Zero-dose Learning Week

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Addressing Zero dose and under immunized children in Pastoralist areas of Ethiopia through strengthened PHCU linkage and head count

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Background

Ethiopia stands second among countries with the highest number of zero dose (ZD) children (1-5). Thus Establishing an effective strategy to reduce ZD children is timely.

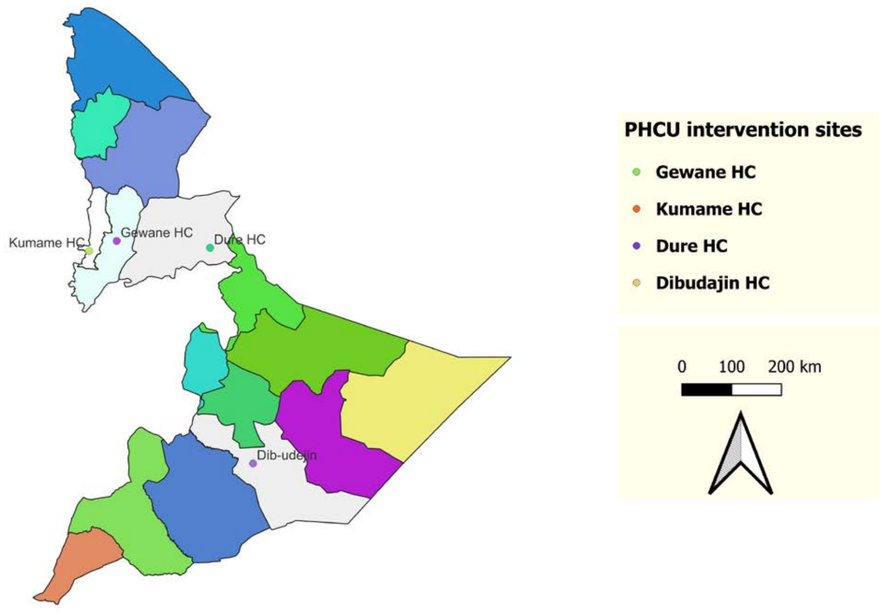
Objectives

The objectives of this study was to test the effectiveness of strengthened PHCU (Health Center and Health Posts) linkage and house to house head count to identify, reach and vaccinate Zero Dose and Under Immunized children in selected PHCUs of Afar and Somali pastoralist region.

Methods

A total of four PHCUs were selected from Afar and Somali pastoralist region with reasonable number of catchment health posts, for implementation of this approach. After providing Refresher training for Health Extension Workers (HEW) at health centers as well as orientation on head counting of under two children through house marking of the respective kebeles, ZD and under immunized children of under two were identified and referral paper were provided and scheduled for response vaccination to the nearest vaccination site, outreach, health post or health center depending up on the context of the area. (Fig 1).

Fig 1. Location of PHCU Intervention sites in Afar and Somali regions



Findings

The result showed that A total of 1619 children of 12-23 months were counted in the 4 PHCU catchment areas with actual counted children were 56% of the estimated 2477 children of SI for previous year based on population projection (Fig 2). The *Number of counted children* in the age of 0-11 months were 1623 in total of which 390 (24%) were unvaccinated(delayed) and 185 (11%) were under-vaccinated, on the other hand the number of Children of 12-23 months were 1619, out of which 332 (21%) zero doses and 355 (22%) under-immunized children (Fig.3). On average, penta-1 coverage among counted children is **19%** point lower than that of DHIS-2 report of respective year and highest discrepancy for Dure PHCU (26%) and lowest for Kumamie PHCU (3%). Reasons for missing of vaccination were explored during the assessment that the vaccination site is too far was found to be the leading reason followed by moved to other areas (Fig 4). Ninety seven percent of never vaccinated (ZD) (357/390) and 97% of defaulters (179/185) were received their appropriate vaccination through response vaccination with in one month time (Fig 5 & 6).

Fig 2. Comparison of number of counted 12-23 months age children with 2013EFY survinving infants calculated from total population by PHCU

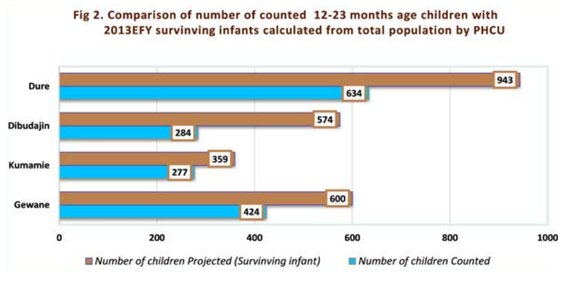


Fig 3. Number of Zero dose and under-immunized children identified during head count by Age group and PHCU

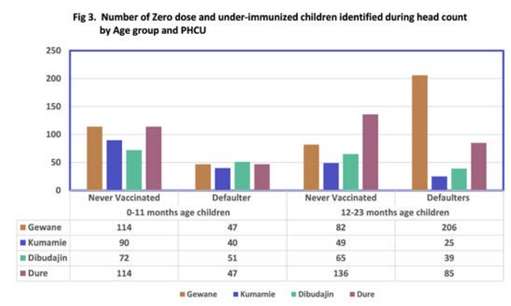


Fig 4. Reasons for failing to vaccinate or continue vaccination for 12-23 months children

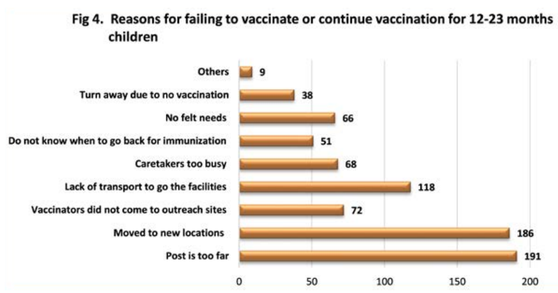


Fig 5. Number of Zero dose 0-11 month Children vaccinated for first dose of pentavalent vaccine following head count by PHCU

Fig 6. Number of Zero dose 0-11 month Children that continued their missed vaccinatation series appropriate for their age following head count by PHCU

Recommendations

Strengthening the PHCU linkage, technical and managerial capacity of primary health care (PHCU) accompanied by head count and referral of ZD and under vaccinated children for vaccination can benefit the identification and reach of children missing vaccination. Scaling up of this strategy to other areas where ZD and UI children are significant is highly recommended.

