recommendations: The suggested mitigation strategy involves house-to-house enumeration after identifying locations with a high burden of zero-dose cases. This proactive approach is commendable, as emphasized in the quote, ***"What is most important to me in terms of zero dose is to even know where those children are" (State Partners Bauchi).*** The recommendation to use GIS tools for estimating eligible children reflects a commitment to leveraging technology for more accurate targeting. However, the evaluation lacks specific details on the GIS tools recommended, and a more comprehensive technological strategy would enhance the efficacy of the immunization program.

3.1.3 RI Short Message Service (SMS) Reporting

Overview: The mobile short message service (SMS) technology has emerged as a game-changer in routine immunization reporting by effective improvement in comprehensiveness and timely reporting of immunization coverage from the health facility level in the states where this is implemented across Nigeria. The SMS systems for RI is currently operational in 18 NERICC priority states (Adamawa, Bauchi, Borno, Bayelsa, Gombe, Jigawa, Kaduna, Kebbi, Kano, Kogi, Katsina, Nasarawa, Niger, Plateau, Sokoto, Taraba, Yobe and Zamfara). [38] This innovative system empowers healthcare facilities to submit data using simple text messages containing alphabets and numbers. These messages, containing information on specific vaccines administered, planned, and conducted immunization sessions (both fixed and outreach), and even vaccine stock levels. These are then further aggregated into a central database, allowing for daily updates and real-time insights.**Error! Bookmark not defined.,' Error! Bookmark not defined.** Beyond daily updates, RI SMS takes things a step further. Every month, national and sub-national reports are generated based on data collated through both RI SMS and the existing DHIS2 platform. This crucial step allows for comparisons and identification of potential discrepancies between the two data sources.

A study done in Nasarawa State, Nigeria where the researchers tested an SMS reporting system where healthcare workers sent daily reports after each vaccination session. The report shows that while not perfect, the SMS system showed promise. They received reports from 85% of health facilities, but the number of reported sessions was lower than expected. There were also some inconsistencies in the data, like reporting more vaccinations than available doses. Despite some initial challenges, daily SMS reporting appears feasible and offers the potential for real-time monitoring of immunization program performance at the health facility level. This could be a valuable tool for improving data quality and ensuring children receive the vaccinations they need. [39]

Data Quality: The RI SMS Reporting system demonstrates a commitment to data quality through measures such as completeness and validation. A quote notes, ***"Yes, you validate the data before sending. And verification. Need community gatekeepers to validate" (Partner LGAF Kumbotso LGA, Kano State).*** However, the details regarding the specific validation methods and community involvement could be further elaborated for a comprehensive understanding of data quality.

[38]. National Primary Health Care Development Agency. July 2023. Rapid Immunization Performance Feedback on DHIS2 and SMS Platforms Apr–Jun 2023.

[39]. Akerele A, Uba B, Aduloju M, Etamesor S, Umar JA, Adeoye OB, Enyojo A, Josiah F, Ayandipo E, Olaoye I, Adegoke OJ, Sidney S, Bagana M, Bassey O, Ghiselli ME, Ndadilnasiya W, Bolu O, Shuaib F. Improving routine immunization data quality using daily short message system reporting platform: An experience from Nasarawa state, Nigeria. *PLoS One* 2021; 16(8): e0255563.

Strength: The RI SMS Reporting system demonstrates strengths in accessibility to government and partners, capturing RI sessions and reach, enabling the estimation of target children, providing a weekly activities dashboard for review, fishing out zero-dose children, and offering access to data for desk review and evaluation. ***The quote, "Even for SMS, it is also accessible to both government and partners at any level" (NERICC Data Manager),*** illustrates the collaborative and transparent nature of the system.

Timeliness: Timeliness is a critical aspect of the system's effectiveness. While the system is designed for timely data collection and decision-making, challenges such as defaulters in sending SMS can hinder its effectiveness. As mentioned in the quote, ***"We have a gap in sending SMS from the facilities" (LGA M&E Kumbotso LGA, Kano State),*** addressing these gaps is essential to ensure timely tracking of routine immunization (RI) activities.

ZD Measurement: The system contributes to zero-dose (ZD) measurement through the evaluation of the denominator, using the percentage of the under-1 population. The codebook notes, ***"We use the percentage of under 1. I think it's 4%. Yes. Yeah, it's 4% of the total population" (Partner LGAF Kumbotso LGA, Kano State).*** This information aids in easily evaluating zero-dose targets and spotting locations with zero-dose children.

Limitation: The system faces several limitations, including the inability to reach zero-dose (ZD) children directly at levels below the Local Government Area (LGA). ***A respondent mention, "One of the weaknesses is that it doesn't go down lower than the LGA level" (State Partners Kano).*** Furthermore, challenges such as difficulty in capturing some terrains, lack of GIS mapping during sessions, limited finances for SMS, and the risk of data loss are highlighted, providing a holistic view of the system's limitations.

Mitigation and Recommendation: Mitigation strategies include conducting a census to determine settlements and population, addressing the shortage of staffing, and providing training to healthcare workers to enhance SMS reporting. The quote, ***"Census has to be conducted by the government to really know the actual number of population" (Partner LGAF Kumbotso LGA, Kano State),*** emphasizes the importance of accurate population data. The recommendation to utilize technology for supportive supervision and boost outreach reflects a proactive approach to overcoming challenges.

3.1.4 Routine Immunization Supportive Supervisory (RISS) checklist

Overview: The Routine Immunization Supportive Supervisory (RISS) checklist stands as a powerful tool in effective service delivery and monitoring routine immunization in Nigeria. Developed in 2010 through a collaborative effort between the Federal Ministry of Health, the WHO, and UNICEF, the RISS checklist has become a cornerstone of strengthening routine immunization practices in the country.[40] The RISS has set of standardized questions that acts as tool or compass for supervisors, guiding them in assessing various aspects of how health facilities deliver immunizations. Various aspects from ensuring proper vaccine availability and storage to evaluating infection control practices and record-keeping at the HF level. **Error! Bookmark not defined.**, [41]

The success of the RISS checklist lies in its ability to drive continuous improvement. By providing a consistent framework for evaluation, the checklist allows for identification of areas needing attention in each health facility. This targeted approach allows for the implementation of specific interventions to address identified gaps, ultimately leading to better quality service delivery. As mentioned by M&E in Ganjuwa LGA, this supervision has helped in identifying drop out cases, thereby allowing the facility to follow-up even at an individual level.

"In this supervision if we go to the facility and we see there's a drop out of penta 1. That we can go through the tickler box and count it and compare with the register. From there we can see that there is this one child that have not returned to the hospital." LGA M&E Ganjuwa LGA

Furthermore, the RISS checklist has demonstrably contributed to improved data quality. By ensuring standardized data collection across facilities, the information gathered becomes more reliable and accurate, enabling better program monitoring and informed decision-making. **Error! Bookmark not defined.**, **Error! Bookmark not defined.**

Data Quality: The Routine Immunization Supportive Supervisory (RISS) Checklist emphasizes the importance of data quality through routine support supervision. A respondent state, ***"we supervise on a monthly basis through what we call the routine support supervision, the RISS to see how far the facilities are conducting these services" (State Partners Bauchi).*** This proactive approach ensures ongoing monitoring of facilities and aids in maintaining high data quality by addressing issues promptly.

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[40]. Etamesor S, Ottih C, Salihu IN, *et al.* Data for decision making: using a dashboard to strengthen routine immunisation in Nigeria. *BMJ Global Health* 2018;3: e000807.

[41]. Shuaib F, Garba AB, Meribole E, Obasi S, Sule A, Nnadi C, Waziri NE, Bolu O, Nguku PM, Ghiselli M, Adegoke OJ, Jacenko S, Mungure E, Gidado S, Wilson I, Wiesen E, Elmousaad H, Bloland P, Rosencrans L, Mahoney F, MacNeil A, Franka R, Vertefeuille J. Implementing the routine immunisation data module and dashboard of DHIS2 in Nigeria, 2014-2019. BMJ Glob Health. 2020 Jul;5(7):e002203. doi: 10.1136/bmjgh-2019-002203. PMID: 32694218; PMCID: PMC7375433.

Timeliness: The RISS Checklist is designed to facilitate timely monitoring of routine immunization (RI) activities in health facilities. Monthly supervision and integrated supporting supervision, as mentioned in the quote, ***"we do supervision that is RISS integrated supporting supervision every month" (LGA M&E Bauchi LGA, Bauchi State),*** contribute to timely identification of gaps, allowing for swift corrective actions and improvements such as follow-up on children who are yet to complete immunization schedule and service delivery improvement at point of care.

Strength: The checklist serves as a robust tool to guide RI supervision, incorporating routine support supervision and community surveys. This quote highlights,
"And equally. we supervise on monthly basis through what we call the routine support supervision, the RISS to see how far are the facilities conducting these services and even part of the RISS is to of course do a Sample community survey to see what is the reach in those location within which those facilities provide services across the eligible children. Are they reaching them or do you have children that have either drop out or they were even zero dose or that were not fully immunized at their age or they were fully immunized at their age." ***(State Partners Bauchi)***
This systematic and comprehensive approach strengthens the overall RI supervision process by ensuring critical assessment of every component of the checklist.

Zero- Dose Measurement: The RISS Checklist incorporates a zero-dose measurement strategy through the identification of drop-out children. A respondent note, ***"In this supervision, if we go to the facility and we see there's a drop out of Penta 1, we can go through the tickler box and count it and compare with the register" (LGA M&E Ganjuwa LGA, Bauchi State).*** This active identification and tracking of drop-out cases contribute to reducing the number of under immunized children and also zero dose children who dropped out after receiving BCG antigen.n.

Limitations: While the codebook doesn't explicitly mention limitations, it is crucial to consider potential challenges associated with the RISS Checklist. Common limitations in supervision processes include resource constraints, scalability issues, and the potential for oversight in remote or underserved areas. These aspects should be explored further for a comprehensive understanding.

Mitigation and Recommendation: While recommendations are not explicitly stated, there is potential to enhance the RISS Checklist by incorporating technological solutions for data collection and analysis. Additionally, expanding the checklist to address emerging challenges, such as vaccine hesitancy or community-specific barriers to immunization, could further strengthen the supervisory process. Regular training and capacity building for healthcare workers involved in the supervision process can also be recommended for continuous improvement.

The RISS Checklist demonstrates a commitment to data quality and timeliness through systematic supervision processes. While strengths and mitigation strategies are evident, exploring potential limitations and making recommendations for continuous improvement will contribute to the checklist's effectiveness in supporting routine immunization programs.

3.2.5 Surveillance, Outbreak Response Management and Analysis System (SORMAS)

Overview: The SORMAS is a software program developed by the Helmholtz Centre for Infection Research (HZI) in collaboration with the NCDC. It arose directly from the experiences gained during the Ebola outbreak in Nigeria. SORMAS is one of the few programs that offers comprehensive disease surveillance and outbreak management functionalities within a single digital platform. The system primarily focuses on surveillance data for measles outbreaks which includes real-time data collection and analysis to monitor and respond to measles outbreaks effectively. It also focuses on other vaccine-preventable disease outbreaks.[42]

SORMAS can also be used to manage outbreaks of other diseases preventable through vaccination. Furthermore, SORMAS works on the post-campaign coverage surveys for measles and yellow fever. The system can handle data from surveys conducted after vaccination campaigns to assess their effectiveness and identify areas with low coverage. SORMAS is domiciled with both the NCDC and the Measles Situation Room at the NPHCDA. This collaboration allows for efficient data sharing and coordinates outbreak response efforts. We will be evaluating the effectiveness of data collected from both SORMAS and the Measles Situation Room to assess their strengths and identify potential areas for improvement in disease surveillance and outbreak management in Nigeria.[43]

Data Quality: The Surveillance Data for routine immunization, including measles and yellow fever, is highlighted in the codebook with a concern about data quality. The quote, ***"our surveillance data...They are still not within the custody of the government. When I say government, I mean NPHCDA. So sometimes we struggle to get this kind of data" (NERICC Data Manager>),*** reveals a challenge in ensuring comprehensive data quality due to the data not being readily available within the government's (NPHCDA) domain. Since the Nigeria Centre for Disease Control (NCDC) has access to this data system, it is imperative

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[42]. Helmholtz Centre for Infection Research (HZI). Deploying SORMAS in Nigeria: Challenges and Accomplishments. Available from https://www.helmholtz-hzi.de/en/news-events/stories/deploying-sormas-in-nigeria-challenges-and-accomplishments/

[43]. WHO. SORMAS (Surveillance Outbreak Response Management and Analysis System). Available from https://innov.afro.who.int/emerging-technological-innovations/sormas-surveillance-outbreak-response-management-and-analysis-system-2084.

to explore data quality further and request support from NCDC in order to understand the use of this system better.

Timeliness: The limitation mentioned in the codebook also alludes to a timeliness issue, stating that the surveillance data is not readily available when needed. The quote***, "So it's very difficult to get such data at the moment we need to now rely entirely on NCDC to get this data, and the data is actually not available as...we might want to have" (NERICC Data Manager),*** indicates a potential delay in accessing critical surveillance data, which could impact the timely response to emerging health threats.

Strength: The interviews did not explicitly mention strengths associated with surveillance data. However, the acknowledgment of the data's importance for routine immunization surveillance, including measles and yellow fever, implies its significance in monitoring and addressing public health issues. Strengthening data accessibility and integration into the government's system could be considered a potential strength.

Limitation: The main limitation identified is the restricted access to surveillance data, particularly concerning routine immunization. The quote, ***"They are still not within the custody of the government...So sometimes we struggle to get this kind of data" (NERICC Data Manager),*** highlights the challenge of reliance on external sources, limiting the autonomy and efficiency of data access for public health initiatives.

Mitigation: The interviews didn't explicitly provide mitigation strategies for the limitation discussed. However, potential mitigation measures could include advocating for improved data-sharing agreements between relevant agencies, enhancing data integration systems, and implementing protocols for more streamlined access to surveillance data.

Recommendation: To address the limitation and improve data quality and timeliness, a recommendation would be to establish stronger collaborations and partnerships between NPHCDA and NCDC. This could involve negotiating data-sharing agreements, facilitating regular and efficient data transfers, and investing in technology and infrastructure that enable seamless integration of surveillance data into the government's public health system. Strengthening the capacity of NPHCDA to independently manage and access surveillance data would contribute to more effective and timely public health responses.

3.2 Health Facility Assessment

The study attempted to understand the extent to which routine immunization services were offered and the readiness of facilities for RI in terms of staff and availability of vaccines. A total of 32 Health facilities were selected across the four states with four (4) HF across each of the selected eight (8) LGAs.

3.2.1 Facility location and facility type:

A total of 12 (37.5%) of the HFs were located in the urban area while 20 (62.5%) of HFs were in rural. Out the 32 selected health facilities, 27 (84%) were PHCs and 19 (59%) of sampled HF offers both out and in-patient care and all of them offer routine immunization.

3.2.2 Human resources for health in terms of quality and quantity:

We did an enumeration of the total staff in the health facilities and found out that there were a total of 608 staff across the 32 health facilities. A total of 324(53.3%) were permanent staff while 284(46.7%) were volunteer staff. Based on cadres, there were only 10 (2%) medical doctors, 64 (10%) junior community health extension workers (JCHEW), 120 (19%) community health extension workers (CHEW) and 284 (47%) volunteers. This is shown in Figure 6 below. From each of the HF, we accessed whether the officer in charge has a current formal medical license, and out of the 32 Officer in charges samples, 24 (75%) of healthcare workers sampled had licenses. Health facilities in urban settings had a higher proportion of health facilities with licenses 85% (17/20) with a 27% variance with rural setting 58% (7/12).

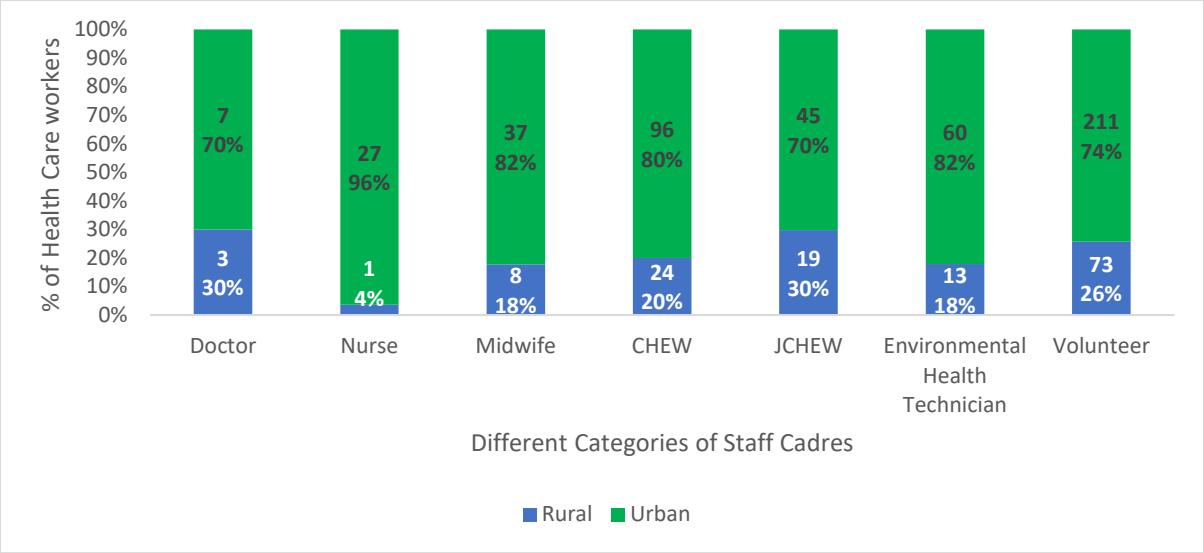

FIGURE 2: DISTRIBUTION OF THE DIFFERENT CADRE OF STAFF ACROSS THE HEALTH FACILITIES BASED ON SETTINGS

3.2.3 Service availability at the HF:

Thirty (93.8%) out of the 32 (6.2%) HFs offered services offers pentavalent vaccines, rotavirus vaccines, measles, and oral polio vaccine at both fixed and outreach sessions while 1 (3.1%) HF does not offer Hepatitis B birth dose and inactivated polio vaccine (IPV) at all. This is shown in Figure 7.

Twenty-four (75%) of the health facility assessed had not reported any vaccine preventable disease in the last six months. Figure 8 shows the different campaigns conducted in the catchment community of the facility in the last six months. There was a report of 5 (42%) out of the 12 in rural HFs reported in Bauchi, Sokoto and Kano while only 3 (15%) out of the 20 health facilities in urban setting reported in Bauchi and Kano. Vaccine preventable diseases mentioned included: Diphtheria and Measles outbreaks in Kano, Pertussis in Sokoto and Whopping cough and circulating polio derived virus in Bauchi State.

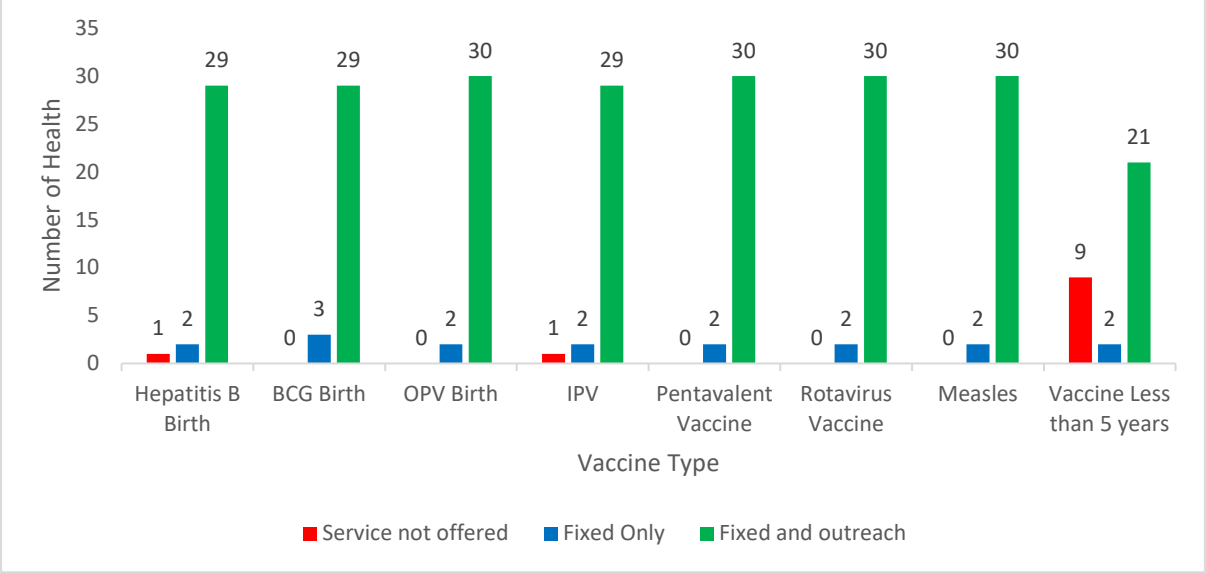

FIGURE 3: ANTIGENS PER DIFFERENT TYPE OF SESSIONS ACROSS HEALTH FACILITIES

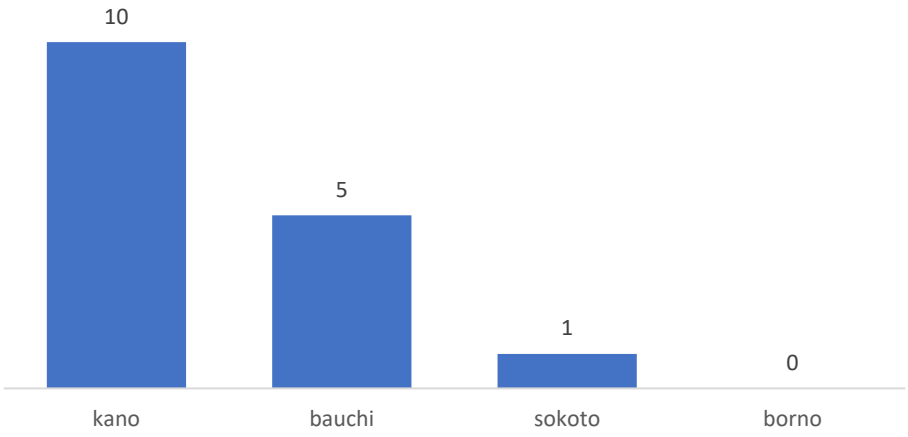

FIGURE 4: CAMPAIGN CONDUCTED IN THE CATCHMENT COMMUNITY OF THE FACILITY IN THE LAST SIX MONTHS

All the 32 (100%) of health facilities reported at least one (1) campaign implemented in the last six (6) months of the assessment in their respective catchment areas. Bauchi and Sokoto had the highest average number of campaign implementation of about 2.9 and 2.8 respectively while Borno and Kano average implementation stood at about 2.4.

Twenty-nine (90%) of the health facilities engage in special efforts towards reaching zero-dose children and missed communities outside the routine planned fixed and outreach sessions. 21 (72%) claimed to integrate zero dose identification and reach during Polio Supplementary Immunization Activities (SIAs) leveraging on the house-to-house teams, 23 (about 79%) claim to conduct outreaches on Special Outreach Days (SODs), while 20 (about 68%) claim to reach zero dose children using the house-to-house vaccination strategy with RI during RI intensification activities, and in-between rounds. Other strategies mentioned include distribution of nutritional materials and engagement with community stakeholders on awareness creation.

About 93% of health facilities integrates routine immunization with campaigns. Identification and reach of zero dose children were reported to be integrated with Seasonal Malaria Chemotherapy, COVID-19 vaccination, nutritional and deworming campaigns, during Maternal and Child Health Weeks (MNCH), fractional IPV campaigns and Integrated Management of Childhood Illnesses campaign (IMCI).

Averagely HF conducts about 2.8 sessions per week from the selected HFs and there was higher session implementation in urban HFs (3.4 sessions per week) than rural HFs (averagely 2/week). This is shown in Figure 3.7. Nineteen (59%) of the HF provide RI service for 1-5 hours (for both urban and rural settings). This is shown in Table 9 and 10. It was observed that only 4 (13%) of HF offer weekend RI sessions while 2 (6%) offers evening RI sessions.

We observed that there were insufficient number of sessions and length for Routine Immunization in both the rural & urban settings and these may pose challenges to accessibility and hinder the effectiveness of immunization programs. The implications of the limited work hours for service providers may pose a potential barrier to accessibility for individuals with weekday commitments and this may also pose gender barrier for mothers with chores and alternative sources of income. We recommended the need for gender sensitive vaccination scheduling and a human centered design approach in micro sessions planning. Furthermore, we recommend the review of the immunization strategies to pay more emphasis on peculiarities of rural health facilities.

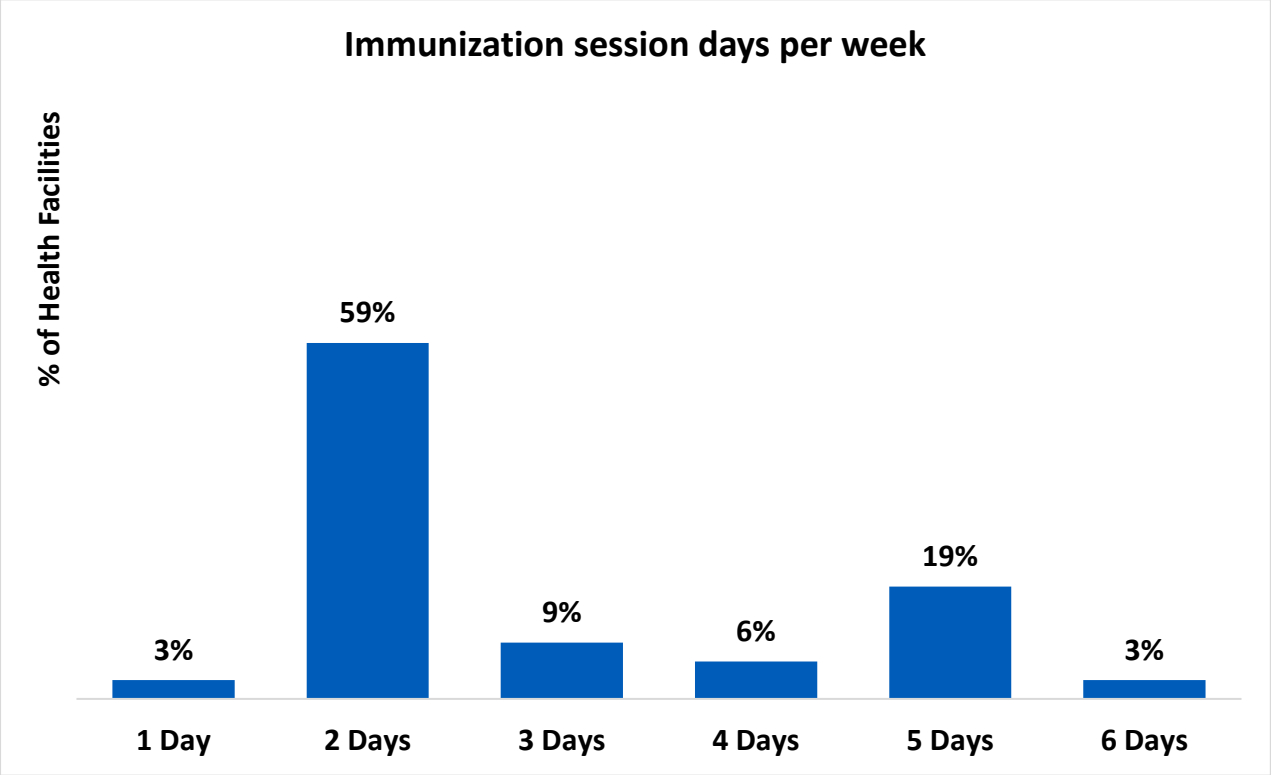

FIGURE 5: IMMUNIZATION SESSION DAYS PER WEEK

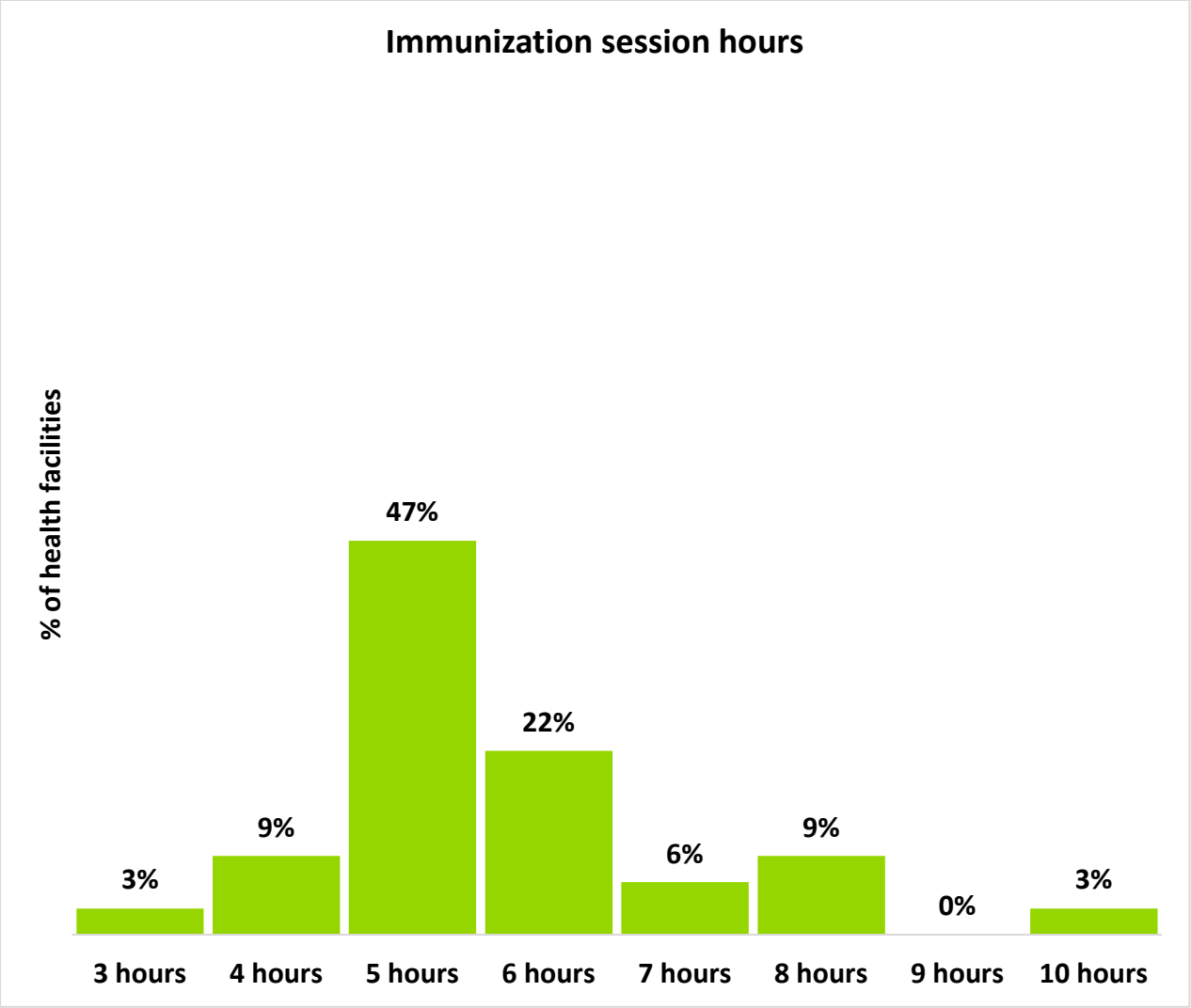

FIGURE 6: IMMUNIZATION SESSION HOURS

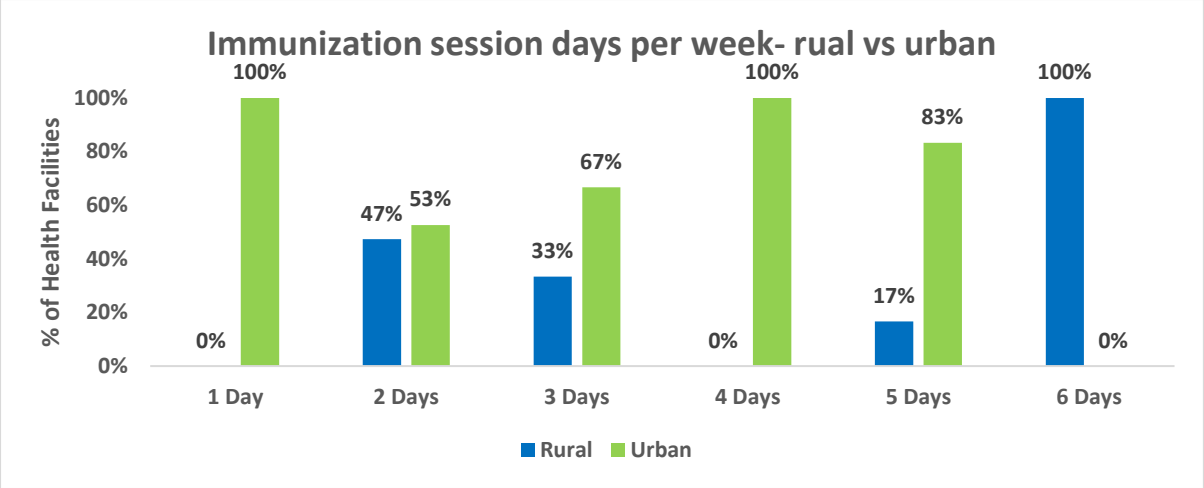

FIGURE 7: IMMUNIZATION SESSION HOURS – RURAL AND URBAN COMPARISON

3.2.4 Infection Prevention and Control of the HF:

Out of the 32 (100%) HFs accessed, none of them had sharp boxes for safe disposal of syringes even though all the 32 (100%) HFs have disposable latex gloves We observed clean running tap water in 27(84%) of the HFs. This is further depicted in Figure 12.

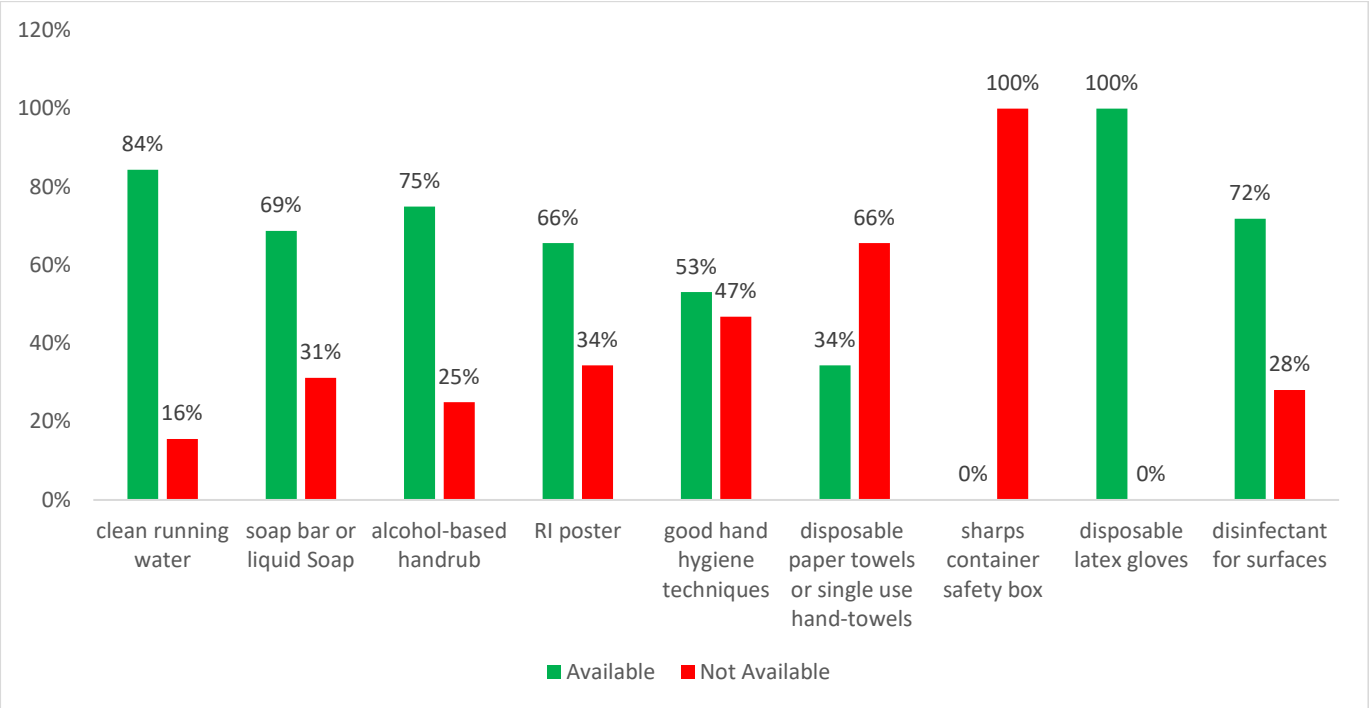

FIGURE 8: AVAILABILITY OF BASIC INFECTION PREVENTION MEASURES ACROSS HEALTH FACILITIES

3.2.5 Equipment's, Cold chain and Vaccines (availability and functionality):

Only Ganjuwa (Bauchi) reported non-availability of Disposable Syringes. Twenty-five (78%) of health facilities surveyed had fridges and 15 (47%) had the temperature log completed for the 30 days period, 22 had at least 1 day missed while 10 (31%) had no temperature log available. Six of the 25 (24%) health facilities had temperature expulsion above 80°C (Bauchi had 1, Kano has 3 and Sokoto had 2). Nine (9) health facilities (6 urban and 3 rural) experienced stock out of Measles and Penta antigens and diluents. Sokoto had the highest stock across the three states of Borno, Kano and Bauchi states. Averagely, RI Focal persons spends ₦25,500 monthly (about $20 USD) to pull vaccines, yet this was deemed inadequate.

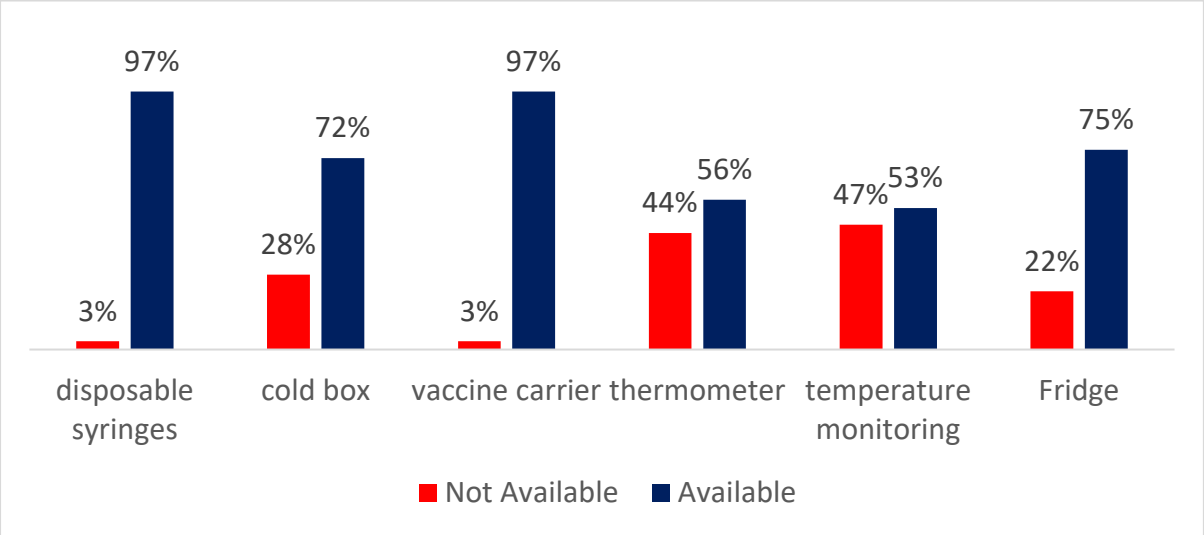

FIGURE 9: AVAILABILITY OF EQUIPMENTS AND COLD CHAIN

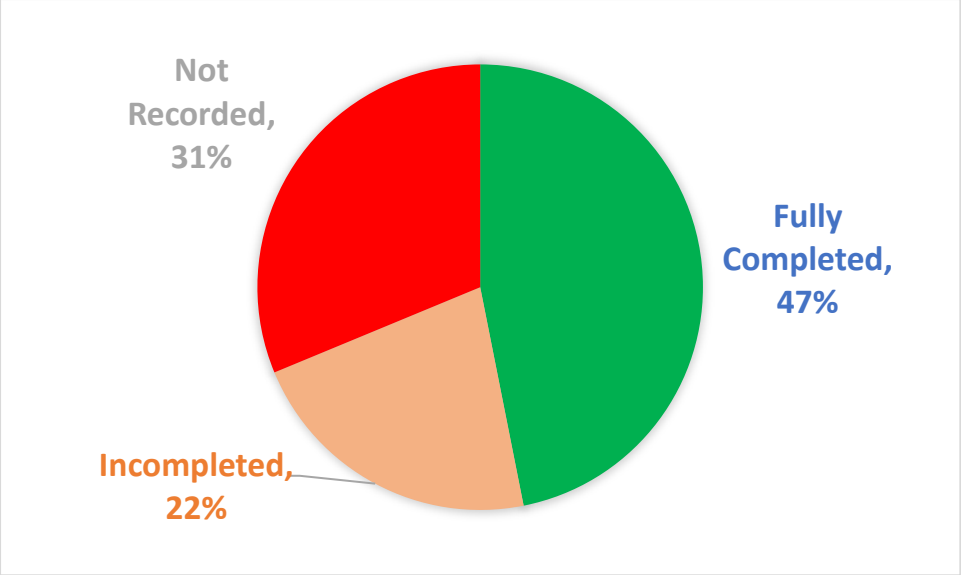

FIGURE 10: COLD CHAIN TEMPERATURE MONITORING

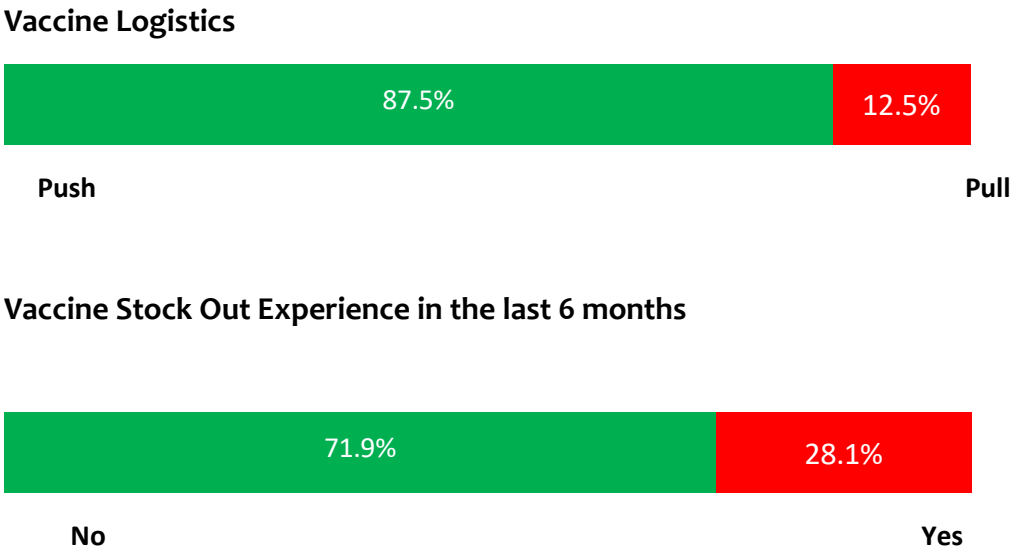

FIGURE 11: VACCINE LOGISTICS AND STOCK OUT

3.2.6 Data tools (presence and availability):

The reaching every ward (REW) Microplan was not available in one (1) HF in Sokoto state while five (5) HFs (three in Sokoto state and two in Bauchi state) were unable to provide physical copy of the recently updated REW Microplan. This represents 6 (19%) of health facilities not to have microplan or the microplan were unavailable for verification from the study sites. Seventeen (53%) of health facilities reported use of improvised noted book within the period of stock out leading to data loss and compromising data integrity. Two (2) health facilities, Bauchi and Kano reported printing data tools out of pocket while source data tools were mainly from Government (LGA level). Partners were reported as the main source for printing of data tools in Borno State.

