

UGANDA LEARNING HUB FOR IMMUNISATION EQUITY

ZERO-DOSE LEARNING AGENDA

APRIL 2024



Acknowledgments

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CITATION

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Executive Summary

Background:

Despite the improvement in vaccination coverage in Uganda, there remains many children and communities who are not reached by these lifesaving vaccinations. Many gaps in immunisation still exist in the country, and innovative strategies are needed to bridge these gaps and inequities. Uganda has diverse settings with anticipated variability in the drivers of zero-dose children (ZDC) and under-immunised children (UIC), which are complex, interrelated, and context-specific. The Uganda Ministry of Health and Uganda National Expanded Programme on Immunisation have often developed and implemented strategies for addressing ZDC and UIC.

The Learning Hub is well placed to augment the activities conducted under this strategy (Gavi 5.0) by ensuring that a learning approach is applied and strengthening the workstreams by applying lessons learned in real time. For effective uptake of research into policy and practice, there is a need to build upon a foundation of active knowledge exchange and stakeholder engagement. The Infectious Diseases Research Collaboration, PATH in Uganda, and Makerere University School of Public Health formed a consortium to implement the Learning Hub in Uganda.

The consortium developed an overarching learning agenda that described learning questions, methods, and approaches using ongoing work on ZDC identification performed by the Ministry of Health and immunisation partners including PATH, as well as targeted stakeholder consultations, as a platform to help understand perspectives related to equity in immunisation.

Methods:

This work was funded by Gavi, the Vaccine Alliance. In creating the learning agenda, the consortium set out to address country-driven learning priorities including identifying ZDC, UIC, and missed communities and challenges faced; evaluate and share learnings on existing and planned immunisation approaches; and improve metrics, measures, and methods to access and use data on a regular basis as a means of increasing equity in immunisation.

Key informant interviews were conducted at national and district levels in the Learning Hub focus districts—Kasese, Mubende, and Wakiso. The core Expanded Programme on Immunisation team at the national level and the District Health Teams were engaged for system-level thinking. The Uganda National Expanded Programme on Immunisation pillar heads were engaged in a validation meeting for the generated learning questions.

Results:

Below is a summary of the learning priorities.

Table 1: Summary of learning priorities.

UNEPI pillar	Learning priorities
Service delivery	<ol style="list-style-type: none">1. Who is a ZD and UI child in Uganda? Where does the ZD and UI child live? Which special population does the child belong to? How many ZD and UI children are in Uganda?2. How effective are the EAF interventions towards reaching ZDC, UIC, and missed communities?3. What is the effectiveness of the approaches used in the RED/REC strategy to ensure every child is reached with lifesaving vaccination?4. How can support supervision be improved to better identify and reach ZD and UI children?
Vaccine supply chain and logistics	<ol style="list-style-type: none">1. How effective are the last-mile delivery initiatives by NMS? What learnings can be derived from these initiatives?2. How can health workers be equipped to better manage vaccines and immunisation supplies?3. How can different stakeholders be engaged to address vaccine distribution challenges at the district level?4. What strategies can NMS adopt to enhance real-time communication mechanisms with districts regarding immunisation supply stockouts to effectively mitigate and prevent stockouts at health facilities?5. How can demand for vaccines and supplies be synchronized with the supply?6. How can visibility of vaccines and supplies be improved at the HF level?
Communication and advocacy	<ol style="list-style-type: none">1. Which community mobilisation approaches are effective at reaching ZDC and UIC?2. How can gender-related barriers to immunisation be addressed to improve uptake?3. To what extent are the DHTs and the district-level political leaders engaged in demand generation for immunisation?4. Why are children not immunised?5. How can the current communication messaging be improved to enhance immunisation services uptake?

UNEPI pillar	Learning priorities
Programme management and finance	<ol style="list-style-type: none"> 1. How adequate and competent are the human resources to offer immunisation services amidst an increase in antigens? 2. How can the private sector be leveraged to offer immunisation services? 3. How can outreaches better be designed to reduce ZDC/UIC? How effective and efficient are these outreaches? 4. How do staffing levels contribute to immunisation uptake? How can the existing staff be leveraged upon to provide effective immunisation services? 5. How can lower-level health centres (HCIs) in underserved areas be supported to optimise immunisation service delivery?
Surveillance, monitoring, and evaluation	<ol style="list-style-type: none"> 1. What is the contribution of the EAF interventions towards reaching ZDC, UIC, and missed communities? 2. What is the relative cost of EAF interventions to reach ZDC and how cost-effective are they? 3. What strategies can be implemented to improve the availability and utilisation of reporting tools to effectively document immunisation activities? 4. What strategies can be used to enhance data use at district and HF levels? 5. How can the estimation of denominators be improved at all administrative levels? 6. How can the existing data capture systems be improved to identify ZDC and UIC? 7. What should be done to streamline the private sector to enhance immunisation data capture and reporting? 8. To what extent does triangulation of data from multiple sources solve the challenge of estimating the number of ZDC and UIC?

Abbreviations: DHT, District Health Team; EAF, Equity Accelerator Fund; HF, health facility; NMS, National Medical Stores; RED/REC, Reaching Every District/Reaching Every Child; UNEPI, Uganda National Expanded Programme on Immunisation; UI, under-immunised; UIC, under-immunised children; ZD, zero-dose; ZDC, zero-dose children.