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Key words:

Zero dose, under immunized, head count, mentoring

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Reducing Zero Dose Children and improving Routine Immunization following COVID-19 through Community Health Workers in Cameroon

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BACKGROUND

Following the COVID-19 pandemic, Cameroon experienced a growing number of zero-dose and under-vaccinated children. Since 2015, the Southwest Region of Cameroon has faced sociopolitical crisis, including displaced populations and burning of health facilities. The COVID pandemic worsened an already weakened health system. Many people became fearful of accessing health facilities, particularly fearing the COVID-19 vaccine, due to rumors circulating in the communities (Njoh et al., 2022). Kumba, a city in the Southwest Region, harbors a large internally displaced population, characterized by many zero-dose and under-immunized children. (Figure 1)

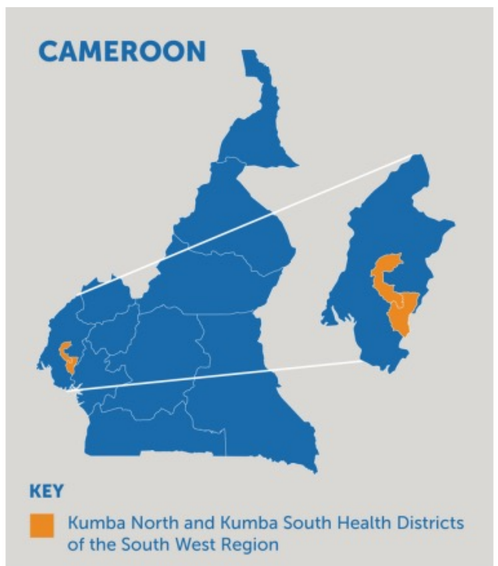

Figure 1: map of Cameroon showing locations of Kumba North and South Health Districts)

We aimed at improving accessibility and utilization of vaccination services by enhancing the training of Community Health Workers (CHWs) and health care workers (HCWs) in routine immunization. Specifically, we aimed to reduce the number of zero-dose and under-vaccinated children in Kumba North and Kumba South Health Districts of the Southwest Region.

METHODS

Routine immunization data for 2020 and 2021 were reviewed prior to project implementation and six of 13 health areas were prioritized for implementation. Advocacy and briefing meetings were held with key stakeholders to get them involved. CHWs and HCWs were trained on community mobilization and reduction of missed opportunities for vaccination. Thereafter, CHWs conducted home visits to identify the zero-dose and under-vaccinated children in their respective communities. Community volunteers were trained as supervisors for the CHWs. Supportive supervision was integrated into other health activities, monthly data reviews were conducted, and feedback given to the districts and health areas concerned. The project was implemented from October 2022 to February 2023. (Figure 2)

Figure 2: Home visits in different communities by CHWs

FINDINGS

Before the project implementation n Kumba North District, 151 children were vaccinated with the Penta-1 vaccine; 212 children with the Penta-3 vaccine; and 549 girls with the Human papillomavirus (HPV) vaccine. In Kumba South District, 134 children were vaccinated with the Penta-1 vaccine; 109 children with the Penta-3 vaccine; and 397 girls with the HPV vaccine. No adolescent boys received HPV vaccination in either district. Upon completion of the project in February 2023, three advocacy meetings and two trainings were held with 6 CHWs, 18 HCWs and 4 community Supervisors trained. CHWs visited 945 homes with sensitization sessions. Vaccination of 3172 (77%) zero-dose children with Penta-1 vaccine and 2893(69%) with Penta-3 vaccine with additional 2134 (41%) adolescent (387 boys and 1747 girls) received the HPV vaccine.

In Cameroon, CHWs are not usually deployed to track routine immunization on a regular basis, and instead are only utilized during immunization campaigns unlike in other countries (Bakkabulindi et al., 2023).

The training of CHWs ended up being one of the most valuable components of the project because they helped increase demand for vaccination in the midst of a conflict setting and filled the gaps that HCWs could not reach. The training of HCWs at different points of entry in health facilities in reducing missed opportunities for vaccination also marked an important component to reach zero dose and under vaccinated children. (Table 1)

NUMBER OF CHILDREN (VACCINATION COVERAGE) BEFORE AND AFTER PROJECT IMPLEMENTATION								
	BEFORE				AFTER			
	Penta 1 (Zero Dose)	Penta 3	HPV Girls	HPV Boys	Penta 1 (Zero Dose)	Penta 3	HPV Girls	HPV Boys
Kumba North	151	212	549	0	1219 (77%)	1106 (72%)	926	251
Kumba South	134	109	397	0	1953 (76%)	1787 (66%)	821	136
Total	**285**	**321**	**946**	**0**	**3172**	**2893**	**1747**	**387**

Table 1: Table of Results

RECOMMENDATIONS

- Train and utilize CHWs in demand generation for routine immunization
- Train and utilize CHWs in other activities such as service delivery and supply chain management in hard-to-reach communities
- CHWs should have access to reliable supervision
- Train and utilize HCWs on the reduction of missed opportunities for vaccination
- Provide adequate, reliable remuneration for CHWs
- Keep accurate record of records of CHW demographic and performance data.

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"FARID"– A unique, innovative model that ensure equity of vaccination and other primary health care services for population living in security compromised areas of Somalia.

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[1]The CORE Group Partners Project , [2]Bill and Melinda Gates Foundation

Introduction

Somalia has faced decades of civil unrest, resulting in a prolonged humanitarian crisis, population displacement, and a collapsed health system, particularly in the South-Central region. According to the 2020 Somali Demographic and Health Survey, over 60% of children didn't receive a single vaccine (zero-dose), with only 11% being fully immunized (SHDS,2020).

Out of the 81 districts in South and Central Somalia, more than 1.5 million children live in 40 districts that are either partially or entirely inaccessible. These children lack access to basic health services due to insecurity, poor negotiations, and funding gaps (Mendes et.al, 2024). The seven-year circulation of the polio variant, coupled with recurrent outbreaks of measles, cholera, diphtheria, and whooping cough, necessitated innovative approaches to increase population immunity in these security-compromised areas.

The CORE Group Partners Project (CGPP), with funding from the Bill and Melinda Gates Foundation, introduced the Far-Reaching Integrated Delivery (FARID) project in 10 partially and entirely inaccessible districts in Jubaland, Somalia. FARID is a unique model of service delivery designed to reach children often missed due to access and structural systemic barriers.