We recommend that all HFs should be made mandatory to have updated REW microplan quarterly that will be pasted onsite to inform immunization service delivery. We also recommend the RI managers at national level to develop a systemic way of close monitoring of child births in the community and reporting zero dose children at the health facility level on a monthly basis as the current RI registers do not provide at a glance information on number of zero dose, unimmunized and fully immunized children for any particular month. Furthermore, we recommend allocation of a budget line for printing and distribution of data tools to health facilities.

Twenty-five (78%) conduct DPT Analysis by monthly calculation of Penta 1 to Penta 3 drop out rate to guide RI implementation. Five (5) rural health facilities from Sokoto and Bauchi states and two (2) urban HFs from Sokoto and Borno had challenges with analysis and decision-making process due to suboptimal capacity in data analysis and interpretation.

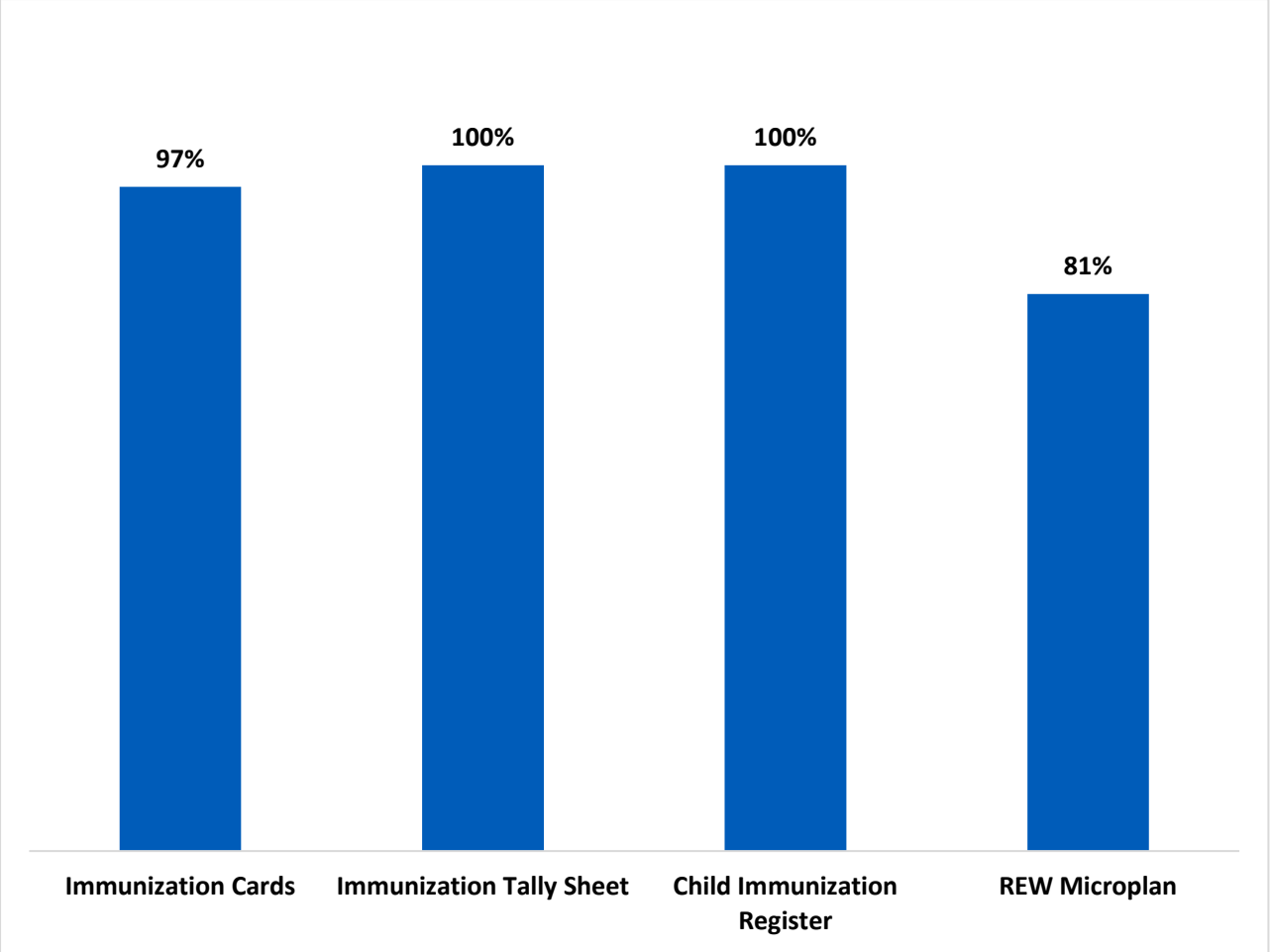

FIGURE 12: AVAILABILITY OF RI DATA TOOLS

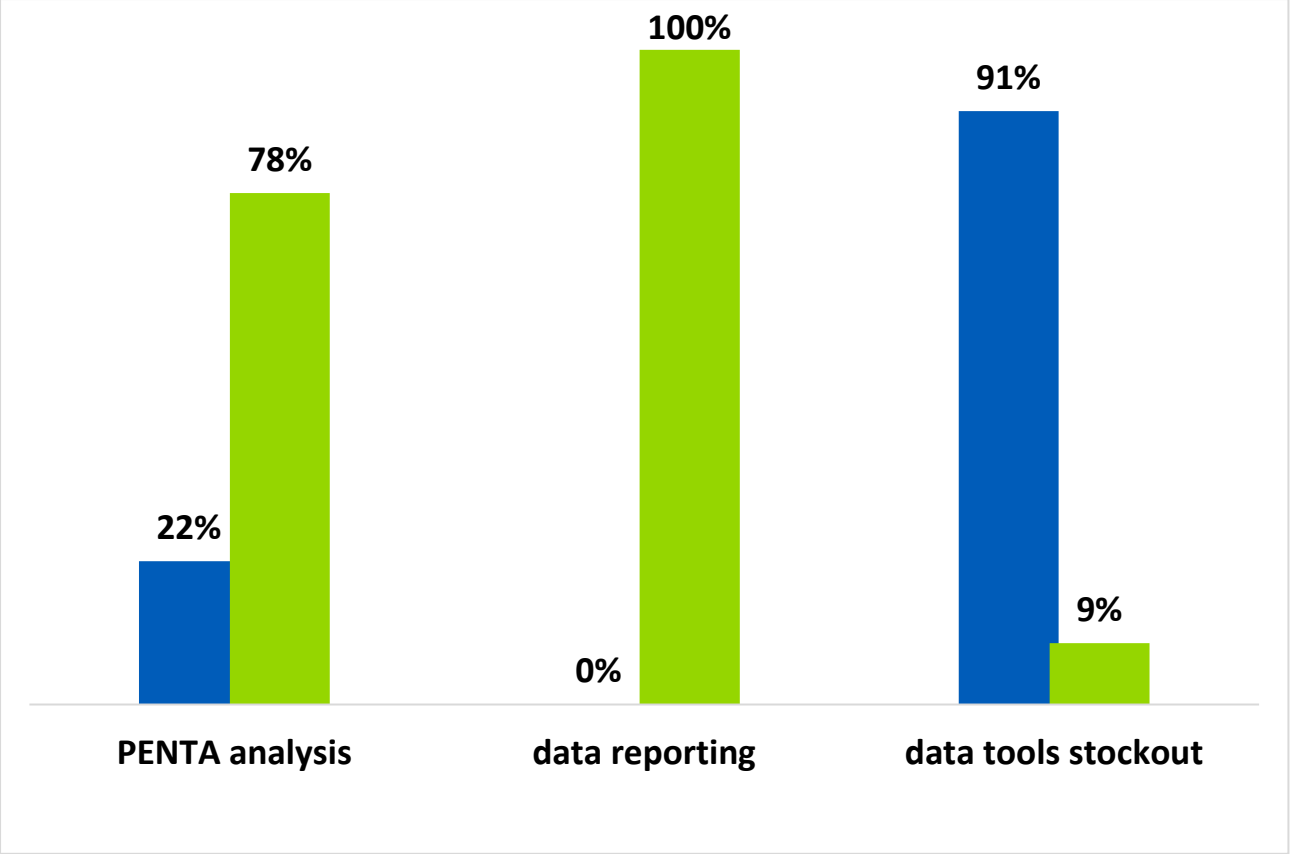

FIGURE 13: DATA USE FOR ACTION AT THE HEALTH FACILITY

3.2.7 Support for quality services:

About 5 (16%) of the respondents reported non-participation in any form of training in the last two (2) years. All health facilities sampled from Tambuwal LGA in Sokoto and a health facility in Borno (Jere) accounted for the 16%. By settings, 67% of HF in rural areas reported to have received at least one training while 95% of HFs in urban areas reported to have received same.

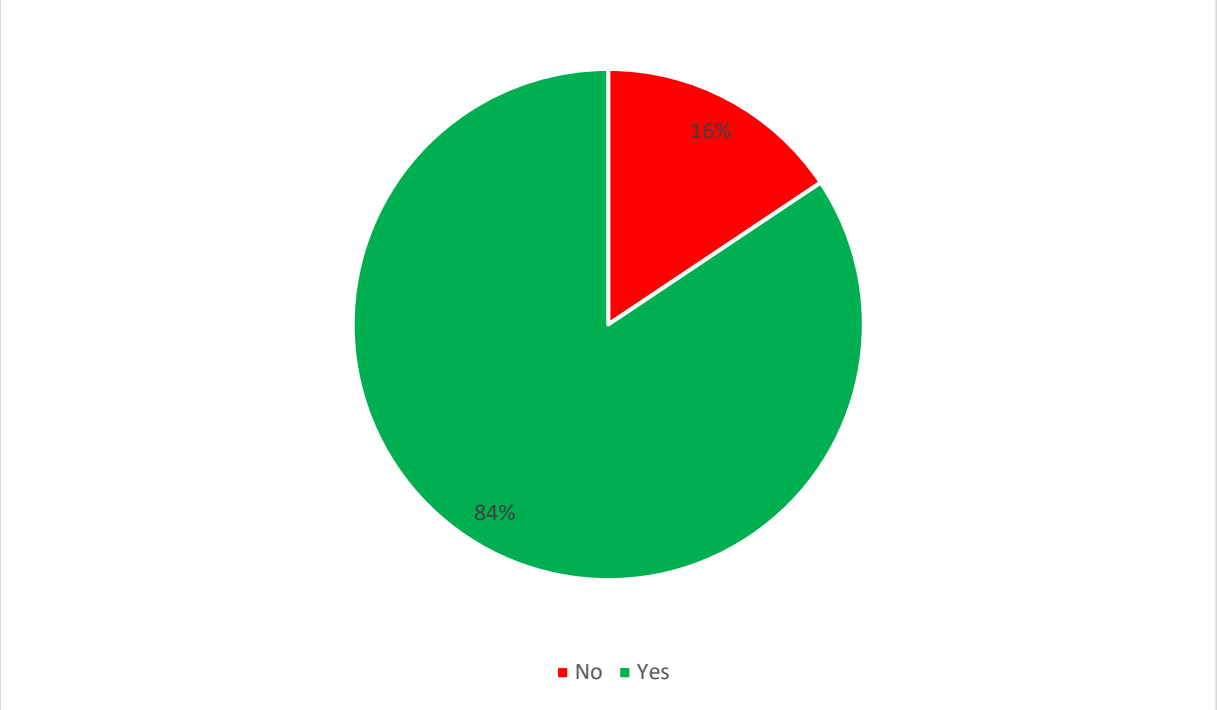

FIGURE 14: PROPORTION OF HEALTHCARE WORKERS THAT HAVE RECEIVED FORMAL TRAINING IN THE LAST TWO YEARS

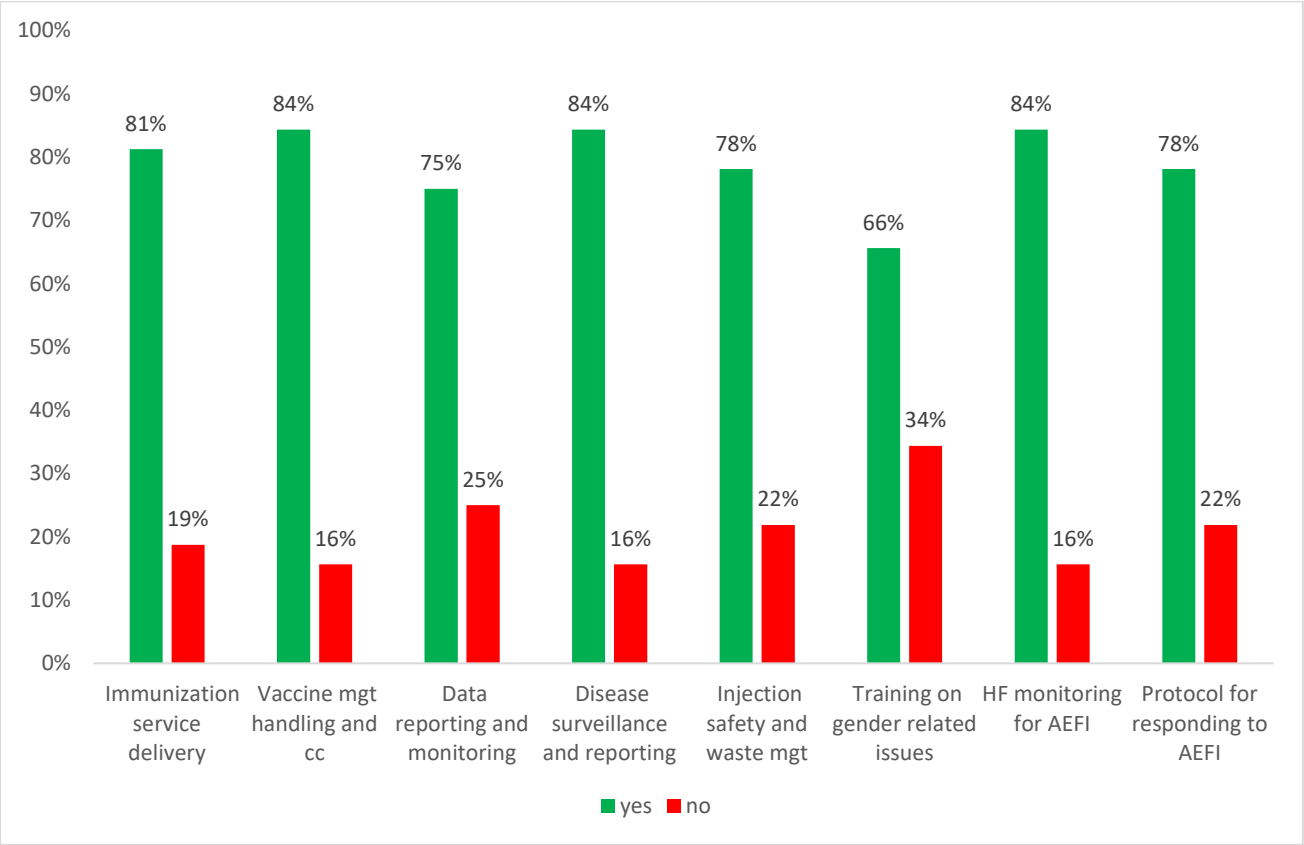

FIGURE 15: DISTRIBUTION OF THE VARIOUS TRAINING TOPICS PER PARTICIPANTS

3.2.8 Data Extraction:

Based on the data extraction that was done from the immunization tally sheet across the 32 HFs, the highest dropout rate for penta 1 versus penta 3 antigens given was in February 2023. Other months experienced dropouts within the acceptable 10% rate except for the months of May and June with 11% and 12% drop out rates. Penta 1 to measles antigens given dropout rates increased from 24% in January to 29% in September 2023 with a peak of 37% in May 2023. This is further depicted in Figure 20 and Table 8 below.

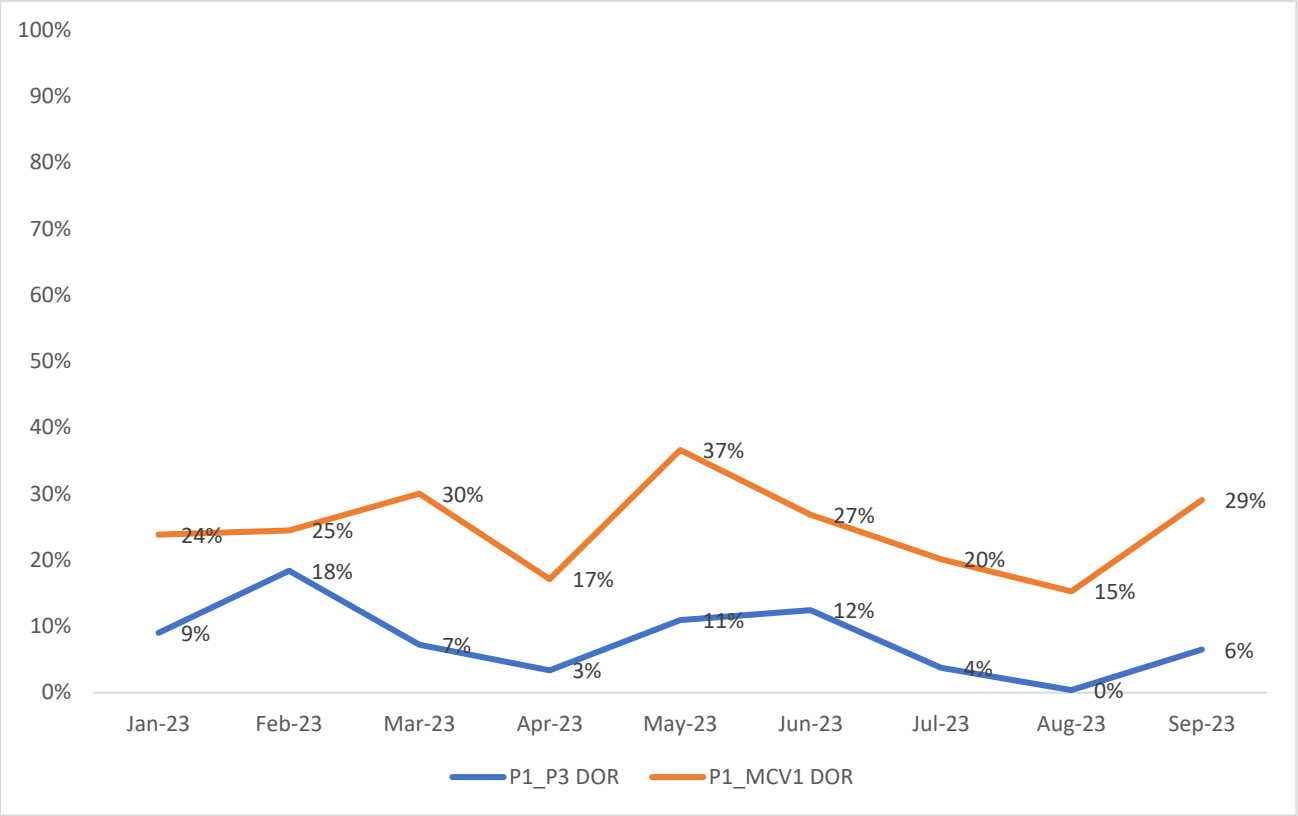

FIGURE 16: TREND ANALYSIS OF PENTA1, PENTA 3 AND MEASLES VACCINATION DROPOUT RATES

TABLE 4: DATA EXTRACTION OF CHILDREN WHO RECEIVED PENTA 1, PENTA 3 AND MEASLES ANTIGENS

	Penta 1	Penta 3	MCV1	P1_P3 DOR	P1_MCV1 DOR
Jan-23	1295	1178	986	9%	24%
Feb-23	1538	1255	1161	18%	25%
Mar-23	1548	1436	1083	7%	30%
Apr-23	1541	1489	1277	3%	17%
May-23	1687	1502	1069	11%	37%
Jun-23	1564	1369	1144	12%	27%
Jul-23	2120	2040	1693	4%	20%
Aug-23	2570	2560	2177	0%	15%
Sep-23	2080	1945	1475	6%	29%

N.B: P1_P3 DOR= P1-P3/P1*100; P1_MCV1 DOR= P1-MCV1/P1*100

3.3 Household Vaccination Survey

3.3.1 Demographics of study respondents

A total of 320 caregivers of eligible children and caregivers were sampled across the four (4) states. The distribution shows that 192 (60%) of the eligible children were 0-11 months old with a mean of five (5) months while 128 (40%) were 12-23 months a mean of 16 months. The mean age of caregivers was 28 (SD+8 years). About 87.2% of the caregivers have only one (1) child. The caregiver relationship with the child were as follows; 87.2% as mothers, 9% as fathers, 2.2% as grandfathers while 1.6% were others (i.e., grandmothers, aunties, etc.). There were more female as caregivers with 280 (87.5%) as shown in Figure 21.

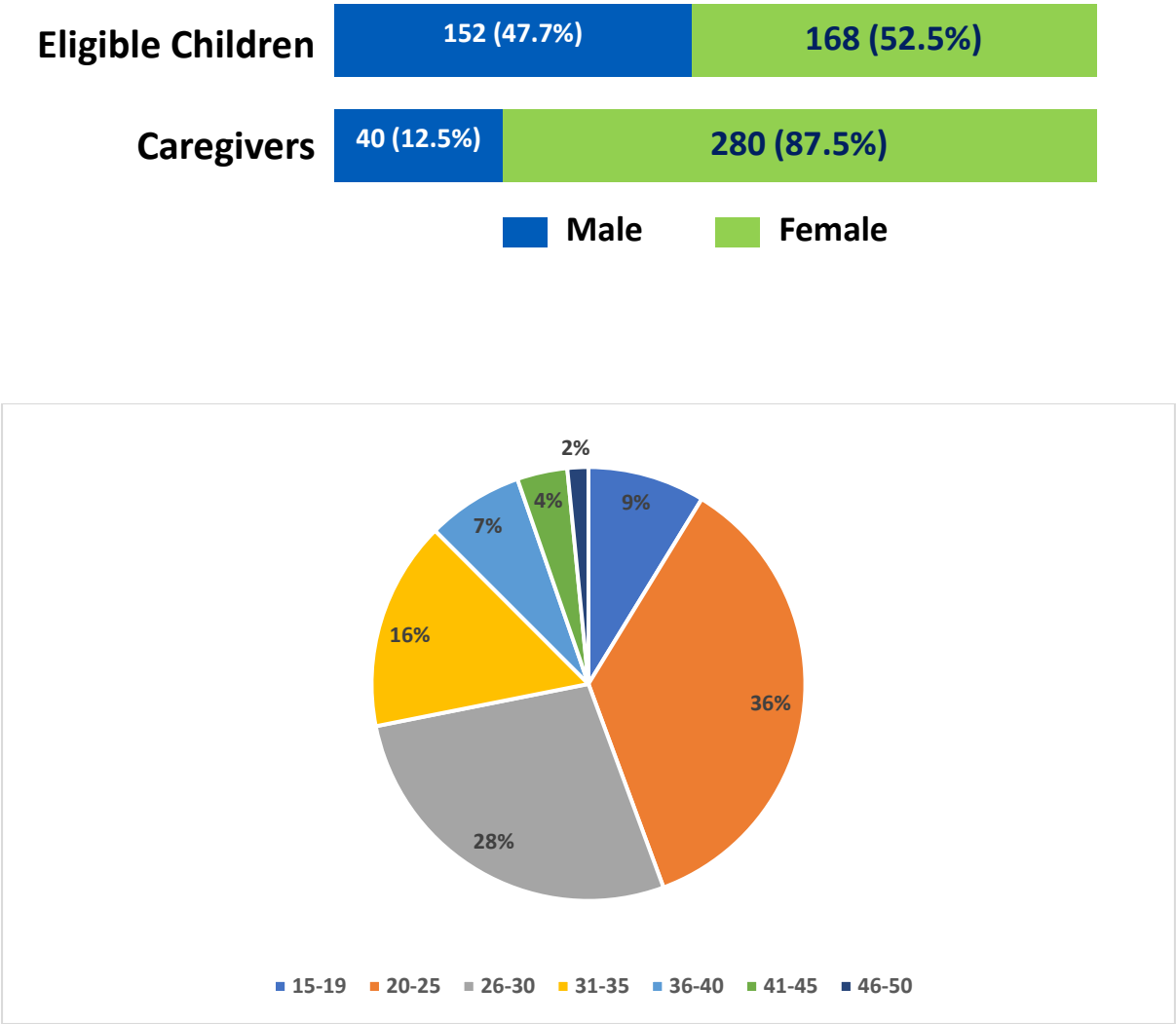

FIGURE 17: DEMOGRAPHICS- SEX AND AGE DISTRIBUTION OF THE STUDY PARTICIPANTS

3.3.2 Priority Indicator: Thinking & Feeling

Across thinking and feelings, there is high performance across all indicators. This priority indicator may not have much influence on zero dose. About 90% (291) of caregivers say vaccines are moderately or very important for their child's health including caregiver of 81 zero dose children. 22.9% of the zero dose caregivers (25% in Urban, 18% rural) do not know the importance of vaccines. A total of 286 (89%) say vaccines are moderately or very safe for their children while 27.6% of zero dose caregivers (32% in rural, 25% urban) feels overwise. Only 11% of zero dose caregivers had no trust in healthcare workers with a higher proportion in urban (13%) than rural settlements (8%).

Generally, vaccine confidence among urban setting is lower. Kumbotso LGA from Kano State has the least percentage of vaccine confidence (17.6%) from Urban LGAs. In the urban areas, some of the concerns were around fertility, AEFI, vaccination route, and discomfort in children. Increasing the knowledge about the safety in getting all the vaccines through media and other channels can significantly impact caregivers' motivation which will increase vaccine confidence and safety.

FIGURE 18: VACCINE IMPORTANCE: PROPORTION OF CAREGIVERS WHO SAY VACCINES ARE MODERATELY OR VERY IMPORTANT FOR THEIR CHILD'S HEALTH (N=320)

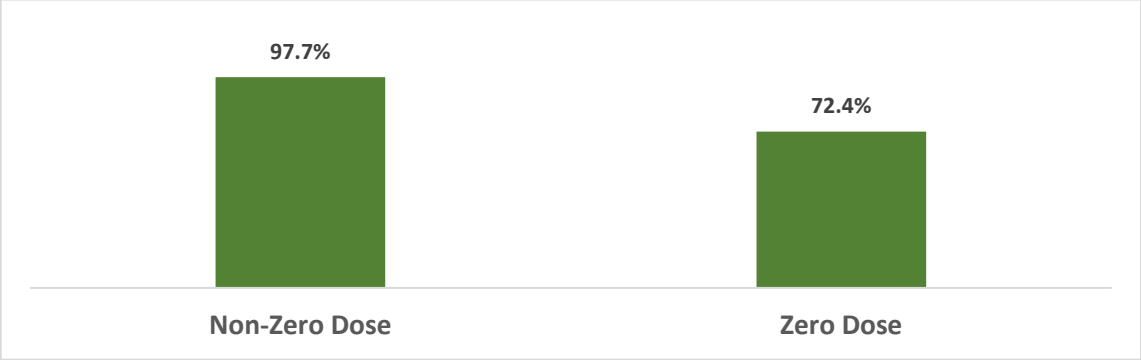

FIGURE 19: VACCINE SAFETY: PROPORTION OF CAREGIVERS WHO SAY VACCINES ARE MODERATELY OR VERY SAFE FOR THEIR CHILDREN (N=320)

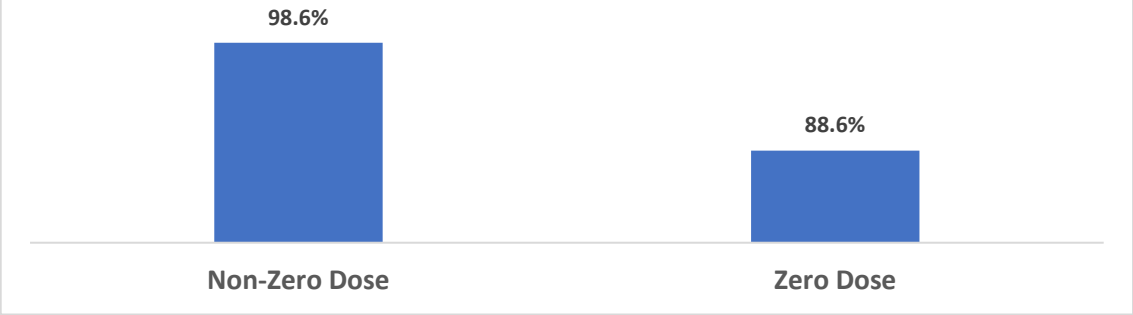

FIGURE 20: TRUST IN HEALTHCARE WORKERS: PROPORTION OF CAREGIVERS WHO SAY THEY TRUST THE HEALTH WORKERS WHO GIVE CHILDREN VACCINES "MODERATELY" OR "VERY" MUCH (N=320)

3.3.3 Priority Indicator: Social Processes

Only about 12% of caregivers say they do not need to take permission for child vaccination. 87% of zero dose caregivers (91% Urban, 79% Rural) require formal consent to visit and get children vaccinated with the appropriate antigens. About 90% of caregivers say most of their close family and friends want their child to be vaccinated. Of the 105 zero dose Caregivers, 23 (22%) do not have the support of friend and close family members with higher proportion in urban (25%) than rural (16%). About 90% and 95% of caregivers say their community leaders and religious leaders respectively want their child to be vaccinated. 14.3% (15) zero dose caregivers in 100% in urban settings reported otherwise.

More caregivers need to take permission from their husbands in rural LGAs compared to Urban LGAs. Husband permission may not be a limiting factor for vaccine uptake in some states and settings. The women in urban LGAs may be more empowered in terms of education, employment, obtaining health information and a level of gender equality which may not be obtainable in the rural setting. Limited information as a demand-side factor can hinder women's ability to make informed decisions. Family and community influence is higher in urban LGAs. Social discussions with neighbours and friends should be adopted as part of interventions to improve vaccination especially in rural areas.

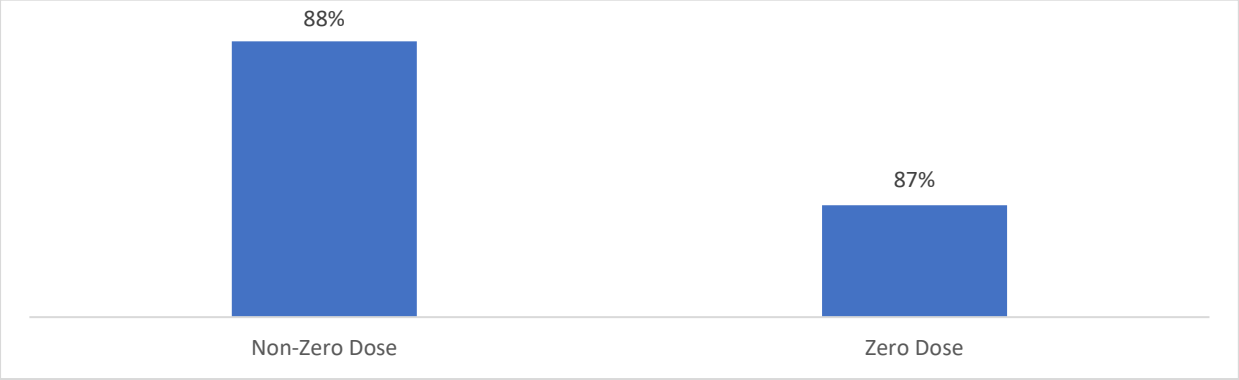

FIGURE 21: PERMISSION SEEKING: PROPORTION OF CAREGIVERS WHO SAY THEY DO NOT NEED TO TAKE PERMISSION FOR CHILD VACCINATION (N=320)

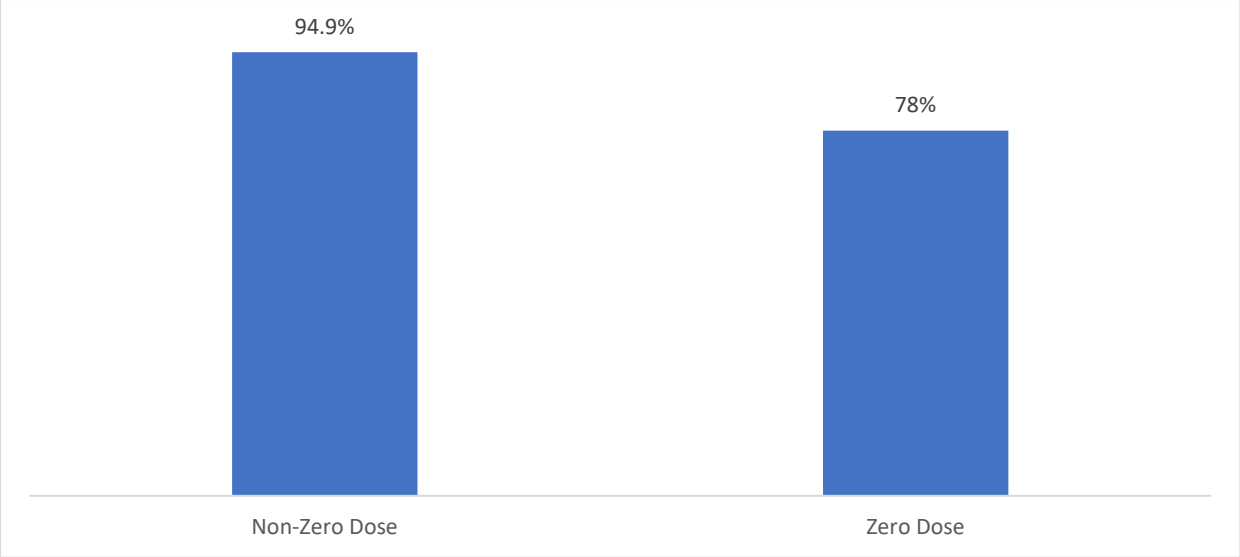

FIGURE 22: FAMILY INFLUENCE: PROPORTION OF CAREGIVERS WHO SAY MOST OF THEIR CLOSE FAMILY AND FRIENDS WANT THEIR CHILD TO BE VACCINATED (N=320)

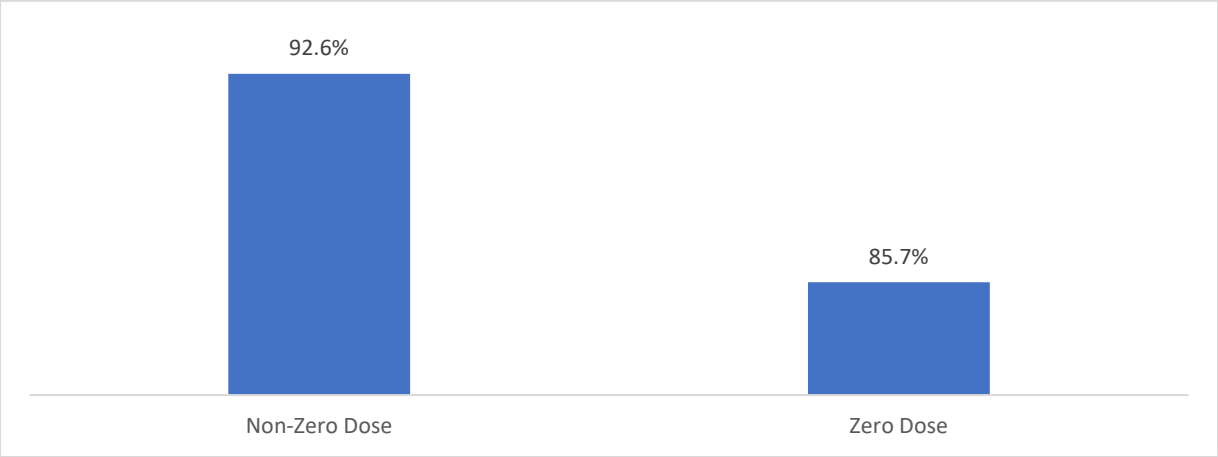

FIGURE 23: RELIGIOUS INFLUENCE: PROPORTION OF CAREGIVERS WHO SAY THEIR RELIGIOUS LEADERS WANT THEIR CHILD TO BE VACCINATED (N=320)

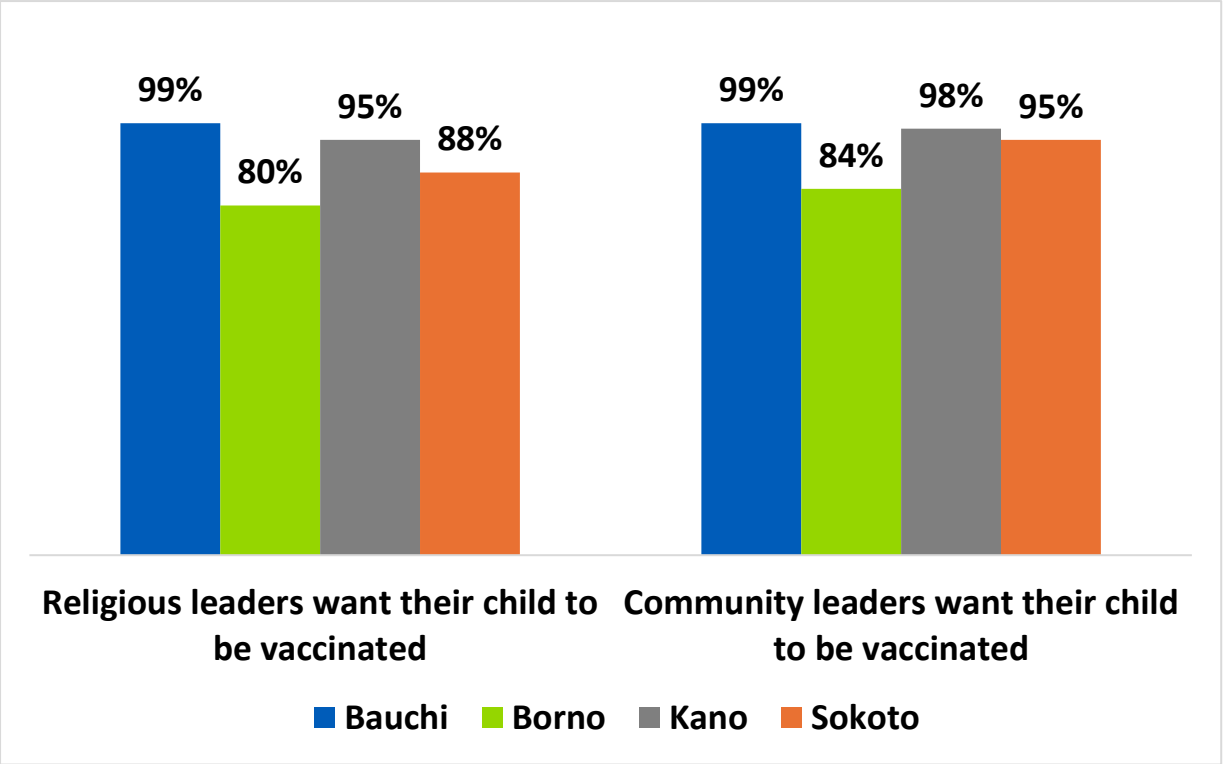

FIGURE 24: COMMUNITY INFLUENCE: PROPORTION OF CAREGIVERS WHO SAY THEIR COMMUNITY AND RELIGIOUS LEADERS WANT THEIR CHILD TO BE VACCINATED ACROSS STATES (N=320)

3.3.4 Priority Indicator: Motivation

Concerning intention to vaccinate their children, about 90% of caregivers say they want their child to get 'all' the recommended vaccines. Caregivers of zero dose (81%) reported having intention to vaccinate their children while 19% (21% in rural, 18% Urban) reported no intention of vaccination. Five critical motivators identified includes father's approval, desire to reduce child's morbidity and mortality, caregivers' knowledge on importance of vaccination, social influences from social circles and financial influence/independence.