Table of Contents

Acknowledgments.....	i
Executive Summary.....	ii
Table of Contents	v
List of tables	v
Abbreviations	vi
1.0 Introduction	1
1.1 The Learning Agenda	3
1.2 Objectives	3
1.2.1 General objective.....	3
2.0 Methodology	4
3.0 Results.....	6
3.1 Synthesis of findings	7
3.2 Zero-dose learning agenda and priority areas	7
3.2.1 Learning priorities under service delivery.....	7
3.2.2 Learning priorities under vaccine supply chain and logistics.....	11
3.2.3 Learning priorities under communication and advocacy.....	13
3.2.4 Learning priorities under programme management and finance.....	16
3.2.5 Learning priorities under surveillance, monitoring, and evaluation.....	20
References	24
Annex.....	25
Annex A: List of emerging learning priorities	25

List of tables

Table 1: Summary of learning priorities.....	iii
Table 2: Data collection methods for the learning agenda.	5
Table 3: Ranking criteria for learning questions.	7
Table 2: Learning priorities under service delivery	9
Table 3: Learning priorities under vaccine supply and logistics.....	11
Table 4: Learning priorities under communication and advocacy.....	15
Table 5: Learning priorities under programme management and finance.	18
Table 6: Learning priorities areas under surveillance, monitoring and evaluation.....	21

Abbreviations

DHIS2	District Health Information System 2
DHT	District Health Team
DPT1	Diphtheria, Tetanus, and Pertussis 1
DPT3	Diphtheria, Tetanus, and Pertussis 3
HCII	Health Centre II
NMS	National Medical Stores
RED/REC	Reaching Every District/Reaching Every Child
TBA	Traditional Birth Assistant
UI	Under-Immunised
UIC	Under-Immunised Children
UNEPI	Uganda National Expanded Programme on Immunisation
UNICEF	United Nations Children's Fund
VHT	Village Health Team
WHO	World Health Organisation
ZD	Zero-Dose
ZDC	Zero-Dose Children



1.0

INTRODUCTION

In Uganda, immunisation is a key public health intervention aimed at reducing morbidity, mortality, and disability due to vaccine-preventable diseases. The government of Uganda, through the Uganda National Expanded Programme on Immunisation (UNEPI), has ensured that every child and priority population at risk of vaccine-preventable diseases is fully vaccinated. The National Development Plan III and Health Sector Strategic Plan 2020/2021–2024/2025 stipulate immunisation as a national priority, and they emphasize mainstreaming gender in the planning and implementation of all health programmes [1].

UNEPI made significant improvements in reaching everyone, resulting in improved diphtheria, tetanus, and pertussis 1 (DPT1) coverage from 91% in 2011 to 97% in 2021 [2]. This was achieved through routine immunisation within the health facility and enhanced by outreach services for populations living in areas with limited access to fixed services [3]. In 2006, Uganda adopted the Reaching Every District (RED) strategy to attain at least 80% coverage for routine immunisations in every district across the country. The RED strategy later evolved to become Reaching Every Child (REC). Other innovations such as the use of community health workers [4] and microsystems quality improvement approaches have been used to generate local solutions to strengthen routine immunisation systems and reach those unreached [5].

Despite the improvement seen in vaccination coverage, there remain many children missing out on these lifesaving vaccinations. According to the Ministry of Health Strategic Plan 2020/21–2024/25, immunisation coverage measured by receipt of diphtheria, tetanus, and pertussis 3 (DPT3) remained stagnant at 87%, far below the national target of 96%, with only 40 out of 136 (29.4%) districts achieving the national target of 96% [1]. Estimates from the District Health Information System 2 (DHIS2) data indicate that

nearly 90,000 children had not received any routine vaccine in 2021. Findings in a situational analysis report as part of technical support to UNEPI by PATH in 2022 revealed that Wakiso, Mubende, Kakumiro, Nwoya, Bushenyi, Ntungamo, Isingiro, Soroti, Serere, and Tororo had the highest number of zero-dose children (ZDC), while districts with the highest number of under-immunised children (UIC) included Arua City, Moyo, Gulu City, Nwoya, Mbarara City, Bushenyi, Rwampara, Mbale City, Moroto, and Kapelebyong. These estimates illustrate that many gaps in immunisation still exist in the country, and innovative strategies are needed to bridge these gaps and inequities.

The documented barriers to immunisation in the country include 1) inadequate information on vaccination by most communities due to limited social mobilisation, 2) vaccine stockouts, 3) costs to caregivers, 4) immunisation hesitancy, and 5) inadequate client-centred immunisation services [6]. Additionally, knowledge and training gaps have been identified in human resource management skills, strategy and micro planning, immunisation practice, and cold chain and vaccine management [7]. Immunisation inequities have been documented as contributing to about 53% of UIC. A previous study showed that UIC in Uganda were found in poor urban settlements, ethnic minorities, religious sects, migrant and refugee communities, fishing communities, island and mountainous communities, as well as remote rural areas. These findings were further supported by a study evaluating barriers to immunisation in Kampala, an urban setting [8]. These inequities in coverage have been associated with socioeconomic factors such as religious affiliation, gender, tribe, maternal education, wealth quintile, costs of immunisation, the proximity of immunisation services, and place of delivery.

1.1 The Learning Agenda

Effective uptake of research into policy and/or practice needs to be built upon a foundation of active knowledge exchange amongst key stakeholders and their full engagement, which brings significant benefits to the process of knowledge production and use [9]. The Learning Hub therefore, developed an overarching learning agenda that described learning questions, methods, and approaches using ongoing work on ZDC identification performed by the Ministry of Health and immunisation partners including PATH, as well as targeted stakeholder consultations, as a platform to help understand perspectives related to equity in immunisation.

1.2 Objectives

1.2.1 General objective

To develop a learning agenda to inform the design and implementation of the immunization equity interventions in Uganda by developing a set of questions to facilitate learning and decision-making for UNEPI and partners.





METHODOLOGY

The Infectious Diseases Research Collaboration, PATH Uganda, and Makerere University School of Public Health formed a consortium to implement the Learning Hub in Uganda. The work was funded by Gavi, the Vaccine Alliance, and it set out to address country-driven learning priorities including identifying ZDC, UIC, and missed communities and challenges faced; evaluate and share learnings on existing and planned immunisation approaches; and improve metrics, measures, and methods to access and use data on a regular basis as a means of increasing equity in immunisation.