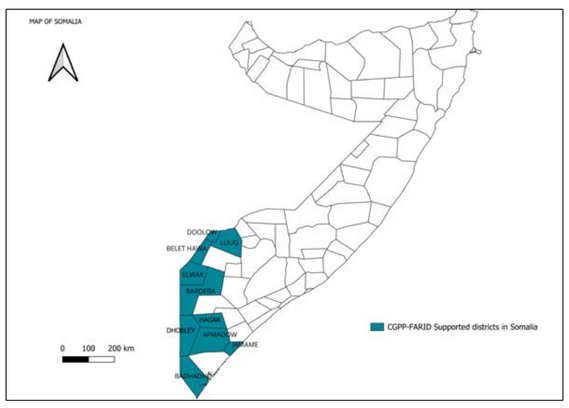

Figure 1: Map showing CGPP-FARID project supported districts in Somalia

Methods

FARID adopted a health camp model that was built around four key approaches; an innovative GIS mapping to identify and reach targeted children, robust community access negotiation process, a collaborative ecosystem approach to partnership and providing accessible integrated primary health care.

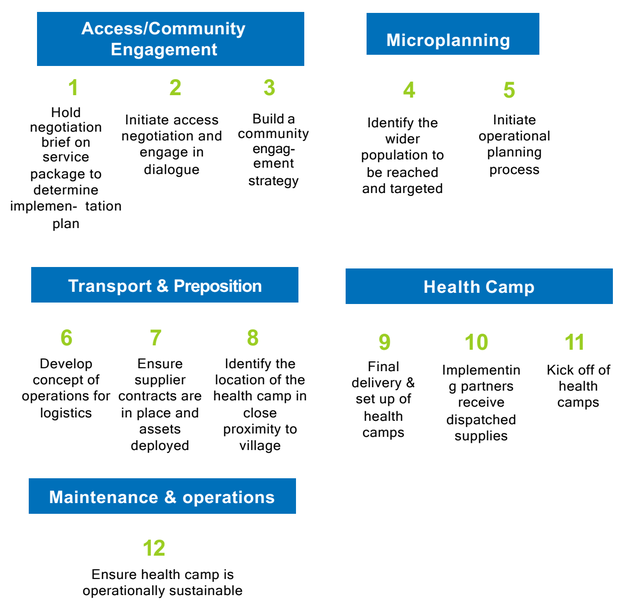

Figure 2: FARID health camp SOPs

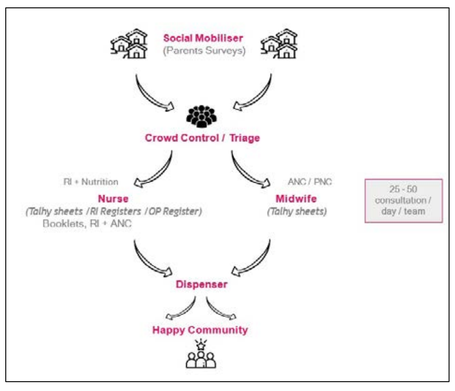

Figure 3: How health camps are conducted

Trained health camps teams in target villages in the 10 districts provide integrated healthcare services, including screening and vaccinating of children under 5, provide antenatal and post-natal care consultations, nutrition screening, and essential medical packages. These services are provided by 30 teams, each team comprising of a nurse, data clerk and a social mobilizer.

Results

Between April 2023 to June 2024, 4,321 health camps were conducted across 826 FARID-eligible villages, identified and immunized 40,619 under-5 ZDC with routine antigens, of whom 56 percent were females. The primary barrier to vaccination noted by caregivers was the lack of nearby health facilities.

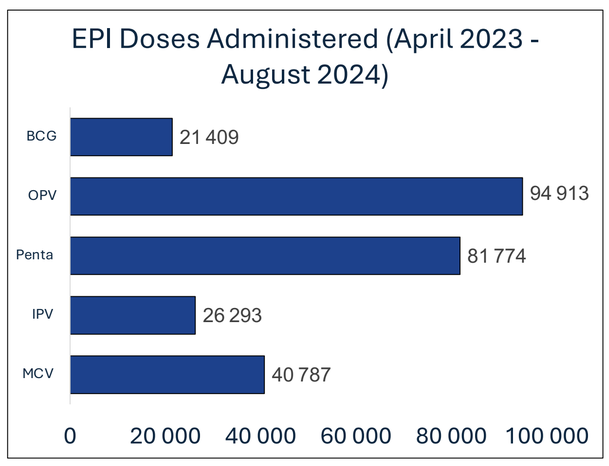

Figure 4: EPI doses administered by antigen at the health camps

Figure 5: Health camp in action

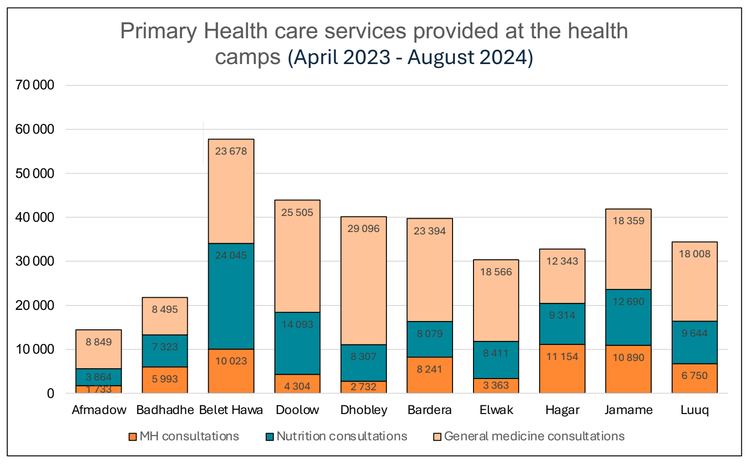

Figure 6: Graph showing primary healthcare services provided at the health camps

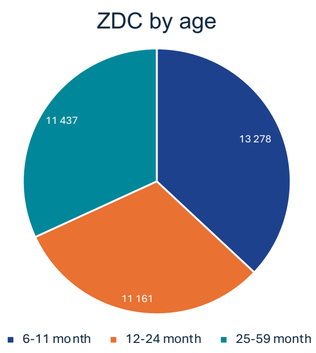

Figure 7: ZCD children identified at the health camps by age group

Notably, over 36,000 of these children were from inaccessible areas of the supported districts. In addition, 65,182 maternal health consultations were provided: antenatal care (44,739), postnatal care (20,443) and referral (1,996), and 105,770 nutrition consultations; MAM (34,289), SAM (12,503) and referrals (1,359).

Conclusion

The FARID health camp model has proven to be cost efficient and scalable. Its success underscores the importance of innovative, adaptable approaches to healthcare delivery in fragile contexts. Community engagement, access negotiation, and collaboration are critical to sustaining these gains and addressing health disparities.