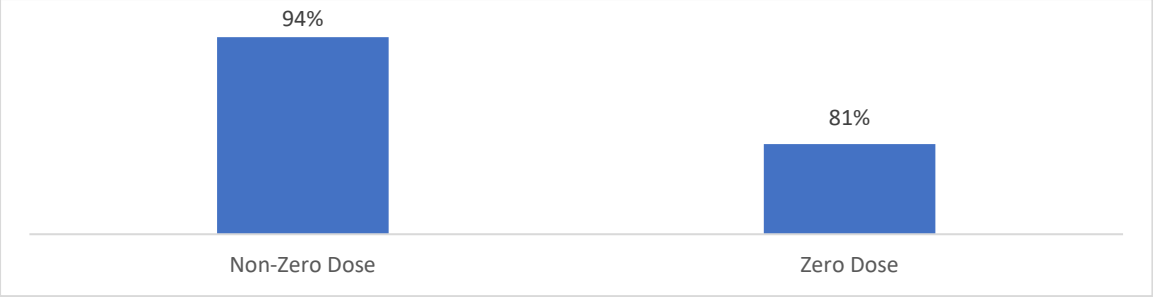

FIGURE 25: INTENTION TO VACCINATE: PROPORTION OF CAREGIVERS WHO SAY THEY WANT THEIR CHILD TO GET ALL THE RECOMMENDED VACCINES (N=320)

3.3.5 Priority Indicators: Practical Issues

Concerning vaccine knowledge; over 95% of caregivers say they know where to get their child vaccinated while for vaccine affordability about 67% of caregivers say vaccination is "moderately" or "very" easy to pay for. Caregivers of fully immunized, partially immunized and zero dose children reported 25%, 39% and 36% respectively challenges with affordability. This was found to be higher in rural settings (25%) than urban settings (12%). The result suggest that caregivers perceive that the cost of vaccination is not affordable in both urban and rural settings. This cost also includes transportation to and from the health facilities. 18.1% (19) of zero dose caregivers reported challenges related to access stating difficulty in reaching health facility and long waiting time as main reasons. Ease of access was reported About 85.6% of the respondents said they were satisfied with vaccination services. Some of the respondents who were not satisfied mentioned long waiting time as a reason for dissatisfaction. Other reasons for dissatisfaction include AEFI, lack of interest, distance, no permission given, limited time, lack of trust in the vaccine and uncomfortable hospital environment.

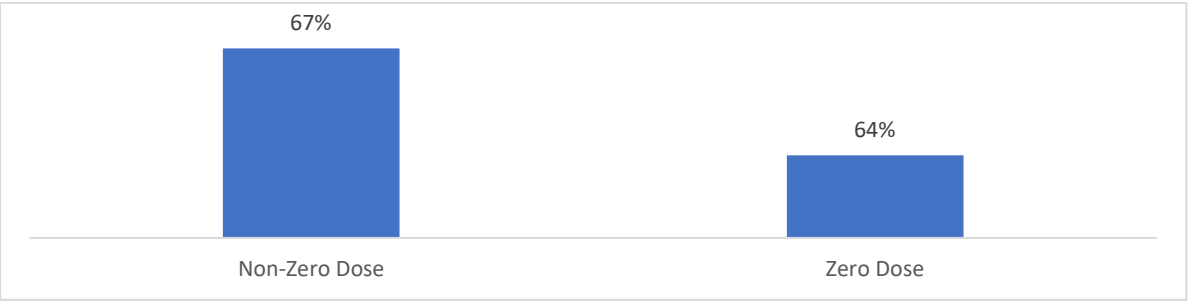

FIGURE 26: VACCINE AFFORDABILITY: PROPORTION OF CAREGIVERS WHO SAY VACCINATION IS "MODERATELY" OR "VERY" EASY TO PAY FOR (N=320)

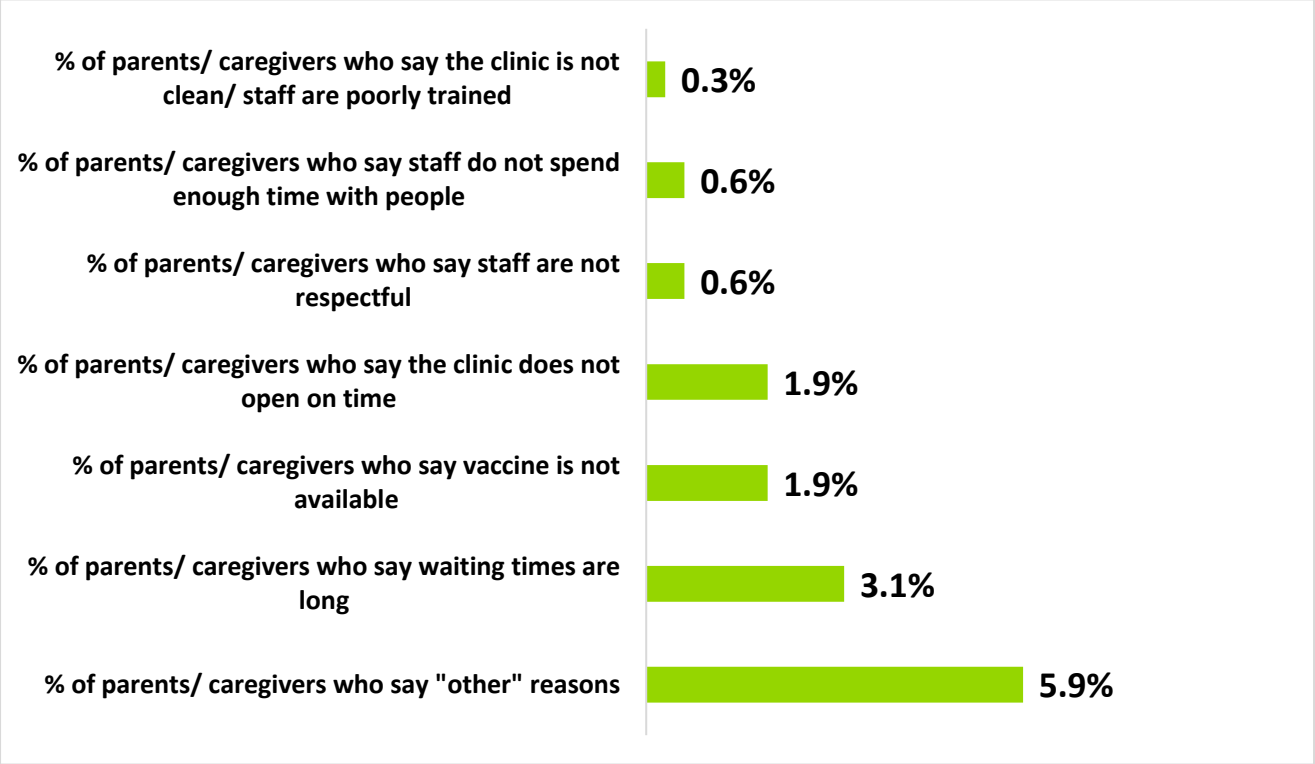

FIGURE 27: REASONS FOR DISSATISFACTION WITH HOSPITAL SERVICES

3.3.6 Community Rapid Assessment

A rapid community survey was conducted across the eight (8) LGAs with 320 children. The distribution shows 193 (60.3%) were 0-11 months while 127 (39.7%) were 12-23 months of age. About 168 (52%) of children sampled were females and 152 (48%) were males and 279 (87%) of respondent had mothers as primary care givers, 29 (9.1%) fathers, others were 12 (3.8%). A total of 105 (32.8%) had full vaccination[44] (for age), 109 (34.1%) had partial vaccination[45] while 105 (32.8%) were zero dose.[46]

Sokoto State has the highest number of zero dose children followed by Kano state as shown in Figure 32. There are higher zero dose children in urban settings in Sokoto and Borno state while in Bauchi state, there are higher numbers of full vaccination in urban settings compared to rural settings. This is shown in figure 3.30. The age group 0-11 months has the highest number of zero dose children from Sokoto state followed by 12-23 months from Kano state as shown in figure 33. Across the eight LGAs, Wamakko has the highest number of zero dose in the 0-11 months age category followed by Tambuwal in the 0-11 months category as shown in figure 32.

[44] Fully Vaccinated Children: are those that received the complete recommended vaccination that is appropriate for age.

[45] Partially Vaccinated Children (Gavi's operational definition): are those missing the third dose of diphtheria, tetanus and pertussis (DTP)-containing vaccine (DTP3) <PENTA 1 in Nigeria>.

[46] Zero Dose Children (Gavi's operational definition): are those who lack the first dose of diphtheria-tetanus-pertussis containing vaccine (DTP1) <PENTA 1 in Nigeria>.

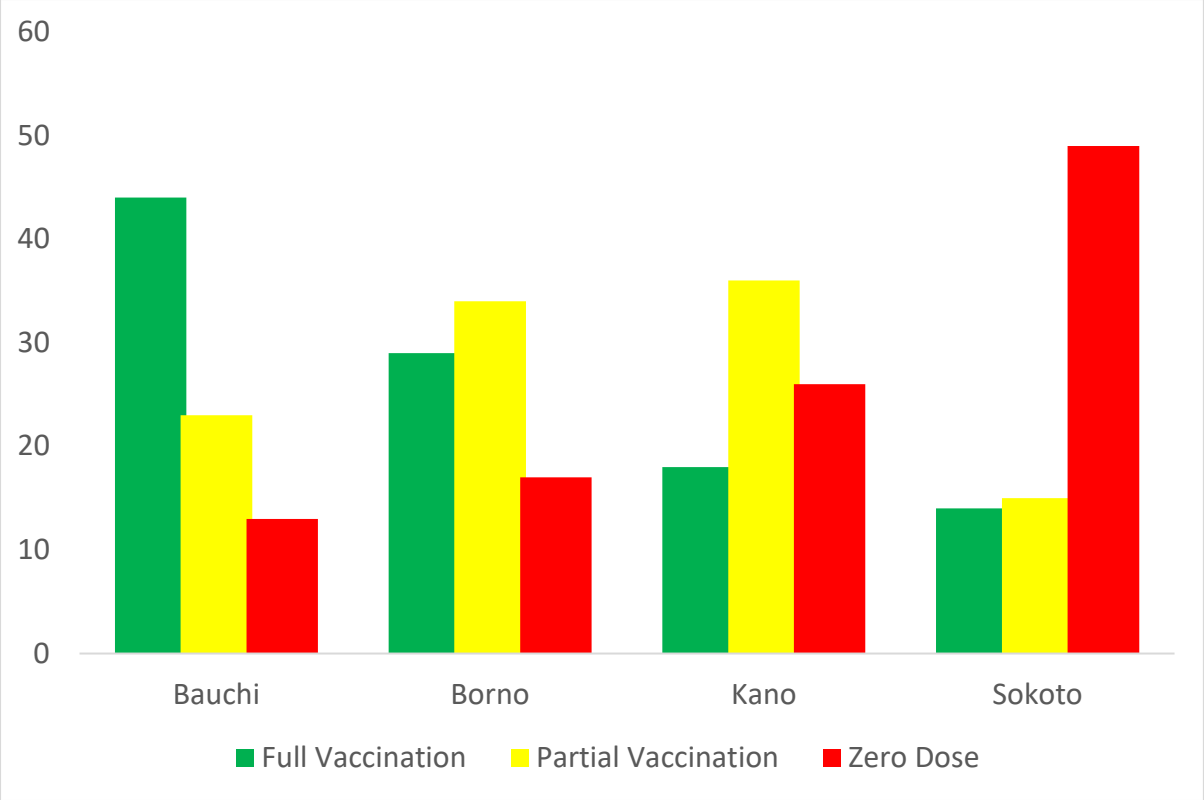

FIGURE 28: IMMUNIZATION STATUS OF CHILDREN SURVEYED ACROSS THE FOUR LEARNING HUB STATES

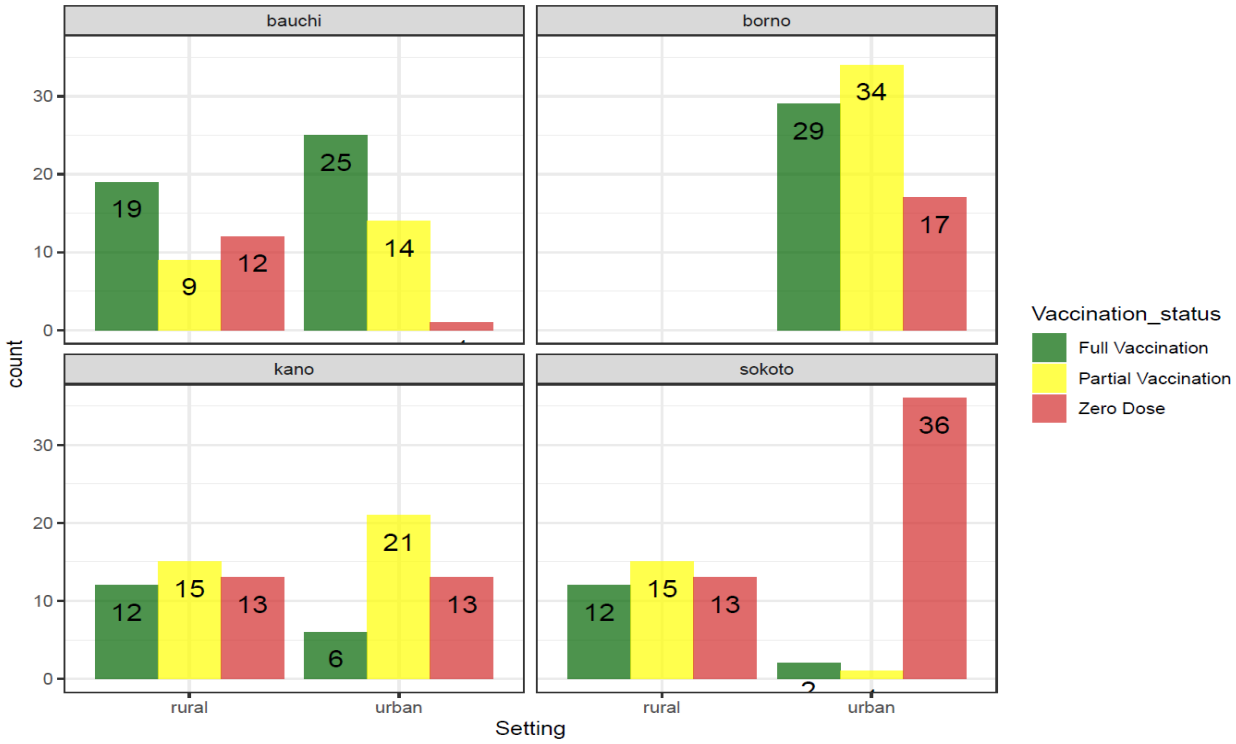

FIGURE 29: IMMUNIZATION STATUS OF CHILDREN SURVEYED ACROSS RURAL AND URBAN SETTINGS IN THE FOUR-LEARNING HUB STATES

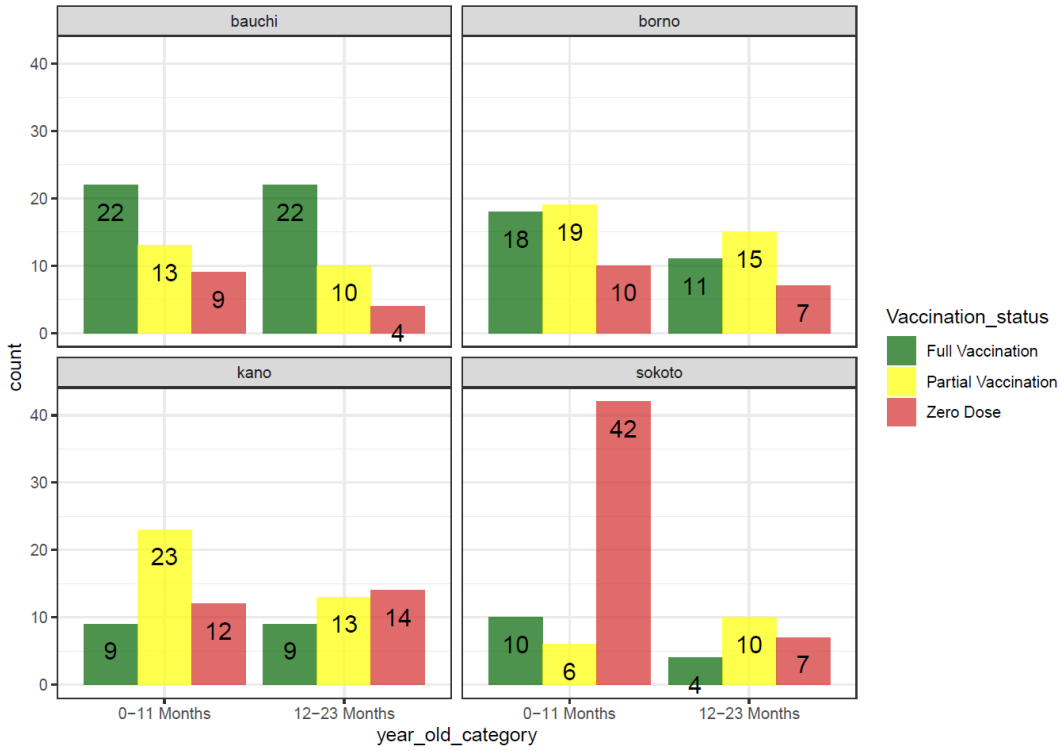

FIGURE 30: IMMUNIZATION STATUS OF CHILDREN SURVEYED ACROSS AGE GROUPS IN THE FOUR-LEARNING HUB STATES

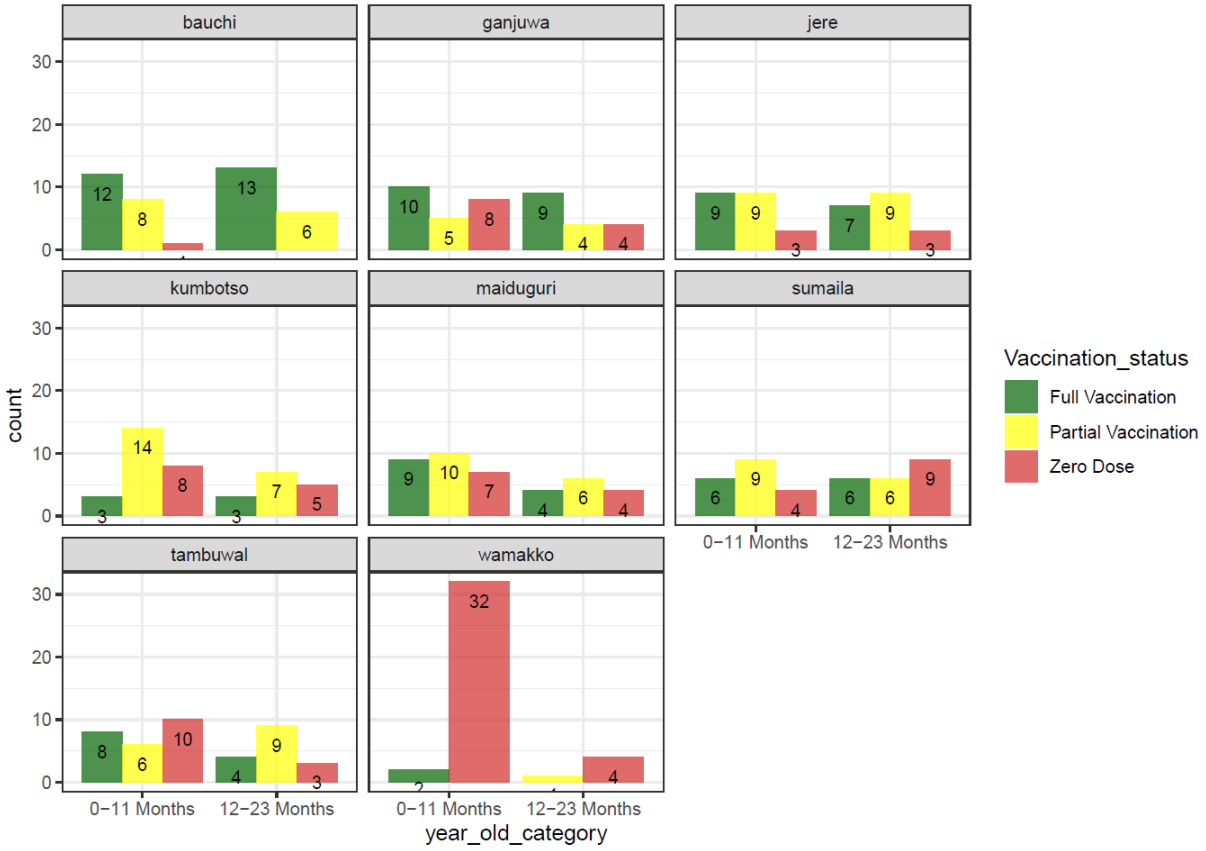

FIGURE 31: IMMUNIZATION STATUS OF CHILDREN SURVEYED BASED ON AGE ACROSS THE EIGHT LGAS IN THE FOUR-LEARNING HUB STATES

3.4 Barriers and Enablers Analysis

3. 1 Caregivers' Experiences on Routine Immunization

Thirty-three caregivers of children under two years were interviewed using the BeSD recommended interview guide for caregivers. Firstly, the interview assessed caregivers' awareness of children's immunization program. On a positive note, we found caregivers expressing agreement regarding the completion of vaccination. In Bauchi, a caregiver affirmed,

"Honestly, I don't miss. I have two children. Since we started with the older one, the small one has never missed and always on time, we were never late not even once" **([CG04] BG-IDI_Caregiver_Summuu Settlement_ Summu PHC_Bauchi LGA).**

This commitment to completing vaccination schedules contributes to ensuring children are protected from preventable diseases. Among the caregivers who were interviewed, we also found caregivers with zero-dose children who gave reasons why their children were not taken for immunization.

In Kano, a caregiver highlighted challenges, stating,

"I said No. Sometimes he (her husband) would not allow it, sometimes a child cries continuously after immunization" **([CG22] Kano SML- IDI_Caregiver_Gediya Kudu_Gediya Ward_Sumaila LGA_Bauchi).**

One of the major reasons for her reluctance stems from lack of approval from her husband, while this is a family issue, she also mentioned the fear of her children crying also makes her felt reluctant. Addressing and alleviating such fears could potentially enhance caregivers' willingness to participate in vaccination programs. Identifying reasons for missed doses and implementing targeted interventions is crucial for achieving comprehensive vaccine coverage. This study used the BeSD Qualitative Analytical framework to bring up practical issues and experiences of caregivers in Bauchi, Kano, Sokoto and Borno states of Nigeria. Key findings from the thematic analysis of caregivers' experiences with routine immunization are as outlined below.

3.1.1 Theme: Practical Issues (Barriers and Facilitators to seek and receive vaccines)

Definition: Description of how they would go about getting their child vaccinated

Key Finding 1: What happens before they arrive at the clinic

Accessing Immunization Facilities: A critical aspect explored was the process of accessing immunization facilities. Factors such as proximity to the vaccination center, transportation modes, and the timing of vaccination sessions were investigated. Instances were reported where individuals lived close to vaccination facilities, facilitating easy access. One caregiver mentioned,

"See my house over there; it's the first one you spot as you go out. If you talk loudly, I will hear; that right there is my house, just a stone's throw away" **(CG04) BG-IDI_Caregiver_Summuu Settlement_ Summu PHC_Bauchi LGA_Bauchi.**

This highlights the convenience of location in promoting vaccination accessibility.

Challenges in Seeking Immunization: Challenges faced by caregivers in attending vaccination sessions were examined, revealing household responsibilities as a significant barrier. The study found that daily chores, such as sweeping, washing clothes, and preparing meals, posed obstacles to timely vaccination. An interviewee expressed these challenges:

"What preparations? The first thing I would do in the morning is sweep the house. I would then wash the kid's clothes, then wash dishes, after which I would prepare breakfast, and I would come after taking breakfast" CG12) Borno M - IDI_caregiver_Goni kime_Baga Road PHC_Maiduguri_Borno.

This suggests that caregiving responsibilities and household duties could impede prompt immunization.

Spousal Approval and Social Dynamics: The study explored the role of spousal approval in the vaccination process, indicating a collaborative decision-making approach. Seeking permission from spouses was reported, with one caregiver stating,
"I ask for his permission, and he grants it" (CG32). Sokoto WMK - IDI caregiver Ksarawa Settlement Ksarawa.
Furthermore, the influence of social networks, including friends and neighbors, played a crucial role in discussions about immunization. A caregiver revealed,
"I discuss it with friends, children, or anyone I respect. If I notice that they haven't done it, I advise them on its importance" **(CG07) BG- IDI_Caregiver_Unguwan Madaki_Kubi PHC_Ganjuwa LGA_Borno.**
This underscores the impact of social dynamics on immunization decisions.

Key Finding 2: What happens when they're at the clinic and after

Immunization Counseling and Post-Immunization Practices: The study delved into counseling sessions and post-immunization practices. Caregivers received advice on general childcare and immunization-specific information. A participant mentioned,

"They advise us on the importance of vaccination and tell us about the type of vaccine given to our children" (CG03) BB-IDI_Caregiver_Shaf PHC_Bauchi LGA_Bauchi.

This points out the key messages provided by the health provider during the hospital visits. Furthermore, post-immunization practices, such as monitoring adverse reactions and administering paracetamol for fever, were explored. A caregiver shared,

"No, he does not feel anything. The moment he slept, and he wakes up, and you bathe him, that is all. I only felt pain when the place swells up". (CG27) Sokoto TML – IDI_caregiver_Maikade settlement_PHC Maikade_Tambuwal LGA_Sokoto.

Key Finding 3: Facilitators and Barriers in Seeking and Receiving Immunization

Gender Related Barriers: The study revealed several gender-related barriers affecting the vaccination process. Caregivers, particularly females, identified challenges associated with traditional gender roles and expectations.

"The first thing I would do in the morning is sweep the house, wash the kid's clothes, then wash dishes." **Borno M - IDI_caregiver_Goni kime_Baga Road PHC_Maiduguri LGA_Borno.**

A female caregiver also expressed concerns about the aftermath of vaccination, stating,

"I cannot sleep whenever she is vaccinated. She screams at night; she does not sleep. That is why I stopped" **(CG08) BG- IDI_Caregivers_Gabi settlement_Gabi PHC_Ganjuwa LGA_Bauchi).**

This quote underscores the gendered burden placed on mothers, as they bear the emotional toll of their child's discomfort post-vaccination, potentially leading to a reluctance to continue the immunization process.

Furthermore, gender-related challenges extend to post-vaccination instructions, with a caregiver noting, ***"After they've given us the vaccine, they'll tell us when we get home, we should not bathe the child."*****(BG-IDI_Caregiver_Summuu Settlement_ Summu Phc_Bauchi LGA).**

Such instructions may disproportionately affect female caregivers responsible for daily hygiene routines, imposing additional constraints on their caregiving roles. Furthermore, this reflects a negative message from the healthcare workers as there is no medical reason

not to bathe after immunization, implying that the quality of care provided by the vaccinators needs improvement.

The impact of gender norms is also evident in the caregiver's statement,

***"The children eat food and leave for school. I will give the child the paracetamol they give me and make him sleep"* (CG31) Sokoto WMK - IDI caregiver B Kusu Klambaina WMK_Sokoto.**

This reflects the gendered expectation of mothers providing care and comfort to their children after vaccination, potentially disrupting their daily routines.

Gender-related barriers, rooted in traditional roles and expectations, significantly influence the vaccination experiences of female caregivers. These barriers encompass household responsibilities, emotional burdens, and adherence to post-vaccination instructions, highlighting the need for gender-sensitive strategies to enhance vaccine accessibility and acceptance among caregivers, particularly women.

Key Finding 4: Knowing when their child's vaccine is due

How do they know when it's time to have their child vaccinated?

The key findings on caregivers' awareness of their child's vaccine schedule reveal various influences and practices.

First Visit: Announcements at mosques stand out as a common source of information, albeit lacking specific details. As one caregiver notes,

"Of course, it's always announced at the mosque," indicating the widespread nature of this practice (GK22). Translated Kano SML Community- KII Gatekeepers - Massu Ward-Sumaila LGA_ Kano.

Antenatal visits play a pivotal role as an early indicator, with caregivers recalling being informed during antenatal care. A caregiver shares,

***"Yes, it was before we gave birth. We are already told that if we go to antenatal... If you go, it is said that you should bring the child when you give birth because it is useful"* [CG08](#): BG- IDI_Caregivers_Gabi settlement_Gabi PHC_Ganjuwa LGA_Bauchi.**

Siblings' vaccination experiences significantly influence caregivers' decisions, highlighting the impact of family practices. A caregiver mentions,

***"Well, I did the same to his siblings when I first took two; he was the third. I took him" CG06](#): BG- IDI_Caregiver_Hakatafi_Hakatafi PHC_Ganjuwa LGA_Bauchi.**

Healthcare providers emerge as key influencers, emphasizing the importance of vaccination immediately after childbirth. A caregiver recalls,

***"The health workers said if the child is delivered, we should take him*". [CG05](#): BG-IDI_Caregiver_Fammashi.**

Hospital visits serve as practical reminders about upcoming vaccinations. A caregiver notes,

"If I went to the hospital, they would inform me about the next vaccination date" [CG19](#): Kano Kbt - Continuation IDI caregiver Gaida Fulani Charanci Kumbotso_Kano.

Personal choices are prevalent, with some caregivers initiating vaccination on their own accord. A caregiver shares**,**

"No. I wasn't advised by anyone to start. I started on my own. I started taking the vaccine two days after my delivery" ([CG15](#): IDI_Borno.

Subsequent Visits: For subsequent visits, caregivers often take a proactive role in scheduling and determining the timing of vaccinations. Some calculate the due date themselves, showcasing individual agency. A caregiver states,

"I know that whenever it's the eighth of every month I will return. This is how I calculate". [CG10](#): Borno M - IDI_caregiver_Dala Masalacin Deribe_Fatima Ali SHeriff PHC_Maiduguri LGA_Borno.

The involvement of the child's father is notable, with fathers actively participating in vaccine scheduling and follow-up. A caregiver mentions,

"Honestly, their father wants the immunization. He always says we didn't take them for immunization" [CG31](#): Sokoto WMK - IDI caregiver B KUSU KLAMBAINA WMK_Sokoto.

Healthcare providers play a crucial role in vaccine scheduling and follow-up. Caregivers report that health workers provide them with a card specifying the date for their next vaccination visit. A caregiver notes, ***"They give us a card saying, you will return on a particular date... They write it for us" . [CG09](#): Borno M - IDI_Caregiver_Bulama fandi_Bulabulin Ngaranam PHC_Maiduguri_Borno.***

These narratives collectively illustrate the various means through which caregivers stay informed and actively engaged in managing their child's vaccine schedule. The integration of personal choices, familial influences, and healthcare provider guidance highlights the multifaceted approach to ensuring the timely and effective administration of vaccines.

3.1.2 Theme: Motivation to immunize child (benefits, stories)

Definition: How much they want their child to be vaccinated

Key Finding 1: How much they want their child to be vaccinated

Father's Approval: The role of paternal involvement emerges as a significant motivator for childhood vaccination. In Sokoto, a caregiver highlighted the importance of obtaining the father's approval, stating,

"Their father agreed, that is why we decided to continue" **([CG26] Sokoto TML - IDI caregiver Nabaguda Settlement PHC Nabaguda Tambuwal LGA_Sokoto.**

Desire for Child's Vaccination: The motivation to vaccinate is intricately tied to how much caregivers desire their child to receive the necessary immunizations. This desire is evident in statements like,

"Because we are enlightened that immunization is good for our children; it prevents them from diseases. That is why I am convinced to bring my child for immunization" **([CG30] Sokoto WMK - IDI Caregiver Arkilla Lima PHC Arkilla WMK_Sokoto.**

The depth of this desire reflects caregivers' commitment to safeguarding their child's health through vaccination.

Preventing Child Mortality: An additional motivator for childhood vaccination is the prevention of child mortality. In a caregiver's account, the importance of vaccination was emphasized as a measure to prevent mortality:

"Like two of my children, they were denied vaccination. And that daughter, it was done to her first. However, in the ninth month, we were not able to vaccinate her; she died" **([CG06] BG-IDI_Caregiver_Hakatafi_Hakatafi PHC_Ganjuwa LGA_Bauchi.**

This poignant experience underscores the motivation rooted in the desire to spare children from life-threatening diseases.

Influence of Advice in Driving Intention to Immunize: Caregivers exhibit varying levels of intention when it comes to childhood vaccination. Some are motivated by a strong intent to ensure the well-being of their children through immunization. In Kano, a caregiver expressed this intention, stating,

"I didn't even use to take my children for vaccination. This is my first child to be vaccinated. I decided to get him vaccinated after being advised to do so" **([CG18] Kano Kbt - IDI caregiver unguwar Yamma Panshekara Kumbotso LGA_Kano.**

These motivational factors collectively contribute to caregivers actively participating in childhood immunization, reflecting a holistic approach to ensuring the health and well-being of their children.

3.1.3 Theme: Caregiver perception towards childhood immunization

Definition: Underlying feelings about childhood vaccination in general and how they feel about having their child vaccinated.

Key Finding 1: Feeling about Childhood Vaccination in General

Underlying feelings about childhood vaccination in general:

Disease Risk: Caregivers express the importance of vaccination in mitigating disease risks. One caregiver in Borno stated,

"It's good. It's very important. I testify to that because a child won't be affected by common diseases. They would be mild even if they affected the child" **([CG14]_IDI_Jere_Borno).**

Importance: The perceived importance of vaccination is a prominent theme among caregivers. A respondent in Borno emphasized,

"Yes, it's good, it protects us against some diseases. That's what encourages me to go"...**CG11) Borno M - IDI_caregiver_Dala Yazaraye _Abujan Talakawa PHC_Maiduguri_Borno.**

Doubts / Worries / Bad Feelings: Negative rumors or misinformation can influence caregivers' perceptions. In Kano, some women expressed doubts, with one caregiver mentioning,

"Some women claim that vaccination prevents childbirth or something" **([CG19] Kano Kbt - Continuation IDI caregiver Gaida Fulani Charanci Kumbotso_Kano.**

Key Finding 2: Feeling about Vaccination Day

How they feel about having their child vaccinated

Concerns or Worries: Observations of child reactions post-vaccination, such as fever and crying, raise concerns for caregivers. In Bauchi, a caregiver mentioned,

"Honestly, it's crying! And the body will be warm. That is why I didn't continue" **([CG08] BG-IDI_Caregivers_Gabi settlement_Gabi PHC_Ganjuwa Bauchi LGA**).

Another major concern Indicated were instances where caregivers notice localized swelling at the vaccination site, contributing to their overall perception of the process. In Bauchi, a caregiver expressed,

"Of course, I felt happy, but then when… it gets swollen, I took him back and they didn't do anything… that's the only thing that made me angry" **([CG05] BG-IDI_Caregiver_Fammashi Bauchi.**

Long Waiting Time was also reported as caregivers' experiences which could impact their satisfaction with the service. In Kano, a caregiver highlighted,

"Well, the waiting is actually hard. Sometimes we would gather at the place, but the workers wouldn't come" **([CG18] Kano Kbt - IDI caregiver unguwar Yamma Panshekara Kumbotso_LGA Kano).**

Positive Feelings: Positive emotions, such as excitement and gratitude, are associated with childhood vaccination experiences. A caregiver in Kano expressed,

"We are just thankful for this vaccine that is given to our children. We enjoy it, and we see its usefulness" **([CG24] Kano SML- IDI_Caregiver_Unguwar Kaya_Magami Ward_Sumaila LGA_Bauchi.**

The perception of free vaccination adds to positive feelings, as highlighted by a caregiver in Borno:

"All I can say is, I really appreciate the fact that we don't pay even a penny for vaccinating our babies" **([CG12] Borno M - IDI_caregiver_Goni kime_Baga Road PHC_Maiduguri LGA_Borno.**

Caregivers associate vaccination with the well-being of their children. A respondent in Borno mentioned,

"And as I said before; if the child is to be infected with measles... he will not be infected severely" **([CG09] Borno M-IDI_Caregiver_Bulama fandi_Bulabulin Ngaranam PHC_Maiduguri_Borno.**

The positive feeling that immunizing the child would guard the child against measles motivated the caregiver to participate in child's immunization.

Counseling and vaccine information also contributed to positive perceptions. A caregiver in Kano expressed,

"Yes, we are happy about the instructions that were being given to us. How to take care of the children, that we should bring them for immunization" **([CG24] Kano SML-IDI_Caregiver_Unguwar Kaya_Magami Ward_Sumaila LGA_Bauchi.**

This Indicates the importance caregivers place on receiving counseling from health provider. Health providers further contributes to positive perceptions of caregivers – an example is adequate attention, possibly during the vaccination process or in related interactions with health workers. A caregiver in Borno expressed,

"Honestly, it's the attention they gave us at the hospital. And I stick to their guidelines and all what I supposed to do" **([CG11] Borno M - IDI_caregiver_Dala Yazaraye _Abujan Talakawa PHC_Maiduguri_Borno.**

Attitude of health workers during hospital visits also contributes to caregivers' perceptions of the vaccination process. In Kano, a caregiver mentioned,

Rephrase - ***"Actually, they use to come early and they don't use to shout at us, that is it" ([CG24] Kano SML- IDI_Caregiver_Unguwar Kaya_Magami Ward_Sumaila LGA_Bauchi.***

This comment puts the vaccinators in good light as they come to work early and are polite to caregivers.

3.1.4 Theme: Social Processes

Definition: Factors that influence the decision-making related to caregivers and their social dynamics.

Key Finding 1: Decision process

What is the general decision process followed when first decided to go ahead with vaccinating their child?

a) Behavioral Factors:

1. Antenatal Visits and Healthcare Provider Recommendations: Caregivers often learn about immunization during antenatal visits, as expressed in the quote,

***"Yes, it was before we gave birth. We are already told that if we go to antenatal. Yes... so we are told. If you go, it is said that you should bring the child when you give birth because it is useful*" [CG08] BG- IDI_Caregivers_Gabi settlement_Gabi PHC_Ganjuwa LGA_Bauchi.**

This highlights a proactive behavioral approach to maternal and child health.

2. *Personal Choice:* The influence of personal choice is evident in statements like,

***"No. I wasn't advised by anyone to start. I started on my own. I started taking the vaccine two days after my delivery*" [CG15]_IDI_Jere_Borno.**

This reflects an autonomous behavioral decision.

3. Social Discussions: Engaging in communal discussions, as observed in the quote,

***"Yes, particularly about its importance. I discuss it with friends, children, or anyone I respect. If I notice that they haven't done it, I advise them on its importance*" [CG07] BG-IDI_Caregiver_Unguwan Madaki_Kubi PHC_Ganjuwa LGA_Bauchi.**

This signifies a collective approach to decision-making.

b) Demand-side Factors:

1. Limited Source of Information as a Woman: Gender-related barriers, where women face challenges in accessing comprehensive information about immunization, are highlighted in quotes like,

***"Though some of my neighbors are foreigners. I tried to convince them to take vaccines. But they refused"* - [CG16] Jere_Borno.**

Limited information as a demand-side factor can hinder women's ability to make informed decisions.

2. Anti-Immunization Advice: Resistance against immunization within social circles presents a demand-side challenge, as noted in the quote,

***"Some said that the girl is too young for immunization. Some believed this immunization is useless"* (CG30). CG30] Sokoto WMK - IDI Caregiver Arkilla Lima PHC Arkilla WMK_Sokoto.**

Conflicting viewpoints within the community can create barriers to vaccine acceptance.

Key Finding 2: Social norms

Describe any social norms involved in vaccine decisions or access

Social Factors:

1. Announcements and Social Norms: The influence of social norms is highlighted through the announcement of vaccination details at communal places like mosques. A caregiver mentioned,

***"Of course, it's always announced at the mosque"* - [GK22] translated Kano SML Community- KII Gatekeepers - Massu Ward- Sumaila LGA_Bauchi.**

Indicating the role of social norms in spreading awareness within the community.

2. Influence from Family Members: Family dynamics significantly shape immunization choices, as seen in quotes like,

***"My husband tells me to take them because immunization is good. For my second child, he also encourages me"* [CG28] Sokoto TML - IDI Caregiver Nasarawa settlement PHC Sanyinna Tambuwal LGA_Sokoto.**

The role of the child's father in advising immunization is a crucial social factor.

3. Social Discussions with Neighbors and Friends: Social discussions within the community contribute to shared knowledge, as expressed in the quote,

"Normally when we sit and talk about the children, we discuss vaccination" **[CG06] BG-IDI_Caregiver_Hakatafi_Hakatafi PHC_Ganjuwa LGA_Bauchi.**

These interactions shape social norms related to the importance of immunization.

3.1.5 Suggested improvements from Caregivers

Recommendations for Improving Childhood Immunization Practices:

1. Awareness: Enhancing awareness through media channels can significantly impact caregivers' motivation to adhere to immunization practices. A caregiver from Bauchi emphasized this, stating,

"But if there is enough awareness in media stations, where people get to hear about it, it will attract people. And they'll understand it. Even I myself, it's because I hear on the radio that's why I have the motivation to bring him" **([CG02] BB-IDI_Caregiver_Kusi PHC_Bauchi LGA_Bauchi.**

Collaborative efforts involving media campaigns can play a vital role in disseminating information and fostering a positive attitude toward vaccination.

2. Husbands Should be Supportive: Recognizing the pivotal role of husbands in supporting vaccination decisions, a caregiver from Sokoto highlighted,

"Men should give their time; they are the ones to give directives to the women to go for immunization. The mother is in a better position to know the condition of the child. They are the ones at home while men do not usually come back till evening" **([CG31] Sokoto WMK - IDI caregiver B Kusu Kalambaina WMK_Sokoto.**

Promoting spousal involvement and understanding can positively influence vaccination rates.

3. Health Workers Should Come Early: Ensuring the timely arrival of health workers is crucial for a seamless vaccination process. A caregiver in Kano expressed concern,

"They would come and vaccinate us late. We would come early, but they would come late. We would be rushing to finish up at the hospital because we have house chores to do" **([CG17] Kano Kbt - IDI Caregiver Hausawar Kirimbo Panshekara KumbotsoLGA_ Kano.**

Addressing this issue can enhance the overall experience for caregivers and encourage prompt attendance.

4. *Increase Incentive:* A desire for increased incentives was noted in Sokoto, with a caregiver stating,

"Nothing, but I just want to say that the government should increase their salary. The children's. If they are vaccinated, they should be helped; their mothers used to feel happy" **([CG27] Sokoto TML - IDI_caregiver_Maikade settlement_PHC Maikade_Tambuwal LGA_Sokoto.**

Exploring avenues to enhance incentives can potentially boost caregiver participation in immunization programs.