Key informant interviews were conducted at national and district levels in the Learning Hub focus districts—Kasese, Mubende, and Wakiso. Key personnel in the immunisation system at the national and sub-national levels were engaged for system-level thinking. As a final activity, study findings were presented to the UNEPI technical meeting to validate the generated learning questions. The table below shows the data collection methods for the learning agenda and priority questions.

Table 2: Data collection methods for the learning agenda.

	Data collection method	Number	Details of data collection
Step 1	Document review	24	National strategies/frameworks, research/programme documents in Uganda, national and global financial reports, national population projection reports and national surveys, national UNEPI documents, national DHIS2 data reports, and Gavi Fund application reports and response plan reports.
Step 2	Stakeholder engagements and meetings	6	Stakeholder engagements and meetings, notably a) stakeholder consultation meeting with UNEPI and UNEPI partners held in March 2023, b) several FPP writing workshop events in March and April 2023, c) Global Learning Hub partners workshop held in July 2023, d) UNEPI partner meetings with national and subnational level stakeholders, and e) UNEPI subcommittee pillar meetings in 2023.
Step 3	Key informant interviews	15	DHT members at the subnational level.
		6	Representatives of immunisation pillars at the national level.
Step 4	Validation of the learning agenda by the UNEPI technical working group	1	This was conducted on 23/04/24. The learning agenda was validated by UNEPI pillar heads (i.e., heads of service delivery, vaccine supply chain and logistics, communication and advocacy, programme management and finance, and surveillance, monitoring, and evaluation pillars).

Abbreviations: DHIS2, District Health Information System 2; DHT, District Health Team; FPP, Full Portfolio Planning ; UNEPI, Uganda National Expanded Programme on Immunisation.



RESULTS

3.1 Synthesis of findings

The findings represented the data collected through the desk review and the key informant interviews. Secondary data, through the desk review, generated barriers to immunisation coverage under the UNEPI immunisation pillars—service delivery, supply chain, communication and advocacy, programme management and finance, and surveillance, monitoring, and evaluation.

The barriers or challenges were then processed into learning questions and later subjected to a locally generated ranking system, ranking them according to the level of priority (Table 2). Primary data generated emerging learning questions through careful consideration of the barriers emerging from the analysis of interview data obtained from national and subnational levels within QSR NVivo 14.

The most commonly mentioned barriers, through the respondents’ quotes, were extracted from the QSR NVivo 14 analysis programme into a Microsoft Word document for further analysis. The table below describes the components of the criteria.

Table 3: Ranking criteria for learning questions.

Rank	Description
High	Alignment with the country’s learning priorities. Strong stakeholder interest. Data are accessible. Seek to understand and address gender-related barriers. Can be answered within the 3-year evaluation period. Presence of a notable evidence gap.

Rank	Description
Medium	Moderate feasibility in terms of methodology to answer the question. Moderate stakeholder interest.
Low	Notable evidence already available. Limited stakeholder interest. Data not easily accessible.

3.2 Zero-dose learning agenda and priority areas

This section presents the zero-dose learning agenda and priority areas. Evidence gaps generated in this section are presented according to five UNEPI immunisation pillars—service delivery, vaccine supply chain and logistics, communication and advocacy, programme management and finance, and surveillance, monitoring and evaluation. The priority areas presented in this report focused on the highly ranked barriers and the entire list of questions is attached in the annex.

3.2.1 Learning priorities under service delivery

According to the findings from key informant interviews, it was reported that all activities under this pillar were implemented but not adequately. These activities included facilitation and motivation of immunisation staff, capacity-building among health workers and local leaders, community immunisation outreaches, provision of transport means for immunisation staff, development and implementation of micro plans, immunisation waste management and disposal, and proper characterisation of the zero-dose child. Community mobilisation and sensitisation emerged as the most pronounced activity, with challenges to reaching ZD and UI

children across the three districts. There was inadequate mobilisation for routine and outreach immunisation activities compared to when there was an immunisation campaign which affected immunisation coverage.

For routine immunisation and outreaches, door-to-door mobilisation was done by Village Health Teams (VHTs), a strategy that was ineffective at reaching all caregivers in communities. Across the three districts, stakeholders mentioned that transport facilitation to the hard-to-reach areas during mobilisation was the main problem. This manifested as the provision of less transport allowance through primary health care funding to health workers to enable reaching geographically challenged areas—for example, populations in villages where people are dispersed and those in mountainous areas. Therefore, health workers planned for outreach locations in consideration of the budget limits, causing children to be left out. One of the approaches UNEPI stakeholders used to reach every child is through community outreaches using the RED/REC strategy. However, the effectiveness of this strategy is not clear.

‘People are not used to that kind of saying that “go and work and we will pay money later”. It is two months [already], they [Health workers] won’t go back for an outreach [where we are asked to] first use our money then [they] pay us after three weeks. These are programmatic issues. We may think we are bringing accountability and transparency but when we are killing the service for lack of visibility of vaccines at facility level’. **(KII, National level)**

Proper characterisation of zero dose was one of the identified challenges with addressing reach. The zero-dose concept was not accurately conceptualized by health workers and VHTs, making it hard to know the main reasons contributing to poor immunisation uptake.

In this study, conducting targeted community outreaches was highly emphasized as a key priority area. Supporting more targeted outreaches would lead to increased access to immunisation services, thereby reducing the number of ZD and UI children in hard-to-reach communities. However, it was also emphasized that implementation strategies for targeted outreaches need to be supported. Stakeholders mentioned that the most used learning platforms under service delivery were support supervision and training (of health workers) to convey how information on ZD and UI children is accessed and shared.