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The effects of zero-dose vaccination status in early childhood & level of community socio-economic development on learning attainment in pre-adolescence in India: A population-based cohort study

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Introduction

“Zero-dose” children (infants who fail to receive basic vaccines, represented by non-receipt of the first dose of diphtheria-tetanus-pertussis-containing (DTP1) vaccine) face substantial adversity in early childhood and are at risk of failure to thrive.

While the survival benefits of immunisation are well established, empirical evidence on developmental outcomes for zero-dose children is lacking.

Objective

To characterise the relationship between zero-dose vaccination status in early childhood and learning attainment in pre-adolescence, a critical child development milestone.

Methods

We analysed the 2019 India Human Development Survey panel to study the performance of zero-dose versus vaccinated children (identified at ages 12 to 59 months) in Wave I on basic learning tests at ages 8 to 11 in Wave II.

The outcome was a sum of reading, writing and math scores ranging from 0 (no knowledge) to 8.

To conceptualise the factors contributing to poor learning attainment in mid-childhood and the possible role of zero-dose vaccination status within these, we referred to the nurturing care framework, a state-of-the-art life course model of human flourishing from preconception to 20 years of age.

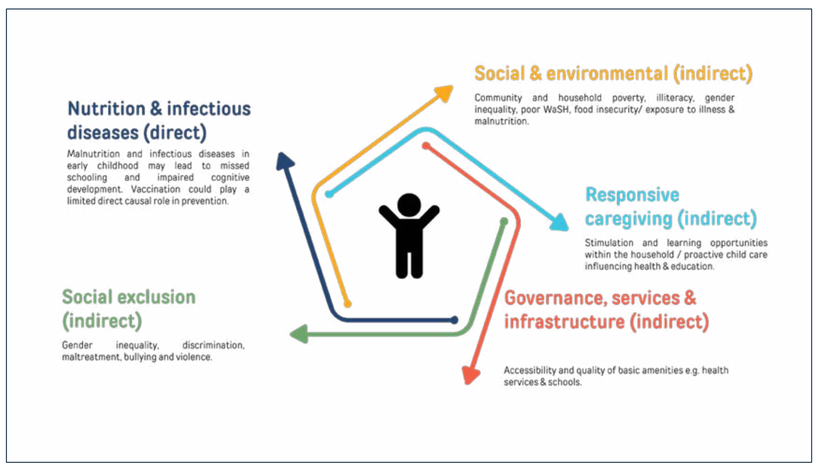


Figure 1. Direct and indirect pathways linking child ZD status to learning attainment

We hypothesised that vulnerability would be highest for zero-dose children living in contexts of grave deprivation; thus, the analysis considered effect moderation due to the level of community socioeconomic development. Communities were classified into 3 categories: urban, rural more developed village, rural less developed village.

We fit three linear regression models examining whether child zero-dose status predicts learning attainment: a crude model, a main effects model including all prespecified covariates, and an effect modification model including all covariates and an interaction between zero-dose status and community development level.

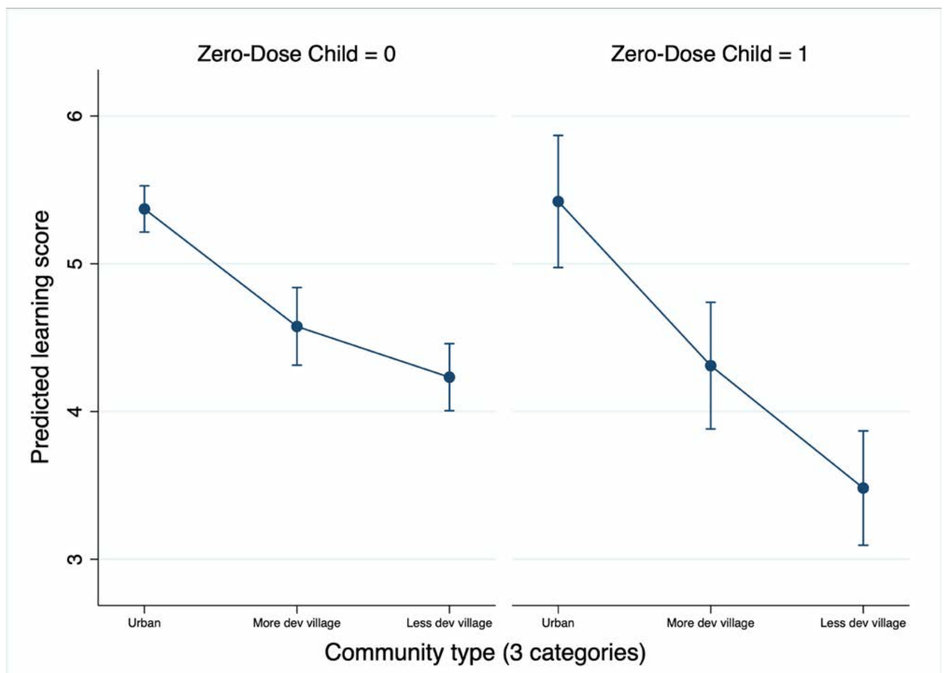
We repeated analyses using linear fixed effects models (to study within-community effects) and ordinal models (to study alternative outcome formulations).

Results

The analytic sample included 3,781 children in 1,699 communities, representing a population cohort of 18.2 million children.

Analyses revealed that **zero-dose vaccination status was associated with poor learning outcomes at ages 8 to 11 years for some, but not all, children**, and that risk was differentiated by the level of community socioeconomic development.

Findings from linear regression, linear fixed effects, and ordinal regression models confirmed that **zero-dose children living in contexts of very low socio-economic development** are at **elevated risk** of poor learning attainment in pre-adolescence.



Margin	Coefficient	95% CI
1. Urban & ZD=0	5.37	[5.21; 5.53]
1. Urban & ZD=1	5.42	[4.97; 5.87]
2. More developed village & ZD=0	4.58	[4.31; 4.84]
2. More developed village & ZD=1	4.31	[3.88; 4.74]
3. Less developed village & ZD=0	4.23	[4.01; 4.46]
3. Less developed village & ZD=1	3.48	[3.09; 3.87]

Figure 2 and Table 1. Predictive margins from linear regression model of child zero-dose vaccination status with 95% CIs, by community type. Model adjusted for household wealth quintile, size, and social group, education levels of mother and father, and child age at testing.

Recommendations

There is an important opportunity for new policy initiatives that unite the zero-dose strategy and the early childhood development and learning agendas encapsulated in Sustainable Development Goal 4.1: “By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes”.

A multisectoral intervention strategy focussing on zero-dose children in high-needs geographies could contribute to transformative change, enabling children from systematically marginalised households and communities to survive, thrive and realise their full potential.