5. Provide Paracetamol (PCM) for Fever and Pains Post Vaccination: Addressing caregivers' concerns about post-vaccination effects, specifically fever and pains, is crucial. A caregiver in Bauchi recommended,

"Well what should be done is, at the vaccination place. After the vaccine, they should give the paracetamol there" **([CG05] BG-IDI_Caregiver_Fammashi_Bauchi.**

Implementing measures to provide immediate relief, such as Paracetamol, can contribute to a more positive vaccination experience.

6. Vaccine Education by Healthcare Provider: Empowering healthcare providers to educate caregivers about vaccines and the importance of immunization is fundamental. A caregiver in Bauchi stressed the impact of personalized education, stating,

"You should tell this.... Dr. Mubarak to educate them because this vaccine is very important. Because then there were a lot of people who don't do it, but Dr. Mubarak went to their houses and educated them about it" **([CG04] BG-IDI_Caregiver_Summuu Settlement_ Summu PHC_Bauchi LGA_Bauchi.**

Investing in healthcare provider training and community outreach can enhance vaccine education and promote informed decision-making.

These recommendations address key aspects of awareness, support, service delivery, incentives, and education, aiming to create an environment conducive to optimal childhood immunization practices.

3.2 Community Gatekeepers Role and Practices in Routine Immunization

3.2.1 Theme: Role in Routine Immunization

Definition: What the participant's role is

Roles and Responsibilities of Community Gatekeepers in Immunization:

These findings underscore the diverse and active roles that community gatekeepers play in promoting and supporting routine immunization practices within their communities.

1. Community Involvement and Religious Leaders: Communities actively engage in supporting routine immunization practices by involving religious leaders. In Sokoto, Islamic scholars play a vital role in enlightening the community. A community leader stated,

"Our Islamic scholars have been tasked to explain the importance of allowing women and children to access health services and routine vaccination" **([GK27] Sokoto TML - Community Leader_Nabaguda settlement_PHC Nabaguda_Tambuwal LGA_Sokoto.**

This showcases the role of religious leaders in endorsing and promoting immunization within the community.

2. Mobilization and Community Engagement: Gatekeepers contribute to mobilizing community members for immunization programs. A community leader in Sokoto emphasized,

"We mobilize people and warn them about behaviors that can jeopardize the lives of women and children for unjustified reasons" **([GK27] Sokoto TML - Community Leader_Nabaguda settlement_PHC Nabaguda_Tambuwal LGA_Sokoto.**

This hands-on approach fosters community engagement and ensures active participation in immunization initiatives.

3. Collaboration with Health Workers and Local Authorities: Collaborative efforts between gatekeepers, health workers, and local government authorities strengthen immunization. Two gatekeepers in Sokoto highlighted,

"The health officials we have good rapport with them, they respect us, and we respect them. Because any official who will be sent from the local government, whether it is from the state or the federal government, God willing, if he comes to my town, he should look for me" **([GK32] Sokoto WMK - G keeper_Arkilla _PHC Arkilla_Wmk LGA_Sokoto.**

"God willing, if he comes to my town, he should look for me. Or the local authority contact and inform me, 'in a certain time, people will come to raise awareness about this or that, or they will vaccinate against this or that'" **([GK32] Sokoto WMK - Gkeeper_Arkilla _PHC Arkilla_Wmk LGA_Sokoto.**

This collaboration facilitates effective communication and community involvement in vaccination programs.

4. Media Utilization for Awareness: Gatekeepers leverage various media channels to disseminate information and raise awareness about immunization. A community gatekeeper in Kano explained,

"When it is almost time, we have our town criers that own speakers. Sometimes it is hours we give it to them, and sometimes the town criers have it. We will call and give them something to buy a battery, they will go. Inform people that there is an immunization injection, and this is the time" **([GK20] Kano KBT-Community gatekeeper maianguwa anguwar yamma zawa ciki panshekara Kumbotso LGA_Kano.**

This approach ensures widespread communication and information dissemination.

5. Tracking Compliance: Gatekeepers play a crucial role in tracking compliance with immunization schedules. In Bauchi, gatekeepers involve senior leaders to enforce compliance, as mentioned by a community leader,

"Those who refused, we as leaders have our seniors in position, we take the issue to them, and they dealt with them or enforce them to be immunized for their families' safety" **([GK05] Bauchi Ganjuwa - KII with Madakin Kubi, Ganjuwa LGA Bauchi State.**

6. Involvement of Women Leaders and Local Midwives: Women leaders and local midwives actively contribute to community health services, including immunization. A local midwife in Sokoto mentioned,

"I am a local midwife in this town. I sell drugs like anti-malaria tabs and also advise pregnant women on the importance of seeking care from health professionals during pregnancy (antenatal care)" **([GK26] Sokoto TML - Community leader_Maikade settlement_PHC Maikade_Tambuwal LGA_Sokoto.**

This highlights the broader community health services linked to immunization.

7. Sharing Routine Immunization Information: Gatekeepers actively share information related to routine immunization to enhance community awareness. In Sokoto, a community leader mentioned,

"Some women ask me about routine vaccination for their children, and some are afraid to take their children to the hospital for these routine vaccines" **([GK26] Sokoto TML - Community leader_Maikade settlement_PHC Maikade_Tambuwal LGA_Sokoto.**

This personal engagement fosters trust and encourages women to seek immunization for their children.

8. Institute House-to-House Committees: The establishment of committees responsible for conducting house-to-house campaigns and promoting immunization is a proactive measure. A gatekeeper in Kano stated,

"Firstly, the moment health workers inform me they are on their way, it's either I meet up with them or they come to me. After that, I go house to house to let them know about it and to ask them to come out for it because of its importance" **([GK19] Kano KBT GateKeeper Maianguwa Hausawar Kirimbo Panshekara Kumbotso LGA_Kano.**

This approach ensures direct communication with community members to emphasize the importance of immunization.

9. Track New Birth Compliance with Immunization: Monitoring and ensuring compliance with immunization schedules for newborns is a key responsibility of gatekeepers. In Maiduguri, a gatekeeper shared,

"If a child is born, the naming that is holding in the mosque, we hear about it and we tell the priests, barbers, and midwives who work in the neighborhood to notify us immediately when a new child is born" **([GK16] Borno MMC- KII_Community Gatekeeper_Fatima Ali SHeriff_Maiduguri LGA_Borno.**

This proactive approach ensures that newborns receive timely vaccinations.

10. House-to-House Announcements: Direct communication through house-to-house campaigns plays a crucial role in immunization advocacy. In Bauchi, a gatekeeper mentioned,

"I could remember, not so long ago, someone comes to this community for a program like this, and they rejected him. We follow them house to house and make them understand it" **([GK01] Bauchi BAU- Community - KII community leader Gida dubu settlement Tirwun PHC Bauchi LGA_Bauchi.**

This personalized approach helps address concerns and promote understanding at the grassroots level.

3.2.2 Theme: What Works to Keep Families Up to Date with Child Immunizations

Definition: What, in their experience, helps keep families up to date with their child's immunizations

1. Efforts to Keep Families Stay Up to Date: In their experiences, community gatekeepers have identified and implemented various strategies to ensure families stay informed and up to date with recommended immunization schedules.

a) Advise caregivers to travel with Vaccination Cards: One effective practice involves advising caregivers to travel with vaccination cards. In Borno, a gatekeeper highlighted this, stating,

"They advise them to go with their cards when they are traveling so that they can also get vaccinated there" **([GK15] Borno MMC KII_Community gate keeper_Bulabulin Ngaranam PHC_Maiduguri LGA_Borno.**

b) Community Enlightenment: Another successful strategy is community enlightenment, with gatekeepers actively engaging in door-to-door campaigns to educate and raise awareness about the importance of immunization. A gatekeeper in Borno explained,

"We enlighten them. We even embark on door-to-door enlightenment. If a woman delivers, we advise her to take the baby to the hospital for immunization" **([GK09] _KII_Community gate keeper_Fariya IDP camp Clinic_Jere LGA_Borno.**

2. Follow-up on the Importance of Vaccination: Efforts involving continued communication and reinforcement of the significance of vaccination contribute to the success of immunization programs. A community leader in Sokoto mentioned,

"They believe in traditional medicine. But as for me, I have been trying my best to explain everything to them and convince them to take their children to the hospital" **([GK26] Sokoto TML - Community leader_Maikade settlement_PHC Maikade_Tambuwal LGA_Sokoto.**

3. Practices in Supporting Immunization: To actively support and promote immunization initiatives within the community, several key practices have been identified.

a) ***Advise HWs (Health Workers):*** Gatekeepers play a crucial role in advising healthcare workers (HWs) on ways to enhance their effectiveness in delivering immunization services. A community leader in Sokoto highlighted,

"When they are vaccinating the children, we visit them physically to ensure compliance and advise them (health workers) on the ways that could improve the exercise smoothly" **([GK29] Sokoto TML - Community Leader_Shiyar Sarki settlement_PHC Jabo_Tambuwal LGA_Sokoto.**

b) Collaborate with Community Stakeholders: Collaboration with various community stakeholders is essential to strengthen immunization programs. A community leader in Sokoto mentioned,

"We collaborate with SMT, an organization, for campaign awareness on the significance of vaccines in 3 communities under our domain—Badarawa, Kasarawa, and one town" **([GK30] Sokoto WMK - Community Leader_PHC Kasarawa_WMK LGA_Sokoto.**

c) Community Mobilization: Community mobilization involves actively involving and mobilizing the community to participate in immunization efforts through gatherings, meetings, and information dissemination. A religious leader in Bauchi explained,

"And we have our group that we gather for a while, so we let people know, and the traditional announcer will go around and spread the information because sometimes they are not here" **([GK08] Bauchi Ganjuwa KII- Religious Leader Hakatafi Settlement- Hakatafi HC Ganjuwa LGA_Bauchi.**

d) ***Collaboration with Health Workers:*** Collaborative efforts between the community and health workers are essential to enhance immunization services. Gatekeepers actively work with health workers, providing support and encouragement. A community leader in Bauchi shared,

"Well, I help him by giving him some youths amongst us to accompany him round the community throughout the campaign" **([GK04) Bauchi BAU - Community- KII_community leader_Summu Settlement_Summu PHC_Bauchi LGA_Bauchi.**

These findings underscore the multifaceted approaches employed by community gatekeepers to keep families informed and engaged in immunization programs, emphasizing collaboration, advocacy, and community mobilization as integral components of successful immunization initiatives.

3.2.3 Theme: Barriers to Immunization

Definition: What, in their experience, are the difficulties in families keeping up to date with their child's vaccines?

1. Children Crying And AEFI: Instances of children crying after vaccination leading to adverse events have been identified as a barrier to immunization. A community leader in Bauchi shared,

"The reason is that children cry after the vaccine. It takes about two days without sleeping. This really disturbs. This is one of the reasons. Stories of how the children cry after the vaccine make others reject it" **([GK02] Bauchi BAU - Community- kII community leader kusi settlement kusi PHC Bauchi LGA_Bauchi.**

2. Corrupt and Negligent Health Workers: Concerns about the unethical conduct or negligence of health workers impacting trust in vaccination services have been raised. A community leader in Bauchi emphasized,

"The health workers should fear God and distribute to the intended people with justice and fairness. Sometimes they divert the free medicine brought for distribution to the people" **([GK01] Bauchi BAU- Community - kII community leader Gida dubu settlement Tirwun PHC Bauchi LGA_Bauchi.**

3. Cost-Related Barriers: Economic considerations related to the cost of antenatal care and perceived economic challenges that hinder access to healthcare services, including immunization, for individuals and families have been identified. A gatekeeper in Kano highlighted discrepancies between advertised free services and the reality on the ground, stating,

"It is supposed to be that many things are available for free in the hospital - like what is said on the radio, that it is not happening in reality" **([GK23] Kano SML Community KII- Getekeeper Rimi Ward Sumaila LGA 2nd November English). Additionally, poverty was identified as a significant economic barrier in Borno, where a gatekeeper explained,**

"In this harshness of life? Even if your wife is sick, not to talk of your child, he won't dare to take them to the hospital; even the transport fee is something else" **([GK13]_KII Community Gatekeeper Abujan Talakawa_MMC__Borno.**

4. Access Barriers: Geographical distance to health facilities, challenges related to insecurity, water availability, and perceived or actual lack of care in healthcare facilities have been highlighted as access barriers to immunization. A community leader in Bauchi mentioned the challenge of distance, stating,

"Second, distance. Sometimes distance can be a barrier between people and immunization center. Distance stops some people from getting to the vaccination centers" **([GK04] Bauchi BAU - Community- KII_community leader_Summu Settlement_Summu PHC_Bauchi LGA_Sokoto.**

In Sokoto, a gatekeeper pointed out the impact of insecurity on health facility operations, saying,

"They removed the hospital's generator for sourcing water. So, the hospital workers who were told to stay 24 hours to work refused" **([GK32] Sokoto WMK - G keeper_Arkilla _PHC Arkilla_Wmk LGA_Sokoto.**

A gatekeeper in Kano expressed concerns about the lack of care in public hospitals, leading individuals to seek services in private facilities:

"Well, like I told you, there is usually a lack of care in the hospital. When you look at the condition of one hospital, you have to go to the private hospital when there is a public hospital." **([GK23] Kano SML Community KII-Gatekeeper Rimi Ward Sumaila LGA_Bauchi.**

5. Psychosocial and Behavioral Barriers: Forgetfulness or engagement in other activities leading to missed vaccination opportunities, reliance on traditional medicine, and misconceptions or misinformation negatively impacting community attitudes towards vaccines have been identified as psychosocial and behavioral barriers. A community leader in Sokoto noted,

"Parents' forgetfulness is one of the main causes of missed vaccinations in their children" **([GK28] Sokoto TML - Community leader_PHC Sanyinna_Tambuwal LGA_Sokoto.**

A community leader in Bauchi highlighted the impact of rumors and misconceptions, stating,

"Rumors like this might discourage a man of weak belief in immunization" **([GK04] Bauchi BAU-Community- KII_community leader_Summu_Settlement_Summu_PHC_Bauchi LGA_Bauchi.**

Moreover, reliance on traditional medicine was emphasized in Sokoto, where a community leader explained,

"Yes, some women would never tell you their problems. They just close themselves and their children at home. It is hard to see them in the hospital, even if they are sick. They believe in traditional medicine" **([GK26] Sokoto TML - Community leader_Maikade settlement_PHC Maikade_Tambuwal LGA_Sokoto.**

6. Social and Community Engagement Barriers: Challenges arising from the limited involvement of influential community figures, the limited role of traditional rulers in advocating for or supporting immunization initiatives, and ineffective recruitment guidelines for social mobilizers have been identified as social and community engagement barriers. A gatekeeper in Borno expressed dissatisfaction, saying,

"They won't give you even transport fee to return. We knew that they do share money among themselves, but even if you go, they won't give you a penny" **([GK13]_KII Community Gatekeeper Abujan Talakawa_MMC_Borno.**

Similarly, a gatekeeper in Sokoto pointed out the limited role of traditional rulers in providing individual alerts and reminders for immunization dates,

"To be honest, we do not tell or alert people individually about the date of return of immunization but the truth is that we are doing it generally. That, they should manage as far as they can in receiving vaccination. Because if you received four out of five, there, it would be better not to do it. We made the announcement generally, but individually, we never tell a person the day he will go back, we barely do this." **([GK32]_Gatekeeper_Arkilla _PHC Arkilla_WMK_WMK_Sokoto.**

Furthermore, challenges related to the recruitment of social mobilizers were raised in Kano, where a gatekeeper emphasized the need for effective communication by recruited individuals,

"The problem that happens is that someone is hired who also does not have their own child vaccinated and cannot explain to people what is happening. Sometimes this is done because of politics or business - the right person is engaged but can't explain it properly." **([GK23] Kano SML Community KII-Gatekeeper Rimi Ward Sumaila LGA_Bauchi.**

*7. **Incentive-Driven Decision-Making:*** Instances where individuals prioritize immunization due to incentives, potentially overshadowing health benefits, have been identified. In Bauchi, a community leader mentioned,

***"Some of the reasons they give, for example, is that whenever the government brings, for example, the mosquito net, it was not everyone that got it. For this reason, some people say they will not give their children for the vaccine because they didn't get the mosquito net"* ([GK01]_Bauchi LGA_Bauchi.**

*8. **Travel-Related Barriers:*** Difficulties arising from travel-related factors that may disrupt regular immunization schedules have been acknowledged. A gatekeeper in Borno mentioned,

***"Some traveled, or when there is an occasion, they don't come to take it"* ([GK15] Borno MMC KII_Community gate keeper_Bulabulin Ngaranam PHC_Maiduguri LGA 3rd_Borno.**

9. Gender-Related Barriers: Gender-related barriers, particularly the lack of involvement or concern from husbands, have been highlighted as significant obstacles. In Bauchi, it was noted,

"Some of them, the husband does not even care about the pregnancy or child spacing. You know some people are heartless. For some of them, it was the neighbors that came together to contribute money to take the wife to the hospital, but the husband doesn't care" ([GK01] Bauchi.

This lack of involvement extends to situations where husbands are uninformed about their child's immunization status, with a community leader in Bauchi stating,

"We apply some wisdom and get some women that carry the children for immunization without the knowledge of the husband" ([GK01] Bauchi.

Furthermore, in Borno, efforts to encourage husbands to allow children to be immunized were emphasized:

"If we find out that it is from the husband's decision, we meet and explain to him" ([GK14]KII_Community gatekeepers_ Baga Road PHC_Maiduguri LGA_Borno.

3.2.4 Theme: Suggested Improvements or Ideas

Any other issues or improvements that could be made, in their opinion?

1. Improving Health Worker (HW) Interaction: Health workers play a pivotal role in shaping community perceptions of immunization, and addressing behavioral aspects is crucial. A community member emphasized,

***"The way health workers are receiving the patients has to be rectified"* _TBL_Sokoto).**

Adequate salary and transportation support are also essential for health workers, as expressed by a participant:

***"My advice first goes to the immunizers; they should be encouraged and supported, with a timely payment of their salaries and allowances"* ([GK04] Bauchi.**

2. Community Engagement and Awareness: To bolster community engagement and awareness, conducting house-to-house campaigns emerged as a valuable strategy. A community leader emphasized,

***"Frontline health workers must work hard to ensure total compliance, going house-to-house. They should be well-prepared to face numerous challenges, and persistence is key"* ([GK28]_Tambuwal_Sokoto.**

Public enlightenment campaigns are equally vital to dispel misconceptions. A community leader highlighted,

***"Public enlightenment will help. It was a lack of enlightenment that makes someone reject immunization. You see that the vaccinated children are healthier than those who are not"* ([GK02] Bauchi.**

Additionally, conducting awareness campaigns in local languages enhances understanding, addressing communication barriers,

***"You people should talk in all local languages, to make them understand the exercise."*[GK15]_MMC_Borno.**

3. Incentivizing Immunization Participation: Addressing challenges related to transportation for caregivers from hard-to-reach communities emerged as a key focus. A community leader stressed,

***"The issue of transporting the mothers and their children from hard-to-reach communities to hospitals must be addressed"* ([GK29]_Tambuwal LGA_Sokoto.**

Furthermore, incentivizing immunization through additional benefits, such as mosquito nets, was noted as a motivating factor.

A community member shared, "*For some people, if you talk to them, they will say that they always take their children for the vaccination, but the worker doesn't do anything good for them. We will ask them to be patient saying that we will give them mosquito net*" ([GK11]_Jere LGA_Borno.

4. Strengthening Community Relationships: Improving record-keeping by encouraging community members to be familiar with and retain their hospital or vaccination cards emerged as a valuable suggestion. A community leader advised,

***"Parents should remember the date of the vaccination backup written in their children's cards. Husbands and wives should communicate and ensure they remember the date so that they can take their family to the hospital if possible"* ([GK30]_WMK LGA_Sokoto WMK.**

Additionally, urging the government to employ locals, with relevant credentials/qualification, can contribute to community development.

***"And we have people with credentials who need to be employed. We urge the government to employ them because it has the ability to also employ people with no credentials."* (GK04)_Community- KII_community leader_Summu Settlement_Summu PHC_Bauchi LGA_Bauchi.**

5. Improving Access and Convenience: Ensuring easier access to immunization services involves establishing vaccination centers in close proximity to communities. A community leader expressed,

***"If possible, we need new centers to be added where the old ones are very far away for the immunizers and the people alike. With these new centers, the immunizers work in one center for days and move to another for two days to make it reach all and sundry"* ([GK04] Bauchi.**

6. Ensuring Medicine Supply: Advocating for a consistent supply of medicines to healthcare facilities emerged as a critical recommendation. A community gatekeeper voiced concerns, saying,

***"If I have that power, I will provide the hospital with the medicines. We are lacking in medicine. We are in total shortage of drugs"* ([GK09]_Jere LGA_Borno.**

7. Gender-Related Recommendations: Recognizing the influence of women within the community, a community leader highlighted the importance of engaging women influencers in promoting immunization.

"I would engage women who are community influencers to accompany caregivers house-to-house to ensure total compliance from the mothers, promoting the benefits of vaccination" **([GK27] Sokoto TM -Community Leader_Nabaguda settlement_PHC Nabaguda_Tambuwal LGA_Sokoto.**

8. Traditional Leader Involvement: Engaging traditional leaders actively in promoting and endorsing immunization practices can leverage their influence in the community. A traditional leader emphasized,

"The government should engage traditional leaders in the flow of information. We, as traditional rulers, know how to engage our people and spread the right information on immunization to our peers, helping more families receive optimal protection from vaccination" **([GK27]_Tambuwal LGA_Sokoto.**

These comprehensive recommendations collectively aim to enhance community engagement, overcome barriers, and improve the overall effectiveness of immunization programs, with a specific focus on gender considerations and leveraging the influence of influential community figures.

3.3 Health Workers Roles and Practice in Routine Immunization

3.3.1 Theme: Role of in-Charges in Routine Immunization:

The role of the **In-Charge** is central to the effective functioning of routine immunization facilities. One in-charge emphasized,

"Well, actually my responsibility as an in-charge is to coordinate all the activities of the facilities to see things are actually going on smoothly as required and then in terms of manpower, the activities and managing the facility actually." **KII HF In-charge Bulabulin Ngaranam PHC Maiduguri LGA_Borno.**

This highlights the in-charge's broad responsibilities, encompassing the coordination of activities, management of resources, and ensuring overall facility smoothness.

Collaboration with Community Gatekeepers (CGs) is identified as a crucial aspect of routine immunization strategy by the in charges. One In-charge health worker stressed the significance of collaboration, stating,

"That's why we call for Community dialogue, then with Bulamas[47] we get together in a meeting. We did monthly meetings for routine immunization because we don't want to miss any child". **KII_HF incharge_Zabarmari PHC_Jere LGA_Borno.**

[47] Bulama's is the local name given to ward heads in Kanuri dialect from Borno State

This highlights the in-charge's proactive engagement with community leaders to prevent the omission of children during immunization.

In the realm of community engagement, the in-charge actively participates in health education to foster awareness and encourage mothers to bring their children for immunization. An in-charge shared,

"I also sometimes I can even do the health education by myself to encourage the mothers, let them bring the child to the facility and also to complete their dose of the immunizations" **KII HF incharge Abujan Talakawa_MMC_Borno.**

This hands-on approach reflects a commitment to community enlightenment.

Growth Monitoring (GMB) emerges as a significant responsibility during routine immunization sessions. An in-charge expressed,

"Yes. There is GMB. That is, Growth Monitoring. And also by the time that you are conducting CMAM at this health facility, I'm also involved" **RI in charge Gediya Sumaila LGA_Kano.**

This underscores the in-charge's involvement in holistic child health, combining growth monitoring with Community Management of Acute Malnutrition (CMAM) efforts.

The in-charge not only provides leadership at the facility but also assumes an active role in monitoring routine immunization activities. This involves ensuring the timely and efficient delivery of vaccination services. One health worker stated,

"If I come in the morning, I used to go and monitor their unit. And if the immunization officer did not come in time, I used to call him so that he will come and give the immunization in time" **Transcribed KII_HF_Dusuman PHC_Jere LGA_Borno.**

This hands-on approach contributes to the smooth operation of immunization activities.

The in-charge serves as a crucial routine immunization service provider within the facility. Actively participating in both community and internal immunization programs, they administer vaccines and maintain accurate data records. An in-charge explained,

"We also participate in immunization programs in the community or inside the facility. The RI immunization inside the facility… Yes, I use to administer the immunization, and we used to write the data. It is part of my job" **RI in Charge Challawa PHC Kumbotso LGA_Kano.**

This underscores their multifaceted role in immunization service provision.

The in-charge emerges as a key figure in routine immunization, playing diverse roles from leadership and coordination to direct service provision and community engagement. Their

involvement spans various facets, emphasizing the holistic nature of their responsibilities in ensuring successful routine immunization outcomes.

3.3.2. Theme: The midwife's role in routine immunization: The midwife's role is multifaceted, involving both direct immunization service provision and responsibility as a family planning session facilitator, as highlighted in the provided transcript

"I worked as an agent, a midwife, and I'm in charge of family planning session." **KII with HCW Haka Tafi PHC Ganjuwa LGm Bauchi.**

Additionally, their involvement in family planning sessions underscores a broader commitment to community health beyond immunization. This dual role aligns with global health strategies recognizing midwives as essential healthcare providers, emphasizing a comprehensive approach to maternal and child well-being within the community.

3.3.4 Theme: Routine Immunization (RI) service providers Roles:

RI service providers play a crucial role in administering vaccines and maintaining accurate records. In the words of RI in charge Gaida Kumbotso LGA, the RI service provider is involved in *"routine immunization and growth monitoring."* This highlights their dual responsibility in ensuring the vaccination process and monitoring the growth of the children.

Furthermore, the RI service provider, has a distinct role in immunizing children and providing enlightenment during fixed sessions.

The quote from **KII with RI Officer of PHC Gabi Ganjuwa_Bauchi_llustrates this, stating**, ***"I'm the consultant, I consult the patients, I do immunizations on Fridays, Saturdays and Sundays, and then I conduct immunizations on Mondays at fixed sessions."***

This emphasizes their active involvement in both the immunization process and patient consultation.

RI service providers are engaged in outreaches to ensure immunization reaches a broader population.

Transcribed KII_HF incharge_Zabarmari PHC_Jere LGA_Borno mentions, *"Yes, we do the work around the clinic. They did the outreach Of routine immunization."*

This underlines the significance of reaching communities beyond the clinic, with RI service providers often handling record-keeping during these outreach services.

The provision of RI advice is another vital aspect of their role.

KII RI in charge in Kusi, in Bauchi LGA emphasizes, *"Before he comes, I advise about RI services such as Hepatitis B."*

This highlights their responsibility in providing information and guidance on specific vaccines as part of routine immunization services.

Moreover, RI service providers are tasked with supervising activities related to routine immunization to ensure smooth operations.

KII RI In-charge Fatima Ali Sheriff PHC Maiduguri LGA, Borno, the responsibility is outlined as, *"My responsibility in the health facility is to make sure that RI activities go on smoothly without any issue."*

This speaks to their oversight role in managing and facilitating the entire process.

Lastly, the management of vaccine logistics is a critical aspect of the RI service provider's responsibilities.

RI in charge Magami Sumaila LGA, Bauchi explains, *"I carry out the role of RI service provider... We receive and store them whenever they're deployed here. We also assess their temperature."* This quote emphasizes their hands-on involvement in managing the logistical aspects, ensuring the proper storage and monitoring of vaccines.

3.2.5 Theme: Process of delivering vaccines

Definition: The work processes the participant follows in their immunization-related activities.

1.Before the Immunization: Prior to the immunization sessions, several crucial steps are undertaken to ensure a smooth and organized process. Health workers, as highlighted in the quote below. Arriving early to arrange the clinic for immunization, demonstrate the importance of preparation:

***"Before the arrival of the parents, we the staff have to be in the clinic earlier, to arrange for the immunization."* - . RI in Charge Zawaciki Kumbosto LGA_Kano.**

The process involves checking the BCG mark on a child's hand, verifying it against the register, and filling out the child's card, if necessary, as mentioned by a RI incharge:

***"The first thing is to look at his hand and see if there is VCG, if there is a mark, we know the baby has been immunized. If there is none, we then check the name on the register to see if the baby was once registered. If there is none, then we fill the card and put the name on the register."* - KII RI incharge Sanyinna Tambuwal LGA_Sokoto.**

Child profiling, as outlined in KII, in Bauchi LGA, involves collecting essential information about the child, including name, settlement, and age, and recording it in the Child Health Card (CHC) and register:

***"First, you ask about name, settlement, age or month. I fill the CHC card first, I register it in my register."* - KII RI in charge in Kusi, in Bauchi LGA_Bauchi.**

Moreover, the timely collection of vaccines from the Local Government Area (LGA) is essential, ensuring all required vaccines are in stock, as emphasized by RI in charge in Gaida Kumbotso LGA:

***"I make sure I collect all vaccines from the LGA."* -. RI in charg Gaida Kumbotso LGA_Kano.**

2.During the Immunization: Administering vaccines is a key aspect of the immunization process. Health workers administer vaccines based on the child's age, systematically providing vaccines such as OPV, HepB, BCG, pentavalent, PCV, and ROTA1:

***"For example, at birth, a child came, let's say, two weeks. We used to give them OPV0, HepB and BCG. The first process that we follow. Then the second process after two weeks, we used to tell them to come back for the 2nd dose that is pentavalent, PCV, ROTA1."* - _KII_RI_Arkilla Wammako_Sokoto.**

Communication remains pivotal, with a RI in Charge Zawaciki Kumbosto LGA noting that health workers provide mothers with key messages during the immunization, explaining the purpose and benefits of each vaccine:

***"When we start the immunization, we give the mother the six keys' messages. Then we tell the mother this vaccine we are giving your child is for this DCG, for this hepatitis, this is for the prevention of this, and this is an OPV for the prevention of."* - . RI in Charge Zawaciki Kumbosto LGA_Kano.**

The vaccination process is initiated after completing health education sessions, ensuring a smooth transition from awareness to action, as stated by HF incharge of Zabarmari PHC_Jere LGA:

***"After the whole health education, then we start the immunization."* - . Transcribed KII_HF incharge_Zabarmari PHC_Jere LGA_Borno.**

3. After the Immunization: Post-immunization, addressing concerns and providing support to caregivers is crucial. RI Incharge of Nabaguda PHC in Tambuwal LGA emphasizes the importance of educating caregivers about potential side effects, reassuring them, and guiding them on normal symptoms:

***"We tell the caregiver the side effects of the vaccination, so if you see so and so symptoms it's normal, don't worry, it is ok, the child will be much better."* - KII_RI Incharge_Nabaguda PHC_Tambuwal_Sokoto.**

Caregivers are encouraged to spread awareness about immunization, fostering a community-driven approach, as highlighted by RI incharge Sanyinna Tambuwal LGA:

***"In addition, tell them to encourage their fellow women the importance of bringing their children for immunization."* - KII RI incharge Sanyinna Tambuwal LGA_Sokoto.**

Furthermore, summarizing and recording vaccine administration information on patient cards and tally sheets is a crucial step for effective documentation, as detailed in:

***"Additionally, after the administration of vaccines, we summarize and put into a tally sheet."* - KII Incharge PHC Kasarawa WMK LG_Sokoto.**

The process involves scheduling the next vaccine visit, providing key messages to caregivers, observing children for adverse events following immunization (AEFI), referring cases from outreaches, and ensuring comprehensive and systematic record-keeping. Each step in this process contributes to the overall success and effectiveness of routine immunization programs.

3.2.6 Theme: What works

Definition: What, in their experience, helps keep families up to date with their child's immunizations

Comprehensive Strategies for keeping families up to date with child's Immunization

1.Education and Communication: Health workers emphasize the importance of comprehensive education to dispel myths and address concerns. They stress the need to inform caregivers about the immunization process and potential side effects. As highlighted by the RI in Charge Challawa PHC Kumbotso LGA, knowledge is a powerful tool:

***"If they know the importance of the immunization and the side effects, a mother will not be afraid to immunize her child. Because we usually tell them the effects of infectious diseases in order to bring her child to immunization; a mother has to be afraid of the disease, not the immunization."* - RI in Charge Challawa PHC Kumbotso LGA_Kano.**

RI In-charge Fatima Ali Sheriff PHC Maiduguri LGA adds that providing proper information alleviates concerns:

***"But if you give them proper information. I think even pertaining the AEFI that sometimes do occur if you give them proper information, it won't make them not come. They will come back."* - RI In-charge Fatima Ali Sheriff PHC Maiduguri LGA_Borno.**

2.Active Follow-up and Reminder Systems: Proactive follow-up mechanisms, such as phone calls and house-to-house visits, are crucial for reminding caregivers of upcoming immunization sessions. Community leaders, mobilizers, and technology play roles in tracking defaulters. According to RI incharge in Sanyinna, Tambuwal LGA:

***"We also have the contact of the fathers; therefore, we call them on the phone to ask about the baby - whether the baby has a reaction."* - KII RI incharge Sanyinna Tambuwal LGA_Sokoto.**

Community mobilizers and announcers play a critical role in identifying defaulters and collaborating with community leaders to ensure maximum immunization coverage. The quote from HF In-charge Bulabulin Ngaranam PHC Maiduguri LGA outlines the responsibilities:

***"We check our registers at the end of every session. If there are some defaulters, then we call the Blamers and give them the addresses. And we also have BCM and chiefs those that will go from one house to the other and be bringing the defaulters."* KII HF In-charge Bulabulin Ngaranam PHC Maiduguri LGA_Borno.**

Informing individuals about the timing of the next vaccine dose by recording dates on their vaccination cards is a systematic approach. RI in charge Magami Sumaila LGA mentions the practice:

***"Well, we always inform them of the time for the next dose whenever they took a dose by writing the dates on their respective vaccination cards."* -. RI in charge Magami Sumaila LGA_Bauchi.**

3.Incentives and Community Engagement: Providing incentives, such as money for transportation or token rewards, addresses financial barriers and encourages active involvement. In the words of RI in Charge PHC Jabo Tambuwal LGA:

***"I sometimes give them incentives such as money for transportation to aid them in being able to come back."* - RI in Charge PHC Jabo Tambuwal LGA_Sokoto.**

Token incentives provided to community groups after each session foster their support and participation in immunization programs. KII with RI FP PHC Ganjuwa, outlines the incentive practice:

"Actually, no one is paying them until the coming of New Incentives. They do give them some token after every session. I cannot say the exact figure. It is either one or two

***thousand Naira. Moreover, on our part, we give them something to encourage them in supporting our work."* KII with RI FP PHC Ganjuwa_Bauchi.**

Engaging schools, community groups and traditional birth attendants in immunization efforts enhances community acceptance. RI in Charge Zawaciki Kumbosto LGA emphasizes the importance of immunization for school enrollment:

***"After telling them the six keys or the importance of immunization at times we tell them if they refuse to collect this immunization, time will come that the children will not be immunized. The children will not involve in school unless they show this immunization card. That their child is fully immunized, to encourage them to bring back their children to continue with the immunization."* - RI in Charge Zawaciki Kumbosto LGA_Kano.**

4.Quality Care and Supportive Environment: Delivering quality care and creating a supportive healthcare environment are crucial for building trust. Positive treatment experiences and accessible complaint mechanisms contribute to a sense of confidence. RI in charge Magami Sumaila LGA highlights the impact of good treatment:

***"The good treatment they receive from us also does help in making them come back."* - RI in charge Magami Sumaila LGA_Bauchi.**

Integrating these strategies with quotes from healthcare workers ensures a holistic approach to overcome barriers, addressing misinformation, logistical challenges, cultural beliefs, and financial constraints. This comprehensive approach, rooted in education, communication, active engagement, and quality care, is key to achieving high immunization coverage and preventing vaccine-preventable diseases within communities.

3.2.7 Theme: What makes it difficult (Barriers to Immunization: Understanding and Addressing Challenges)

Definition: What, in their experience, are the difficulties in families keeping up to date with their child's vaccines

Immunization is a critical aspect of public health, yet numerous barriers hinder the optimal participation of caregivers and their children in vaccination programs. These barriers can be categorized into several themes, each highlighting specific challenges and concerns.

1.Fear and Reluctance Due to AEFI: A significant barrier emerges from caregivers' fear and reluctance caused by Adverse Events Following Immunization (AEFI). One caregiver expressed this concern vividly, stating,

"After I have received immunization, my child developed fever. We couldn't sleep. So that is why I feel reluctant to come for the subsequent visit." **KII RI In-charge Fatima Ali Sheriff PHC Maiduguri LGA_Borno.**

2.Health Worker Attitude and Influence: The attitude of health workers plays a pivotal role in shaping caregivers' willingness to continue with immunization. A health worker acknowledged this influence, stating,

"What makes caregivers come back for the subsequent immunization is our attitude" **KII RI In-charge Fatima Ali Sheriff PHC Maiduguri LGA_Borno.**

3.Forgetfulness and Negligence: Caregiver forgetfulness, often driven by negligence and busy schedules, results in missed doses. A health worker highlighted this, explaining,

"Negligence from the parents, they would skip a dose when they are busy and would only come back when they finished" **RI in charge Massu in Sumaila LGA_Bauchi.**

4.Lack of Education Among Husbands: Husbands' lack of education poses a unique challenge as they struggle to comprehend immunization schedules. As expressed by a health worker,

"The major challenge is that the husbands are not educated. So we use to have issues with them when we write the date for the next visit they cannot read". **KII with RI FP PHC Ganjuwa_Bauchi.**

5.Difficulty in Convincing Caregivers: Convincing individuals about the importance of vaccination can be challenging, leading to arguments and resistance. A healthcare provider noted,

"While you are trying to mobilize a person, he seems not to understand what you are saying, while counseling him on the importance of vaccination". **KII_RI Incharge_Nabaguda PHC_Tambuwal_Sokoto.**

6.Geographical Barriers: Geographical distance acts as a barrier, especially in remote settlements. The distance from the facility becomes a hindrance, as described by a health worker,

"Most of the settlements in Challawa are too far from the facility. They are even parallel with the facility" **RI in Charge Challawa PHC Kumbotso LGA_Kano.**

7.Misconceptions, Especially Regarding Fertility: Misunderstandings, such as the belief that vaccines affect fertility, contribute to hesitancy. A caregiver mentioned,

"Some say the vaccine was mixed with the family planning dose, if a child got shot, he will not give birth" **KII_RI Incharge_Nabaguda PHC_Tambuwal_Kano.**

8.Challenges in Following Up Missed Clients: Difficulties in reaching and following up with clients, often due to unreachable phone numbers or lack of contact information, pose a barrier. A health worker highlighted the issue, stating,

"Some phones not reachable, switched off. Some don't even have phone numbers."**RI in charge Gaida Kumbotso LGA_Kano.**

9.Issues in Reaching Hard-to-Reach Communities: Reaching specific communities, particularly nomadic or remote areas, during immunization campaigns presents significant challenges. A healthcare provider noted, ***"It's hard to reach areas, like Anguwan Bawa, Kilmi. These areas are far, especially those missed during mobile sessions"*****KII RI in charge in Kusi, in Bauchi LGA_Bauchi.**

10. Economic and Personal Priorities Over Immunization: Challenges arise when caregivers prioritize personal and economic activities, such as market days or weddings, over immunization visits. A health worker explained,

"Some are running businesses; if they stay back, they earn like one thousand five hundred naira"**RI in Charge Panshekara Kumbotso LGA_Kano.**

These identified barriers reflect the complex interplay of social, economic, and healthcare system factors that contribute to suboptimal immunization rates. Addressing these challenges requires multifaceted strategies, including improved communication, community engagement, and targeted interventions tailored to specific barriers in diverse settings. Health education, community involvement, and culturally sensitive approaches are vital components in overcoming these barriers and ensuring widespread immunization coverage.

3.2.8 Theme: Suggested improvements or ideas

Definition: Any other issues or improvements that could be made, in their opinion?

The key findings from the recommendations provided by community stakeholders and health workers shed light on critical aspects of routine immunization programs. The quotes from various files offer valuable insights into these recommendations.

1.Allowance for CGs (Community Gatekeepers): The recommendation emphasizes the need to financially support community leaders to enhance community engagement. The statement from the interview highlights the current practice where community leaders are not paid, and external support is crucial:

"You know the community leaders we are working with are not paid. We are the ones paying them and buying them batteries to make announcements." **KII with RI FP PHC Ganjuwa_Bauchi.**

2.Avoid Rumours: Stressing the importance of avoiding unnecessary rumors, the quote from a RI in charge underlines the significance of rumor control for the successful acceptance of immunization:

"If they avoid rumours we will get… My advice is avoid rumours, unnecessary rumours are what is not try and we will achieve, this immunization will be accepted very well." **RI in Charge Zawaciki Kumbosto LGA_Kano.**

3.Change Contracts of HWs from Volunteer to Permanent: The suggestion to transform routine immunization in-charge roles from volunteer to permanent positions is supported by the quote below. This recommendation emphasizes empowering staff with more authority and responsibilities:

"But if the RI (routine immunization) in-charge will be given a permanent appointment, in that case whatever you do, he can defend himself because he is a staff. But so long as you remain a volunteer, you have limitations which you must not cross." **KII with RI Focal Person, PHCC Kubi, Ganjuwa LG Bauchi.**

4.Government Should Enforce Vaccines: Proposing policymaking to mandate complete vaccination for every child before attending school, highlights the importance of enforcing vaccines for higher immunization coverage:

"I will make a policy that each and every child must have taken the complete vaccine before going to school first." **[KII Incharge PHC kasarawa WMK LG_Sokoto.**

5.Improve Vaccine Storage: Addressing challenges related to storage facilities, the RI in charge Jabo PHC expresses the need for better storage facilities and the inconvenience of collecting vaccines from distant locations:

"The only thing is about this how PHC, issue of SDD, I talk more about SDD, we don't have the storage facility for the vaccines, so we use to go far distances to go and collect them and bring them back here at the center." **RI in Charge PHC Jabo Tambuwal LGA_Sokoto.**

6.Incentivize Care: Advocating for the use of incentives during immunization sessions, recognizes the community's preferences and the potential impact of providing incentives:

"Sometime if they will come to immunization. You know that our people, they like something, even if you come to immunization, you give them soap Or Nets for plus, even if you give them mosquito net. You will see this place will be full." **[Transcribed KII_HF incharge_Zabarmari PHC_Jere LGA_Borno.**

7.Increase Staffing and Allowance for RI Provider and Allied Staff: RI in-charge in Sanyinna Tambuwal LGA suggests supporting routine immunization providers with transportation allowances during outreach activities to enhance their performance:

"First, I will support them with transport fare during outreach or anything that has to do with the immunization." **KII RI incharge Sanyinna Tambuwal LGA_Sokoto.**

8.Media Advocacy: The recommendation to leverage media for advocacy and sensitization from PHC In-charge Kasarawa WMK LGA, highlights the potential impact of media in enhancing public awareness:

"If I had the chance, I think I would emphasize based on the sensitization on the advocacy through media."**KII Incharge PHC Kasarawa WMK LG_Sokoto.**

9. More House to House: Recommending increased house-to-house efforts, health worker in Wamakko recognizes the importance of reaching individuals who may not visit healthcare facilities:

"I will do more house to house to reach those who don't want to come to the facility to make sure every child has been immunized." **Wamakko Fanare HP_WMK LGA_Sokoto.**

These findings collectively provide a comprehensive overview of the recommendations, reflecting the diverse strategies and considerations needed for the success of routine immunization programs.