Support supervision was the most identified platform. National and district-level UNEPI technical supervision and mentorships provided a platform for districts to engage and support health facilities with strategies to reach all the children. Following the Reach Every Child strategy for immunisation, micro plans were developed to understand the root causes and existing barriers to reaching every child. Refresher trainings were organised by the district local government on a quarterly basis through which immunisation knowledge and skills were shared. Seminars have also been organised to enhance knowledge and skills for UNEPI staff in the districts of Wakiso, Mubende, and Kasese.

Table 2: Learning priorities under service delivery

	Question	IRMMA	How LH will contribute to the evidence	Ranking	Key stakeholders and type of decision needed
1.	Who is a ZD and UI child in Uganda? Where does the ZD and UI child live? Which special population does the child belong to? How many ZD and UI children are in Uganda?	Identify, Reach, Measure, Monitor, Advocate	Through the targeted survey, data was collected on the names and social demographics of the child and mother and coordinates of their households, and we can estimate how many ZDC are in the community from the findings of the targeted survey but also using administrative data. For special populations, we will triangulate administrative data with LH data to identify where children belong. We will work with key stakeholders at national, sub-national and community levels to identify the special population.	High	National, UNEPI EPI partners, sub-national stakeholders. Planning (resource allocation, mobilization, distribution, forecasting) and social mobilization of immunization activities.
2.	How effective will the proposed EAF interventions be towards reaching ZDC, UIC, and missed communities?	Measure, Monitor	LH is conducting the household survey as part of the implementation research where we will measure the difference in ZD burden using the before and after activities.	High	

Question	IRMMA	How LH will contribute to the evidence	Ranking	Key stakeholders and type of decision needed
		We will conduct a process evaluation of the EAF interventions and rely on administrative data to estimate the effectiveness of the interventions and conduct interviews with key implementers and beneficiaries at the sub-national level.		
3. What is the effectiveness of the approaches used in the RED/REC strategy to ensure every child is reached with lifesaving vaccination?	Reach, Monitor	LH will not generate evidence to answer this question	High	
4. How can support supervision be improved to better identify and reach ZD and UI children?	Identify, Reach	LH may not generate evidence to answer this question	High	

Abbreviations: EAF, Equity Accelerator Fund; IRMMA, Identify, Reach, Measure, Monitor, Advocate; LH, Learning Hub; RED/REC, Reaching Every District/Reaching Every Child; UNEPI; Expanded Programme on Immunisation; UI, under-immunised; UIC, under-immunised children; ZD, zero-dose; ZDC, zero-dose children.

National level-UNEPI, National Medical Stores, Joint Medical Stores; UNEPI EPI partners – WHO, UNICEF, CHAI, PATH; Subnational – Civil Society Organisations, District Health Teams, health workers, VHTs, political and administrative leaders, regional referral hospitals.

3.2.2 Learning priorities under vaccine supply chain and logistics

Inadequate vaccines and supplies distribution were the most mentioned challenges in the LH focus districts. This challenge was experienced when last-mile delivery from the district vaccine store to the health facility was not met, which sometimes led to stockouts, especially at lower-level facilities. The lack of transport facilities at lower-level health facilities to pick vaccines from the district vaccine store caused the insufficiency. In Kasese, Mubende, and Wakiso, vaccines are delivered to distribution centres like health centre IVs (health sub-districts) on a quarterly basis to reduce pickup. Another challenge was a lack of timely communication from the national level to the district whenever stockouts of immunisation supplies occurs. This has contributed to stockouts at health facilities which accelerates the number of ZDC and UIC in communities. Another challenge reported by stakeholders was the failure of National Medical Stores (NMS) to honor immunisation supply requests and delivery schedules, sometimes delivering fewer supplies than requested or delivering them late.

'If there's an incidence of an antigen not available, you never know until when you receive [the supplies]. I don't know why it is consistent because for us we highlight [the antigens needed] while requesting but at the receiving point, that is when they say haaaa we don't have stock. Imagine and in the process, you have already promised people that you are about to get a delivery but on the receiving day that's when you get to know that ahh you are receiving but this one is not there'. *(KII, Mubende district)*

Timely distribution of requested immunisation supplies to the district and all lower-level health facilities together with vaccine bundling is a priority area for timely immunisation coverage. An example of this challenge was portrayed in Kasese, where the bacillus Calmette-Guérin (BCG) vaccine was delivered without syringes and the district did not administer BCG for three months.

Table 3: Learning priorities under vaccine supply and logistics.

	Question	IRMMA	How LH will contribute to the evidence	Ranking	Key stakeholders and type of decision needed
1.	How effective are the last-mile delivery initiatives by NMS? What learnings can be derived from these initiatives?	Reach	Based on the interviews we will conduct with caregivers of ZD children and health workers, we will be able to document the advantages of last-mile delivery as a solution to the barrier of stockouts	High	National, UNEPI EPI partners, sub-national stakeholders

	Question	IRMMA	How LH will contribute to the evidence	Ranking	Key stakeholders and type of decision needed
2.	How can health workers be equipped to better manage vaccines and immunisation supplies?	Reach	LH will generate evidence from health facility assessment	High	Planning (resource allocation, mobilization, distribution, forecasting) and social mobilization of immunization activities
3.	How can different stakeholders be engaged to address vaccine distribution challenges at the district level?	Reach	LH will generate evidence from health facility assessment interviews with health workers and key stakeholders at national (NMS and UNEPI) and sub-national levels (DHT, CSOs, political leaders) in addition to the facility assessment.	High	
4.	What strategies can NMS adopt to enhance real-time communication mechanisms with districts regarding immunisation supply stockouts to effectively mitigate and prevent stockouts at health facilities?	Reach	LH will generate evidence from health facility assessment interviews with health workers and key stakeholders at national (NMS, UNEPI) and sub-national levels (DHT, CSOs, political leaders)	High	
5.	How can demand for vaccines and supplies be synchronized with the supply?	Reach	LH will generate evidence from health facility assessment interviews with health workers and key stakeholders at national (NMS, UNEPI) and sub-national levels (DHT, CSOs, political leaders)	High	