Reference

Johri M, Ng E, S. W. , Sharkey A, Bosson-Rieutort D, Kone GK, Subramanian SV. Effects of zero-dose vaccination status in early childhood and level of community socioeconomic development on learning attainment in preadolescence in India: a population-based cohort study. BMJ Public Health. 2023;1(1):e000022

Small-area variation in child under-vaccination in India

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Introduction

India has made exceptional advances in child immunisation in recent decades, but subnational inequities in vaccination coverage impede attainment of key programmatic goals. Despite high aggregate immunisation coverage, India ranked second in 2023 for the highest number of zero-dose (ZD) children globally, and experienced recent vaccine-preventable disease outbreaks, including measles and diphtheria.[1]

Objective

To provide the first national analysis of local variations in child vaccination in India that considers a comprehensive set of indicators relevant to routine immunisation.

Methods

Indicators were constructed using data from India's 2019–2021 National Family Health Survey (NFHS-5).

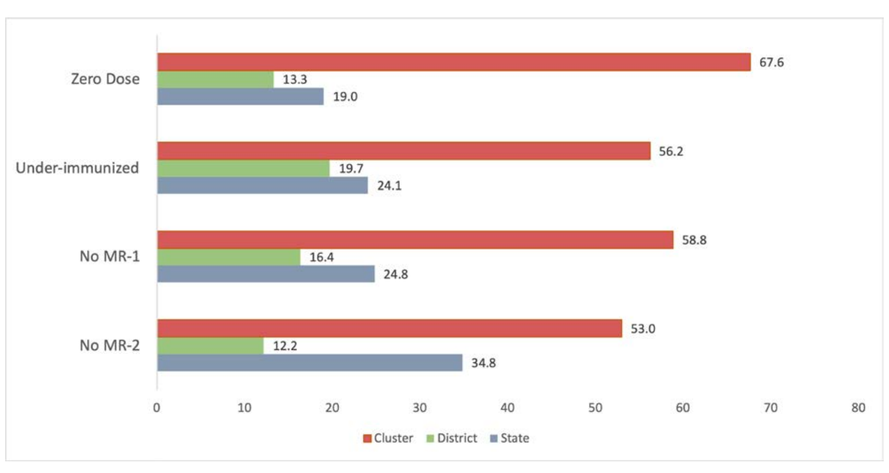
- ZD– all surviving children aged 12 to 23 months who failed to receive any diphtheria-tetanus-pertussis (DTP) or pentavalent vaccine doses.
- Basic Incomplete "BI" - all surviving children 12 to 23 months who failed to receive all 8 basic doses (one dose of BCG, three doses of DTP or pentavalent vaccine, three doses of oral polio vaccine (OPV), and one dose of measles-containing vaccine (MCV)).
- Insufficient measles vaccination - all surviving children 12 to 23 months who failed to receive any MCV were tagged as "No MR-1", and those 24 to 35 months who failed to receive a second MCV dose were designated "No MR-2".

We used four-level Bayesian random effects logistic regression models to partition the total outcome variation over state, district and cluster levels, and to produce precision-weighted estimates of prevalence across clusters. District-level prevalence and within-district variation using standard deviation measures were derived for each outcome. We explored the patterning of under-vaccination outcomes at the small-area level. Sensitivity analyses assessed the robustness of results to cluster size and child age.

Results

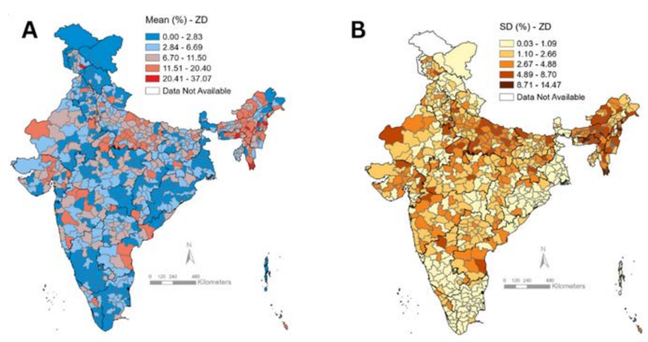
The analysis included 87,622 children from all of India's 36 states/ UTs and 707 districts, residing in 22,349 survey clusters, and representing a population of approximately 46 million children between one and three years of age.

Finding #1: In India, the largest variations in coverage now occur at the small-area (cluster) level.



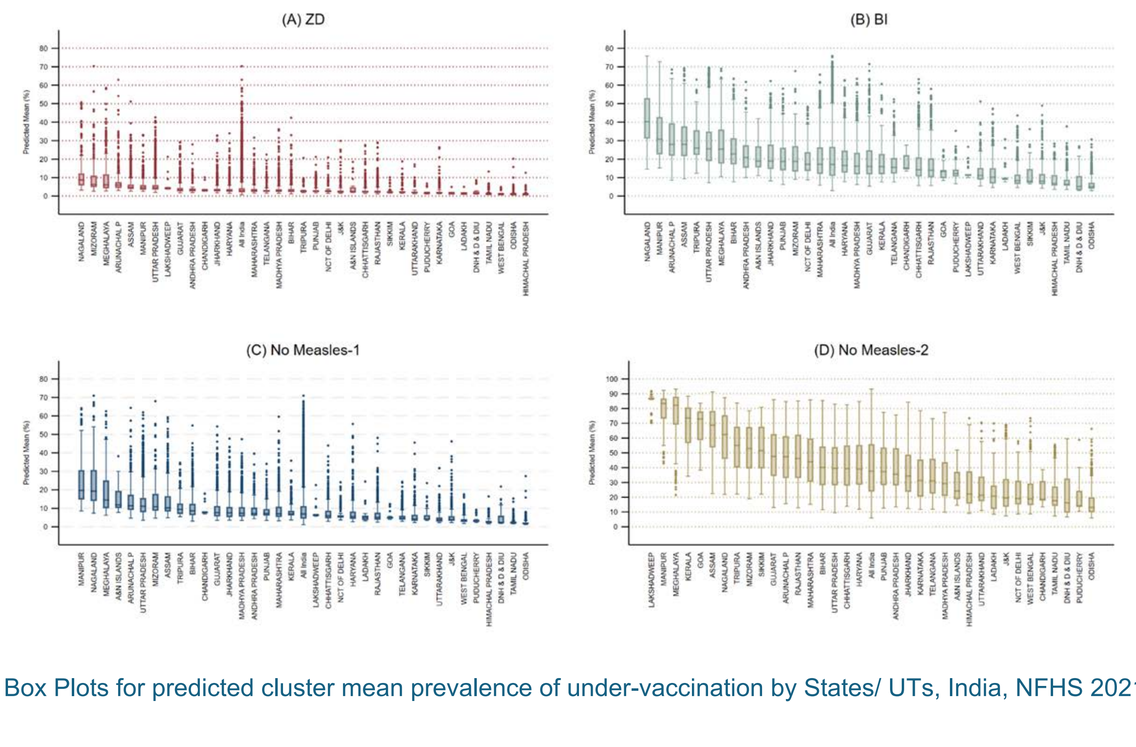
Geographic variance partitioning (%) by clusters, districts and states for four indicators of child under-vaccination, NFHS-5, India

Finding #2: For all indicators, districts with a higher prevalence of under-vaccination tended to be more inequitable. For ZD, No MR-1, and BI, these high-burden districts were concentrated in the north-eastern states and in Uttar Pradesh.