4.0 CONCLUSION AND RECOMMENDATIONS

5.1 Evaluation of routine immunization systems:

The DHIS2 exhibits both strengths and limitations in the context of data quality, timeliness, zero-dose measurement, and overall functionality. The system's reliance on the technical capacity of data entry personnel and the potential for data entry errors, falsification, and underreporting present challenges. Timeliness is hindered by monthly analysis, and the system faces difficulties in measuring zero-dose children. Despite these challenges, the DHIS2 system demonstrates strengths in identifying performing health facilities, providing accessibility, and measuring indicators monthly. To address the identified limitations, a multifaceted approach is recommended, including the development of a Data Quality Improvement Plan (DQIP), improved accountability structures, and enhanced training for health workers.

Moving on to the PAPA LQAS, the evaluation provides valuable insights into the program's strengths and challenges. The program excels in identifying locations with a high burden of zero-dose cases and employs quarterly tracking mechanisms. However, challenges related to human resources pose a significant limitation, emphasizing the need for a sustainable and accountable workforce. Recommendations include leveraging technology for data collection and addressing specific issues faced by volunteers for a more comprehensive understanding.

The RI SMS Reporting system demonstrates a commitment to data quality through ensuring completeness and validating data. However, limitations such as the inability to reach zero-dose children directly and challenges in capturing certain terrains, lack of GIS mapping, and limited finances for SMS are notable. The system's strengths lie in accessibility, capturing RI sessions, and enabling estimation of target children. Mitigation strategies include conducting a census, addressing staffing shortages, and providing training for healthcare workers. Recommendations involve technology for supportive supervision and outreach to enhance the system's effectiveness.

The RISS Checklist emphasizes data quality through routine support supervision. Monthly supervision and integrated supporting supervision contribute to timely identification of gaps. The checklist's strength lies in its systematic approach to guide RI supervision. The identification of drop-out children supports zero-dose measurement. Potential limitations such as resource constraints and scalability should be explored further, and recommendations could include incorporating technological solutions and regular training for healthcare workers.

Regarding SORMAS, recommendations include stronger collaborations between NPHCDA and NCDC, data-sharing agreements, and improved data integration systems to enhance overall effectiveness.

5.2 Health facility assessment:

The HF assessment for evaluation of RI services across 32 health facilities in four Nigerian states showed various strengths and areas for improvement in service delivery. The assessment revealed that over 93.8% of the evaluated facilities offer essential vaccines, ensuring that children have access to immunization services uninterrupted. All facilities (100%) have actively conducted at least one campaign in the last six months, indicating a commitment to reaching wider populations. Approximately 90% of the facilities implemented strategies to track and reach children who have not received routine vaccinations, demonstrating proactive efforts to address immunization gaps. Integration of RI with other healthcare campaigns occurs in 93% of the facilities, maximizing service delivery opportunities and enhancing efficiency.

To enhance decision-making processes at HF level, there is a need to strengthen data analysis capabilities at the HF level. This can be done by investing in the development of healthcare workers through regular training on immunization best practices, data analysis/interpretation and implementation of robust data quality improvement plans to ensure accurate and reliable data collection. Addressing staffing challenges requires strategic workforce solutions, including training, recruitment, and retention strategies, to ensure adequate personnel for effective service delivery. Proper vaccine storage and temperature monitoring across all facilities are essential to maintain vaccine potency. Prioritizing budget allocation for equipment maintenance and repairs will ensure optimal cold chain management. Furthermore, improving the availability of data tools, such as updated REW microplans, and allocating budget for printing and distributing these tools will enhance data management and service delivery planning. We also recommend increasing service accessibility by extending service hours or offering weekend/evening sessions so as to improve access for individuals with work commitments and potentially address gender barriers faced by some caregivers. Finally, we recommend the prioritizing of infection prevention and control measures, such as equipping all facilities with proper waste disposal systems and ensuring access to clean water and sanitation facilities for overall healthcare quality and safety.

5.3 Household vaccination survey:

The household vaccination survey provided significant insights with the majority of the caregivers exhibiting confidence in vaccines and expressing their intent to vaccinate their children, practical issues like affordability and long waiting times at healthcare facilities impede vaccination efforts. We recommend strengthening community engagement, especially with religious and community leaders to dispel rumors, myths and foster vaccination advocacy. To enhance vaccination efforts, we recommend targeted and context specific interventions especially in the urban areas to alleviate concerns regarding vaccine safety and fertility. There are also service delivery issues that should be addressed

across all the states, like the long waiting times to enhance satisfaction levels and foster vaccination uptake. We need to also explore strategies for financial support to enhance vaccine affordability and mitigate transportation costs, ensuring accessibility for all. A deeper dive would be done to delve into the underlying reasons behind the high number of ZD children, particularly in the 0-11 months age group and urban settings of some of the states.

5.4 Barriers and Enablers:

Caregivers in Bauchi, Kano, Sokoto, and Borno states exhibit commendable dedication to their children's vaccination schedules, showcasing an inspiring commitment to health. However, challenges like spousal approval and gender-related barriers underscore the need for tailored interventions. Practical issues, social dynamics, and traditional gender roles significantly influence caregiver's experiences. The results from this study highlight facilitators like early arrival and proximity to health centers, alongside barriers such as delayed arrival and household responsibilities. We recommend increasing awareness, encouraging spousal support to mitigate these challenges.

The experiences shared by community gatekeepers show their vital role in promoting and sustaining routine immunization practices within their communities. The responsibilities handled by these gatekeepers, ranges from engaging religious leaders to fostering collaboration with health workers and local authorities, reflecting a proactive approach to immunization advocacy. Their efforts in community mobilization, media utilization, and house-to-house campaigns show the significance of direct communication in enhancing awareness. Despite facing barriers such as AEFIs and economic challenges, gatekeepers persistently work towards overcoming these obstacles. Moreover, their insightful recommendations, spanning improved health worker interactions, strengthening community relationships, and incentivizing immunization, offer practical insights for enhancing immunization programs.

Health workers play a pivotal role in the success of routine immunization programs, embodying dedication in their responsibilities, from in-charges coordinating facility activities to midwives fostering maternal well-being, these roles contribute to the effective service delivery. The detailed process they follow, coupled with active communication and education, reflects their commitment to keeping families informed. Despite facing challenges such as caregiver reluctance and geographic barriers, health workers provide valuable recommendations, emphasizing the need for financial support, rumor control, and systems improvements. As unsung heroes, their experiences illuminate a path forward, calling for a collective effort to achieve higher immunization coverage, healthier communities, and a future free from vaccine-preventable diseases.

5.0 LIMITATIONS OF THE RAPID ASSESSMENT

5.1 Evaluation of routine immunization systems:

- ***Data Quality and Reliability***: The evaluation highlighted the limitations of inaccurate or unreliable data in the DHIS2 due to the effect of the denominator and other reporting mechanisms. This underscores the need to invest in training data entry personnel and implement robust Data Quality Improvement Plans (DQIPs) to enhance data reliability.
- ***Timeliness of Data:*** Delays in data reporting and analysis were observed in DHIS2 and surveillance systems, hindering timely responses to emerging challenges. This emphasizes the need to prioritize measures ensuring timely submission, validation, and analysis of data for swift decision-making.
- ***Human Resources Challenges:*** The PAPA LQAS identified significant limitations associated with human resources, particularly reliance on volunteers. Addressing these challenges requires strategic planning, sustainable workforce solutions, and clear accountability structures.
- ***Limited Technology Utilization:*** The evaluation identified limited use of technology in overcoming challenges like reaching zero-dose children and improving program effectiveness. This suggests the need to leverage GIS mapping for accurate population estimates, utilize SMS reporting for transparency, and employ technology for supportive supervision.
- ***Lack of Systematic Approaches:*** The absence of systematic approaches in supervision and data collection emerged as a limitation. This highlights the importance of routine support supervision, integrated supporting supervision, and a checklist-guided process to enhance program effectiveness.
- ***Collaboration and Data Sharing:*** The evaluation revealed limitations in collaboration and data sharing between agencies like NPHCDA and NCDC. This emphasizes the need to strengthen partnerships, advocate for data-sharing agreements, and invest in integration systems to enhance data accessibility and utility.
- ***Cooperation with Agencies of Health:*** In this evaluation, we could not get any member to interview from a key government agency which could have strengthened this report despite several formal and informal requests. We attributed this to a probable case of inter-agency rivalry which government should address wholistically.

5.2 Health facility assessment:

The HF assessment we conducted in this study provides valuable insights into the current state of RI services in the assessed facilities and highlights areas for improvement. However, we are mindful of the fact that this assessment has some limitations which if addressed in future assessments or studies, it can strengthen the evidence base for policy and programmatic decisions to further improve immunization coverage and reduce the number of zero dose children. The limitations are as follows:

- ***Sample size:*** The assessment covered only 32 facilities, limiting generalizability to the entire region.
- ***Cross-sectional design***: The study design does not allow for establishing causal relationships between observed findings and potential influencing factors.
- **Data quality:** Data quality may have been affected by potential inaccuracies in record keeping and possible recall bias.

5.3 Household vaccination survey:

The following were the limitations of the household vaccination survey;

- ***Sample size:*** The relatively small sample size (320) might not be fully representative of the entire population in the four states. Even though this is methodologically sound for the rapid assessment we conducted as our aim was not statistically robust precise immunization coverages but rather to provide timely valuable insights into the current situation at the LH areas. This decision has been supported by previous researchers.[48]

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[48]. Rapid Assessment Procedures – Qualitative Methodologies for Planning and Evaluation of Health-Related Programmes" by Scrimshaw, S. C., & Gleason, G. R. (1992). International Nutrition Foundation for Developing Countries, Available from https://archive.unu.edu/unupress/food2/UIN08E/UIN08E00.HTM.

- ***Social desirability bias***: Respondents might have been influenced by social desirability bias, leading to over-reporting of positive attitudes towards vaccination.

5.4 Barriers and Enablers:

The following were noted as limitations of the study;

- This study only included key informants from four specific states, limiting generalizability to other parts of Nigeria but the contextual informations are revealing.
- The qualitative nature of the study cannot establish causation event though the ZDPLH intends to conduct implementation research later to track government led intervention on reaching ZD children so as to access the effectiveness of interventions over time.

6. APPENDICES

Appendix 1: Codebook for Routine Immunization Systems Evaluation

Appendix II: Codebook for Barriers and Enablers Analysis (Caregivers and Community Gatekeepers)

Appendix III: Codebook for Barriers and Enablers Analysis (Healthcare Workers)

Appendix 1: Codebook for Routine Immunization Systems Evaluation

Name	Description	Files	References	Examples
DHIS		0	0	
Data Quality		0	0	
Data is reliable	Ensures reliability and accuracy of collected data within the DHIS system.	5	5	<Files\\LIO Borno State (Jere LGA)> Yeah, DHS is reliable and valid platform for sending the data.
Data Validation	Emphasizes the trustworthiness and dependability of data recorded in the DHIS.	11	16	<Files\\LGA M&E Jere LGA> - The facility report on monthly basis to the LGA then the LGA has to input the data on the DHIS 2. Then we during entering the data of the facility on DHIS, we do data validation.
Depends on technical capacity	Depends on technical capacity to verify and authenticate the accuracy of data.	2	2	<Files\\KII With Dr Lukman WHO, system evalustion> So With regard to the quality of the data, the quality of the data is also depends on the technical capacity of the person that is entering the data. Because sometimes, a data will be entered however it's not valid. And this can remain in the DHIS for up to months without being corrected. So there is need for better way of accounting for data with regards to those that those that, the vaccines utilization and all the other parameter.
High burden on RI providers	Reflects substantial workload on Routine Immunization (RI) providers.	1	1	<Files\\LGA M&E MMC LGA_1> - There are some discrepancies in data from the register and tally sheet because of high burden of work on RI providers which makes them forget to fill in registers. The tally will be more complete than the register.
Use forms to validate data reliability	Implements forms to validate and ensure reliability of entered data.	2	2	<Files\\State Partners Sokoto> Well as we have been mentioning it, since one is not there to supervise, completely but using the ad-hoc, other forms you know and forms that we can support the data for example, you can use the number of vaccines viruses , number of doses use to see how many children are vaccinated

Yearly state level DQAs	Annual assessments at the state level to evaluate and enhance data quality.	2	2	<Files\\Transcript on System Evaluation - NERICC Data Manager> Between 2014 and now, no decrease was conducted in Nigeria, by the national, however, states that they are doing their own DQA just to check for the quality of the data. You know, the DQ being conducted by nation is to adjust for the RI coverage either for LGA or for state or national. So whatever report we get from that DQA is what is being used to now adjust whatever coverage we have. So essentially it is actually being conducted at the beginning of every year. So if for instance, we are in 2024 this is the time to conduct the DQA for 2023, right? So as to check for the quality of the data that we have. So if there are issues, so that is saves a recommendation from WHO on how the RI coverage could be adjusted based on the findings from the DQA.
Limitation	Highlights various limitations in the DHIS system and data collection process.	0	0	
Data can be accessed on a monthly basis	Monthly accessibility of data within the DHIS system.	1	1	<Files\\KII With Dr Lukman WHO, system evalustion> - The weakness however is that (1) the DHIS is analyzed most of the time on a monthly basis so it does not give enough time to make adequate corrections within that month.
Data Entry errors and falsification	Identifies challenges related to inaccuracies and intentional misreporting.	2	3	<Files\\State Partners Bauchi> - If you count only 12, it means there is a lot of falcification and it mean that it's the falsification that went to the DHIS2. Beacsue what goes into the DHIS2 is the summary. is not the register because the register is treated individually . We have realized over the years that most of these reasons are because people are, it's human centered. It's human centered. People are just. Sometimes putting in whatever they want to put in, thinking that nobody cares. Nobody's going to look at it. So it's it's an issue of of attitudes.
Dependent on Incentives_Limited	Acknowledges reliance on incentives for data reporting, with limitations.	2	2	<Files\\Transcribed - LGA-KII__PARTNER_SUMAILA LGA> The incentive which is used for the health care workers, the funds that are used for going for outreach throughout this year, it has been stopped. So this also again cause this high number of these zero dose actually.
Difficult to measure zero dose children	Challenges in accurately assessing the number of children with zero doses.	5	5	<Files\\Transcript on System Evaluation - NERICC Data Manager> Yeah. You know, they there's no particular element that collect data on children that have not received Penta 1. So what we do at the moment is just to identify those that

				have received and find the difference between that and the target population to know, those who have not received. So that's the only data we make use of.
Incomplete data for population estimation	Indicates gaps affecting the accuracy of population estimates.	1	2	Files\\Transcript on System Evaluation - NERICC Data Manager> - So unfortunately, our population data in Nigeria does not go beyond LGA maybe because of political reasons. It stops at the LGA level. So, you can only have population estimated LGA. So if you want to know the population at the lower level like the ward, the health facility, It now depends on the discretion of the officers at the edge to do a proportional allocation, since they have an evidence of how many people might be in one particular location and all that. They use their discretion to do the proportional allocation of the population estimate given for that LGA. So the major demerit of this particular process is sometimes under-estimation of a population estimate in some instances overestimation in other locations.
Insecurity and hard to reach	Recognizes difficulties in data collection due to security concerns.	2	2	<Files\\Transcribed - LGA-KII__PARTNER_SUMAILA LGA> You know, for example, here is where we have hard to reach so hard to REACH is a barrier. Secondly we have insecurity as a barrier. Files\\State Partners Sokoto> There are a lot of barriers, first is insecurity . myself that you see me here, I like to go to hard to reach area because I believe these are the places where services are needed ..but today I cannot brag about that because I fear for my life. I cannot risk my life to go and supervise and I will be kidnap or be killed and that is a major barrier in this work.
Lack of data tools at the facilities	Points out absence of adequate tools for data collection at healthcare facilities.	3	3	<Files\\Transcribed - LGA-KII__PARTNER_SUMAILA LGA> - The strength is that the system is our guide and the weakness is that a lot of LGA team don't have access to this DHIS.
Lack of GIS mapping during sessions	Indicates absence of GIS mapping during data collection sessions.	1	1	<Files\\KII With Dr Lukman WHO, system evalustion> the gaps (1) none of these reporting systems can tell that an RI provider is actually at a settlement he plans to be. So an RI provider can decide to send data that does not represent the settlement they are supposed to cover for that week even though I am not saying this is the practice. Or they can conduct a fixed post and send it as a outreach or vice versa.

Limited access to only those in the system	Access to DHIS system is restricted, limiting participation to registered users.	1	1	<Files\\M & E Sokoto State (Tambuwal LGA)> - There is no body that can access the data except those who are in the system."
Limited Capacity of users	Users may face limitations in effectively using the DHIS system.	4	6	
limited funding	Acknowledges financial constraints affecting DHIS system operations.	1	1	<Files\\KII With Dr Lukman WHO, system evalustion> - The other weakness is human aspect, the program that support this line listing and reconciliation of data between the community and health facility, the program is not very vibrant, the funding for it has significantly reduced so it affects the ability to actually make that link in real time.
Network issues	Challenges related to network connectivity impacting data transmission.	1	1	<Files\\LIO Borno State (Maiduguri LGA)> - Sometimes the network is failing and they have issue with their data
Non Compliance in communities	Indicates resistance or lack of adherence to data reporting in certain communities.	1	1	Files\\State Partners Sokoto> - it is likely that sometimes even though reconciliation takes place, you still find children missing in the community. They have not had contact and also there is this rejection of vaccination services by the community members who have a lot of misconception about RI, and then they hide the children or they lie or about it or sometimes they may cornive with the providers they may provide false card especially when the know that someone is coming to the settlement to cross check, they may provide false card indicating that the child has gotten the vaccination but truly the child has not gotten. so that they can cover themselves and then they are in harmony with the community members.
Poor Accountability	Recognizes a lack of responsibility and ownership in data reporting.	2	2	<Files\\State Partners Borno> - Then lastly, the one I also want tomention is the weaker accountability on the government system. While I was still insisting on one data sources, we partners still have to push the government people to look at these DHIS to download it. Look at what is happening, that poor accountability and ownership is really, really key. They don't do that if you don't push them.

Poor Supervision	Highlights insufficient oversight and management in the data collection process.	2	3	Files\\State Partners Sokoto> The second one is the ….and because of that poor supervision, health workers in the remote areas are doing what they want . you can never be sure of they are submitting, you can just make do with whatever they submit to you. During monthly validation meeting, even if they don't have data on their sheet, they can concoct it and and bring and you don't have means to validate it. That is one of the major problem that we have.
Requires password to edit	Data editing is restricted and requires password access for security.	2	2	Files\\LGA M&E Kumbotso LGA> - Yes it is accessed by username and password
Set deadline for aggregating data	Establishes a specified timeframe for data compilation.	1	1	<Files\\Transcript on System Evaluation - NERICC Data Manager> So on the DHISII, we know that you don't submit your data before midnight or 14th, right? You know that data. It's not timely, we don't count that kind of data to be timely. If you submit beyond midnight or 14th, so we usually recommend to the LGA officers to make sure that data is entered between first and 14th of every month so that their data we can any data submitted beyond that time is not timely.
Under reporting	Instances where reported data is lower than actual figures.	1	1	<Files\\State Partners Borno> So it means we are not actually seeing the value because the truth is you can just check when the RI intensification has been done and see the number of children that were vaccinated. Now go back and download for that previous month, you will see, you see only just 50% of the data. So what I will even say is it is reliable but is is even under reportied but not of the fact that you think is over reporting. So we need to actually improve the quality and reliability in terms of actually getting. Getting it higher? Yeah. Because to me, most often times during the analysis is under reporting, not over reporting.
Unstable population growth	Challenges in accurately estimating population growth due to instability.	1	1	<Files\\LIO Borno State (Maiduguri LGA)> we'll see that the time will finish our planning, we will go and then then you will see your settlement is already over populated, OK. And then some time ago that they have also shipped to another settlement. So these are some of the challenges.
Untimely reporting	Recognizes delays in submitting required data.	5	6	<Files\\LGA M&E Ganjuwa LGA> -

				Lack of data from RI provider or from the facility. Some are not submitting in time so we have late reporting which will hinder us from knowing what is going on in the facility.
Mitigations	Strategies and actions to address identified challenges.	0	0	
Accurate National population for estimates	Emphasizes precise national population for reliable estimates.	3	3	<Files\\State Partners Kano> - The only thing i csan recommend is to have an accurate national population data to get the exact number of the population so that we know where we are headed.
Appreciate and set reward systems for HWs	Significance of recognizing and rewarding health workers.	1	1	<Files\\State Partners Sokoto> And then we can also use a kind of appreciation, even if it is a certificate, appreciate those that are doing good. Let us show them that we care, we know what they are doing and if any promotion comes, let us consider them and if they are un employed, they are volunteers let us give them chance whenever offers comes out . let us appreciate them.
Assure reliability of data and DQIP	Ensures dependability of data through a quality improvement program.	3	3	Files\\KII With Dr Lukman WHO, system evalustion> - the reliability will be improved if the data being given represents the work that was done. The validity will be improved by having the technical knowledge to harmonize between the immunizations, the vaccine use as well the data entry on the DHIS tool <Files\\Transcript on System Evaluation - NERICC Data Manager> Yeah, my recommendation is to, as a matter of urgency domesticate data quality improvement plan (DQIP), which the national has developed over time. Let's see how that could be operationalized and the lower level it helps to in improve the assurance that we are expecting on the quality of the data that are coming from that level.
Better accountability structure for HWs	Advocates for an improved system to hold health workers accountable.	2	3	Files\\KII With Dr Lukman WHO, system evalustion> - So there is need for better way of accounting for data with regards to those that those that, the vaccines utilization and all the other parameter.

Better remuneration for HWs	Suggests enhanced financial compensation for health workers.	4	4	<Files\\Transcribed LGA- KII_Partner_Bauchi LGA> - The only challenges we have been having is in terms of support, you know most of the providers, I mean those who are doing the RI, most of them are not employed. They are volunteers, so that would actually hamper the work. So these are volunteers who are not paid. So if government can. Step in and give them some stipends. Agenda will actually help.
Develope DHIS guide for facilities	Proposes creation of a comprehensive guide for DHIS usage at healthcare facilities.	1	1	Files\\Transcribed - LGA-KII__PARTNER_SUMAILA LGA> There is need for all LGA-Team to be guided On how to. Access the DHIS 2 data.
Engagement of data staff in facilities	Involves active participation of dedicated data staff at healthcare facilities.	2	2	<Files\\KII With Dr Lukman WHO, system evalustion> increase the number of the workforce so that they don't get fatigue on the concurrent programs because if all our providers are in the field doing SIAs, who mans the facility?
Estimate with previous month data	Recommends using data from the previous month for more accurate estimates.	1	1	<Files\\LIO Tambuwal LG> - I recommend this estimation Gaskya, I am recommend that the data of last month be use to be our target of next month."
Government should be accountable	Calls for governmental responsibility in ensuring DHIS effectiveness.	1	1	<Files\\LIO Tambuwal LG> I recommend this estimation Gaskya, I am recommend that the data of last month be use to be our target of next month."
Harmonize activities	Encourages coordination and alignment of various activities for improved efficiency.	1	1	<Files\\Transcript on System Evaluation - NERICC Data Manager> OK. Yes, I think what is very critical now has been recommended by various quarters is to harmonize our micro plan, right, harmonize the SIA and routine immunization micro plants such that it makes life easier for people at that lower level that. Was the first record.
Have Zero dose specified database	Proposes creation of a specialized database for zero-dose children.	1	1	<Files\\Transcript on System Evaluation - NERICC Data Manager> The second recommendation is to have a database of the number of 0 dose children or under-immunized children reached either through campaign or through routine immunization such that it when we are thinking about quantifying the number of 0

				dose children in the country, so once that database is available is accessible. It makes life easier for everyone.
House to House Enumeration	Suggests conducting data enumeration through house-to-house visits.	1	2	Files\\State Partners Sokoto> - So but let us involve local people that really need their people to have this house to house headcount of this target children so that whatever we immunized, we will know that this is our real target otherwise we will continue to use the projected population or the average of the three last rounds etc.
Individual care system	Recommends a personalized approach to healthcare data collection.	1	1	<Files\\Transcript on System Evaluation - NERICC Data Manager> The second recommendation is the deployment of individual case based system. As I say, a case based system that collect data about the individual. It will help us to kind of identify and track these zero dose children. At their facility. So it's something that I felt the country needs to prioritize. The aggregate system is fine, fantastic, but we need at this moment. Where there are a lot of doubt about the quality of our data to as a matter of urgency, deploy a tracker system, which is a case based system to collect client data so that we'll be able to track them over time. We will also be able to identify defaulters. This will definitely reduce data quality issues, and improve the validity of the admin data as it were.
LGA review meeting for triangulation	Suggests local government area meetings for cross-verification and validation of data.	1	1	<Files\\State Partners Sokoto> So later in the day, the ward focal person from 10 or 11 ward … the …, gather at the local government level to conduct what we call Local government evening review meeting where by the data from all the wards is also aggregated to form the LGA data. The state technical person now enter into their own form, into their own while the LGA .. also enter into his own form provided by the … to ..a kind of opportunity to triangulate, to validate the data because the data from STF … is supposed to be the same with the data ..by the LGA person.
Monitoring and supervision of RI providers	Emphasizes the need for continuous monitoring and supervision of Routine Immunization providers.	3	3	Files\\Transcribed LGA- KII_Partner_Bauchi LGA> - Through monitoring and supervision because There are sometimes that some of these RI providers try to falsify data. So through effective Monitoring and supervision, we will be able to get a. Very good data.

Query late submitters	Involves investigating and addressing delays in data submission.	1	1	<Files\\LGA M&E Ganjuwa LGA> - Late submitters are summoned in the LGA and queried if they have no genuine reason for late or no submission.
Review meetings with stakeholders	Advocates for periodic meetings involving relevant stakeholders for comprehensive data review.	1	1	<Files\\State Partners Bauchi> - Currently on monthly basis, we conduct what wecall a LGA a review meetings. state review meeting and ward level review meeting. And at all these levels, what we dois data validation. one of the componentsactually the the activity has three components. The first component ispresentation of the data or let's say performance program performance. OK, now you tell us that months previous month that passed, what was the performance? What is the penta 3 coverge. the second components ofthe exercise is to Dao data validation facility by facility. We bring their data, their their, their tools, their registers and the summary and we will validate the data and see are the data talking to each other? is the summary and the tally and the register are they alighningor they are in disarray?deciding?
Technology cant improve RI	Acknowledges limitations in technology's ability to enhance Routine Immunization.	1	1	<Files\\LGA M&E Jere LGA> - Actual technology I say no, technology is not to support improve RI because I don't think technology is improving RI. I don't think so. Yeah.
Timely payment of transport allowance and increase	Stresses the importance of timely payment and increased allowances for transportation.	2	2	<Files\\LGA M&E Ganjuwa LGA> - also government should increase transport stipends. Even though we have divided the LGA into two axis Ganjuwa and Soro but still transport is insufficient.
Timely reporting	Emphasizes the significance of submitting data within specified timeframes.	2	2	Files\\LIO Tambuwal LG> - Through the providers, providers they have to complete their data, in time we can enter it into DHIS before the closing time."
Train Locals to deliver health services	Recommends training local individuals to provide healthcare services and assist in data collection.	2	2	<Files\\State Partners Sokoto> - The people that have finished their education and are health workers that are not employed, government can make effort to employ more so that we can have more hands and have people available to go to places whereby services can be rendered even if not supervise at least those people can provide adequate services.

Training of HWs	Advocates for ongoing training programs for health workers.	8	8	<Files\\LGA M&E Sumaila LGA> The validity of the of the data to me will be improved through training for health providers in terms of data it will imporive their knowledge on data quality. <Files\\LGA M&E Jere LGA> - Training of RI providers and M&E officers on data entry, validation and analysis.
Use CGs for enumeration	Suggests involving community gatekeepers in data enumeration processes.	2	2	<Files\\Transcribed KII_LGA Partner_Jere LGA_30th Oct 2023> - That's what I was saying by awareness, by the traditional religious and religious leader and by outreach.
USe GIS for microplan location tracking	Proposes the use of GIS technology for tracking locations during microplanning.	2	2	<Files\\Transcript on System Evaluation - NERICC Data Manager> We felt the use of map. And also a digital micro plan will help us to know the locations where there are, you know those children and so that we could develop interventions that will help to reach it.
Use Grided Estimates for Population projection	Recommends employing gridded estimates for more accurate population projections.	1	1	<Files\\Transcript on System Evaluation - NERICC Data Manager> Yeah, in, in my opinion, my recommendation will be for now, pending when the next the next census will be conducted in Nigeria, we can make use of the Gridded estimate just to plan for retaining RI program for now so. Pending when censors will be conducted, if we make use of Gridded estimate, it might not be 100% accurate but it give us an idea of how many population are existing within each of the administrative level, whether it's facility attachment or ward. You can even aggregate it to state and national.
Use of trackers	Suggests the use of tracking tools for improved data monitoring.	1	1	<Files\\Transcribed - LGA-KII__PARTNER_SUMAILA LGA> Yes, this tracker can help a lot. Because since we have the list of the settlements, so by using this tracker We can track the teams, that have reached our land settlements or not, we can use the tracker to see these settlements are they reached or not.
Strengths	Highlights the positive aspects and capabilities of the DHIS system.	0	0	
Identify performing Health facilities	Recognizes and acknowledges health facilities demonstrating exemplary performance.	4	4	Files\\LGA M&E Sumaila LGA> - We know the system is functioning or fully benefiting to the to the client or caregiver by comparing with the performance of the previous month with current month. If

				the performance is low we are taking care of that of that facility with low performance and support them to identify the missed children.
Measure Indicators monthly	Emphasizes the regular measurement of key indicators on a monthly basis.	10	13	<Files\\LIO Borno State (Maiduguri LGA)> - We must have a meeting to make assessment until we tell them this is your weakness. This wherever you are, make concession. You are weak. So you are weak on this. You are weak on this. We have to identify all areas by per city on monthly basis. <Files\\LIO Sokoto State (Tambuwal LGA)> When we are immunizing the child then we are enter, entering the tally sheet and the register. Also in the end of the month we can enter the vaccine utilization into DHIS.
Use data to create Social mobilization plan	Recommends leveraging data for the development of effective social mobilization strategies.	1	1	<Files\\State Partners Sokoto> this is how we create social mobilization plan to go out and these children and also track defaulters using our various outlet the VCMs, the CBHBs the field volunteers and also the WDC members we are supposed to track these children and bring them back to the system .
Accessible and ease of use	Highlights the user-friendly and accessible nature of the DHIS system.	10	10	<Files\\State Partners Bauchi> DHIS2 data. That is the data that is being uploaded which is an administrative data. That is being uploaded into the DHIS2 and the DHIS2 is in the public domain. It's in the public domain. You can easily access that, bring it down to your analysis, and know whether Bauchi has example has 700 or 750,000 eligible children.
AEFI Data	Focuses on the analysis of Adverse Events Following Immunization (AEFI) data.	1	1	Files\\State Partners Sokoto> - While some times, or most of the time, the CDC focal person at the LGA now collect the RI data and ... for adverse ... event following immunization . and some times, this data are sent to the state level and the state level at the EOT use that data for the day to discuss the happening at various LGAs and wherever they pinpoint problems are discussed and solutions are proffered. And that data is transmitted to the national.
Analysis of data reported by REW microplan	Evaluates and interprets data reported by REW microplan.	1	1	<Files\\State Partners Sokoto> - Like I told you once this data are entered, analysis can be done and since analys is done by health facility, they are likely to identify which settlement have we call them.. Orphan settlement..and the is likely to be missed children on those settlements . so aggregate of those settlement fish out and then going settlemnent

				by settlement because the register captures children by settlement.and it os likely that if any child is not captured and is found in the community then we know that that child is a zero dose.
Locate missed settlements	Aims to identify and address areas or communities that may have been missed during data collection.	10	13	<Files\\LGA M&E Sumaila LGA> \ Technology can help us identify settlement specific zero dose.
Monthly Data access timely	Emphasizes the prompt and regular access to data on a monthly basis.	3	4	<Files\\Transcript on System Evaluation - NERICC Data Manager> So we have the national data system which we know as DHISII system that we use to monitor routine immunization program on a monthly basis
Reconciliation meeting with CGs	Involves meetings to reconcile and align data with Community Gatekeepers (CGs).	2	2	<Files\\LGA M&E Sumaila LGA> - It starts from the facility. Reported in register to ward level to LGA where it is collated and we enter it into DHIS2.
Record facility RI activities	Encompasses the documentation of Routine Immunization (RI) activities at healthcare facilities.	2	2	<Files\\M & E Sokoto State (Tambuwal LGA)> It helps a lot because through, by reporting this data, of the children being immunized, you will see the figure or total the number of the clients being immunized at the facility or at that particular ward, it is through the reporting that we can know whether we are progressing or not progressing, so that we can know the achievements we have gone
Storing Child record during enumeration and all activities real time	Advocates for the real-time storage of child records and all related activities during enumeration.	2	3	<Files\\LGA M&E Sumaila LGA> It starts from the facility. Reported in register to ward level to LGA where it is collated and we enter it into DHIS2. We are using data to identify the children that have not receive penta one through the antigen given to the children when it come to the age of receiving the penta one, and we observed that we are very low compared with the target children under that facility. This is the first step that we're using to identify because if it is facility has a target we can be able to calculate the zero dose.
Support of CGs	Highlights the importance of community gatekeepers in	1	1	<Files\\State Partners Sokoto> -

	supporting data collection efforts.			The strenght is that if they do the work deligently, the community members especially at the settlement they know each and every household, they can go and enumerate these children. And any child that is out of the area until immunization is well known to the health facility provider and the community
Timeliness	Addresses issues related to untimely reporting and provides solutions for prompt data submission.	0	0	
Defaulters-late reporting	Sets specific deadlines for the submission of data to ensure timely reporting.	2	2	<Files\\LGA M&E MMC LGA_1> - Not all the data is submitted on time. Reason is because of lack of data tools. The completeness is there, but the timeliness is not there because we are not getting data in time.
Stipulated data submission time		2	2	Files\\LGA M&E Ganjuwa LGA> - We have a timeline for reporting which is from 5th to 14th then we start doing ward level or monthly validation
Untimely reporting		5	6	<Files\\State Partners Sokoto> - The only may be bottle neck is thatbthere is a timeliness , before 14th of any month , you can not have the data complete. So you must have to wait for that date for you to have the complete data. Otherwise you can target the particular LGA where you want the data and then collect it directly.
ZD Measurement		0	0	
Denominators	Describes various methods and criteria for determining the denominators in measuring zero-dose (ZD) children.	0	0	
20 percent of population	Specifies a percentage of the population to be considered in certain calculations.	4	4	<Files\\LGA Partners MMC Borno State> - The target population by settlements? we used to, let's say the target population of that ward. Just 20% of it, that's where you can able to target the Under 1 children.

4 percent of projected population	Establishes a percentage of the projected population for specific assessments.	7	7	<Files\\Transcribed - LGA-KII__PARTNER_SUMAILA LGA> - we are Guided through this 4% data And through it we are getting the Target population. Since there is no census done, we're using this as guide.
Average of last three rounds	Recommends considering the average of data from the last three reporting rounds.	1	2	<Files\\State Partners Sokoto> The second option is for you to use the average of the three last round … we can also use that to estimate the target population.
Based on consumption record	Utilizes consumption records as a basis for determining certain population factors.	1	1	<Files\\State Partners Sokoto> Sometimes immunization was done in a settlement and we have seen the number of children vaccinated there, and then when you are issuing new vaccines, we now issue based on what was consumed last time, and in case, additional population was found, we provide a buffer. so su[pplemental immunization activities is in a similar manner.
Population based on Conception	Suggests estimating population figures based on conception data.	1	1	<Files\\State Partners Sokoto> - We can also use population based on conception.
Settlement aggregates	Utilizes aggregated settlement data for various calculations and assessments.	2	2	Files\\State Partners Sokoto> - And you can also use the aggregate of what was eatimated in the previous year from both settlements, from both LGAs and ward and then we can now come up with a target population for that settlement using that projected population.
Analyzed priority LGAs	Focuses on the analysis and evaluation of data from priority Local Government Areas (LGAs).	1	1	<Files\\Transcript on System Evaluation - NERICC Data Manager> Yeah. As I said earlier, sometimes ago. It's more than a year now. We did zero those analysis to identify the number of 0-dose children as well as under immunized children. So we did this working with the University of South Hampton and statistician from GAVI so as to be able to identify the number of zero dose across all the LGAs in the country and that also help us to now prioritize 100 of these LGA out of 774. So. This is actually based on the pathway that we chose for the country and the pathway we chose for the country is to be able to reduce the number of 0 doses by 30% by 2025. That is the pathway the country choose so we hope that every year, each of these 100 LGAs prioritized will achieve 15% reduction in their number of.

Calculate number of unimmunized	Involves the calculation of the number of individuals who are not immunized.	2	3	<Files\\LGA M&E MMC LGA_1> In the DHS, we only see the immunized children and get population from facility and compare. When we subtract then we can know number of unimmunized.
Dashboard to measure facility level performance	Utilizes dashboards to assess and monitor the performance of healthcare facilities at a granular level.	2	3	<Files\\Transcript on System Evaluation - NERICC Data Manager> Here at the moment, there is a dashboard, a customized dashboard on DHIS2 system at the subnational level, which help them to make use of the data they have, right? So they have an idea of what the performance of the LGA looks like and even at the LGA level you have an idea of what the performance of the facility under the LGA looks like. I
Unrealistic estimates	Acknowledges challenges in making accurate estimates and proposes solutions.	1	1	<Files\\LGA M&E Ganjuwa LGA> - Sometimes they are giving false estimate and more children are being estimated which increases our drop out because of the high and unrealistic target.
Others		6	7	<Files\\Trancribed KII_Partner_Tambuwal LGA_1st Nov 2023> And secondly we we we look at the raw data at the health facility, all the data tools from the health facility be it the registers be it the, the, the. Immunization registers be a tally sheet and what have you in in the in the rotiner immunization data tools we look at every data from head to toe.
PAPA LQAS		0	0	
Data Quality	Focuses on ensuring the reliability and accuracy of collected data within the PAPA LQAS system.	0	0	
Limitation	Acknowledges and highlights the various limitations in the PAPA LQAS system and data collection process.	0	0	
Skills of health workers	Emphasizes the importance of health workers' skills in ensuring data quality within the PAPA LQAS framework.	1	1	<Files\\State Partners Bauchi> - Secondly, of course, is the issue of human resource. Human resource is a big, big challenge. A lot of the facilities have been manned by volunteers. And volunteers are not . You cannot hold us responsible.

Mitigation	Strategies and actions to address identified challenge.	0	0	
House to House Enumeration after location with high burden is known	Advocates for conducting data enumeration through house-to-house visits, especially in areas identified with a high burden of data.	1	1	<Files\\State Partners Bauchi> - I think what is most important to me is to me in terms of zero dose is to even know where those children are. There are many ways we can do that include using GIS mapping and what have you but what we did actually was house to house enumeration in some selected wards and what we found is amazing.
Use GIS tools to estimate eligible children	Recommends leveraging Geographic Information System (GIS) tools for estimating the number of eligible children in the context of PAPA LQAS.	1	1	<Files\\State Partners Bauchi> - I think using the communities using also the GIS is going to be very critical using technology to tohave a better estimateof how many kids we think in the settlement so that we can properly target them.
Strength	Focuses on the positive aspects and capabilities of the PAPA LQAS system, particularly related to data quality and completeness.	0	0	
Identify location with high zero dose burden	Emphasizes the need to pinpoint locations with a significant burden of zero-dose children within the PAPA LQAS framework.	1	1	<Files\\State Partners Bauchi> - We have been able to identify a lot of them, especially in terms of the local communities that have the high burden for these kind of issues we have also been able to do some level of analysis at our own level looking at different parameters and we have been able to arrive at which ones are even the most high burden wards, even among the facilities within the LGAs.
Provide quarterly tracking of RI reach	Highlights the importance of regular tracking of Routine Immunization (RI) coverage on a quarterly basis.	1	1	Files\\State Partners Bauchi> - Another activity that takes place to monitor what we do in RIis the quarterly PAPALQAS which the NPHCA supports and that is done on quarterly basis sampling different facilities and different wards, settlements to and they reaching them. Or do you still have children that have either drop? see how many children are fully immunized at their age and also how many are either partially immunized or not immunized at all.
Quarterly Score card for RI	Highlights the importance of regular tracking of Routine	1	1	<Files\\State Partners Bauchi> -

	Immunization (RI) coverage using a quarterly score card.			Also on quarterly basis at the state level we conduct what we call the the score card, the quarterly RMCH score card tells us facility by facility, ward by ward, LGA by LGA what are their coverage's across different indicators including Penta3 and other routine RI indicators to see how are they fairing, how are they doing and of course since it's a quarterly activities, so we keep tracking quarter in and quarter out to see whether there is progress or decrease in quality of what they do.
Weakness		0	0	
RI SMS Reporting		0	0	
Data Quality		0	0	
Completeness and validation	Recognizes the risk of data loss in the SMS reporting process and suggests mitigations to ensure completeness and validation.	1	1	<Files\\Transcribed Partner LGAF Kumbotso LGA Kano> - Yes, you validate the data Before sending. And verification.
Need community gatekeepers to validate	Acknowledges potential issues of low motivation during data validation with community gatekeepers and emphasizes their role in the validation process.	1	1	<Files\\Transcribed Partner LGAF Kumbotso LGA Kano> So no settlement is left out. And the reconciliation meeting is done, it's a strength because you'll be able to validate with the community leader.
Limitation	Proposes conducting a census to accurately determine settlements and population figures to address limitations in RI SMS reporting.	0	0	
Can not reach ZD child directly	Identifies the challenge of insufficient staff for effective SMS reporting within the RI context.	1	2	<Files\\State Partners Kano> - This this strength is that it fishes out those children. One of the weaknesses is that it doesn't go down to, it doesn't go down lower than the LGA level.
denominator might not reach actual target	Situation were denominator might not succinimide to .provide estimates.	1	2	Files\\Transcribed Partner LGAF Kumbotso LGA Kano> - The estimate is OK, but We are not reaching the actual target for population.