Question	IRMMA	How LH will contribute to the evidence	Ranking	Key stakeholders and type of decision needed
6. How can visibility of vaccines and supplies be improved at the health facility level?	Reach	LH will generate evidence from health facility assessment interviews with health workers and key stakeholders at national (NMS, UNEPI) and sub-national levels (DHT, CSOs, political leaders) to generate suggestions on how to improve vaccine supply to the health facility level	High	

Abbreviations: IRMMA, Identify, Reach, Measure, Monitor, Advocate; LH, Learning Hub

National level-UNEPI, National Medical Stores, Joint Medical Stores; UNEPI EPI partners – WHO, UNICEF, CHAI, PATH; Subnational – Civil Society Organisations, District Health Teams, health workers, VHTs, political and administrative leaders, regional referral hospitals

3.2.3 Learning priorities under communication and advocacy

Within the three districts, radio communication was reported to have had a wider coverage in communities and many caregivers had access to it. Despite families having access to radios, radio communication had not been extensively used to sensitise and mobilise communities for immunisation due to a lack of budgetary allocation for airtime. However, in some districts, some district health officers leveraged local politicians' radio airtime to sensitise the masses about health issues. There was also a need to adopt sensitisation of traditional birth attendants (TBAs) on immunisation issues. Although TBAs were banned from practicing in Uganda, it was found out that they still do perform deliveries. Sensitisation had only been achieved in areas of Wakiso District; however,

their (TBAs) engagement in mobilisation for immunisation was inadequate. TBAs just like the VHTs could be sensitised on the importance of immunisation since they attended to mothers giving birth, especially in hard-to-reach areas.

Platforms that were used within the three districts included radio talk shows, online platforms, community gatherings, immunisation outreaches, community radio towers, print media, children's events days' celebrations, suggestion boxes at health facilities, television programmes, and the use of megaphones. However, the most prominent of all communications was through radio. Radio talk shows played a crucial role in sensitising and mobilising communities for immunisation services. This was the case for Kasese, Wakiso, and Mubende where radio stations were commonly used to relay immunisation information. Health educators

and community leaders also actively engaged in radio talk shows to emphasize the importance of immunisation, with the involvement of influential political leaders like the Residence District Commissioners to promote awareness and encourage parents to bring their children for vaccination. The use of radio talk shows leveraged the accessibility and effectiveness of radio platforms in reaching diverse audiences, especially mothers, to obtain information in their local languages.

'We have radio talk shows and recently we had one of our health educators sensitizing communities about zero-dose and under-immunized children. We have a program on the radio every Wednesday at 9:39 pm where we invite different people to come and share with the community about immunisation. We need to have radio talk shows because there are mothers who will not get this VHT but will have time for radio, like in the evening, and get much of the information on the radio'. **(KII, Kasese district)**

Other commonly used online platforms included WhatsApp groups that health workers created and used to a) discuss integrated child days; b) exchange information, share challenges, and discuss solutions; and c) mobilise for

performance review meetings and partner meetings and share information from all other sectors. These groups united health workers and were commonly used to communicate and advocate for immunisation services at the grassroots. Community gatherings, immunisation outreaches, community radio towers, and print media were also mentioned as available platforms used to advocate for immunisation services offered in health facilities.

From literature, seeking immunisation services was described as a female role however, men were relied upon to offer consent and provide money for transport [1]. The priority area was to conduct targeted community mobilisation, using radio communication and others such as community gatherings, outreaches, radio towers, and print media. Health workers, VHTs, and other community stakeholders can be targeted to help debunk negative perceptions and myths about immunisation, thereby increasing the uptake of vaccines. In addition, risk communication can be integrated into immunisation activities at various levels and more risk communication messages to the population can be developed to create awareness and reduce vaccine hesitancy. All three districts mentioned the need to create awareness of zero-dose and under-immunised children in the community as targeted populations, as well as integrate risk communication to reduce vaccine hesitancy.

Table 4: Learning priorities under communication and advocacy.

Question	IRMMA	How LH will contribute to the evidence	Ranking	Key stakeholders and type of decision needed
1. Which community mobilisation approaches are effective at reaching ZDC and UIC?	Identify, Reach	we will do the process evaluation of EAF interventions on community mobilization and sensitization in the study areas and also review documents on evaluations that have worked in other areas of similar context to document success stories	High	National, UNEPI EPI partners, sub-national stakeholders
2. How can gender-related barriers to immunisation be addressed to improve uptake?	Reach	LH may not directly contribute to providing evidence	High	Planning (resource allocation, mobilization, distribution, forecasting) and social mobilization of immunization activities
3. To what extent are the District Health Teams and the district-level political leaders involved in demand generation for immunisation?	Reach, Advocate	To a small extent, the LH will generate evidence for this question through interviews during implementation research and stakeholder engagement. We will also conduct a process evaluation of the EAF interventions demand generation for immunisation	High	

	Question	IRMMA	How LH will contribute to the evidence	Ranking	Key stakeholders and type of decision needed
4.	Why are children not immunised?	Reach, Advocate	To a large extent, the LH will generate evidence for this question through interviews during implementation research at the sub-national and community levels with caregivers and stakeholder engagement	High	
5.	How can the current communication messaging be improved to enhance immunisation services uptake?	Reach, Advocate	LH will generate evidence for this question through interviews during implementation research at the sub-national and community levels with DHT and local leaders in addition to stakeholder engagement at the national and sub-national levels	High	

Abbreviations: IRMMA, Identify, Reach, Measure, Monitor, Advocate; LH, Learning Hub; UIC, under-immunised children; ZDC, zero-dose children.