Maps of district-level prevalence and within-district small-area variations in the prevalence of zero-dose (ZD) children and children with basic immunisation incomplete (BI), NFHS-5

Finding #3: The patterning of predicted cluster mean prevalences suggests persistent pockets of low immunity even in high-performing states and UTs. For all indicators of under-vaccination, States and UTs with a higher prevalence of under-vaccination tended to have greater variability. For first year of life vaccines (ZD, BI, No-MR-1), all distributions were positively skewed, with more extreme values towards the high end and numerous outliers. Despite India's high aggregate vaccine coverage, this variation (coexistence of pockets of high and low coverage) permits subnational chains of infection and outbreaks to persist.



Box Plots for predicted cluster mean prevalence of under-vaccination by States/ UTs, India, NFHS 2021

Conclusion

In India, where aggregate vaccine coverage levels are high, our findings support a fundamental strategic shift towards sub-district level strategies aimed at granular pockets of low immunity to increase vaccination coverage, advance disease-control priorities, and reduce inequities.

Reference

1. WHO/ UNICEF. 2023 WHO/UNICEF Estimates of National Immunization Coverage (WUENIC) (Data as of 1 July 2024; Estimates as of 15 July 2024

ZERO-DOSE LEARNING WEEK
GHC, GENEVA – SEPTEMBER 2024

Leveraging Technology and Outreach Service Delivery To Identify and Reach Zero-Dose Children in Afghanistan

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Affiliations ([1]Senior Project Manager, Acasus & [2]National EPI Director, Afghanistan)

Background: Afghanistan has historically struggled to identify and provide immunisation services for all communities. This is generally due to limited data on the location of communities, harsh terrain, and the limited quality of microplanning and oversight. GAVI and the Ministry of Public Health investments in Afghanistan have helped to create a strong foundation that drives and sustains long-term improvements. These investments also help to identify and reach underserved and zero-dose communities. This stronger foundation includes utilising modern technology, data and launching new performance management frameworks at national and subnational levels. National EPI, Acasus and partners utilise this approach to ensure equitable immunisation service delivery. The approach also ensures all communities to be identified and reached.

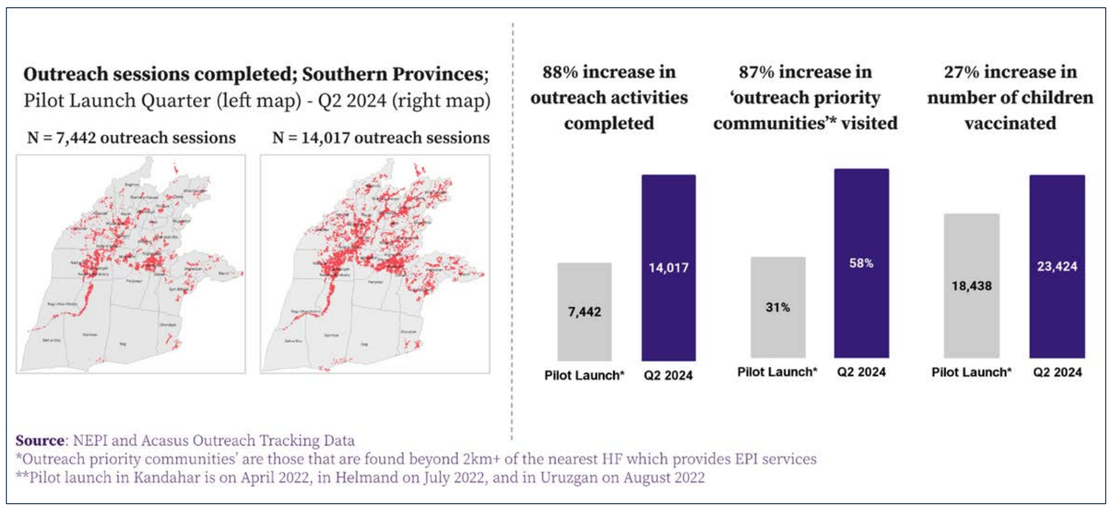
Method: This approach entails several interventions including but not limited to:

- Leveraging the existing EPI supervision app (launched by GAVI, NEPI, and Acasus) to enable vaccinators to submit the location and other performance data (e.g. availability of key inputs, kids vaccinated, zero-dose kids reached, etc.) during outreach visits.
- Using new geospatial dashboards and reports to identify missed communities. These also help to locate and understand the concentrations of zero-dose children identified in outreach visits. Managers can then course correct vaccinator activities on a monthly basis, and optimise the impact of outreach activities.
- Using new geospatial analyses to inform new microplanning workshops. This will ensure that all communities are identified and have a clear plan in place, so that they can be reached.
- Launching new outreach performance review routines at national and subnational levels, to identify and solve performance challenges. This will drive improvements in the reach and impact of outreach visits.

Vaccinators use an app to submit the location, number of kids vaccinated, and number of ZDCs reached in each outreach visit

Findings: The following approach has resulted in several encouraging initial impacts in outreach performance across three polio endemic provinces (i.e. Kandahar, Helmand and Uruzgan combined) since the launch of the pilot and Q2 2024:

- Consistent use of the new outreach monitoring tool by vaccinators, resulting in the digital monitoring of over 14,000 individual outreach activities each quarter in the South.
- An 88% increase in outreach visits completed, from 7,442 in the pilot launch to 14,017 in Q2 2024.
- An 87% increase in outreach priority communities (i.e those beyond 2km of the nearest health facility) visited each month, from 31% in the pilot launch to 58% in Q2 2024.
- A 27% increase in children vaccinated with Penta 1 vaccines during outreach sessions, from 18,438 in the pilot launch to 23,424 in Q2 2024.
- The approach has identified and reached over 30,000 zero-dose children, 24,000 underimmunised children, and 13,000 missed communities.
- This approach is being scaled nationally. It is expected to identify and reach around 300,000 zero-dose children in one year.