Difficult to capture some terrain	Highlights the accessibility of RI SMS reporting data to government and partnering organizations.	1	1	Files\\KII With Dr Lukman WHO, system evalustion> - Data can also be inaccessible if those populations that are supposed to be vaccinated are not reached. For instance if the population that are in security compromised areas, hard to reached or we have RI providers that are not committed, or they are in missed settlement. So this can also lead to data loss.
Lack of GIS mapping during sessions	Describes the capability of RI SMS reporting to capture information on RI sessions and reach, particularly focusing on the absence of GIS mapping.	1	1	<Files\\KII With Dr Lukman WHO, system evalustion> the gaps (1) none of these reporting systems can tell that an RI provider is actually at a settlement he plans to be. So an RI provider can decide to send data that does not represent the settlement they are supposed to cover for that week even though I am not saying this is the practice. Or they can conduct a fixed post and send it as a outreach or vice versa.
Limited fiances for SMS	Allows for the estimation of the number of target children through SMS reporting despite financial constraints.	1	1	<Files\\LIO Borno State (Jere LGA)> - Plan for a session and conduct the session for if they said they were going to release the money for outreach, for sending RSMS for monthly data validation, harmonization, meeting.
Lost of data	Supports the review of weekly activities through a dashboard for better decision-making and addresses challenges related to potential data loss.	1	1	<Files\\KII With Dr Lukman WHO, system evalustion> However, for the SMS server, it is usually associated with the complains of data loss. Data being uploaded but doesn't reflect on the server. This is one of the challenges.
Low motivation during validation with CG	Aims to identify and address cases of zero-dose children through SMS reporting, particularly focusing on issues of low motivation during validation with community gatekeepers.	1	1	<Files\\Transcribed Partner LGAF Kumbotso LGA Kano> The weakness is Some of the community leaders are not really active because they feel they are doing it voluntarily. Maybe if there is incentive, they will work better.

Mitigations	Enables access to data for thorough desk reviews and evaluations, proposing strategies to address challenges within the RI SMS reporting framework.	0	0	
Conduct census to determine settements and population	Supplies data necessary for planning and conducting RI sessions effectively, advocating for conducting a census to accurately determine settlements and population figures.	2	2	<Files\\Transcribed Partner LGAF Kumbotso LGA Kano> - I think census has to be done to be conducted by the government to really know the actual number of.
Shortage of staffing	Streamlines the process of sending data directly from healthcare facilities to the SMS server, particularly addressing challenges related to the shortage of staffing.	1	1	<Files\\LGA M&E Kumbotso LGA> - Secondly, the shortage of staff. Most of that service providers I have mentioned before is a temporary workers in some part of the facilities we have
Training of HWs	Emphasizes the importance of receiving timely data for informed decision-making, advocating for ongoing training programs for health workers involved in SMS reporting.	1	1	<Files\\LGA M&E Kumbotso LGA> - So means any technology that can help to boost that SMS reporting to give the service providers and other knowledge and on the job training to move toward them to give them supportive supervision. To boost outreach and have good knowledge on SMS.
Strength	Addresses issues related to untimely submission of SMS reports, emphasizing the positive aspects of the RI SMS reporting system.	0	0	
Accessible to government and partners	Stresses the need for prompt tracking of Routine Immunization (RI) activities within the RI SMS reporting context.	3	3	<Files\\Transcript on System Evaluation - NERICC Data Manager> even for SMS is also accessible to both government and partners at any level, whether national or sub national, so. They are all open system for anyone to use.
Captures RI sessions and Reach	Describes a specific denominator (4 percent of the population) for	1	1	<Files\\State Partners Bauchi> -

	measuring zero-dose children within the RI SMS reporting framework.			the SMS platform provides another Avenue whereby sessions can be planned and conducted, and also capture children actually immunized through that. We track whether sessions are being conducted or not, whether children are actually reached or not, and also whether vaccines are properly utilized or not, even sometimeswhether vaccines have Stakeout during any particular session, whether a fixed or outreach session, all that can be traced using the SMS platform
Enable estimation of target children	Facilitates the easy evaluation of the target number of zero-dose children, particularly focusing on the ability to estimate the target population.	1	1	<Files\\LGA M&E Kumbotso LGA> - So the advantage of estimating the number of children is for us to forecast how many vaccines do we need during the routine immunization? So if we don't have the targeted number of children, we don't estimate the vaccine that we are going to collect from these states.
Enable Weekly activities dashboard review	Allows for quick identification of areas with a high prevalence of zero-dose children through a dashboard review of weekly activities within the RI SMS reporting system.	4	4	<Files\\State Partners Bauchi> - Even today we had the SERICC meeting, which is the State Emergency on Routine Immunization Coordination Center whereby the weekly dashboard, the weekly SMS dashboard report was downloaded. It was analyzed for last week. It was discussed. We've seen. How many kids, vaccine wastages How many plans against how many conducted You know
Fish out zero dose children	Aims to identify and address cases of zero-dose children through SMS reporting, focusing on the proactive approach of "fishing out" these children.	1	1	<Files\\State Partners Kano> - of course we have the SMS, it's OK there is no problem. It has always fish out those have never had Penta 1.. both the SMS and the DHIS, it always tell us the level of immunization of children at any level. So it fishes out those that have not been vaccinated at all
Provide access to data for desk review and evaluation	Enables access to data for thorough desk reviews and evaluations, emphasizing the importance of data in assessing performance and making informed decisions.	1	1	<Files\\Transcript on System Evaluation - NERICC Data Manager> Yeah, currently we do some sort of data desk review. So, since we have an idea of the population that have received penta1, one which is the DPT1, we could do a kind of analysis to find the difference between that population that I have received and the population that I have not received. So as to know who are the 0 dose, particularly those that have not received Penta1.
Provide data for planning and conducting sessions	Supplies data necessary for planning and conducting RI sessions effectively, focusing on the role of data in the	1	1	<Files\\LIO Borno State (Jere LGA)> - Then we have a RI SMS real time SMS reporting by the healthcare which they used to report their planning session and conducted session.

	programmatic aspects of immunization.			
Sends from facility directly to SMS server	Streamlines the process of sending data directly from healthcare facilities to the SMS server, ensuring efficiency in data transmission.	1	1	<Files\\Transcribed Partner LGAF Kumbotso LGA Kano> SMS is from the health facility directly to the server.
Timely data for Decision making	Emphasizes the significance of timely data for informed decision-making within the RI SMS reporting context.	1	2	<Files\\Transcript on System Evaluation - NERICC Data Manager> also just of recent we develop an SMS based system not to collect data directly from the facility so as to provide timely and timely data and for quick decision making both at the state and national.
Timeliness	Addresses issues related to untimely submission of SMS reports, advocating for timely reporting within the RI SMS reporting system.	0	0	
Defaulters in sending SMS	Sets specific deadlines for the submission of data to ensure timely reporting and addresses issues related to defaulters in sending SMS.	1	1	Files\\LGA M&E Kumbotso LGA> We have gap in sending SMS from the facilities you know the facilities are going to send the SMS directly to the server. So if they didn't send it at the end of the month we are going to crosscheck between SMS and DHIS 2, we are going to send, so we see the gap of immunized because they are not sending it on time.
Timely tracking of RI activities	Advocates for timely tracking of Routine Immunization (RI) activities within the RI SMS reporting framework.	1	1	<Files\\State Partners Bauchi> - the SMS platform provides another Avenue whereby sessions can be planned and conducted, and also capture children actually immunized through that. We track whether sessions are being conducted or not, whether children are actually reached or not, and also whether vaccines are properly utilized or not, even sometimeswhether vaccines have Stakeout during any particular session, whether a fixed or outreach session, all that can be traced using the SMS platform,
ZD measurement		0	0	
Denominator	Describes various methods and criteria for determining the denominators in measuring zero-	0	0	

	dose (ZD) children within the ZD measurement framework.			
4 percent of population	Specifies a percentage of the population to be considered in certain calculations within the ZD measurement context.	2	2	<Files\\Transcribed Partner LGAF Kumbotso LGA Kano> - We use the percentage of under 1. I think It's 4%. Yes. Yeah, it's 4% of the total population.
Easily evalute zero dose target	Facilitates the easy evaluation of the target number of zero-dose children, particularly focusing on assessing zero-dose targets.	1	1	<Files\\Transcript on System Evaluation - NERICC Data Manager> Yeah, currently we do some sort of data desk review. So, since we have an idea of the population that have received penta1, one which is the DPT1, we could do a kind of analysis to find the difference between that population that I have received and the population that I have not received. So as to know who are the 0 dose, particularly those that have not received Penta1.
Easily spot locations with zero dose children	Emphasizes the ability to easily identify locations with zero-dose children within the ZD measurement framework.	3	3	<Files\\KII With Dr Lukman WHO, system evalustion> - the strength of the system is the fact that you can (in a system that is working optimally), you can in real time week in week out actually make the effort and reach new born as well as those that have defaulted. The SMS particularly can be able to give an idea that if we have feedback of new born under a particular health facility and we compare that with the data on the SMS we can be able to say we have a gap in reaching new born.
Facility register allows reconciliation meeting and follow up	Highlights the role of facility registers in allowing reconciliation meetings and follow-up, particularly in the context of ZD measurement.	1	1	<Files\\Transcribed Partner LGAF Kumbotso LGA Kano> - There's a register. The register at for routine immunization is by settlement. And every month we normally sit with the Community leader of that area where the hospital is serving. So then they have their own names and number of clients. Reconciliation meeting. So that is how we reconcile the client. We track through the reconciliation meeting so we know the client that came then we follow up.
Routine Immunization Supportive Supervisory (RISS) Checklist		0	0	
Data Quality	Focuses on ensuring data quality within the RISS checklist framework, addressing	0	0	

	challenges and proposing strategies for improvement.			
Limitation	Acknowledges limitations within the RISS checklist framework and suggests ways to overcome or mitigate these challenges.	0	0	
Mitigation	Proposes strategies and actions to mitigate challenges within the RISS checklist framework, particularly focusing on improving data quality.	0	0	
Strength	Highlights the positive aspects and capabilities of the RISS checklist, emphasizing its role in guiding RI supervision, monitoring activities in facilities, and providing community coverage data.	0	0	
Guide RI supervision	Emphasizes the role of the RISS checklist in guiding Routine Immunization (RI) supervision activities.	1	1	<Files\\State Partners Bauchi> - And equally. we supervise on monthly basis through what we call the routine support supervision, the RISS to see how far are the facilities conducting these services and even part of the RISS isto of course do a Sample community survey to see what is the reach in those s location within which those facilities provide services across the eligible children. Are they reaching them or do you have children that have either drop out or they were even zero dose or that were not fully immunized at their age or they were fully immunized at their age.
Monitor RI activities in facilities	Highlights the capability of the RISS checklist to monitor RI activities in healthcare facilities.	1	1	Files\\LGA M&E Bauchi LGA> - we do supervision that is RISS integrated supporting supervision every month. I have four health facilities to visit every month
Provide community coverage data	Describes the role of the RISS checklist in providing data related	1	1	<Files\\State Partners Bauchi> - Ask the team to also look at the RISS data. And look at the community sampling and that we do dis, fthose ten ten householder we sample and see how many percentage

	to community coverage in the context of Routine Immunization.			are fully immunized And how many are partially immunized and how many are not immunized at all?
Weaknesses	Recognizes weaknesses within the RISS checklist framework, addressing issues related to ZD measurements, identification of drop-out children, and surveillance data.	0	0	
ZD Measurements		0	0	
Identify drop out children	Emphasizes the role of ZD measurements in identifying drop-out children and addressing weaknesses within the RISS checklist framework.	1	1	<Files\\LGA M&E Ganjuwa LGA> - In this supervision if we go to the facility and we see there's a drop out of penta 1. That we can go through the tickler box and count it and compare with the register. From there we can see that there is this one child that have not returned to the hospital.
Surveillance Data	Describes the role of surveillance addressing challenges, limitations, and strengths.	0	0	
Data Quality		0	0	
Limitation	.	0	0	
Restricted to NCDC	Acknowledges limitations of surveillance data being restricted to the National Center for Disease Control (NCDC).	1	1	<Files\\Transcript on System Evaluation - NERICC Data Manager> At the moment, our surveillance data. Particularly the one that has to do with the routine immunization surveillance data for measles, yellow fever and all that. They are still not within the custody of the government. When I say government, I mean NPHCDA. So sometimes we struggle to get this kind of data. So it's very difficult to get such data at the moment we need to now rely entirely on NCDC to get this data and the data is actually not available as. As we might want to have
Mitigation	Proposes strategies to address challenges related to surveillance data.	0	0	

Strengths	Highlights the strengths of surveillance data, recognizing its positive aspects.	0	0	
ZD Measurements		0	0	

Appendix II: Codebook for Barriers and Enablers Analysis (Caregivers and Community Gatekeepers)

Name	Description	Number of Respondents	Number of times mentioned	Examples
Caregivers	Represents primary caregivers making healthcare decisions for a child.	0	0	
Practical Issues (Barriers and Facilitators to seek and receive vaccines)	Examines factors influencing vaccination decisions.	0	0	
Accessing Immunization -before	Focuses on actions and circumstances before vaccination.	0	0	
Arrived Early	Indicates instances where individuals arrived early for vaccination.	1	1	I normally gather everything on time because the vaccine does not like a hot sun. People actually come early. So, whatever it is I want to do, I normally leave it until I come back. (CG04) BG-IDI_CAREGIVER_SUMMUU SETTLEMENT_ SUMMU PHC_BAUCHI LGA
feed, bath and dress child	Examines activities of feeding, bathing, and dressing a child in preparation for vaccination.	9	9	I would breastfeed my baby well, before I bath it, dress it up, dress it using diapers, carry it on my back, and take it for vaccination. <Files\\(CG13) BornoJ - IDI
House Nearby(Proximity)	Identifies situations where individuals live close to vaccination facilities.	2	2	See my house over there; it's the first one you spot as you go out. If you talk loudly I will hear; that right there is my house, just a stone's throw away. <Files\\(CG04) BG-IDI_CAREGIVER_SUMMUU SETTLEMENT_ SUMMU PHC_BAUCHI LGA
Need to complete chores	Explores challenges attending vaccination due to household responsibilities.	16	16	What preparations? The first thing I would do in the morning is sweep the house. I would then wash the kid's clothes, then wash dishes, after which I would prepare breakfast, and I would come after taking breakfast <Files\\(CG12) Borno M - IDI_caregiver_Goni kime_Baga Road PHC_Maiduguri
Seeking Spousal Approval	Examines the practice of seeking spousal approval for child vaccination.	2	2	I ask for his permission and he grants it. Sokoto WMK - IDI caregiver KSARAWA SETTLEMENT KSARAWA
Transport by foot(Proximity)	Indicates instances of walking as a mode of transportation for vaccination.	12	12	Yes, when I think of the importance of it, I'll then focus on the vaccination and rush to the place by foot. <Files\\(CG11) Borno M - IDI_caregiver_Dala Yazaraye _Abujan Talakawa PHC_Maidug I walk because we are not far from the hospital. <Files\\(CG32) Sokoto WMK - IDI caregiver KSARAWA SETTLEMENT KSARAWA

Transport by tricycle or motobike	Examines the use of tricycles or motorbikes for accessing vaccination services.	6	6	Well, we would either come by tricycle, taxi, or motorbike. Today, I came by tricycle. <Files\\(CG13) BornoJ - IDI
Accessing the vaccine at the facility	Focuses on the process of accessing the vaccine within the vaccination facility.	0	0	
Agency -Accompany and stay with friends	Explores the practice of accompanying and staying with friends during vaccination visits.	1	1	Whenever we come, I would sit with my friends because I come with my friends and chat before we take the vaccines, after which we would go back home. Borno M - IDI_caregiver_Goni kime_Baga Road PHC_Maiduguri LGA_2nd Nov 2023 (ENGLISH)> -
Arrived Late	Indicates instances where individuals arrived late for vaccination.	2	3	Well, apart from one issue due to my late arrival, I've not faced any other problems during vaccinations. Kano Kbt - Continuation IDI caregiver Gaida Fulani Charanci Kumbotso Kano 2 (ENGLISH)> -
Asked not to bath Child	Explores situations where individuals are advised not to bathe their child before vaccination.	4	4	Honestly, after they've given us the vaccine, they'll tell us when we get home we should not bathe the child. BG-IDI_CAREGIVER_SUMMUU SETTLEMENT_ SUMMU PHC_BAUCHI LGA (ENGLISH)-- 2> -
Bought book to replace card	Examines instances where individuals use books as a replacement for vaccination cards.	1	1	<Files\\(CG21) Kano Kbt - IDI Damfami Chalawa Kumbotso Kano (ENGLISH)> - Card... yes, the card wasn't available. Yes, I bought...Yes, so the details would get copied the next time I went back. Then...
Child Profiling	Explores the practice of profiling children, possibly related to vaccination records and health status.	10	12	<Files\\(CG31) Sokoto WMK - IDI caregiver B KUSU KLAMBAINA WMK 31-10-2023> - She asked how many injections did the child receive. She then takes our photograph Files\\(CG16) BornoJ - IDI1 (ENGLISH)> - Though we go to a farther vaccination point when we couldn't get vaccinated here. If not, I always get my children vaccinated here. My children were once admitted here, about two or three times, without going to a higher-level hospital
Close after 12	Indicates instances where vaccination facilities close after 12 PM.	1	1	<Files\\(CG20) Kano Kbt - IDI caregiver Gaida Fulani Charanci Kumbotso 1 (ENGLISH)> - Around twelve in the noon. They said, they closed. My neighbor and I even went to different locations in the hospital, trying to find a way out. Yet they were determined not to do it for us. Well, this happened to me two times. So, I didn't come back again. However, I went two times (received Penta 1 and Penta 2) after they received BCG.
Counsel on caring for children	Explores counseling sessions related to general care for children, potentially including vaccination advice.	2	2	<Files\\(CG13) BornoJ - IDI 2 (ENGLISH)> -

				Well, they would tell us to take good care of our children. If it's during harmattan, they would tell us to dress them up in sweaters after bathing them with warm water.
Counsel on Immunization	Examines counseling sessions specifically focused on immunization practices and information.	11	12	Files\\(CG08) BG- IDI_Caregivers_Gabi settlement_Gabi PHC_Ganjuwa LGA_31st Octo (English)> - you will be asked questions, "What was the last time you came for vaccination? Did you see its use?" You will explain and tell the story about your experience. If the child still has a fever, this will not be a problem. The vaccination circulates within the body. They say. <Files\\(CG03) BB-IDI_CAREGIVER_SHAF PHC_BA UCHI LGA_2ND NOV 2023–ENGLISH (2)> - They advise us on the importance of vaccination and tell us about the type of vaccine given to our children.
Examine Child	Examines the physical condition or health status of the child, possibly pre/post-immunization.	3	3	Files\\(CG31) Sokoto WMK - IDI caregiver B KUSU KLAMBAINA WMK 31-10-2023> - They do ask about the wellbeing of the child. They check to make sure he is well before the immunization. We go home afterward.
Follow up on previous vaccine experience	Investigates actions taken or inquiries made regarding the individual's previous vaccination experiences.	2	2	iles\\(CG14) BornoJ - IDI 3 (ENGLISH)> - No. They ask how was the first vaccine, "Was the child affected by fever? If yes, did you give him paracetamol? Did the injected location pained the child or get swollen?" They ask such questions. <Files\\(CG21) Kano Kbt - IDI Damfami Chalawa Kumbotso Kano (ENGLISH)> - Yes, they didn't talk to us at first. They only asked why I didn't bring him when he was born. I said I completely forgot.
Free with a female HW	Indicates situations where individuals receive immunization services for free, specifically from a female healthcare worker.	1	1	iles\\(CG31) Sokoto WMK - IDI caregiver B KUSU KLAMBAINA WMK 31-10-2023> - I am more at ease with Aunty Maryam.
Given PCM for fever	Examines instances where individuals are provided with Paracetamol (PCM) for fever, potentially after immunization.	2	2	<Files\\(CG13) BornoJ - IDI 2 (ENGLISH)> - When we receive vaccines, the children would sometimes feel fever, where they would give us paracetamol before we leave.
Hand washing practice	Explores the practice of handwashing, possibly in relation to immunization hygiene.	2	2	Files\\(CG07) BG- IDI_Caregiver_Unguwan Madaki_Kubi PHC_Ganjuwa LGA_2nd November (English)> When it is your turn, you should go and wash your hands with hand sanitizer before proceeding.

No Certificate issued	Indicates situations where no official certificate is issued following the immunization process.	1	1	Files\\(CG06) BG- IDI_Caregiver_Hakatafi_Hakatafi PHC_Ganjuwa LGA_3rd November 2023 (English)> - .there will be a BCG, but they don't have a certificate. Then he will say, God willing, this time everyone whose name is in this register, God willing, will be given a certificate.
Protect the child from sunlight by taking tricycle	Examines the practice of using a tricycle to protect a child from sunlight, potentially after immunization.	1	1	Files\\(CG12) Borno M - IDI_caregiver_Goni kime_Baga Road PHC_Maiduguri LGA_2nd Nov 2023 (ENGLISH)> - § Yes, if the sun is shining, we would go back by tricycle. But if it's in the morning, we would trek back home
Queuing	Explores experiences and challenges related to queuing for immunization services.	16	17	Files\\(CG10) Borno M - IDI_caregiver_Dala Masalacin Deribe_Fatima Ali SHeriff PHC_Maiduguri LGA_01st Nov 2023 (English)> - Yes, that's true. Whatever wastes time is embarrassing, especially when there's a long queue, and you're eager to return home
Schedule for Subsequent vaccine	Examines the planning or scheduling of subsequent vaccine doses for individuals.	3	3	Files\\(CG07) BG- IDI_Caregiver_Unguwan Madaki_Kubi PHC_Ganjuwa LGA_2nd November (English)> - Since the child was three weeks old, we took him for BCG. We were given a card with the return date written on it. So, when the time approaches, we check the card to confirm if it's time to go
Sometimes go to farther clinic	Indicates instances where individuals sometimes seek immunization services from farther clinics.	1	1	Files\\(CG16) BornoJ - IDI1 (ENGLISH)> - Though we go to a farther vaccination point when we couldn't get vaccinated here. If not, I always get my children vaccinated here. My children were once admitted here, about two or three times, without going to a higher-level hospital.
Timeliness	Examines the importance and adherence to timely attendance for immunization appointments.	1	1	<Files\\(CG13) BornoJ - IDI 2 (ENGLISH)> Time isn't wasted… Time isn't wasted if I come in the morning. But if I didn't come in the morning, I may only receive the vaccine after three or four people received the vaccine, and I would go back home on time.
Vaccine is always available at the facility	Indicates situations where vaccines are consistently available at the immunization facility.	1	1	Files\\(CG17) Kano Kbt - IDI Caregiver Hausawar Kirimbo Panshekara Kumbostso Kano (ENGLISH)> Yes, we have never been told that.
We don't pay	Explores experiences of not having to pay for immunization services.	17	17	Files\\(CG19) Kano Kbt - Continuation IDI caregiver Gaida Fulani Charanci Kumbotso Kano 2 (ENGLISH)> - § 1 reference coded [I only went there for the vaccinations; nothing else was discussed, and I didn't have to pay for anything at all. I wasn't asked... Files\\(CG28) Sokoto TML - IDI Caregiver_Nasarawa settlement_PHC sanyinna Tambuwal LGA 3rd Nov 2023> -

				Actually, we do not give any money. In fact, they give us money to buy medicine for our children in case of fever.
Weight Measurement	Examines the practice of measuring a child's weight, potentially in relation to immunization.	1	1	Files\\(CG09) Borno M - IDI_Caregiver_Bulama fandi_Bulabulin Ngaranam PHC_Maidu (English)> - Until your weight is measured before proceeding for injection.
Don't measure	Indicates situations where the weight of a child is not measured during the immunization process.	1	1	\\(CG10) Borno M - IDI_caregiver_Dala Masalacin Deribe_Fatima Ali SHeriff PHC_Maiduguri LGA_01st Nov 2023 (English)> - No they don't measure the weight.
Who takes the child for vaccination		0	0	
Child's Sister(Adolescent)	Explores the involvement of an adolescent sister in taking child for immunization.	1	1	Files\\(CG26) Sokoto TML - IDI_care giver_Nabaguda Settlement__PHC Nabaguda_Tambuwal LGA_2nd Nov 2023 (English)> Fatima.Fadimatu: She is my daughter. She is not that big, she is an adolescent
Father	Examines the role and involvement of the child's father in the immunization process.	1	1	Files\\(GK22) translated Kano SML Community- KII GATEKEEPERS - MASSU WARD-SUMAILA LGA_ 31st Octo> You took the child by yourself to the hospital? I have done so several times
Grandma	Explores the involvement or influence of the child's grandmother in the immunization process.	1	2	Files\\(CG09) Borno M - IDI_Caregiver_Bulama fandi_Bulabulin Ngaranam PHC_Maidu (English)> - Their mother went to work and left them here with me. And now that my daughter is out for work I'm looking after her children
Mother	Examines the role and experiences of the child's mother in the immunization process.	12	12	\\(CG12) Borno M - IDI_caregiver_Goni kime_Baga Road PHC_Maiduguri LGA_2nd Nov 2023 (ENGLISH)> - No. He's never taken them to the vaccination. I always do that. iles\\(CG08) BG- IDI_Caregivers_Gabi settlement_Gabi PHC_Ganjuwa LGA_31st Octo (English)> I did it alone. I take them to the hospital myself.
After Immunization		0	0	
AEFI	Adverse Events Following Immunization, explores adverse reactions post-immunization	12	12	<Files\\(CG27) Sokoto TML - IDI_caregiver_Maikade settlement_PHC Maikade_Tambuwal LGA_1st Nov 2023 (English)>

				No, he does not feel anything. The moment he slept and he woke up, and you bathe him, that is all. I only felt pain when the place swells up, and I asked people about it, and they said it will be okay. s\\(CG13) BornoJ - IDI 2 (ENGLISH)> - sometimes the vaccine would incur fever in the child, where they would give us paracetamol. If they don't have, we would go and buy from pharmacy, before we get back home
Antenatal service	Relates to experiences or utilization of antenatal services	1	1	Files\\(CG02)_BB-IDI_CAREGIVER_KUSI PHC_BAUCHI LGA_1ST NOV. 2023_ENGLISH> - They do antenatal
Child Profiling	Examines the process of gathering information about a child	2	2	Files\\(CG28) Sokoto TML - IDI Caregiver_Nasarawa settlement_PHC sanyinna Tambuwal LGA 3rd Nov 2023> - Zainab: Nothing much happens; after the vaccine, you go and see someone who snaps a photo,
Discouraged to contiue	Explores instances where individuals are discouraged from continuing immunization.	4	6	Files\\(CG08) BG- IDI_Caregivers_Gabi settlement_Gabi PHC_Ganjuwa LGA_31st Octo (English)> - I cannot sleep whenever she is vaccinated. She screams at night; she does not sleep. That is why I stopped.
Husband come to pick them	Indicates husbands actively participating in picking up mother and child after immunization.	1	1	<Files\\(CG31) Sokoto WMK - IDI caregiver B KUSU KLAMBAINA WMK 31-10-2023> My husband will come and carry me.
Incentive	Investigates the impact of incentives on immunization decisions	6	6	Files\\(CG09) Borno M - IDI_Caregiver_Bulama fandi_Bulabulin Ngaranam PHC_Maidu (English)> - § 1 reference coded [0.69% Coverage] Reference 1 - 0.69% Coverage After that, they will tell us to come for vaccination. Those who performed better even get gifts. Files\\(CG26) Sokoto TML - IDI_care giver_Nabaguda Settlement__PHC Nabaguda_Tambuwal LGA_2nd Nov 2023 (English)> - Yes, they will start giving five hundred Naira, then later one thousand Naira.
Refered to buy PCM from chemist	Examines instances where referral to buy Paracetamol (PCM) occurs	2	2	Files\\(CG13) BornoJ - IDI 2 (ENGLISH)> - sometimes the vaccine would incur fever in the child, where they would give us paracetamol. If they don't have, we would go and buy from pharmacy, before we get back home

Return home to rest	Explores the practice of returning home to rest after immunization	2	2	<Files\\(CG31) Sokoto WMK - IDI caregiver B KUSU KLAMBAINA WMK 31-10-2023> - The children eat food and leave for school. I will give the child the paracetamol they give me and make him sleep. Files\\(CG32) Sokoto WMK - IDI caregiver KSARAWA SETTLEMENT KSARAWA 2-11-2023> - If there is work, I finish it first. If there is no work, I rest.
Take transport return to chores	Examines transport use due to sun exposure concerns post-immunization	1	2	Files\\(CG27) Sokoto TML - IDI_caregiver_Maikade settlement_PHC Maikade_Tambuwal LGA_1st Nov 2023 (English)> - No problem at all. The moment you are attended, you will just go home, only if it is not sunny and hot. But if it is, then you have to wait for the temperature to cool down, and if you have your transport fare, you will use a bike and go home to cook.
Walk home	Indicates instances where individuals choose to walk home after immunization	1	1	Files\\(CG32) Sokoto WMK - IDI caregiver KSARAWA SETTLEMENT KSARAWA 2-11-2023> - Just like the way I come. I walk.
Who reminds you of next dose		0	0	
I calculate myself	Indicates a self-driven approach to determining immunization timing	2	2	iles\\(CG10) Borno M - IDI_caregiver_Dala Masalacin Deribe_Fatima Ali SHeriff PHC_Maiduguri LGA_01st Nov 2023 (English)> - I know that whenever it's the eighth of every month I will return.... This is how I calculate
The Child's father	Examines the involvement and role of the child's father in immunization	1	2	Files\\(CG31) Sokoto WMK - IDI caregiver B KUSU KLAMBAINA WMK 31-10-2023> - Honestly, their father wants the immunization. He always says we didn't take them for immunization. The father keeps their hospital file with him. He tells me it is time. Even last week I missed the immunization because he fell sick with a fever.
Health Workers Service		0	0	
Build relationship	Explores the development of relationships in the context of immunization	1	1	Files\\(CG02) BB-IDI_CAREGIVER_KUSI PHC_BAUCHI LGA_1ST NOV. 2023_ENGLISH> - And we don't have any issue with them except that we kind of joke and laugh.
Friendly Attitude	Examines instances of healthcare providers displaying a friendly attitude	6	6	iles\\(CG27) Sokoto TML - IDI_caregiver_Maikade settlement_PHC Maikade_Tambuwal LGA_1st Nov 2023 (English)> -

				I think there is nothing they do that is wrong. No matter what you ask for, they will give you, even malaria and cold medicine. They are friendly; they have no problem at all.
Vaccine Information	Investigates the provision of information related to vaccines	3	5	<Files\\(CG24) Kano SML- IDI_CAREGIVER_UNGUWAR KAYA_MAGAMI WARD_SUMAILA LGA_3rd NOVEMBER,2023 (English)> - We mothers will be gathered and they will explain some things for us…
Vaccine Scheduling and Follow up	Examines planning and follow-up procedures for vaccine schedules	7	7	Files\\(CG09) Borno M - IDI_Caregiver_Bulama fandi_Bulabulin Ngaranam PHC_Maidu (English)> They give us a card saying, you will return on a particular date… They write it for us.
Social Norms	Social norms (includes support of family and religious leaders)Health worker recommendation Gender equity			
How I knew		0	0	
Annoucements	Indicates instances where announcements are made, but details are not provided	1	1	Files\\(GK22) translated Kano SML Community- KII GATEKEEPERS - MASSU WARD-SUMAILA LGA_ 31st Octo> - Of course, it's always announced at the mosque.
Antenatal visits	Explores experiences or practices related to antenatal visits	3	3	<Files\\(CG08) BG- IDI_Caregivers_Gabi settlement_Gabi PHC_Ganjuwa LGA_31st Octo (English)> - Yes, it was before we gave birth. We are already told that, if we go to antenatal. Yes… so we are told. If you go, it is said that you should bring the child when you give birth because it is useful.
Had Experience with Siblings	Examines experiences related to immunization and siblings	1	1	Files\\(CG06) BG- IDI_Caregiver_Hakatafi_Hakatafi PHC_Ganjuwa LGA_3rd November 2023 (English)> - Well, I did the same to his siblings when I first took two; he was the third. I took him. And even nursing the children who are vaccinated and those who were not, the thing is incomparable.
Healthcare provider	Investigates the role and experiences with healthcare providers in immunization	7	8	Files\\(CG05) BG-IDI_Caregiver_Fammashi---ENGLISH> - The health workers said if the child is delivered we should take him.
Hospital Visits	Explores instances of visiting hospitals, potentially for immunization	4	4	<Files\\(CG19) Kano Kbt - Continuation IDI caregiver Gaida Fulani Charanci Kumbotso Kano 2 (ENGLISH)> If I went to the hospital, they would inform me about the next vaccination date.

Personal Choice	Examines individual choices or preferences related to immunization	2	3	Files\\(CG15) BornoJ - IDI (ENGLISH)> - No. I wasn't advised by anyone to start. I started on my own. I started taking the vaccine two days after my delivery.
Who Advised Taking Vaccine	Captures instances where individuals receive advice or recommendations regarding vaccination from various sources, including friends, family members, and others in their social circles.	0	0	
A friend	Indicates that advice or encouragement for vaccination is received from friends, showcasing the influence of peer relationships on immunization decisions.	1	1	Files\\(CG18) Kano Kbt - IDI caregiver unguwar Yamma Panshekara Kumbotso LGA Kano (ENGLISH)> A good friend of mine advised me to do so.
Child's Father	Reflects situations where the child's father plays a role in advising or supporting the decision to vaccinate, highlighting paternal involvement in the immunization process.	3	3	Files\\(CG28) Sokoto TML - IDI Caregiver Nasarawa settlement PHC sanyinna Tambuwal LGA 3rd Nov 2023> - My husband tells me to take them because immunization is good. For my second child, he also encourages me.
Co-wife	Addresses cases where advice on vaccination comes from a co-wife, indicating the influence of family dynamics and relationships on immunization choices.	1	1	Files\\(CG29) Sokoto TML - IDI Caregiver shiyar sarki settlement PHC Jabo Tambuwal LGA 31st october 2023> - It was my co-wife. She said we should please be taking our children to be vaccinated. Thank God, it is 10 years, and we have not stopped.
Influenced by grandfather	Describes scenarios where the advice or influence to vaccinate is attributed to the child's grandfather, emphasizing the role of extended family members.	1	1	Files\\(CG16) BornoJ - IDI1 (ENGLISH)> - I take vaccines because my father was a school teacher, and he always got us vaccinated when most people don't even take vaccines. So, I went to take vaccines on my own after a week after my first delivery. I did the same for my subsequent births.
Influenced by grandmother	Similar to the above, focuses on instances where the child's grandmother influences the decision to vaccinate, emphasizing the impact of family elders.	2	2	Files\\(CG27) Sokoto TML - IDI_caregiver_Maikade settlement_PHC Maikade_Tambuwal LGA_1st Nov 2023 (English)> My mothers; she told me if she is vaccinated, she will become healthy. That is why I decided to bring her.
Random people	Captures situations where vaccination advice is received from individuals not directly connected to the family, showcasing the influence of community or external opinions.	1	1	Files\\(CG21) Kano Kbt - IDI Damfami Chalawa Kumbotso Kano (ENGLISH)> I was advised by random people.
Social Discuss with neighbours,friends	Describes instances where caregivers engage in discussions about vaccination with their social	19	20	Files\\(CG07) BG- IDI_Caregiver_Unguwan Madaki_Kubi PHC_Ganjuwa LGA_2nd November (English)> - §

	network, emphasizing the social influence on decisions.			Yes, particularly about its importance. I discuss it with friends, children, or anyone I respect. If I notice that they haven't done it, I advise them on its importance.
Anti immunization advice	Captures instances where caregivers receive advice against immunization, reflecting the presence of opposing viewpoints.	1	1	Files\\(CG30) Sokoto WMK - IDI Caregiver Arkilla Lima PHC Arkilla WMK 1 Nov> During the first time, my daughter was an infant. Some family members said, "So you want to take this girl for immunization?" I said yes because we were taught the importance of doing so, and since I am a health student, I read its importance. Some said that the girl is too young for immunization. Some believed this immunization is useless. I told them its significance before I left for the hospital.
Limited source of information as a woman	Highlights the challenges faced by women in accessing comprehensive information about immunization, indicating potential gender-related barriers.	2	2	Files\\(CG16) BornoJ - IDI1 (ENGLISH)> - Though some of my neighbors are foreigners. I tried to convince them to take vaccines. But they refused, citing that they're foreigners, they're from Niger Republic, and their husbands do not allow them to take vaccines. <Files\\(CG06) BG- IDI_Caregiver_Hakatafi_Hakatafi PHC_Ganjuwa LGA_3rd November 2023 (English)> - Lami: Normally when we sit and talk about the children, we discuss vaccination. Some people will say that they do not know the importance of this vaccination. They want to take their children to that, but when they do, the child cries. That is their concern.
Caregiver perception towards childhood immunization	Explores the caregiver's overall outlook and beliefs regarding childhood immunization, providing insights into their attitudes, concerns, and motivations.	0	0	
Feeling about Childhood Vaccination	Examines the emotional responses and sentiments caregivers associate with childhood vaccination, including both positive and negative feelings.	0	0	
Excited and thankful	Indicates positive emotions such as excitement and gratitude expressed by caregivers in relation to childhood vaccination experiences.	3	3	<Files\\(CG24) Kano SML- IDI_CAREGIVER_UNGUWAR KAYA_MAGAMI WARD_SUMAILA LGA_3rd NOVEMBER,2023 (English)> - The information I will add is that we are just thankful for this vaccine that is given to our children. We enjoy it, and we see its usefulness. Therefore, we thank the community for this, those who are helping us in this process, they are doing it for us, we thank them, God bless them. May God exalt them more, Thank you. That's all I can say.
Importance of it's use	Explores caregivers' understanding of the significance and utility of vaccination, emphasizing its perceived importance in safeguarding children's health.	15	20	Files\\(CG14) BornoJ - IDI 3 (ENGLISH)> - It's good. It's very important. I testify to that because a child won't be affected by common diseases. They would be mild even if they affected the child. Files\\(CG09) Borno M - IDI_Caregiver_Bulama fandi_Bulabulin Ngaranam PHC_Maidu (English)> -

				And as I said before; if the child is to be infected with measles... he will not be infected severely. And if he gets sick, he won't suffer severely. “Yes, it's good, it protects us against some diseases. That's what encourages me to go”...**CG11) Borno M - IDI_caregiver_Dala Yazaraye _Abujan Talakawa PHC_Maidug (English)>**
It is free	Highlights the perception that vaccination is provided at no cost, which could influence caregivers' decisions to immunize their children.	1	1	Files\\(CG12) Borno M - IDI_caregiver_Goni kime_Baga Road PHC_Maiduguri LGA_2nd Nov 2023 (ENGLISH)> - All I can say is, I really appreciate the fact that we don’t pay even a penny for vaccinating our babies
Makes Child energtic	Describes the perception that vaccination contributes to the child's energy and vitality, showcasing positive expectations associated with the process.	1	1	
Negative Rumors	Captures instances where caregivers are influenced by negative rumors or misinformation circulating within their communities regarding childhood vaccination.	1	1	Files\\(CG19) Kano Kbt - Continuation IDI caregiver Gaida Fulani Charanci Kumbotso Kano 2 (ENGLISH)> - You know, some women claim that vaccination prevents childbirth or something. Respondent: I've never doubted vaccination, except for polio, which had many rumors surrounding it. But...
Feeling about vaccination day	Explores the emotions and sentiments caregivers experience on the actual day of vaccination, shedding light on their overall experiences.	0	0	
Things you are not happy about	Highlights aspects of the vaccination process that caregivers find dissatisfactory or challenging, providing insights into areas that may require improvement.	0	0	
Child Fever and crying	Focuses on caregivers' observations and experiences related to child reactions such as fever and crying post-vaccination.	8	9	<Files\\(CG08) BG- IDI_Caregivers_Gabi settlement_Gabi PHC_Ganjuwa LGA_31st Octo (English)> - Honestly, it's crying! And the body will be warm.Honestly no. The reason why I didn't continue is... this headache and fever. That is why I didn't continue. <Files\\(CG30) Sokoto WMK - IDI Caregiver Arkilla Lima PHC Arkilla WMK 1 Nov> - It was the baby crying that disturbs me. However, when they told me that it is okay, I feel relaxed.
Localized Swelling	Indicates instances where caregivers notice localized swelling at the vaccination site, contributing to their overall perception of the process.	1	1	<Files\\(CG05) BG-IDI_Caregiver_Fammashi---ENGLISH> - of course, I felt happy, but then when… it gets swollen, I took him back and they didn’t…. that’s the only thing that made me angry, and I said this vaccination is not a must.