National level-UNEPI, National Medical Stores, Joint Medical Stores; UNEPI EPI partners – WHO, UNICEF, CHAI, PATH; Subnational – Civil Society Organisations, District Health Teams, health workers, VHTs, political and administrative leaders, regional referral hospitals.

3.2.4 Learning priorities under programme management and finance

A key challenge mentioned by stakeholders is the increasing number of antigens in the immunisation schedule. Stakeholders reported a challenge of increased immunisation workload that comes with new vaccine introduction but not an increase in human resources. In addition, low levels of staffing in health facilities was one of the most mentioned challenges which affected reaching the ZD and UI children. This was evident in sub-counties served by health centre IIs, with most having only two health care workers and a health assistant to conduct all health activities. Furthermore, immunisation

outreaches were reported to increase stress among these few health workers because they served a relatively large population that would benefit effectively from a health sub-district-level facility. An example of this problem was reflected in Mubende District where there were ten sub-counties served by health centre IIs each. These sub-counties were mentioned to have high numbers of ZD and UI children. In addition to managing a large population at the health facility, clerical work in terms of documenting immunisation details emerged as problematic. An additional challenge was the ineffective engagement of immunisation stakeholders including VHTs, politicians, religious leaders, district executive leaders, and the caregivers themselves to discuss how best services can be extended to communities.

'There is also a problem of staffing! There are very few people at the facility. Now look at health centre II where we have about two established staff where you find several people waiting for OPD [outpatient] services. You find the OPD full. One is attending to the OPD. The one writing is the one dispensing drug and is the one examining patients. The mothers for antenatal are also waiting... Someone comes with an accident, and some have come for family planning.' (*KII, Mubende district*)

Despite the above challenges, stakeholders mentioned that regular review meetings held at various levels were the most crucial avenue reported for disseminating immunisation information. Stakeholders who attended these meetings were primarily responsible

for allocating resources, implementing health policies, and monitoring immunisation services, and they included politicians (Resident District Commissioners and Local Council Five [LCV] chairpersons), religious leaders, DHT and facility-based health workers, and executive teams (Chief Administrative Officers). These stakeholders were always encouraged to disseminate information regarding the progress on immunisation coverage and encourage communities to participate in upcoming immunisation events. Meetings were reported as planned avenues to be used both at national and district levels to engage the various stakeholders and solicit ways of reaching the ZD and UI children. Health facility-based immunisation sessions were key sessions to empower mothers with immunisation knowledge and to remind them to engage other caregivers about immunisation, schedules and targeted interventions like outreaches.

Community dialogues were mentioned as an additional avenue for getting feedback from the RED/REC strategy and to identify the RED/REC-based poorly performing sub-counties and devise strategies to reach the actual communities where the ZDC lived. Written health reports were the least-used learning platforms to understand strategies for ZD and UI children as they were not as effective as traditional face-to-face learning. Key informants mainly reported on three priority areas; these included staffing at health facilities, multilevel stakeholder engagement, and review meetings. There was a need for these meetings to be organised at various levels—for example, from the ministry to the community level—to help stakeholders appreciate the immunisation gap of ZD and UI children and participate in mobilisation. Improving staffing at health facilities was mentioned as the priority problem that needed to be addressed to reduce ZD and UI children.

Table 5: Learning priorities under programme management and finance.

	Question	IRMMA	How LH will contribute to the evidence	Ranking	Key stakeholders and type of decision needed
1.	How adequate and competent are the human resources to offer immunisation services amidst an increase in antigens?	Reach	LH will generate evidence from health facility assessment interviews with health workers and key stakeholders at the national and sub-national levels (DHT, CSOs, political leaders) to understand the adequacy of human resources	High	National, UNEPI EPI partners, sub-national stakeholders
2.	How can the private sector be leveraged to offer immunisation services?	Monitor	LH may not directly contribute to providing evidence	High	Planning (resource allocation, mobilization, distribution, forecasting) and social mobilization of immunization activities
3.	How can outreaches better be designed to reduce ZD/UI children? How effective and efficient are these outreaches?	Reach	LH will generate evidence from health facility assessment interviews with health workers and key stakeholders at the sub-national levels (DHT, CSOs, political leaders) to understand how to best design outreaches	High	

Question	IRMMA	How LH will contribute to the evidence	Ranking	Key stakeholders and type of decision needed
4. What is the contribution of low levels of staffing to immunisation uptake? How can the existing staff be leveraged to provide effective immunisation services?	Reach	LH will generate evidence from health facility assessment interviews with health workers and key stakeholders at the sub-national levels (DHT, CSOs, political leaders) to suggest on the optimization of the available human resource		
5. How can lower-level health centres (HCIs) in underserved areas be supported to optimise immunisation service delivery?	Reach	To a small extent, LH will generate some evidence from interviews with the DHT, local leaders and key stakeholders at the national level to generate suggestions on the optimization immunization using the available resources		

Abbreviations: IRMMA, Identify, Reach, Measure, Monitor, Advocate; LH, Learning Hub; UI, under-immunised; ZD, zero-dose.

National level-UNEPI, National Medical Stores, Joint Medical Stores; UNEPI EPI partners – WHO, UNICEF, CHAI, PATH; Subnational – Civil Society Organisations, District Health Teams, health workers, VHTs, political and administrative leaders, regional referral hospitals.

3.2.5 Learning priorities under surveillance, monitoring, and evaluation

Stakeholders reported inadequacy of data on immunisation. The inefficiencies in the data arose from routine shortfalls in providing adequate data collection tools to document the immunisation services offered. Such tools included the immunisation data capture registers and child vaccination cards. Across the three districts, health workers reported a lack of verification cards to issue to caregivers during vaccination services, which prompted them to use exercise books to document children's immunisation events. These books often were used for other family records and activities, which led to the loss of data of the respective child. Reports indicate that there were no reporting tools/registers that captured data for the newly introduced antigens such as yellow fever and hepatitis B at birth. Another challenge experienced was the limited use of immunisation data to make decisions at all levels, hence the inadequate support supervision. One respondent articulated this critical challenge below.