Recommendations: Key recommendations for reaching zero-dose children and missed communities include, but are not limited to:

- The zero-dose and missed communities' exact locations must be identified in order to provide services. Estimating zero-dose children at the district level does not always result in reaching them.
- A monitoring and performance management mechanism must be in place to ensure the identified zero-dose and missed communities are reached.
- Utilise modern technology to inform the planning and implementation of EPI activities. It is cost effective, accurate and more impactful – especially in harsh terrains and climates.
- Reaching zero-dose and missed communities comes at a great financial cost. This is due to their remote locations, a limited availability of health facilities, and a lack of trained health workers (especially females).

Geospatial mapping and targeted strategies to reach hard-to-access communities in DRC

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DRC EOC Coordinator, Acasus Project Director, Acasus Project Manager, Acasus Senior Associate

Background: Since September 2022, the Democratic Republic of Congo (DRC) has been experiencing an outbreak of circulating vaccine-derived poliovirus type 1 (cVDPV 1). Nearly 99% of the cases are concentrated in the southeastern provinces of Haut-Lomami, Tanganyika, and Haut-Katanga. Over 80% of these cases are in districts with rivers, lakes, or remote communities or in insecurities, many systematically missed by routine immunisation efforts.

To tackle these challenges, “Geo-spatial mapping and targeted strategies to reach DRC's hard-to-reach communities” project was launched in February 2024 aiming to stop cVDPV 1 transmission in targeted provinces by end of 2024.

Method:

1. Identify hard-to-reach communities:

Nurses were deployed to map hard-to-reach communities, capturing specific data such as GPS coordinates via a digital tool. This step included training, feedback loops, and validation with other geospatial data sources to ensure accurate and exhaustive mapping of hard-to-reach communities in the three provinces.

2. Reach via tailored vaccination strategies:

Vaccination strategies were tailored to each community type, such as deploying NGO vaccinators in insecure areas and using boats in riverine regions.

Last Mile category	Challenges overview	Tailored strategies implemented
Islands, River / lakes, Fishing camps	Limited **transportation options** and **seasonal disruptions** including fishing and tides.	• **Special vaccination** teams • Additional **boats** to ensure mobility of teams across water bodies • Vaccinator **tracking**
Mines, Fields	**Long travel distances, remote locations**, and **limited infrastructure**.	• **Special vaccination** teams • Additional **vehicles** (i.e., motorbikes) to support vaccination **efforts of RI teams**
Displaced camps, Insecurity	Significant **safety challenges** for vaccination teams.	• Collaboration with **local NGOs** to conduct vaccination activities
Border regions	Population **movements across borders**.	• **Synchronized activities** at borders • Vaccination at **access points**

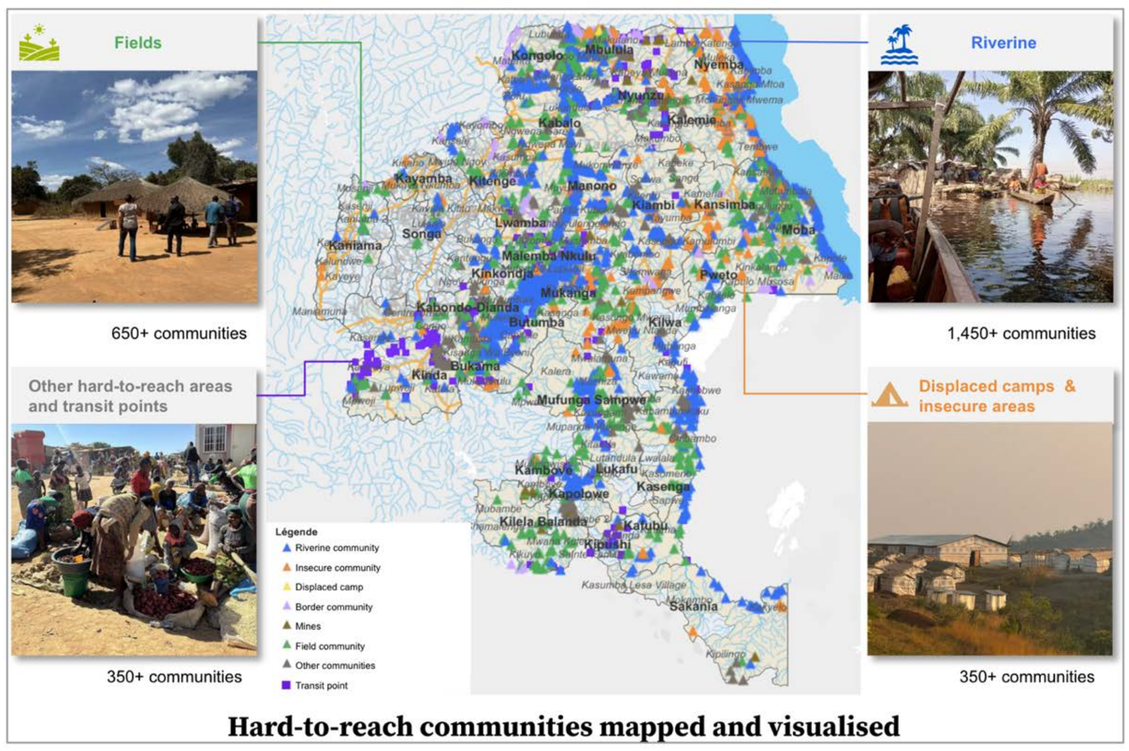
Human resources and logistics were allocated accordingly, resulting in the recruitment of 140+ special vaccination teams (i.e., not routine immunisation teams). Each community was assigned to one of these teams, achieving full vaccination coverage for all assigned communities and children under 59 months.

3. Monitor vaccination sessions:

Geo-enabled applications and a centralised dashboard were used to track and monitor vaccination activities, integrating data on maps, coverage, and performance. Weekly performance reviews facilitated improvements, and independent surveys provided additional assurance, ensuring the achievement of monthly vaccination targets.

Findings: After a pilot in Haut Lomami riverine communities, all strategies are currently deployed in the three provinces. As of early August 2024:

- **Communities mapped:** 2,700+ communities mapped (15% of total communities in the three provinces).
- **Communities covered:** 1,300+ communities reached at least once.
- **Children reached:** 20k+ polio zero-dose children reached (30% of total target).
- The project is expected **to reach +95% of all ZD children and fully vaccinate +75% of all children in scope** by end of 2024.