Long waiting time	Captures caregivers' experiences of extended waiting periods during vaccination, which could impact their satisfaction with the service.	3	3	Files\\(CG18) Kano Kbt - IDI caregiver unguwar Yamma Panshekara Kumbotso LGA Kano (ENGLISH)> - Well, the waiting is actually hard. Sometimes we would gather at the place, but the workers wouldn't come. I once spent an hour waiting, without any worker at the place. When they finally arrived, the queue was scattered; some of us that came early end up being at the back in the queue.
Quarrel with HW	Describes situations where caregivers engage in disagreements or conflicts with health workers, providing insights into potential communication challenges.	1	1	Files\\(CG30) Sokoto WMK - IDI Caregiver Arkilla Lima PHC Arkilla WMK 1 Nov> At the venue, some people are impatient. They quarrel with the health workers there, that they are there and they did not attend to them. In addition, they know that some are there before them
Vaccine route of administration	Examines caregivers' understanding and perceptions of how vaccines are administered, including their preferences and concerns.	3	3	Files\\(CG28) Sokoto TML - IDI Caregiver Nasarawa settlement PHC sanyinna Tambuwal LGA 3rd Nov 2023> - When an ant bites your child, you feel the pain even if you didn't see it, let alone see your child injected with a syringe. As a mother, I feel bad. The cry of your baby makes you feel bad, but there is no problem
What makes you happy	Explores the positive aspects of the vaccination process that bring joy or satisfaction to caregivers.	0	0	
Attention	Indicates the importance caregivers place on receiving adequate attention, possibly during the vaccination process or in related interactions with health workers.	1	1	Files\\(CG11) Borno M - IDI_caregiver_Dala Yazaraye _Abujan Talakawa PHC_Maidug (English)> - Honestly, it's the attention they gave us at the hospital. And I stick to their guidelines and all what I supposed to do.
Attitude of HW	Examines caregivers' perceptions of the attitude displayed by health workers during the vaccination process.	2	3	Files\\(CG24) Kano SML- IDI_CAREGIVER_UNGUWAR KAYA_MAGAMI WARD_SUMAILA LGA_3rd NOVEMBER,2023 (English)> - Actually, they used to come early and they don't used to shout at us, that is it.
Counselling and Vaccine information	Captures instances where caregivers receive counselling and information related to vaccines, providing insights into the educational aspect of immunization.	5	6	Files\\(CG24) Kano SML- IDI_CAREGIVER_UNGUWAR KAYA_MAGAMI WARD_SUMAILA LGA_3rd NOVEMBER,2023 (English)> - Yes, we are happy about the instructions that were being given to us. How to take care of the children, that we should bring them for immunization, its importance and significance, that we should always continue to do so.
Didn't face any challenges	Indicates caregivers' experiences of a smooth vaccination process without encountering significant obstacles or difficulties.	2	2	Files\\(CG16) BornoJ - IDI1 (ENGLISH)> - Well, there isn't any problem. I don't even give my baby any drugs. They would say that we give the children paracetamol after taking the vaccines. But I've never done that, and nothing has ever happened to my children.
Incentive	Explores the role of incentives in influencing caregivers' decisions and behaviors related to childhood vaccination.	2	2	<Files\\(CG07) BG- IDI_Caregiver_Unguwan Madaki_Kubi PHC_Ganjuwa LGA_2nd November (English)> - even if it was polio vaccine, some of them run away and hide the children from it. But as the result of this money that is being given to them, they are now going by themselves.

				You will even see them overcrowding the place. Sometimes a woman will come. When the card is checked, she will be told no since it is not time; Go until after a week.
Safe and Friendly environment	Highlights the importance caregivers attribute to a secure and amicable atmosphere during the vaccination process.	3	3	Files\\(CG06) BG- IDI_Caregiver_Hakatafi_Hakatafi PHC_Ganjuwa LGA_3rd November 2023 (English)> - We sat together, played and laughed, then it was over! We got together safely and left safely.
Satisfied with the process	Reflects caregivers' overall satisfaction with the vaccination process, encompassing various aspects of their experience.	2	3	Files\\(CG10) Borno M - IDI_caregiver_Dala Masalacin Deribe_Fatima Ali SHeriff PHC_Maiduguri LGA_01st Nov 2023 (English)> There's nothing else. I'm satisfied with the vaccination process
Timeliness	Captures caregivers' emphasis on the importance of timely vaccination, indicating a recognition of schedule adherence.	1	1	Files\\(CG02)_BB-IDI_CAREGIVER_KUSI PHC_BAUCHI LGA_1ST NOV. 2023_ENGLISH> - Honestly, it's to have my child vaccinated on time, so he doesn't miss his time. And the wish of every child today is to have good health.
Trust in vaccination	Explores the level of trust caregivers place in the vaccination process, including trust in vaccine safety and efficacy.	7	9	Files\\(CG04) BG-IDI_CAREGIVER_SUMMUU SETTLEMENT_ SUMMU PHC_BAUCHI LGA (ENGLISH)-- 2> - I feel nothing. I don't have any fear, nothing! If I have any fear, I wouldn't have brought him.
Motivation to immunize child	Examines the factors that motivate caregivers to actively participate in the immunization of their children.	0	0	
Advised to	Indicates instances where caregivers receive specific advice or recommendations regarding immunization practices.	1	1	Files\\(CG18) Kano Kbt - IDI caregiver unguwar Yamma Panshekara Kumbotso LGA Kano (ENGLISH)> - I didn't even use to take my children for vaccination. This is my first child to be vaccinated. I decided to get him vaccinated after being advised to do so.
Crying is inevitable	Acknowledges the understanding that crying may be an inevitable reaction during or after vaccination.	1	1	Files\\(CG24) Kano SML- IDI_CAREGIVER_UNGUWAR KAYA_MAGAMI WARD_SUMAILA LGA_3rd NOVEMBER,2023 (English)> - Okay, I do not want him to be crying but they said it is inevitable .No, my friends said they were informed by the healthcare providers.
Does not Discuss Vacination	Captures situations where caregivers avoid or do not engage in discussions about vaccination.	2	2	Files\\(CG12) Borno M - IDI_caregiver_Goni kime_Baga Road PHC_Maiduguri LGA_2nd Nov 2023 (ENGLISH)> - Yes. Most of the people I live with don't like vaccination. So, you can't bring it up in a conversation with them just because you do take it. They tend to despise that. That's why I don't discuss it with...They don't, citing that their husbands don't allow it.

Father's Approval	Highlights the significance of obtaining the father's approval or support for the vaccination decision.	3	3	Files\\(CG26) Sokoto TML - IDI_care giver_Nabaguda Settlement__PHC Nabaguda_Tambuwal LGA_2nd Nov 2023 (English)> - Their father agreed, that is why we decided to continue.
Health Benefits-Disease Prevention	Explores caregivers' awareness and acknowledgment of the health benefits associated with preventing diseases through vaccination.	8	9	<Files\\(CG30) Sokoto WMK - IDI Caregiver Arkilla Lima PHC Arkilla WMK 1 Nov> - Because we are enlightened that immunization is good for our children; it prevents them from diseases. That is why I am convinced to bring my child for immunization.
Prevent Child Mortality	Indicates caregivers' recognition of vaccination as a crucial measure in preventing child mortality.	1	1	Files\\(CG06) BG- IDI_Caregiver_Hakatafi_Hakatafi PHC_Ganjuwa LGA_3rd November 2023 (English)> - Like two of my children, they were denied vaccination. And that daughter, it was done to her first. However in the ninth month, we were not able to vaccinate her; she died.
Number of children up to date.	Indicates the caregiver's awareness or knowledge regarding the up-to-date immunization status of their children.	0	0	
No	Represents instances where caregivers express a negative response or refusal regarding vaccination.	0	0	
Disapproval from Husband	Highlights situations where the husband disapproves of the decision to vaccinate, showcasing potential familial challenges.	1	1	Files\\(CG22) Kano SML- IDI_CAREGIVER_GEDIYA KUDU_GEDIYA WARD_SUMAILA LGA_2ND NOVEMBER,2023 (English)> - I said no. Sometimes he (her husband) would not allow it, sometimes a child cries continuously after immunization.
Fear of needle	Explores caregivers' apprehensions or fears related to the use of needles during the vaccination process.	2	2	<Files\\(CG21) Kano Kbt - IDI Damfami Chalawa Kumbotso Kano (ENGLISH)> - Well, I was advised to start taking the vaccines, citing its importance. However, I discontinued when he cried a lot after taking the first dose forty days after delivery. <Files\\(CG22) Kano SML- IDI_CAREGIVER_GEDIYA KUDU_GEDIYA WARD_SUMAILA LGA_2ND NOVEMBER,2023 (English)> - Who? Me, right? It scares me to see a child been pierced with a needle.
Missed Dose	Indicates instances where caregivers report missing scheduled vaccine doses for their children.	7	12	Files\\(CG12) Borno M - IDI_caregiver_Goni kime_Baga Road PHC_Maiduguri LGA_2nd Nov 2023 (ENGLISH)> - She started receiving vaccination, but we stopped before it was completed.
Yes	Represents instances where caregivers express a positive response or agreement regarding completion of vaccination.	16	17	Files\\(CG04) BG-IDI_CAREGIVER_SUMMUU SETTLEMENT_ SUMMU PHC_BAUCHI LGA (ENGLISH)- 2> Honestly, I don't miss. I have two children. Since we started with the older one, the small one has never missed and always on time, we were never late not even once.

Recommendation	Suggests instances where caregivers receive recommendations or endorsements related to vaccination practices.	0	0	
Awareness	Captures the level of awareness caregivers have regarding immunization practices and related information.	1	2	Files\\(CG02) BB-IDI_CAREGIVER_KUSI PHC_BAUCHI LGA_ 1ST NOV. 2023_ENGLISH> .But if there is enough awareness in media stations, where people get to hear about it, it will attract people. And they'll understand it. Even I myself it's because I hear on the radio that's why I have the motivation to bring him.
Husbands Should be Supportive	Emphasizes the importance caregivers place on receiving support from their husbands in the context of childhood vaccination.	1	1	<Files\\(CG31) Sokoto WMK - IDI caregiver B KUSU KLAMBAINA WMK 31-10-2023> - One thing I want to say is that people should bring their children for immunization since there is nothing bad in it. Men should give their time; they are the ones to give directives to the women to go for immunization. The mother is in a better position to know the condition of the child. They are the ones at home while men do not usually come back till evening.
HW should come early	Indicates the preference for health workers to arrive early, possibly influencing the overall vaccination experience.	1	1	Files\\(CG17) Kano Kbt - IDI Caregiver Hausawar Kirimbo Panshekara Kumbostso Kano (ENGLISH)> Respondent: They would come and vaccinate us late. We would come early, but they would come late. We would be rushing to finish up at the hospital because we have house chores to do.
Increase incentive	Suggests the desire for an increase in incentives to further encourage caregivers to participate in immunization.	1	1	Files\\(CG27) Sokoto TML - IDI_caregiver_Maikade settlement_PHC Maikade_Tambuwal LGA_1st Nov 2023 (English)> - Nothing, but I just want to say that the government should increase their salary. The children's. If they are vaccinated, they should be helped; their mothers used to feel happy
Provide PCM for fever,pains PV	Highlights the expectation or request for the provision of Paracetamol (PCM) to address fever and pains after vaccination.	1	1	Files\\(CG05) BG-IDI_Caregiver_Fammashi---ENGLISH> - Well what should be done is, at the vaccination place. After the vaccine, they should give the paracetamol there. But in the previous days, they give you money or anything, and then when you take your child and they inject him, you have to go and buy the medicine even if you don't have money you have to find it and buy. And your child must have a fever.
Vaccine Education by Healthcare provider	Emphasizes the role of healthcare providers in educating caregivers about vaccines and the importance of immunization.	1	2	<Files\\(CG04) BG-IDI_CAREGIVER_SUMMUU SETTLEMENT_ SUMMU PHC_BAUCHI LGA (ENGLISH)-- 2> - You should tell this.... Dr. Mubarak to educate them because this vaccine is very important. Because then there were a lot of people who don't do it, but Dr. Mubarak went to their houses and educated them about it. He told them this vaccine is very good; it has been done since when we were kids.
Community Gatekeepers	Individuals or entities within the community who hold influence or authority and can play a crucial role in shaping perceptions and decisions related to immunization.	0	0	

Barriers to immunization	Factors or obstacles that hinder the smooth implementation of immunization programs, contributing to low vaccine uptake.	0	0	
Children Crying And AEFI	Instances where children's crying is associated with adverse events following vaccination, potentially affecting caregiver perceptions and decisions.	10	12	Files\\(GK02) Bauchi BAU - Community- kll community leader kusi settlement kusi PHC Bauchi LGA 1st Nov 2023> - The reason is that children cry after the vaccine. It takes about two days without sleeping. This really disturbs. This is one of the reasons. Stories of how the children cry after the vaccine make others reject it.
Corrupt and Negligent HWs	Concerns or instances related to the unethical conduct or negligence of health workers, impacting the trust and confidence in vaccination services.	1	1	<Files\\(GK01) Bauchi BAU- Community - kll community leader Gida dubu settlement Tirwun PHC Bauchi LGA 3rd Nov 2023> - The health workers should fear God and distribute to the intended people with justice and fairness. Sometimes they divert the free medicine brought for distribution to the people. I could remember, some time back, I was a ward head then under Galadima, I witnessed such cases of diverting drugs. I once caught a woman diverting free drugs to sell. I said to her, we are not going to tolerate such an act. I may not have the power to punish her, but I can report to higher authorities. This is one of the areas we have challenges. Sometimes, women will come to find there is no staff on duty in the hospital. Sometimes, the staff rarely stay in the hospital during the night.
Cost of Antenatal care	Economic considerations related to the expenses associated with antenatal care, potentially affecting access to immunization services.	2	3	Files\\(GK23) KANO SML Community KII-Getekeeper Rimi Ward Sumaila LGA 2nd NOVEMBER English> - It is supposed to be that many things are available for free in the hospital - like what is said on the radio, that it is not happening in reality. They say giving birth for free, antenatal care for free, but when you get there it is not possible.
Distance to Health facility	The geographical distance individuals need to cover to reach health facilities, posing a logistical challenge to accessing vaccination services.	7	11	Files\\(GK04) Bauchi BAU - Community- KII_community leader_Summu Settlement_Summu PHC_Bauchi LGA_31ST Oct 2023.MP3 (ENGLISH)> - Second, distance. Sometimes distance can be a barrier between people and immunization center. Distance stops some people from getting to the vaccination centers. It makes one prefer continuing his business than going to get immunized.
Excessive interest in incentive	Instances where individuals may prioritize immunization due to the presence of incentives, potentially overshadowing the primary health benefits.	4	5	Files\\(GK01) Bauchi BAU- Community - kll community leader Gida dubu settlement Tirwun PHC Bauchi LGA 3rd Nov 2023> - Some of the reasons they give, for example, is that whenever the government brings, for example, the mosquito net, it was not everyone that got it. For this reason, some people say they will not give their children for the vaccine because they didn't get the mosquito net
Forgetfulness and Engagement in other activities	Instances where forgetfulness or engagement in other activities may lead to missed vaccination opportunities, affecting immunization coverage.	4	4	Files\\(GK28) Sokoto TML - Community leader_PHC Sanyinna_Tambuwal LGA_3rd Nov 2023 (English)> - Parents' forgetfulness is one of the main causes of missed vaccinations in their children. If children miss a routine vaccination, parents should talk to their nearest health worker about catching up with the schedule. Some parents think that since they forgot the vaccination schedule, they have no reason to return to the hospital. We have been

				telling them that even if they have forgotten, they should come, and missing a dose does not require restarting the series of injections from the beginning.
Insecurity and water	Challenges related to insecurity and water availability, potentially impacting the regularity of health facility visits for immunization.	1	1	Files\\(GK32) Sokoto WMK - G keeper_Arkilla _PHC Arkilla_Wmk LGA1st Nov (English)> - Then I told you that we took a good cause of progress for getting things, even the hospital was told that it will be working 24hrs, then they just came and killed the guard. They removed the hospital's generator for sourcing water. So, the hospital workers who were told to stay 24 hours to work refused. Due to lack of water.... They refused to live in this building
Lack of care in hospital	Situations where perceived or actual lack of care in healthcare facilities influences individuals' decisions regarding immunization.	1	2	Files\\(GK23) KANO SML Community KII-Getekeeper Rimi Ward Sumaila LGA 2nd NOVEMBER English> - Well, like I told you, there is usually a lack of care in the hospital. When you look at the condition of one hospital, you have to go to the private hospital when there is a public hospital.
Lack of understanding	Instances where a lack of understanding or awareness about the importance of immunization contributes to low vaccine acceptance.	3	3	Files\\(GK30) Sokoto WMK - Community Leader_PHC Kasarawa_WMK LG_2nd Nov23 (English)> - Lack of understanding and peace of mind among some parents are reasons why they resist vaccination. Convincing them religiously and talking to them in a logical and respectful manner can help change their mindset.
Limited inclusion of community gatekeepers	Challenges arising from the limited involvement or engagement of influential community figures in promoting immunization.	1	1	Files\\(GK13) Borno MMC-Kanuri-KII Community Gatekeeper Abujan Talakawa> - Some time ago, there's a hospital near Shehuri. Where they used to do polio.They used to call us after two or three months for a meeting.So, as we observed that they are selfish, they only consider themselves, not others, that's why I refused to be part of them again.Yes, they won't give you even transport fee to return. We knew that they do share money among themselves, but even if you go, they won't give you a penny
Limited role of TR	Situations where traditional rulers play a limited role in advocating for or supporting immunization initiatives.	1	1	Files\\(GK32) Sokoto WMK - G keeper_Arkilla _PHC Arkilla_Wmk LGA1st Nov (English)> - To be honest, we do not tell or alert people individually about the date of return of immunization but the truth is that we are doing it generally. That, they should manage as far as they can in receiving vaccination. Because if you received four out of five, there, it would be better not to do it. We made the announcement generally, but individually, we never tell a person the day he will go back, we barely do this.
Misconception	Instances where misconceptions or misinformation about vaccines and immunization negatively impact community attitudes.	7	7	Files\\(GK04) Bauchi BAU - Community- KII_community leader_Summu Settlement_Summu PHC_Bauchi LGA_31ST Oct 2023.MP3 (ENGLISH)> - Of course, it happens. Rumors like this might discourage a man of weak belief in immunization. Finally, it turns out to be falsehoods; it's just our village people foolish thought. Yes.

Poor recruitment guidline for social mobilizers	Challenges related to ineffective recruitment guidelines for social mobilizers, impacting community outreach and awareness efforts.	1	1	Files\\(GK23) KANO SML Community KII-Getekeeper Rimi Ward Sumaila LGA 2nd NOVEMBER English> - The problem that happens is that someone is hired who also does not have their own child vaccinated, and cannot explain to people what is happening. Sometimes this is done because of politics or business - the right person is engaged but can't explain it properly.
Poverty	Economic challenges that hinder access to healthcare services, including immunization, for individuals and families.	2	2	Files\\(GK13) Borno MMC-Kanuri-KII Community Gatekeeper Abujan Talakawa> - In this harshness of life? Even if your wife is sick, not to talk of your child, he won't dare to take them to the hospital; even the transport fee is something else. Files\\(GK29) Sokoto TML - Community Leader_Shiyar Sarki settlement_PHC Jabo_Tambuwal LGA_31st Oct 2023 (English)> Poverty, people are battling with food now, therefore their attention is not on vaccination anymore; they want the government to subsidize the price, and a hungry man is an angry man. Some
Reliance on Traditional Medicine	Instances where reliance on traditional medicine influences health-seeking behaviors, potentially affecting vaccination decisions.	1	1	Files\\(GK26) Sokoto TML - Community leader_Maikade settlement_PHC Maikade_Tambuwal LGA_1st Nov 2023 (English)> Yes, some women would never tell you their problems. They just close themselves and their children at home. It is hard to see them in the hospital, even if they are sick. They believe in traditional medicine. But as for me, I have been trying my best to explain everything to them and convince them to take their children to the hospital.
Travel	Difficulties arising from travel-related factors that may disrupt regular immunization schedules.	2	3	iles\\(GK15) Borno MMC KII_Community gate keeper_Bulabulin Ngaranam PHC_Maiduguri LGA 3rd November 2023 English> Some traveled,Or when there is an occasion, they don't come to take it.
Unsupportive Spouses	Lack of support from spouses in making decisions about immunization, potentially influencing caregiver choices.	1	1	Files\\(GK01) Bauchi BAU- Community - kII community leader Gida dubu settlement Tirwun PHC Bauchi LGA 3rd Nov 2023> Some of them, the husband does not even care about the pregnancy or child spacing. You know some people are heartless. For some of them, it was the neighbors that came together to contribute money to take the wife to the hospital, but the husband doesn't care. Sometimes we call to admonish them and sometimes to even punish the erring ones
Efforts to keep families stay up to date	Strategies or programs aimed at ensuring families stay informed and up to date with recommended immunization schedules.	0	0	
Advise caregivers to travel with Vaccination Cards	Guidance emphasizing the importance of caregivers carrying vaccination cards during travel to maintain up-to-date records.	2	2	Files\\(GK15) Borno MMC KII_Community gate keeper_Bulabulin Ngaranam PHC_Maiduguri LGA 3rd November 2023 English> - Okay, so, they advise them to go with their cards when they are traveling so that they can also get vaccinated there.

Community Enlightenment	Activities focused on educating and raising awareness within the community about the importance of immunization.	12	14	Files\\(GK09) Borno Jere - KII_Community gate keeper_Fariya IDP camp Clinic_Jere LGA_2nd Nov 2023 (English)>\nWe enlighten them. We even embark on door-to-door enlightenment. If a woman delivers, we advise her to take the baby to the hospital for immunization. And if she doesn't visit, we reach out to her house and convince her to come; they heed our advice and visit.\nFiles\\(GK01) Bauchi BAU- Community - kll community leader Gida dubu settlement Tirwun PHC Bauchi LGA 3rd Nov 2023>\nWe are trying to make the society understand through the scholars that preach to understand.
Encourage Hospital Births	Efforts to promote the benefits of hospital births, potentially linked to subsequent immunization services.	1	1	Files\\(GK30) Sokoto WMK - Community Leader_PHC Kasarawa_WMK LG_2nd Nov23 (English)> -\nWe discuss issues related to routine vaccines and the importance of women giving birth in the hospital. Although the percentage of women delivering babies in the hospital is not encouraging, we have seen positive changes. We also talk about working together with health professionals to ensure children receive all vaccinations at the appropriate times.
Encourage Husbands to allow children to be immunized	Initiatives encouraging husbands to support and allow the immunization of their children.	4	4	Files\\(GK14) Borno MMC- KII_Community gate keepe_ Baga Road PHC_Maiduguri LGA_2nd Nov 2023 Translated>\nYes, this, except if we were informed about those who are in the same house, or if one is not going for, what are the reasons? If we find out that it is from the husband's decision, we meet and explain to him.
Encourage Husbands to keep vaccine cards	Encouraging husbands to actively participate in maintaining and safeguarding their children's vaccination records.	1	1	Files\\(GK33) Sokoto WMK - IDI_Community Leader_BK_Kalambaina_WMK_31 oct 2023 (ENGLISH)>\nWell, we tell husbands to keep the vaccination card with them after each vaccination to avoid missing the card. We would also tell the husbands to keep the counts and the timelines correctly
Encourage people to immunize children	Efforts aimed at motivating and convincing community members to prioritize the immunization of their children.	12	14	Community - kll community leader Gida dubu settlement_Tirwun PHC Bauchi LGA 3rd Nov 2023>\nAs leaders, we encourage them by announcing at mosques during Maghreb and morning prayers. We try to make them understand its importance so that we will not be left behind
Follow-up on importance of Vaccination	Activities involving continued communication and reinforcement of the significance of vaccination.	9	10	Files\\(GK26) Sokoto TML - Community leader_Maikade settlement_PHC Maikade_Tambuwal LGA_1st Nov 2023 (English)>\nThey believe in traditional medicine. But as for me, I have been trying my best to explain everything to them and convince them to take their children to the hospital.
Gathering people	Actions to bring together community members for discussions, education, or awareness programs related to immunization.	4	4	Files\\(GK03) Bauchi BAU - Community- KII_community leader_Shafa Settlement_Shafa PHC_Bauchi LGA_2nd Nov 2023.MP3 (English)>\nYes. Our palace is next to the hospital. So, we hold our meetings in the hospital, not in the palace. We, along with hospital workers, gather the people, and anyone with questions can ask, and it will be answered\nFiles\\(GK24) Kano SML - COMMUNTY-KII_GATEKEEPER_GEDIYA WARD_SUMAILA -

				English> I will do that by gathering the people, I will give this great contribution wherever they are and I will do my best to bring them.
Promote available incentives	Activities focused on promoting existing incentives to encourage community members to participate in immunization programs.	3	4	<Files\\(GK21) Kano SML - Community English> - in Bauchi there is a system that they have in place that when a child is taken for vaccination, there is a money that is being shared, 500, 1000, and so on. This also gives more motivation to others.
Use Influencial people to convince	Leveraging influential figures within the community to persuade and convince others about the importance of immunization.	2	2	<Files\\(GK27) Sokoto TML - Community Leader_Nabaguda settlement_PHC Nabaguda_Tambuwal LGA_2nd Nov 2023 (English)> - An organization visited our town recently, and during our meeting, we, including the chairman of WDC, district head, and Imam, emphasized the importance of educating women during naming ceremonies and other gatherings about the significance of regular health screening for pregnant women and routine vaccination for babies. Town announcers were informed to keep educating people about the importance of antenatal and routine vaccination. Religious clerics were tasked to promote routine vaccination and other health services by delivering messages to husbands, fathers, and sons at mosques
Vaccine Schedule Reminder	Initiatives providing reminders or notifications to caregivers about upcoming vaccine schedules for their children.	6	8	Files\\(GK16) Borno MMC- KII_Community gate keeper_Fatima Ali SHeriff_Maiduguri LGA_01st Nov 2023 English> we will tell them again, if they don't go we will remind them again to go and receive it we meet them and tell them whether they have taken or not, if they don't go, then we tell them to go and we sometimes go to the hospital and sometimes we ask if these people have come? Or they didn't come?
Without knowledge of Husbands	Instances where husbands may lack knowledge or awareness about the immunization status of their children.	1	1	Files\\(GK01) Bauchi BAU- Community - kll community leader Gida dubu settlement Tirwun PHC Bauchi LGA 3rd Nov 2023> - We apply some wisdom and get some women that carry the children for immunization without the knowledge of the husband.
Women to Women Campaigns	Campaigns specifically targeting women to raise awareness and encourage participation in immunization.	7	8	Files\\(GK29) Sokoto TML - Community Leader_Shiyar Sarki settlement_PHC Jabo_Tambuwal LGA_31st Oct 2023 (English)> We have women environmental health officers who are conducting investigations and inspections house-to-house, as they are doing their job, they are also educating women to take their children to health facilities for vaccinations.
Practices in supporting immunization	Actions or practices within the community that actively support and promote immunization initiatives.	0	0	
Advise HWs	Suggestions or guidance provided to health workers to enhance their effectiveness in delivering immunization services.	1	1	Files\\(GK29) Sokoto TML - Community Leader_Shiyar Sarki settlement_PHC Jabo_Tambuwal LGA_31st Oct 2023 (English)> - When they are vaccinating the children, we visit them physically to ensure compliance and advise them (health workers) on the ways that could improve the exercise smoothly.

Advocacy	Systematic efforts to promote and advocate for the importance of immunization within the community.	2	2	Files\\(GK25) Sokoto TML - Community leader 2_Maikade settlement_PHC Maikade_Tambuwal LGA_1st Nov 2023 (English)> Most of our discussions with our people center around delivering life-saving messages during sermons and other religious gatherings to dispel negative attitudes towards routine vaccinations and other health services.
Collaborate with community stakeholders	Working in collaboration with various community stakeholders to strengthen immunization programs.	7	9	Files\\(GK30) Sokoto WMK - Community Leader_PHC Kasarawa_WMK LG_2nd Nov23 (English)> - We collaborate with SMT, an organization, for campaign awareness on the significance of vaccines in 3 communities under our domain—Badarawa, Kasarawa, and one town.
Community Mobilization	Activities aimed at actively involving and mobilizing the community to participate in immunization efforts.	9	9	Files\\(GK08) Bauchi Ganjuwa KII- Religous Leader Hakatafi Settlement- Hakatafi HC Ganjuwa LGA 3rd November 2023 English> - And we have our group that we gather for a while, so we let people know, and the traditional announcer will go around and spread the information because sometimes they are not here.
Encourages HWs	Creating an environment that encourages and supports health workers in their immunization-related duties.	5	7	<Files\\(GK21) Kano SML - Community English> - As how I encourage them, whenever they want to divide us to different places, wherever is the furthest, they will ask me to go there, and I will go, because even if they don't know the place, I will take the bike to accompany them.
Providing Incentives	Offering rewards or benefits to individuals as a means of encouraging participation in immunization programs.	3	5	Files\\(GK28) Sokoto TML - Community leader_PHC Sanyinna_Tambuwal LGA_3rd Nov 2023 (English)> In most cases, it is hard for people to accept changes, but with dialogue and talks in a diplomatic manner, you can convince them. Providing incentives like biscuits or sweets to children can encourage more participation in vaccination programs.
Risk Communication	Effectively communicating and addressing potential risks associated with immunization to the community.	3	3	Files\\(GK09) Borno Jere - KII_Community gate keeper_Fariya IDP camp Clinic_Jere LGA_2nd Nov 2023 (English)> - We do nothing. We just enlighten them about it; it is for your well-being. So if you reject it, it's you who will be at the receiving end of the bad results. It's your child who will suffer.
Use of Success Stories	Sharing stories of successful immunization experiences to inspire confidence and trust within the community.	5	6	<Files\\(GK28) Sokoto TML - Community leader_PHC Sanyinna_Tambuwal LGA_3rd Nov 2023 (English)> - We emphasize the difference between vaccinated and unvaccinated children. Children with weak immune systems may be at risk of vaccine-preventable diseases. Many people praise the strength of my son, who has been fully vaccinated, and we use such stories to convince parents.
Work with HWs	Collaborative efforts between the community and health workers to enhance immunization services.	10	13	<Files\\(GK04) Bauchi BAU - Community- KII_community leader_Summu Settlement_Summu PHC_Bauchi LGA_31ST Oct 2023.MP3 (ENGLISH)> Well, I help him by giving him some youths amongst us to accompany him round the community throughout the campaign. These youths, whether paid or not, work tirelessly

				with him in order to support and encourage him. We never harass or intimidate him for being a stranger or discourage him, no. So, he received all the necessary support to carry out his duties.
Recommendation	Expressing formal approval or endorsement of immunization practices and programs.	0	0	
Attitude of HWs	Evaluating the behavior and demeanor of health workers during interactions with the community.	2	3	Files\\(GK29) Sokoto TML - Community Leader_Shiyar Sarki settlement_PHC Jabo_Tambuwal LGA_31st Oct 2023 (English)> The way health workers are receiving the patients has to be rectified.
Familirize with hospital Cards	Encouraging community members to become familiar with and retain their hospital or vaccination cards.	1	1	Files\\(GK30) Sokoto WMK - Community Leader_PHC Kasarawa_WMK LG_2nd Nov23 (English)> Parents should remember the date of the vaccination backup written in their children's cards. Husbands and wives should communicate and ensure they remember the date so that they can take their family to the hospital if possible.
House to House Campaigns	Conducting awareness and immunization campaigns directly at individuals' homes.	2	2	Files\\(GK28) Sokoto TML - Community leader_PHC Sanyinna_Tambuwal LGA_3rd Nov 2023 (English)> - Frontline health workers must work hard to ensure total compliance, going house-to-house. They should be well-prepared to face numerous challenges, and persistence is key. Some people may reject initially, but with consistent efforts, they can be convinced over time.
Incentivize immunization	Providing additional incentives to further motivate caregivers to prioritize immunization for their children.	10	11	Files\\(GK29) Sokoto TML - Community Leader_Shiyar Sarki settlement_PHC Jabo_Tambuwal LGA_31st Oct 2023 (English)> the issue of transporting the mothers and their children from hard-to-reach communities to hospitals must be addressed
Incentivize with Mosquitoe nets	Offering mosquito nets as an additional incentive to promote immunization participation.	3	3	<Files\\(GK11) Borno Jere - English> - For some people, if you talk to them, they will say that they always take their children for the vaccination, but the worker doesn't do anything good for them, we will ask them to be patient saying that we will give them mosquito net, Hahaha.
Local Hire	Involving individuals from the local community as part of the immunization workforce.	1	1	Files\\(GK04) Bauchi BAU - Community- KII_community leader_Summu Settlement_Summu PHC_Bauchi LGA_31ST Oct 2023.MP3 (ENGLISH)> - And we have people with credentials who need to be employed. We urge the government to employ them because it has the ability to also employ people with no credentials.
Raise Awareness and social mob	Activities aimed at both raising awareness and actively mobilizing the community to participate in immunization.	11	16	Files\\(GK02) Bauchi BAU - Community- kII community leader kusi settlement kusi PHC Bauchi LGA 1st Nov 2023>

				Public enlightenment will help. It was a lack of enlightenment that makes someone reject immunization. You see that the vaccinated children are healthier than those who are not. We have seen so many examples.
Salary and Transport of HWs	Advocating for adequate salary and transportation support for health workers to enhance their performance.	1	2	Files\\(GK04) Bauchi BAU - Community- KII_community leader_Summu Settlement_Summu PHC_Bauchi LGA_31ST Oct 2023.MP3 (ENGLISH)> Well, Alhamdulillahi (praised be the Lord!) My advice first goes to the immunizers; they should be encouraged and supported, with a timely payment of their salaries and allowances. Because many times we heard their grievances on unpaid salaries and allowances.
Set up nearby centre	Proposing the establishment of vaccination centers in close proximity to communities for easier access.	2	2	Files\\(GK04) Bauchi BAU - Community- KII_community leader_Summu Settlement_Summu PHC_Bauchi LGA_31ST Oct 2023.MP3 (ENGLISH)> Third, if possible, we need new centers to be added where the old ones are very far away for the immunizers and the people alike. With these new centers, the immunizers work in one center for days and move to another for two days to make it reach all and sundry.
Supply medicines to the hospital	Ensuring a consistent supply of medicines to healthcare facilities to support immunization services.	1	1	Files\\(GK09) Borno Jere - KII_Community gate keeper_Fariya IDP camp Clinic_Jere LGA_2nd Nov 2023 (English)> If I have that power, I will provide the hospital with the medicines. We are lacking in medicine. We are in total shortage of drugs.
Use Local Language in Awareness	Conducting awareness campaigns in the local language to enhance understanding and reach.	1	1	Files\\(GK15) Borno MMC KII_Community gate keeper_Bulabulin Ngaranam PHC_Maiduguri LGA 3rd November 2023 English> You people should talk in all local languages, to make them understand the exercise.
Use Tradition Leaders as Agents	Involving traditional leaders as active agents in promoting and endorsing immunization practices.	2	3	iles\\(GK27) Sokoto TML - Community Leader_Nabaguda settlement_PHC Nabaguda_Tambuwal LGA_2nd Nov 2023 (English)> The government should engage traditional leaders in the flow of information. We, as traditional rulers, know how to engage our people and spread the right information on immunization to our peers, helping more families receive optimal protection from vaccination. Using our positions, we would educate the general public in our respective communities to enforce the rights of the child.
Use women community influencers	Leveraging influential women within the community to influence and encourage immunization.	3	3	<Files\\(GK27) Sokoto TML - Community Leader_Nabaguda settlement_PHC Nabaguda_Tambuwal LGA_2nd Nov 2023 (English)> - I would engage women who are community influencers to accompany caregivers house-to-house to ensure total compliance from the mothers, promoting the benefits of vaccination.
Role in Routine Immunization	Describing the active involvement and role of the community in supporting routine immunization practices.	0	0	

Clergy	Involving religious leaders, such as clergy, in supporting and endorsing immunization within the community.	0	0	
Enlightenment	Activities focused on enlightening the community about the importance of immunization and dispelling myths.	3	5	Files\\(GK27) Sokoto TML - Community Leader_Nabaguda settlement_PHC Nabaguda_Tambuwal LGA_2nd Nov 2023 (English)> - Our Islamic scholars have been tasked to explain the importance of allowing women and children to access health services and routine vaccination, emphasizing the dire consequences of rejecting these services. Muslim clerics deliver life-saving messages during sermons and religious gatherings to dispel negative attitudes toward vaccination and other health services.
mobilization	Engaging and mobilizing community members to actively participate in immunization programs.	1	1	Files\\(GK25) Sokoto TML - Community leader 2_Maikade settlement_PHC Maikade_Tambuwal LGA_1st Nov 2023 (English)> We also send our representatives to accompany them house-to-house to ensure the success of the program. Additionally, we warn our people to come out en masse, both women and children, to access health services and routine immunization, along with the dire consequences of rejecting the services.
Prayer and encouragment	Incorporating prayer and encouragement as part of community engagement to promote immunization.	2	3	Files\\(GK06) Bauchi Ganjuwa - KII_Community Leader_Fammawashi settlement_Ganjuwa PHC_Ganjuwa LGA_1st November 2023 (English)> - I offer prayers for their success. If there's a complaint, we encourage the immunizers to address it
Community Leader	Active participation and involvement of community leaders in promoting and advocating for immunization.	0	0	
Enlightenments at Gathering	Providing enlightening information about immunization during community gatherings or events.	7	10	<Files\\(GK30) Sokoto WMK - Community Leader_PHC Kasarawa_WMK LG_2nd Nov23 (English)> - We use various methods to deliver healthcare messages to our subjects. Our clerics deliver messages during sermons and other religious gatherings.
House to house announcement	Making immunization-related announcements directly at individuals' homes through house-to-house campaigns.	8	8	Files\\(GK01) Bauchi BAU- Community - kll community leader Gida dubu settlement Tirwun PHC Bauchi LGA 3rd Nov 2023> - I could remember, not so long ago, someone comes to this community for a program like this, and they rejected him. We follow them house to house and make them understand it. Some of them accepted it, while there are few that refused to accept.
Mobilization	Activities aimed at mobilizing and encouraging community members to actively participate in immunization programs.	5	6	Files\\(GK27) Sokoto TML - Community Leader_Nabaguda settlement_PHC Nabaguda_Tambuwal LGA_2nd Nov 2023 (English)> The message is clear; we mobilize people and warn them about behaviors that can jeopardize the lives of women and children for unjustified reasons.
Track Compliance with immunization	Systems or initiatives in place to track and ensure compliance with recommended immunization schedules.	5	5	<Files\\(GK05) Bauchi Ganjuwa - KII with Madakin Kubi, Ganjuwa LGA Bauchi State_2nd Nov. 2023.MP3 (ENGLISH)> Those who refused, we as leaders have our seniors in position, we take the issue to them, and they dealt with them or enforce them to be immunized for their families' safety.