'Majorly data use! It is not until people start appreciating data and using it [then] they can appreciate if they are performing well or poorly and that guides the strategy for improvement. Rarely can you find the DHO aware of their [immunisation] coverages until we invite them for a national engagement, and they are shocked in that meeting that they are performing that way'. (KII, Wakiso district)

The use of Uganda Bureau of Statistics figures to determine the district immunisation targets created a discrepancy between the target and the actual figures at the facility level. This discrepancy also created an over- and underestimation of the denominator.

The available surveillance, monitoring, and evaluation learning platforms reported were immunisation data capture registers, surveys, and online platforms. Immunisation data capture registers were used as a platform to identify the UI and ZD children. In Wakiso, it was reported that with the support of UNICEF, some VHTs had

registers that they used to capture and track all ZD and UI children in their areas. This data capture provided guidance on areas for outreaches. In addition, child vaccination cards were used to determine UIC when they come for immunisation services, and this provided guidance on mapping areas that needed outreaches. Findings from research and surveys conducted by academic institutions and organisations to characterise ZDC were used to estimate immunisation uptake in communities, and this data could be benchmarked to further characterise the ZD and UI children.

In Wakiso District, many private facilities routinely collected vaccines from a public health centre nearest to them monthly. In Mubende, three private clinics provided immunisation to children in Butoloogo Sub-County, Kilwanyi Parish, and Makukulu Parish monthly. These health facilities charged caregivers a minimum of 2,000 Uganda shillings for every child vaccination and sold vaccination cards to caregivers with none. There was a recommendation to find a better system that could capture data at private health facilities to avoid the loss of data. It was important to map all and attach responsible officers to follow up and monitor how data flowed back to the district. Key informants reported that the private facilities tended to receive large numbers of patients and were therefore a good platform to leverage. Besides, the RED/REC categorization using DHIS2 data was used as a platform to access information on the monthly vaccination status at district, sub-county, and facility levels, which guided immunisation programming at the national and district levels.

The priority area mentioned was to consider digitalization of the immunisation data system to effectively track the UI and ZD children. Registration of all births and immunisation status by VHTs was fronted for easy tracking and monitoring of all children in the immunisable age. They emphasized the need to validate, clean, and use immunisation data for evidence-based decision-making and improved performance. Overall, reporting data would only be possible if improved reporting tools encompassing all relevant immunisation data variables, such as new antigens, were in place in all private health facilities that offer immunisation.

Table 6: Learning priorities areas under surveillance, monitoring and evaluation.

	Question	IRMMA	How LH will contribute to the evidence	Ranking	Key stakeholders and type of decision needed
1.	What is the contribution of the EAF interventions towards reaching ZDC, UIC, and missed communities?	Reach	<p>LH is conducting the household survey as part of the implementation research where we will measure the difference in ZD burden using the before and after activities.</p> <p>We will conduct a process evaluation of the EAF interventions and rely on administrative data to estimate the effectiveness of the interventions and conduct interviews with key implementers and beneficiaries at the sub-national level.</p> <p>We will triangulate administrative data with LH data to identify how EAF interventions support the reduction of ZD.</p>	High	<p>National, UNEPI EPI partners, sub-national stakeholders</p> <p>Planning (resource allocation, mobilization, distribution, forecasting) and social mobilization of immunization activities</p>
2.	What is the relative cost of EAF interventions to reach ZDC and how cost-effective are they?	Monitor	<p>LH will generate evidence for this question through a) implementation research costing and cost-effectiveness analysis studies and b) stakeholder engagement</p>	High	

	Question	IRMMA	How LH will contribute to the evidence	Ranking	Key stakeholders and type of decision needed
3.	What strategies can be implemented to improve the availability and use of reporting tools to effectively document immunisation activities?	Monitor	LH will conduct interviews with key stakeholders at the national level, DHT and health workers during the health facility assessment to document the optimization of reporting tools	High	
4.	What strategies can be used to enhance data use at district and health facility levels?	Monitor	<p>LH may not directly contribute to providing evidence</p> <p>LH will conduct interviews with the DHT and health workers during the health facility assessment to generate suggestions to enhance data use</p>	High	
5.	How can the estimation of denominators be improved at all administrative levels?	Monitor	LH may not directly contribute to providing evidence	High	

	Question	IRMMA	How LH will contribute to the evidence	Ranking	Key stakeholders and type of decision needed
6.	How can the existing data capture systems be improved to identify ZDC and UIC?	Monitor	LH conducted a mapping of data capture ecosystems and generated evidence on the challenges and suggested approaches to improving data capture systems. We will continue stakeholder engagement on how to improve data capture systems	High	
7.	What should be done to streamline the private sector to enhance immunisation data capture and reporting?	Monitor	LH may not directly contribute to providing evidence	High	
8.	To what extent does triangulation of data from multiple sources solve the challenge of estimating the number of ZD and UI children?	Monitor	LH will generate data from the implementation research survey and will be triangulated with administrative data to estimate the ZD and UI children numbers	High	

Abbreviations: EAF, Equity Accelerator Fund; IRMMA, Identify, Reach, Measure, Monitor, Advocate; LH, Learning Hub; UIC, under-immunised children; ZDC, zero-dose children.

National level-UNEPI, National Medical Stores, Joint Medical Stores; UNEPI EPI partners – WHO, UNICEF, CHAI, PATH; Subnational – Civil Society Organisations, District Health Teams, health workers, VHTs, political and administrative leaders, regional referral hospitals.