Volunteer Vaccinator	Involving volunteers from the community in the role of vaccinators to enhance coverage.	1	1	Files\\(GK28) Sokoto TML - Community leader_PHC Sanyinna_Tambuwal LGA_3rd Nov 2023 (English)> - Yes, I administer injections for measles, yellow fever, hepatitis B, polio, and RI. Also, I work with NGOs that provide health interventions even when my father was alive.
Traditional Leaders	Involvement and endorsement of immunization by traditional leaders, such as the Emir and Ward Head.	0	0	
Community Engagement	Involving the community in various activities and discussions to foster engagement and support for immunization.	4	6	Files\\(GK18) Kano KBT-Community GateKeeper Maianguwa Damfami Chalawa ward Kumbotso LGA translated> Whenever something comes up, we used to be informed and we used to inform the public. What we do usually, if something like this comes up, to make it more effective by contacting daily mosques' imams
Collaborate with HWs and LGA	Collaborative efforts between the community, health workers, and local government authorities to strengthen immunization.	1	1	<Files\\(GK32) Sokoto WMK - G keeper_Arkilla _PHC Arkilla_Wmk LGA1st Nov (English)> - And Alhamdulillahi, the health officials we have good rapport with them, they respect us, and we respect them. Because any official who will be sent from the local government, whether it is from the state or the federal government, God willing, if he comes to my town, he should look for me. Or the local authority contact and inform me, "in a certain time, people will come to raise awareness about this or that, or they will vaccinate against this or that. Then I have to try to inform my community and the ward-heads of my villages about that, that if the health officials called in, they were sent by the local authorities. By this way, we have developed so many areas, like vaccines and other things.
Enlightenment at Gatherings	Providing enlightening information about immunization during community gatherings or events.	5	5	<Files\\(GK14) Borno MMC- KII_Community gate keepe_ Baga Road PHC_Maiduguri LGA_2nd Nov 2023 Translated> - § Yes, often times with regard to this, in mosques, and joints, we use to visit and sensitize them on the importance of this immunization, this helps children a lot, we explain to them always. Files\\(GK19) Kano KBT GateKeeper Maianguwa Hausawar Kirimbo Panshekara Kumbotso LGA (English)> Mostly, if the immunization equipment arrived, and I have been alerted by a phone call, I usually inform family heads when we meet at the mosque that when they get back home, they should inform their wives to go for the immunization.
Influence Vaccine Acceptance	The impact of efforts aimed at influencing and increasing acceptance of vaccines within the community.	1	2	Files\\(GK32) Sokoto WMK - G keeper_Arkilla _PHC Arkilla_Wmk LGA1st Nov (English)> someone swore that his children will not be vaccinated. Then it happened that I got there, it turns out that the man and I have respect for each other. He said that since you've come, you should make a sacrifice for cleansing my vow and had the children vaccinated.
Institute House to House committee	Establishing committees responsible for conducting house-to-house campaigns and promoting immunization.	2	2	Files\\(GK19) Kano KBT GateKeeper Maianguwa Hausawar Kirimbo Panshekara Kumbotso LGA (English)>

				Firstly, the moment health workers inform me they are on their way, it's either I meet up with them or they come to me. After that, I go house to house to let them know about it and to ask them to come out for it because of its importance.
Track new birth compliance with immunization	Monitoring and ensuring compliance with immunization schedules for newborns.	1	1	iles\\(GK16) Borno MMC- KII_Community gate keeper_Fatima Ali SHeriff_Maiduguri LGA_01st Nov 2023 English> if a child is born the naming that is holding in the mosque, we hear about it and we tell the priests, barbers and midwives who work in the neighbourhood, to notify us immediately when new child is born. and we are usually invited, if we know a child is born before we even meet them, we tell them to immediately go and take their first vaccination, usually in the community they call it number-number.
Use of media for awareness	Leveraging various media channels to disseminate information and raise awareness about immunization.	2	2	Files\\(GK20) Kano KBT-Community gatekeeper maianguwa anguwar yamma zawa ciki panshekara Kumbotso LGA (English)> - When it is almost time, we have our town criers that own speakers. Sometimes it is hours we give it to them, and sometimes the town criers have it. We will call and give them something to buy a battery, they will go. Inform people that there is an immunization injection and this is the time.
Woman Leader and Local Midwife	Involving women leaders and local midwives in leadership roles to support and promote immunization.	0	0	
Sell drugs and antenatal	Offering drugs and antenatal services as part of broader community health services, potentially linked to immunization.	1	1	<Files\\(GK26) Sokoto TML - Community leader_Maikade settlement_PHC Maikade_Tambuwal LGA_1st Nov 2023 (English)> I am a local midwife in this town. I sell drugs like anti-malaria tabs and also advise pregnant women on the importance of seeking care from health professionals during pregnancy (antenatal care)
Share RI information	Actively sharing information related to routine immunization to enhance community awareness.	1	1	Files\\(GK26) Sokoto TML - Community leader_Maikade settlement_PHC Maikade_Tambuwal LGA_1st Nov 2023 (English)> Some women ask me about routine vaccination for their children, and some are afraid to take their children to the hospital for these routine vaccines. I advise them that a woman is the backbone of her family, and it is of utmost importance to keep her children and herself healthy because the family depends on her. Usually, 5 to 7 women would be taken to the hospital with their children at a time when they are convinced.
Health Provider		0	0	
Barriers to immunization		0	0	
Efforts to keep families stay up to date		0	0	
Practices in supporting immunization		0	0	
Recommendation		0	0	
Role in Routine Immunization		0	0	
Emir Representative		0	0	

Appendix III: Codebook for Barriers and Enablers Analysis (Healthcare Workers)

Name	Description	Files	References	Example
Health Provider	The overarching category related to issues and challenges faced by health providers in the context of immunization.	0	0	
Barriers to immunization	Identifies various obstacles that impede the successful implementation of immunization programs.	0	0	
AEFI concerns	Apprehensions and reluctance arising from adverse events following immunization, causing hesitancy in subsequent visits.	20	25	Files\\31. KII RI In-charge Fatima Ali Sheriff PHC Maiduguri LGA> After I have received immunization, my child developed fever. We couldn't sleep. So that is why I feel. Reluctant to come for the subsequent visit.
Attitude of Health Workers	The impact of health workers' behavior on caregivers' willingness to return for subsequent immunizations.	1	1	Files\\31. KII RI In-charge Fatima Ali Sheriff PHC Maiduguri LGA> Well, my observation, what make caregivers to come back for the subsequent immunization is our attitude.
Caregiver forgetfulness	Instances where caregivers forget immunization schedules, leading to missed doses due to negligence or busy schedules.	3	3	Files\\5. RI in charge Massu in Sumaila LGA> Well, that is mostly caused by negligence from the parents. For instance, they would skip dosewhen they are busy, and would only come back when they finished.
Caregiver level of knowledge	Challenges arising from the lack of education among husbands, affecting their ability to comprehend immunization schedules.	5	5	Files\\22. KII with RI FP PHC Ganjuwa, 1st Nov 2023_ENG> - The major challenge is that the husbands are not educated. So we use to have issues with them when we write the date for the next visit they cannot read. Therefore, we try to reduce this by telling them to count the weeks.
Difficult to convine caregivers	Challenges faced when convincing individuals about the importance of	2	2	Files\\24. KII_RI Incharge_Nabaguda PHC_Tambuwal_2nd Nov 2023_ENG>

	vaccination, often leading to arguments and resistance.			The most difficult way is, while you are trying to mobilize a person he seams that he did not to understand what you are saying, while counseling him on the importance of vaccination the argument that arises between the two of us while I am convincing him that all the propaganda about the vaccine is not true, that is the hardest part of it. That's the only rough challenge I face on the process.
Far from hospital or outreach location	The impact of geographical distance on accessibility to immunization services, especially in remote settlements.	6	7	<Files\\12. RI in Charge Challawa PHC Kumbotso LGA> - Yes. Because most of the settlements in Challawa are too far from the facility. They are even parallel with the facility
Fertility Misconception	Misunderstandings and misconceptions about immunization, such as beliefs that vaccines affect fertility.	4	4	<Files\\24. KII_RI Incharge_Nabaguda PHC_Tambuwal_2nd Nov 2023_ENG> Some say the vaccine was mixed with the family planning dose, if a child got shot he will not give birth.
Following up missed clients	Difficulties in reaching and following up with clients, often due to unreachable phone numbers or lack of contact information.	1	2	<Files\\9. RI in charg Gaida Kumbotso LGA_1> Some phones not reachable, switched off. That's is the issue. Some don't even have phone numbers
Hard to reach communities	Challenges in reaching specific communities, such as nomadic or remote areas, during immunization campaigns.	3	3	<Files\\1. KII RI in charge in Kusi, in Bauchi LGA> I think is hard to reach area, like anguwan bawa , killmi. These areas are far. And especially they are missed during mobile sessions . Nomadic fulanis, . Nomadic people usually stay in places in short time.
House to House follow-up	The difficulty and challenges associated with conducting house-to-house follow-ups for immunization.	1	2	<Files\\10. RI in Charge Panshekara Kumbotso LGA> - House to house is the hardest. Because some houses are long far away.
Husband not around	Instances where caregivers are unable to bring children for immunization due to the absence of their husbands.	2	3	<Files\\30. KII HF In-charge Baga Road PHC Maiduguri LGA> - Example of that reason is that my husband travel. Then I give them an example. I said, look, Mama. If you fall sick and your husband travel, who will take care of you? They say something in hausa ..There is no permission

Ill caregiver	Challenges arising when caregivers are unwell, leading to difficulties in bringing children for immunization.	1	1	<Files\\15. KII HF incharge Abujan Talakawa> But sometimes the mother would say “me ma I was sick for two weeks, three weeks no one will carry baby to immunization” that was their excuse.
inadequate finances	Challenges related to financial constraints, hindering caregivers' ability to participate in immunization programs.	1	1	Files\\14. RI in Charge PHC Maikade Tambuwal LG> the last period we are doing the community mobilizer, we are working with each two months or one month they are giving them 2000 naira, then the issue is that the 2000 naira have not been given , so the reason why they are not cooperate of them
lack of Food and wellbeing for child	Complaints about the lack of food and overall wellbeing for children, impacting their health and immunization participation.	1	2	Files\\13. RI in Charge PHC Jabo Tambuwal LGA> - like we often get complains such as lack of feed for the children,..my child is sick.
Lack of incentive	Reduced motivation to participate in immunization programs due to the absence or inadequacy of incentives for caregivers.	3	3	Files\\26. Transcribed KII_HF incharge_Fariya IDP Camp Clinic_Jere LGA> - Initially, there are some things they are giving them like mosquito net and other things, but nowadays it's not forthcoming so they feel adamant to come.
Lack of proper information	Challenges arising from inadequate information provided to caregivers during immunization, leading to potential defaults.	1	1	<Files\\31. KII RI In-charge Fatima Ali Sheriff PHC Maiduguri LGA> When a caregiver comes, they’ll just immunize the child without telling them the importance of the immunization, what they're supposed to do in case if any AEFI occur. So, there is no proper information. That is why most of them. Used to we have do have. Problem of defaulting.
Lack of RI funding support	Issues related to the lack of financial support for Routine Immunization (RI) programs, impacting their effectiveness.	1	1	Files\\8. RI in charg Gediya Sumaila LGA> - So... formally there’s some support that givernment or a particular... what do I call... agency, that use to provide. But now actually, they didn’t... Even the RI supporting fund that I used to give, now totally they do not give.
Lack of transport money	Challenges associated with caregivers lacking the financial means for transportation to immunization facilities.	7	7	Files\\12. RI in Charge Challawa PHC Kumbotso LGA> And they have no money for transport. I always encourage them and tell them that this immunization is free. The card is free. Just try and come to the facility.
living in Security compromised areas	Issues related to non-compliance and challenges faced by individuals	1	1	Files\\16. KII HF In-charge Bulabulin Ngaranam PHC Maiduguri LGA>

	residing in areas with security concerns.			And secondly, those most of the non compliance are those that are coming from the security compromised areas
Location travel	Difficulties expressed by individuals who have traveled to areas where immunization services are not readily available.	3	5	<Files\\7. RI in charge Magami Sumaila LGA> some would say that they had travelled to where the vaccination isn't conducted;
Low HW allowance	Challenges arising from health workers being underpaid, impacting their availability and commitment to immunization services.	2	3	<Files\\26. Transcribed KII_HF incharge_Fariya IDP Camp Clinic_Jere LGA> - The only thing is that the personnel are Under paid. And because of that, before they are coming from from Monday to Friday, but nowadays they are coming twice Monday and Wednesday because they cannot afford transportation. <Files\\21. KII with RI Focal Person, PHCC Kubi, Ganjuwa LG Bauchi State 2nd Nov_ENG> Then secondly, my 2OIC is a volunteer personnel, me either; but he has no support compared to me. Since we do not give them salary, we cannot force them to work. This is also a great challenge about this.
Market day and wedding	Challenges related to caregivers prioritizing personal and economic activities, such as market days or weddings, over immunization visits.	3	4	Files\\10. RI in Charge Panshekara Kumbotso LGA> Some are running businesses, if they stay back they earn like one thousand five hundred naira. If they abandoned their businesses and visit the vaccination facility they lost their daily earnings.
Misconception	Challenges arising from misconceptions and misunderstandings about the importance and safety of immunization.	2	4	<Files\\24. KII_RI Incharge_Nabaguda PHC_Tambuwal_2nd Nov 2023_ENG> - All their reasons indicates their misconceptions or misunderstanding of the vaccination, it is about not understanding the importance of the vaccination. <Files\\5. RI in charge Massu in Sumaila LGA> Some don't take the vaccines due to their mindsets: they'd mention that they had been alive without ever taking any vaccine, citing that there are many who lived without even knowing the vaccines.
Missed visits by moilizers	Challenges associated with missed visits by mobilizers, resulting in caregivers missing immunization doses.	1	1	Files\\24. KII_RI Incharge_Nabaguda PHC_Tambuwal_2nd Nov 2023_ENG> The second challenge is, as I have said I write date of their next visit on their cards, and our mobilizer happened not passed by their areas to remind them again, this also makes them missed their dose. Because the child's parents have lost the count of the weeks he meant to come back for the next doses

Negative Social influences	The impact of negative social influences, including reactions from neighbors or family members, on vaccine acceptance.	2	3	<Files\\17. KII Incharge PHC kasarawa WMK LG> some the reaction of the vaccine and like some of their husband and neighbours that the vaccine is not that important to them
No cost for Vaccines	Challenges arising from individuals questioning the value of free vaccines, comparing them to purchased drugs for illness.	1	1	<Files\\19. KII RI incharge SAnyinna Tambuwal LGA_ENG> They just do not like it. While others say they buy drugs for their illness, why is it that this one is free.
Religious Belief	Challenges linked to religious beliefs that may prohibit or discourage individuals from participating in immunization programs.	3	3	<Files\\3. RI in charge in Tirwun in Bauchi LGA> Sometimes they say they use their religious leader prohibit. So they put the blame on religion.
Spousal support	Challenges arising when husbands do not allow their wives to return for the second dose of immunization.	6	10	<Files\\32_KII_RI_Arkilla Wammako> sometimes their husbands, did not allow them to come back to the hospital, for the second dose of the RI
Unavailability of HWs	Issues related to the unavailability of health workers, impacting the accessibility of immunization services.	1	1	Files\\18. KII RI Incharge Bakin kusu PHC wamako> unavailability of the health worker
Unreachable numbers	Challenges associated with unreachable phone numbers or switched-off phones, hindering communication for immunization follow-ups.	2	2	Files\\9. RI in charg Gaida Kumbotso LGA> Some phones not reachable, switched off. That's is the issue. Some don't even have phone numbers
Vaccine Shortage	Challenges arising from the shortage of vaccines, leading to potential non-participation in immunization programs.	2	2	<Files\\18. KII RI Incharge Bakin kusu PHC wamako> - sometimes shortage of the vaccine can make a child to not come. Files\\21. KII with RI Focal Person, PHCC Kubi, Ganjuwa LG Bauchi State 2nd Nov_ENG> Furthermore, when we had no fridge here, they may come and find the exercise closed because we cannot preserve ***Penta.*** It has side effect of warming the body. Then we will take vaccine and you cannot return it back at 12 noon. So, sometimes they come and find you nowhere.

Efforts to keep families stay up to date		0	0	
Address AEFI Concerns	**Addressing AEFI Concerns:** Witness the power of knowledge in mitigating fears as health workers provide comprehensive information on immunization importance and side effects, fostering confidence among mothers.	6	6	<Files\\12. RI in Charge Challawa PHC Kumbotso LGA> If they know the important of the immunization and the side effects, a mother will not be afraid to immunize her child. Because we usually tell them the effects of infectious diseases in order to bring her child to immunization a mother have to be afraid of the disease not the immunization. Files\\31. KII RI In-charge Fatima Ali Sheriff PHC Maiduguri LGA> But if you give them proper information. I think even pertaining the AEFI that sometimes do occur if you give them proper information, it won't make them not to come. They will come back.
Build relationship	**Building Relationships:** Explore the indispensable role of strong relationships between health workers and clients, creating an atmosphere where individuals not only opt for immunization but also share other health-related concerns.	1	1	Files\\16. KII HF In-charge Bulabulin Ngaranam PHC Maiduguri LGA> - You know, the relationship between the health worker and the client is very important. So much important because when a health worker is, you know, somehow very cordial with them, they always like to come. Even apart from immunization they can even tell you another different case so that you will help them and resolve it.
Call reminder - Have contact record of caregiver	**Call Reminder and Caregiver Contact:** Understand the proactive approach of maintaining contact with caregivers through phone calls, addressing concerns and fostering continuous engagement.	5	6	<Files\\19. KII RI incharge SAnyinna Tambuwal LGA_ENG> We also have the contact of the fathers; therefore, we call them on phone to ask about the baby- whether the baby has a reaction.
Compliant box	**Complaint Box Mechanism:** Uncover the effectiveness of complaint boxes in encouraging open communication, enabling communities to voice concerns and ensuring accountability in healthcare services.	1	1	<Files\\7. RI in charge Magami Sumaila LGA> - Well, in short, we sensitise women and the community leaders who live in locations where the residents don't usually come to hospital on coming to hospital, and that they can make any complaints about how we work, whenever there is any, so that we may tackle the isues or raise them to the higher authority.
Deliver Quality Care	**Delivering Quality Care:** Recognize the impact of providing quality treatment and care in building trust,	1	1	<Files\\7. RI in charge Magami Sumaila LGA> - The good treatment they receive from us also does help in making them come back.

	thus encouraging individuals to return for immunization and other health services.			
Dialogue with TBAs	**Dialogue with Traditional Birth Attendants (TBAs):** Learn about the constructive dialogues initiated with traditional birth attendants, addressing concerns and paving the way for vaccine acceptance within communities.	1	1	<Files\\27. Transcribed KII_HF incharge_Zabarmari PHC_Jere LGA> - We called the traditional birth attendant. Then we sit together and then discuss what is the problem that they will not take the vaccine. So what is the issue? What is the problem? What is the solution for it? So we discussed through this one through dialogue then They will receive it.
Enlighten Fathers	**Enlightening Fathers:** Explore the counseling strategies employed to enlighten fathers about the importance of vaccination, fostering support for the immunization of their children.	1	1	Files\\24. KII_RI Incharge_Nabaguda PHC_Tambuwal_2nd Nov 2023_ENG> Initially we counsel the child's father, the one who refused his children to be immunized. If he come to the hospital on a visit or brought in a sick child, you mobilize him on the importance of the vaccination, man, you supposed to let your children get immunized, this and this, and that about it's importance
Enlightenment	**Enlightenment through Health Education:** Dive into the realm of health education, awareness, and mobilization, understanding how informed communities are more likely to participate in immunization programs.	13	14	<Files\\12. RI in Charge Challawa PHC Kumbotso LGA> Good health education, and good awareness, with good mobilization. If they know the important of the immunization and the side effects of the immunization, I think it will be problem to them to come when the immunization begins again for the next session.
Follow-up missed doses	**Follow-up for Missed Doses:** Examine the comprehensive follow-up strategies, utilizing community leaders, mobilizers, and technology to ensure individuals do not miss subsequent vaccine doses.	12	12	<Files\\13. RI in Charge PHC Jabo Tambuwal LGA> we have the follow ups, we use the community leader and the mobilizer, we use trackers for new incentives, we use the phones to track the people who are due for the next vaccination. Files\\19. KII RI incharge SAnyinna Tambuwal LGA_ENG> Sometimes, we ourselves do visit the settlements after settlement since we know where they all live.

Giving of Incentives	**Giving Incentives:** Discover the motivational impact of providing incentives such as transportation support, encouraging community members to actively participate in immunization programs.	5	6	<Files\\13. RI in Charge PHC Jabo Tambuwal LGA> I sometimes give them incentives such as money for transportation to aid them be able to come back
House to House Sensitization and followup	**House to House Sensitization and Follow-up:** Explore the effectiveness of mobilizers visiting households to remind individuals of upcoming immunization sessions, ensuring continuous community engagement.	5	5	Files\\24. KII_RI Incharge_Nabaguda PHC_Tambuwal_2nd Nov 2023_ENG> Secondly, our mobilizer usually visits their houses and remind them not to forget their next visit after the usual four weeks time.
Incentives for CGs	**Incentives for Community Groups (CGs):** Understand the token incentives provided to community groups after each session, fostering their support and participation in immunization programs.	1	1	<Files\\22. KII with RI FP PHC Ganjuwa, 1st Nov 2023_ENG> - Actually, no one is paying them until the coming of New Inceptives. They do give them some token after every session. I cannot say the exact figure. It is either one or two thousand Naira. Moreover, on our part we give them something to encourage them in supporting our work.
Leverage antenatal visits	**Leveraging Antenatal Visits:** Recognize the strategy of promoting immunization during antenatal visits, targeting both men and women and encouraging positive responses, even among those delivering at home.	2	2	Files\\29. Wamakko Fanare HP> - To encourage men and women right from ANC on need of immunization and some are responding even those who deliver at home.
outreaches	**Outreaches:** Delve into the integrated health service and outreach programs, including house-to-house vaccination initiatives, to reach communities through various channels.	2	3	Files\\16. KII HF In-charge Bulabulin Ngaranam PHC Maiduguri LGA> And then secondly, we do conduct integrated health service, outreach services sorry. So we sometimes get them through integrated health service sometimes from house to house vaccination
Promote importance of Vaccine	**Promoting Importance of Vaccine:** Witness the continuous awareness efforts emphasizing the importance	7	10	Files\\25. Trajnscribed KII_HF incharge_Gongulong PHC_Jere LGA>

	of vaccines in maintaining good health within communities.			We keep on awareness, we keep on telling them the importance of that vaccine,
Schedule next visits	**Scheduling Next Visits:** Understand the systematic approach of informing individuals about the timing of the next vaccine dose by recording dates on their vaccination cards.	9	9	Files\\7. RI in charge Magami Sumaila LGA> Well, we always inform them the time for the next dose whenever they took a dose by writing the dates on their respective vaccination cards.
School requirement	**School Requirement:** Learn about the encouragement provided for immunization by linking it to school requirements, motivating parents to ensure their children are fully immunized for school participation.	1	1	Files\\11. RI in Charge Zawaciki Kumbosto LGA> After telling them the six keys or the important of immunization at times we tell them if they refuse to collect this immunization, time will come that the children will not be immunized. The children will not involve into school unless they show this immunization card. That their child is fully immunized, to encourage them to bring back their children to continue with the immunization.
Use CG to follow up	**Using Caregivers to Follow Up:** Explore the dynamic of involving community leaders in convincing reluctant fathers about the importance of immunization, ensuring collective support for the cause.	13	17	Files\\19. KII RI incharge SAnyinna Tambuwal LGA_ENG> In most cases, the mother wants the baby to be immunized but the father will say no. we usually go with the community leader to meet the father and enlighten him about the importance of the immunization.
Use Volunteer Community Mobilizer and Annoucer	**Utilizing Volunteer Community Mobilizers and Announcers:** Discover the role of community mobilizers and announcers in identifying defaulters, locating addresses, and collaborating with community leaders to ensure maximum immunization coverage.	8	11	<Files\\16. KII HF In-charge Bulabulin Ngaranam PHC Maiduguri LGA> - § 2 references coded [5.60% Coverage] Reference 1 - 2.61% Coverage We check our registers at the end of every session. If there are some defaulters then we call the Blamers and give them the addresses. And we also have BCM and chiefs those that will go from one house to the other and be bringing the defaulters, yeah. Reference 2 - 2.99% Coverage It is our responsibility at the health facility to check our registers. You know our registers is by settlement now, so it can easily be traced and then we write the name and give it to the BCM. All the BCMs and tips are being assigned to all these settlements that are in the register .

Process of delivering vaccines		0	0	
After the immunization		0	0	
Address AEFI Concerns	**After the Immunization:** Focus on addressing concerns post-immunization by educating caregivers about potential side effects, reassuring them, and guiding them on what symptoms are normal for the child's well-being.	8	8	<Files\\24. KII_RI Incharge_Nabaguda PHC_Tambuwal_2nd Nov 2023_ENG> We tell the caregiver the side effects of the vaccination, so if you see so and so symptoms it's normal, don't worry, it is ok, the child will be much better.
Ask caregivers to tell others about immunization	**Ask Caregivers to Tell Others About Immunization:** Encourage caregivers to spread awareness among their peers about the importance of bringing their children for immunization, fostering a community-driven approach.	1	1	<Files\\19. KII RI incharge SAnyinna Tambuwal LGA_ENG> In addition, tell them to encourage their fellow women the importance of bringing their children for immunization.
Document on patient cards and tally sheet	**Document on Patient Cards and Tally Sheet:** Detail the process of summarizing and recording vaccine administration information on patient cards and tally sheets for effective documentation.	4	4	<Files\\17. KII Incharge PHC kasarawa WMK LG> Additionally after the administration of vaccines , we summarize and put into a tally sheet .
Give Incentives	**Give Incentives:** Explore the practice of providing incentives, such as mosquito nets, to motivate caregivers and enhance their participation in immunization programs.	3	3	Files\\16. KII HF In-charge Bulabulin Ngaranam PHC Maiduguri LGA> - Then we give them some incentives just to motivate them. Yeah. Like a mosquito net. Yeah.

Key Messages	**Key Messages:** Provide six key messages to inform caregivers about the administered antigens, possible side effects, and how to manage observed side effects at home, ensuring comprehensive awareness.	6	6	<Files\\2. RI in charge in Shafa in Bauchi LGA> - we give them six key messages which is very important to let them know what antigens that we give, what are the possible side effects, and what are the management if there is any side effect that they observe at home.
Observe Child for AEFI	**Observe Child for AEFI (Adverse Events Following Immunization):** Keep children under observation for a few minutes after vaccination to detect any signs of adverse reactions and respond promptly.	2	2	<Files\\5. RI in charge Massu in Sumaila LGA> - Yes. We also do keep them for a few minutes after they were vaccinated, to see if the child would show a sign of problem after receiving the vaccine.
Refer Cases from outreaches	**Refer Cases From Outreaches:** Discuss the approach of using Mid-upper arm circumference (MUAC) measurements during outreaches to identify malnourished children and referring patients to the in-charge for medical attention.	1	1	<Files\\21. KII with RI Focal Person, PHCC Kubi, Ganjuwa LG Bauchi State 2nd Nov_ENG> - We go along with MUAC (Mid-upper arm circumference) to measure the children if a mong them is malnourished child. And if there is any patient, we refer him/her to the in-charge for medical attention. If also there is a pregnant mother, we use to tell the Village Head to ask her husband to bring her to the OC (officer in-charge) for medical checkup and ask her be placed in the ANC (antenatal care) system.
Schedule next vaccine	**Schedule Next Vaccine:** Inform caregivers about the date of their next immunization visit, emphasizing the importance of timely follow-ups.	13	16	<Files\\11. RI in Charge Zawaciki Kumbosto LGA> - Then we tell he the date of her next visit. She should turn up for the next visit after six weeks or four weeks for the immunization. She should take good care of her card.
Before the immunization starts		0	0	
Arrange equipments and prepare center	**Arrange Equipments and Prepare Center:** Prepare for immunization sessions by organizing equipment and ensuring the vaccination center is ready before the arrival of parents.	10	11	<Files\\11. RI in Charge Zawaciki Kumbosto LGA> Before the arrival of the parents, we the staff have to be in the clinic earlier, to arrange for the immunization.

	Checking BCG mark	**Checking BCG Mark:** Verify BCG marks on a child's hand and cross-check with the register to confirm previous immunization status, filling out the card if necessary.	1	1	<Files\\19. KII RI incharge SAnyinna Tambuwal LGA_ENG> the first thing is to look at his hand and see if there is VCG, if there is mark we know the baby has been immunized. If there is no, we then check the name on the register to see if the baby was once registered. If there is none, then we fill the card and put the name on the register.
	Child Profilling	**Child Profiling:** Collect essential information about the child, including name, settlement, age or month, and fill out the Child Health Card (CHC) and register accordingly.	11	13	<Files\\1. KII RI in charge in Kusi, in Bauchi LGA> But first you ask about name, settlement , age or month . I fill the CHC card first , I register it in my register,
	Collecting Numbers	**Collecting Numbers:** Initiate the immunization process by registering individuals at the OPD Unit, collecting numbers, screening, and eventually filling out their vaccination cards.	2	2	<Files\\10. RI in Charge Panshekara Kumbotso LGA> Ok, they will start with the OPD Unit, they register there and collect numbers. They will bring the number here, we screened them and finally we fill out their cards.
	Define Team roles	**Define Team Roles:** Assign roles to health workers involved in the vaccination center, selecting vaccinators, recorders, and RI service providers.	1	1	Files\\12. RI in Charge Challawa PHC Kumbotso LGA> the health workers gathered together, we select the health workers that will work in the vaccination center, the vaccinator. Ok, before this we select the RI service provider, then select the recorder.
	Entry and IPC Protocol	**Entry and IPC Protocol:** Emphasize the role of gatekeepers and infection prevention and control (IPC) protocols at the facility's entrance for effective management.	1	1	<Files\\30. KII HF In-charge Baga Road PHC Maiduguri LGA> The security is the first constant of every facility or caregiver the person cannot be impatient, the person may come for other services, so the gatekeeper there is the first contact. The IPC protocols is there at the gate site.
	Evaluate Growth and Development	**Evaluate Growth and Development:** Assess the growth and development of children during the pre-immunization phase.	1	1	<Files\\9. RI in charg Gaida Kumbotso LGA_1> we evaluate their growth, development,
	Fix time and place for immunization	**Fix Time and Place for Immunization:** Inform caregivers in advance about the scheduled day	7	9	<Files\\2. RI in charge in Shafa in Bauchi LGA> -

	for immunization, ensuring better preparedness.			If for instance a mother or a care giver arrives at a facility, before they come we inform them about the day they should come for immunizing their children.
Getting Vaccine Stock	**Getting Vaccine Stock:** Ensure the timely collection of all vaccines required from the Local Government Area (LGA).	3	3	Files\\9. RI in charg Gaida Kumbotso LGA_1> I make sure I collect all vaccines from the LGA
Health Education and Key Messages	**Health Education and Key Messages:** Prioritize health education and key messages related to immunization, hygiene, and other relevant topics before the immunization sessions.	15	19	<Files\\1. KII RI in charge in Kusi, in Bauchi LGA> Wash my hands with soap and use basic alcohol then health talk to participant about immunization, hygiene and other things regarding to RI services. <Files\\28. Transcribed KII_HF_Dusuman PHC_Jere LGA> - If the women come and gather there, they give them health talk on how to take care of their Children's and educate them on the importance of RI So that they will be bringing their Children to the immunization.
Organize outreaches	**Organize Outreaches:** Plan and communicate outreach initiatives, informing the in-charge about the upcoming outreach activities.	3	4	<Files\\21. KII with RI Focal Person, PHCC Kubi, Ganjuwa LG Bauchi State 2nd Nov_ENG> - The process we follow is that, I will have to first let the in-charge know that we will be going for an outreach.
Organize queue	**Organize Queue:** Establish an organized queue system for patients and children receiving vaccines, ensuring efficient and monitored vaccination processes.	1	1	<Files\\17. KII Incharge PHC kasarawa WMK LG> - We used to organize then in a queue, and we used to organize for the patients , the children who will receive the vaccine and before the get vaccinated we obverse them and we access them we make sure there is good monitoring then
Rapport and Orient People	**Rapport and Orient People:** Create a welcoming environment by arranging seating, greeting attendees, and building rapport between health workers and the community.	9	9	<Files\\12. RI in Charge Challawa PHC Kumbotso LGA> - I have to arrange the place, give them sits to sit down, greet them, creat rapport between you and them
Vaccine documentation	**Vaccine Documentation:** Document the vaccines supposed to be given	2	2	<Files\\9. RI in charg Gaida Kumbotso LGA_1> - then document the vaccine supposed to be given to a child,

	to each child, ensuring accurate and systematic record-keeping.			
During the immunization		0	0	
Administer based on age	**Administer Based on Age:** Administer vaccines based on the child's age, following a systematic process and informing caregivers about subsequent doses.	5	5	<Files\\32_KII_RI_Arkilla Wammako> for example at birth, A child came, let's say, two weeks. We used to give them OPV0, HepB and BCG. The first process that we follow. Then the second process after two weeks, we used to tell them to come back for the 2nd dose that is pentavalent, PCV, ROTA1.
Key messages	**Key Messages:** Communicate key messages to mothers during the immunization process, providing information about the purpose and benefits of each vaccine.	1	1	<Files\\11. RI in Charge Zawaciki Kumbosto LGA> - When we start the immunization we give the mother the six keys messages. Then we tell the mother this vaccine we are giving your child is for this DCG, for this hypetatis, this is for prevention of this and this is an OPV for the prevention of
Vaccination	**Vaccination:** Initiate the vaccination process after completing the health education session, ensuring a smooth transition from awareness to action.	10	10	<Files\\27. Transcribed KII_HF incharge_Zabarmari PHC_Jere LGA> After the whole health education, then we start the immunization.
Recommendation		0	0	
Allowance for CGs	**Allowance for CGs:** Highlight the practice of paying community leaders and providing batteries for announcements, emphasizing the need for financial support to enhance community engagement.	1	1	<Files\\22. KII with RI FP PHC Ganjuwa, 1st Nov 2023_ENG> - You know the community leaders we are working with are not paid. We are the ones paying them and buying them batteries to make announcement.
Avoid Rumours	**Avoid Rumours:** Stress the importance of avoiding unnecessary rumors to ensure the successful acceptance of immunization by the community.	1	1	<Files\\11. RI in Charge Zawaciki Kumbosto LGA> - If they avoid rumours we will get… My advice is avoid rumours, unnecessary rumours are what is not try and we will achieve, this immunization will be accepted very well.

Change contracts of HWs from volunteer to permenent	**Change Contracts of HWs from Volunteer to Permanent:** Suggest transforming routine immunization in-charge roles from volunteer to permanent positions to empower staff with more authority and responsibilities.	1	2	<Files\\21. KII with RI Focal Person, PHCC Kubi, Ganjuwa LG Bauchi State 2nd Nov_ENG> - But if the RI (routine immunization) in-charge will be given a permanent appointment, in that case whatever you do, he can defend himself because he is a staff. But so long as you remain a volunteer, you have limitations which you must not cross.
Government should enforce vaccines	**Government Should Enforce Vaccines:** Propose policy-making to mandate complete vaccination for every child before attending school, ensuring higher immunization coverage.	3	3	<Files\\17. KII Incharge PHC kasarawa WMK LG> - I will make a policy that each and every child must have taken the complete vaccine before going to school first .
Improve Vaccine storage	**Improve Vaccine Storage:** Express the need for better storage facilities for vaccines, addressing challenges related to the absence of suitable storage facilities and the inconvenience of collecting vaccines from distant locations.	1	1	<Files\\13. RI in Charge PHC Jabo Tambuwal LGA> the only thing is about this how PHC , issue of SDD, I talk more about SDD, we don't have the storage facility for the vaccines, so we use to go far distances to go and collect them and bring them back here at the center.
incentivize care	**Incentivize Care:** Advocate for the use of incentives such as soap or mosquito nets during immunization sessions to encourage community members to participate.	9	12	Files\\27. Transcribed KII_HF incharge_Zabarmari PHC_Jere LGA> Sometime if they will come to immunization. You know that our people, they like something, even if you come to immunization, you give them soap Or Nets for plus, even if you give them mosquito net. You will see this place will be full.
Increase staffing and Allowance for RI provider and allied staff	**Increase Staffing and Allowance for RI Provider and Allied Staff:** Suggest supporting routine immunization providers with transportation allowances during outreach activities, aiming to enhance their performance.	6	6	Files\\19. KII RI incharge SAnyinna Tambuwal LGA_ENG> First, I will support them with transport fare during outreach or anything that has to do with the immunization.

Intensify RI	**Intensify RI:** Emphasize the importance of intensifying routine immunization efforts to achieve higher coverage.	1	1	<Files\\3. RI in charge in Tirwun in Bauchi LGA> - Ensure you increase RI intensification.
Media advocacy	**Media Advocacy:** Propose leveraging media for advocacy and sensitization to enhance public awareness about immunization programs.	2	3	<Files\\17. KII Incharge PHC kasarawa WMK LG> - If I had the chance, I think I would emphasize based on the sensitization on the advocacy through media.
More house to house	**More House to House:** Recommend increasing house-to-house efforts to reach individuals who might not visit facilities, ensuring comprehensive immunization coverage.	1	1	Files\\29. Wamakko Fanare HP> I will do more house to house to reach those who don't want to come to the facility to make sure every child has been immunized.
Parents Sensitization	**Parents Sensitization:** Advocate for sensitizing parents to prioritize vaccination over other daily activities, recognizing its crucial role in child health.	4	4	<Files\\5. RI in charge Massu in Sumaila LGA> - Well, my advice is, parents should be sensitised against prioritizing their everyday business over vaccination.
Positive attitude from HW	**Positive Attitude from HW:** Emphasize the significance of health workers maintaining positive attitudes and professionalism, creating a favorable environment for clients.	1	1	<Files\\15. KII HF incharge Abujan Talakawa> The first thing is our behavior, yeah, when the health worker knows his or her job description, and to know how to handle the clients, the clients will be likely to come back without even tell the person why to go.
Sensitization at antenatal visit	**Sensitization at Antenatal Visit:** Suggest sensitizing women during antenatal visits to raise awareness about the importance of bringing their babies for vaccinations after birth.	1	1	<Files\\7. RI in charge Magami Sumaila LGA> - Furthermore, the women that come for antenatal tests should always be sensitised and encouraged on bringing their babies for vaccinations after birth.
Sensitization of CG	**Sensitization of CG:** Highlight the importance of sensitizing	1	2	<Files\\16. KII HF In-charge Bulabulin Ngaranam PHC Maiduguri LGA> -

	community gatekeepers and stakeholders for effective community engagement.			The sensitization of the bulamers and also the, you know, if the if stakeholders are being sensitized,
Set up LGA committees	**Set Up LGA Committees:** Recommend the establishment of Local Government Authority (LGA) supervising committees to oversee and raise awareness of immunization activities.	1	1	<Files\\24. KII_RI Incharge_Nabaguda PHC_Tambuwal_2nd Nov 2023_ENG> And the government, through the local government authority should set supervising committees to over see the mass responses to the activities. And to raise more awareness to the public,
Support Relive from AEFI	**Support Relief from AEFI:** Propose providing support to caregivers facing adverse events following immunization, ensuring they have access to necessary relief and medication.	1	1	Files\\10. RI in Charge Panshekara Kumbotso LGA> Yauwa, as I have told you, a woman will bring her child as fit as a fiddle, after the child got immunized later he run a fever, and she doesn't know her way out because she is not financially stable. So we need the facility to be prepared to be supportive to the woman after her child develop that fever. She supposed to be supported with even a paracetamol, this will help her.
Use Community Gatekeepers for CE	**Use Community Gatekeepers for CE (Community Engagement):** Encourage community gatherings and awareness creation in collaboration with village heads and gatekeepers to enhance community engagement.	12	12	Files\\18. KII RI Incharge Bakin kusu PHC wamako> - Awareness honestly , community gathering, I and the village head of the community to sit and see how can we achieve our ends what are the contributes form the community and the village heads to the awareness and the community gatherings in the community
Use VCM to track	**Use VCM (Volunteer Community Mobilizers) to Track:** Encourage the use of Volunteer Community Mobilizers, improving their allowances, and motivating them to work harder to achieve program goals.	4	5	<Files\\9. RI in charg Gaida Kumbotso LGA_1> - I will encourage the use of VCMs. The VCMs have influence to encourage and improve the allowances of the VCMs so that they will work hard to get you what we want.
Vaccine Education	**Vaccine Education:** Stress the importance of vaccine education through health talks, community visits, mobilization, and discussions	3	3	<Files\\8. RI in charg Gediya Sumaila LGA> So, as usual, health education is very very important. Health education and also community visit. That is... there's advocacy, community visit, mobilisation, and also WDC meeting, and also to discuss about very very important immunisation schedule.

	during Women's Development Committee (WDC) meetings.			
Role in Routine Immunization		0	0	
In-Charge	**In-Charge:** Highlight the in-charge's role in coordinating facility activities, managing resources, and ensuring smooth operations.	0	0	
Collaborate with CGs	**Collaborate with CGs:** Emphasize the importance of collaborating with community gatekeepers for community dialogue and monthly meetings to prevent missing children during routine immunization.	3	3	<Files\\27. Transcribed KII_HF incharge_Zabarmari PHC_Jere LGA> That's why we call for Community dialogue, then with Bulamas we get together in meeting. we did monthly meeting for routine immunization because we don't want Miss child
Engage in Enlightenment	**Engage in Enlightenment:** Describe how the in-charge participates in health education to encourage mothers to bring their children to the facility for immunization.	3	3	Files\\15. KII HF incharge Abujan Talakawa> - I also sometimes I can even do the health education by myself to encourage the mothers let them bring the child to the facility and also to complete their dose of the immunizations,
Growth Monitoring	**Growth Monitoring:** Describe the role of growth monitoring during routine immunization sessions, emphasizing its importance.	1	1	<Files\\8. RI in charg Gediya Sumaila LGA> Yes. There is GMB. That is, Growth Monitoring. And also by the time that you are conducting CMAM at this health facility, I'm also involved.
Leadership of the facility	**Leadership of the Facility:** Explain the responsibilities of leading the facility, coordinating activities, and managing manpower.	9	12	<Files\\16. KII HF In-charge Bulabulin Ngaranam PHC Maiduguri LGA> Well, actually my responsibility as an in-charge is to coordinate all the activities of the facilities to see things are actually going on smoothly as required and then in terms of manpower, the activities and managing the facility actually .
Monitoring RI activities	**Monitoring RI Activities:** Describe the in-charge's role in monitoring routine immunization activities,	1	1	<Files\\28. Transcribed KII_HF_Dusuman PHC_Jere LGA> - If I come in the morning, I used to go and monitor their unit. And if the immunization officer did not come in time, I used to call him so that he will come and give the immunization in time.

	ensuring timely and efficient vaccination.			Because if it is 12:00, we don't encourage that vaccination, so he used to come early in the morning and give the vaccination.
Service Provider	**Service Provider:** Describe the in-charge's role as a routine immunization service provider, administering vaccines and maintaining accurate data records.	3	4	<Files\\12. RI in Charge Challawa PHC Kumbotso LGA> We also participate in immunization programs in the community or inside the facility. The RI immunization inside the facility… Yes I use to administer the immunization, and we use to write the data it is part of my job.
Midwife and CHEW	**Midwife and CHEW (Community Health Extension Worker):** Explain the responsibilities of a midwife and CHEW, including family planning sessions.	1	1	Files\\20. KII with HCW Haka Tafi PHC Ganjuwa LGm Bauchi State_ENG> I worked as an agent, a midwife and I'm in charge of family planning session.
RI Service Provider	**RI Service Provider (Repeat):** Reiterate the role of routine immunization service providers in administering vaccines and recording data.	1	1	
Growth Monitoring	**Growth Monitoring (Repeat):** Reiterate the role of growth monitoring in routine immunization sessions.	1	2	Files\\9. RI in charg Gaida Kumbotso LGA> - It's only routine immunization and growth monitoring.
Immunize children and enlightenment at sessions	**Immunize Children and Enlightenment at Sessions:** Explain the consultant's role in consulting patients, conducting immunizations, and providing enlightenment during fixed sessions.	10	12	<Files\\23. KII with RI Officer of PHC Gabi Ganjuwa_ENG> So, like now I'm the consultant, I consult the patients, I do immunizations on Fridays, Saturdays and Sundays I consult patients, and then I conducts immunizations on Mondays at fixed sessions.
Outreaches	**Outreaches:** Describe the involvement of health workers in conducting outreaches for routine	8	10	Files\\27. Transcribed KII_HF incharge_Zabarmari PHC_Jere LGA> Yes, we do the work around the clinic. They did the outreach Of routine immunization.

	immunization, sometimes handling record-keeping.			Sometime I will do even the record, then we do the outreach services. Mobile and so on.
Provide RI Advice	**Provide RI Advice:** Emphasize the role of providing advice related to routine immunization services, including information about specific vaccines.	1	1	<Files\\1. KII RI in charge in Kusi, in Bauchi LGA> - Before he comes, I advice about RI services such as Hepatitis B .. when hepatitis B I going to countries then yiu tell more knowledge about RI.
Supervise activities	**Supervise Activities:** Explain the responsibility of supervising routine immunization activities to ensure smooth operations.	2	3	<Files\\31. KII RI In-charge Fatima Ali Sheriff PHC Maiduguri LGA> OK, my responsibility in the health facility is to make sure that RI activities. Go on smoothly without any issue.
Vaccine Logistics	**Vaccine Logistics:** Describe the role of managing routine immunization service provision, including storage, monitoring temperature, and overall logistics.	1	1	Files\\7. RI in charge Magami Sumaila LGA> - \ Well, I carry out the role of RI service provider, that is routine immunization, RI. I'm also responsible for vaccine, like where to keep and how to manage vaccines. We receive and store them whenever they're deployed here. We also assess their temperature. In short, we monitor everything about the vaccines.

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