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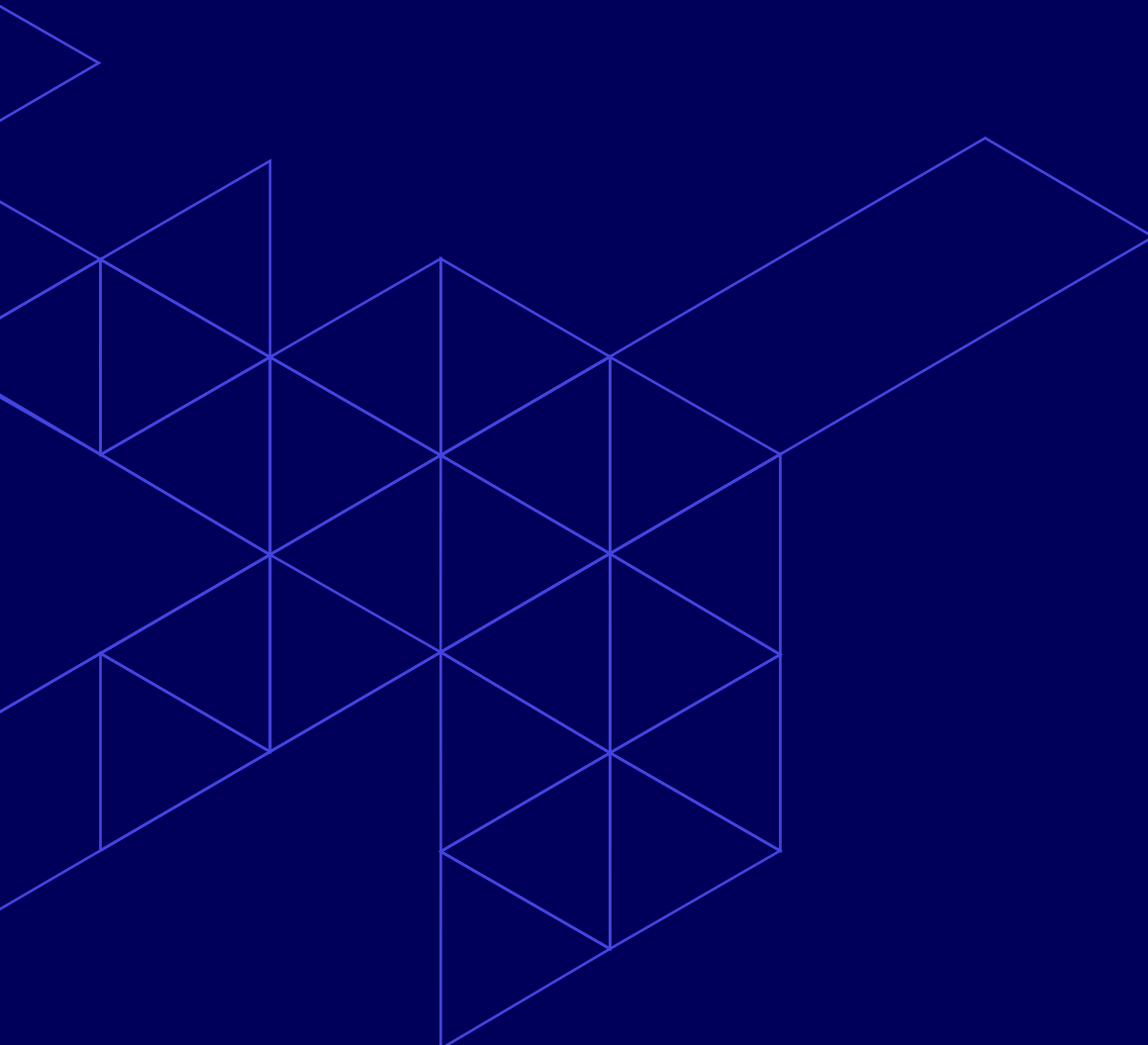
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Annex

Annex A: List of emerging learning priorities

Pillar Head	Learning Questions	Ranking
	How does the current immunisation funding gap affect vaccine uptake?	High
	What is the relative cost of interventions to reach Zero Dose children and how cost-effective are they?	
	What should be emphasized to improve QOC through collective problem-solving and accountability with providers?	Medium
	How can providers be empowered to identify and overcome barriers that affect vaccine uptake as this is critical to individual performance, team effectiveness, and QOC?	
	To what extent can the use of digital tools improve microplanning and adherence to the plans?	High
	To what extent are the District Health Teams (DHTs) and the political leaders at the district level engaged in demand generation for immunisation?	Medium
	Do they understand their roles in demand generation for immunisation?	
	What challenges do they face while undertaking demand generation for immunisation?	
	How can they be supported to undertake their roles better?	
	How effective will the proposed interventions be towards reaching ZDC, UI and missed communities?	High

Pillar Head	Learning Questions	Ranking
Programme Management	To what extent can improved partner coordination especially during annual district work plan development contribute to improved immunisation outcomes?	Medium
Service delivery	What is the effectiveness of the approaches used in the RED/ REC strategy to ensure every child is reached with lifesaving vaccination?	High
	Which community mobilization approaches demonstrate effectiveness and efficiency in reaching ZDC and UIC?	High
	How effective is the immunisation service delivery model used in urban areas?	Hgh
Monitoring & Evaluation	To what extent does triangulation of data from multiple sources (UBOS, DHIS2, IHME) solve the challenge of estimating the number of ZD and UI children?	High
	What is the capacity of biostatisticians, healthcare facility data personnel and health workers to capture, record, analyze and interpret EPI data? What strategies can be adopted to bridge any gaps therein?	Medium
	What is the effectiveness of the existing data capture (including digital) tools in use at EPI in vaccine data use at national and subnational levels?	High
Communication & Advocacy	Which effective gender-responsive approaches can be adopted by the program to improve immunization uptake?	High



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