Hard-to-reach communities mapped and visualised

Recommendations: To effectively identify and reach zero-dose children and missed hard-to-reach communities, the following strategies are recommended:

- **Combine field expertise with geospatial technology:** Utilise the on-the-ground knowledge of field teams alongside geospatial data and tracking tools to ensure accurate and comprehensive mapping. Continuous feedback will help maintain mapping quality.
- **Safeguard routine immunisation efforts:** Avoid disrupting existing routine immunisation coverage by cross-checking mapped hard-to-reach areas against current outreach efforts. This prevents duplication and ensures continuity.
- **Embed sustainability in strategy design:** Design special intervention strategies with long-term sustainability in mind. Ensure a smooth transition of these efforts into routine immunisation programs by integrating necessary resources, such as equipment, transportation, and specific targets for hard-to-reach areas.

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A political economy analysis of the routine immunization landscape in Ethiopia: a qualitative study

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1 BACKGROUND

RATIONALE Despite national commitments to prioritize immunization uptake among zero-dose (ZD) and under-immunized (UI) populations in Ethiopia, the structural and institutional factors that shape the delivery of childhood vaccination services are poorly understood.

AIM We examined the political and economic landscape of routine immunization in Ethiopia.

2 METHODS

PARTICIPANTS We conducted key informant interviews (KIIs) with relevant government and external stakeholders at different levels.

SAMPLING We used purposive and snowball sampling to select potential participants.

DATA MANAGEMENT AND ANALYSIS Interviews were voice recorded, transcribed, and translated. Data were coded using MAXQDA 2020 software. We conducted a deductive thematic content analysis of transcripts and field notes. We focused on immunization policy content/process and context. We also explored the role of actors and their engagement in immunization policy and strategy development, implementation, and service evaluation.

3 FINDINGS

STUDY PARTICIPANTS AND GEOGRAPHICAL COVERAGE We conducted 52 KIIs with actors at national level and within Amhara, Oromia, and Somali regions. This included 7 national, 15 regional, 11 zonal, and 19 district, and community level informants.

THE SYSTEM IN BRIEF

- Ethiopia's federal system allocates budget as a block grant to regional states.
- Regional governments distribute grants to sectoral, zonal, and district-level governments.
- Regional Health Bureaus receive funding via:
  a. Regional budget for operational expenses
  b. Earmarked funds from external sources via the Ministry of Health (MOH) and the Sustainable Development Goals pooled fund
- Districts have full authority/mandate to decide how much budget to allocate to immunization services.

THE POLITICS OF POLICY MAKING: HOW BEST TO REACH UNDER IMMUNIZED COMMUNITIES?

- Most participants acknowledged that the MOH formulates policy in discussion with different actors, but subnational staff perceived policy and decision-making as 'top-down'.
- The MOH develops immunization policies, allocating resources to regional governments/district authorities who are responsible for implementation.
- Most participants felt that despite prioritizing ZD and UI, national immunization policies lacked context-based approaches to achieve these goals.
- They reported three main considerations to which policies should be adapted:
  a. Political instability and conflict
  b. Population mobility-especially amongst pastoralists
  c. Geographical isolation and inaccessibility

> ***"In our woreda, there are remote areas where communities frequently travel in search of water and food for their livelihoods. When they migrate, health extension workers do not move with them, leading to vaccine defaulting…policy should account for such factors."***
>
> ***(District-level health actor)***

- There was also a clear unmet demand to shape policy and planning for hard-to reach populations using better quality and updated census population figures.

> ***''the biggest problem is that the population has not been counted…this will also have an impact on future supply. It impacts the resource allocated [to us]…because everything [is allocated] based on population."***
>
> ***(Zonal-level health actor)***

HOW BEST TO OPERATIONALIZE POLICIES?

- Regardless of the quality and contextualization of existing policy, their implementation was often hampered by inadequate resources.
- This may be especially impactful where additional resources for supplies, logistics, and training are needed to address specific challenges.
- Despite a comprehensive immunization strategy, a tailored strategy for special populations with high ZD/UI, such as IDPs, pastoralists, and conflict-affected people, is needed.

WORKING TOGETHER OR APART?

- Despite a significant level of external funding, the MOH retained most coordination and decision-making.
- Despite earmarked budget allocation for immunisation at the national level, funds are not earmarked at the zonal/district levels.
- Most participants felt there was strong coordination among stakeholders, including government bodies and non-government actors; however, coordination at zonal/district levels could be improved.
- Some suggested that despite there being alignment of donor priorities with national ones, support could be better directed if donors could improve coordination and alignment of their plans among themselves.

4 RECOMMENDATIONS

- Strengthening advocacy for resource mobilization and context-specific immunization strategies is necessary.
- Budget allocation should be based on contextualized policy informed by improved estimates of populations in need; all administration levels should have dedicated funds for immunisation.
- Coordination amongst donors, and at sub-national administration levels, should improve.

This study was funded by a grant from GSK to the Save the Children Fund

ZERO-DOSE LEARNING WEEK
GHC, GENEVA – SEPTEMBER 2024

Strategies to reach zero-dose children in crisis-affected states in Sudan: A qualitative study

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1. Ahfad University for Women, Sudan; 2. University of Sydney; 3. London School of Hygiene &Tropical Medicine;
4. Federal Ministry of Health, Sudan; 5. Uppsala University

Background

In Sudan, only three-quarters of children have received their first dose of DTP-containing vaccine, and in conflict-affected areas, up to 48% of children are reportedly zero-dose.

The study aimed to map current vaccine delivery practices to reach zero-dose and under-vaccinated children in crisis-affected communities in Sudan.

Methods

Participants: In-depth interviews with 20 governmental EPI officers, UN agencies and NGOs professionals involved in vaccination at the federal, state and locality levels.

Study areas: 3 conflict-affected states: South Kordofan, South Darfur and the Blue Nile.

Data collection and analysis: Data was collected before the conflict escalation in April 2023. Interviews and analysis were guided by Gavi's IRMMA framework (Identify-Reach-Monitor-Measure-Advocate)

Findings

The findings are summarized in Figure 1.

Identify:

- Zero-dose children were concentrated in three populations: opposition-controlled areas, rural populations and nomadic communities.
- Zero-dose children are identified through:
  - **In easily accessible areas:** routine vaccination and surveillance reports
  - **In inaccessible areas:** collaboration with trusted NGOs and focal persons.

Reach:

- **Zero-dose children are reached** through ad-hoc co-delivery of vaccination campaigns with other health commodities such as COVID-19 vaccination and mosquito net distribution.
- Challenges to reaching zero-dose children:
  - immunization programmatic issues including funding
  - caregiver avoidance,
  - context-specific constraints (e.g. insecurity)

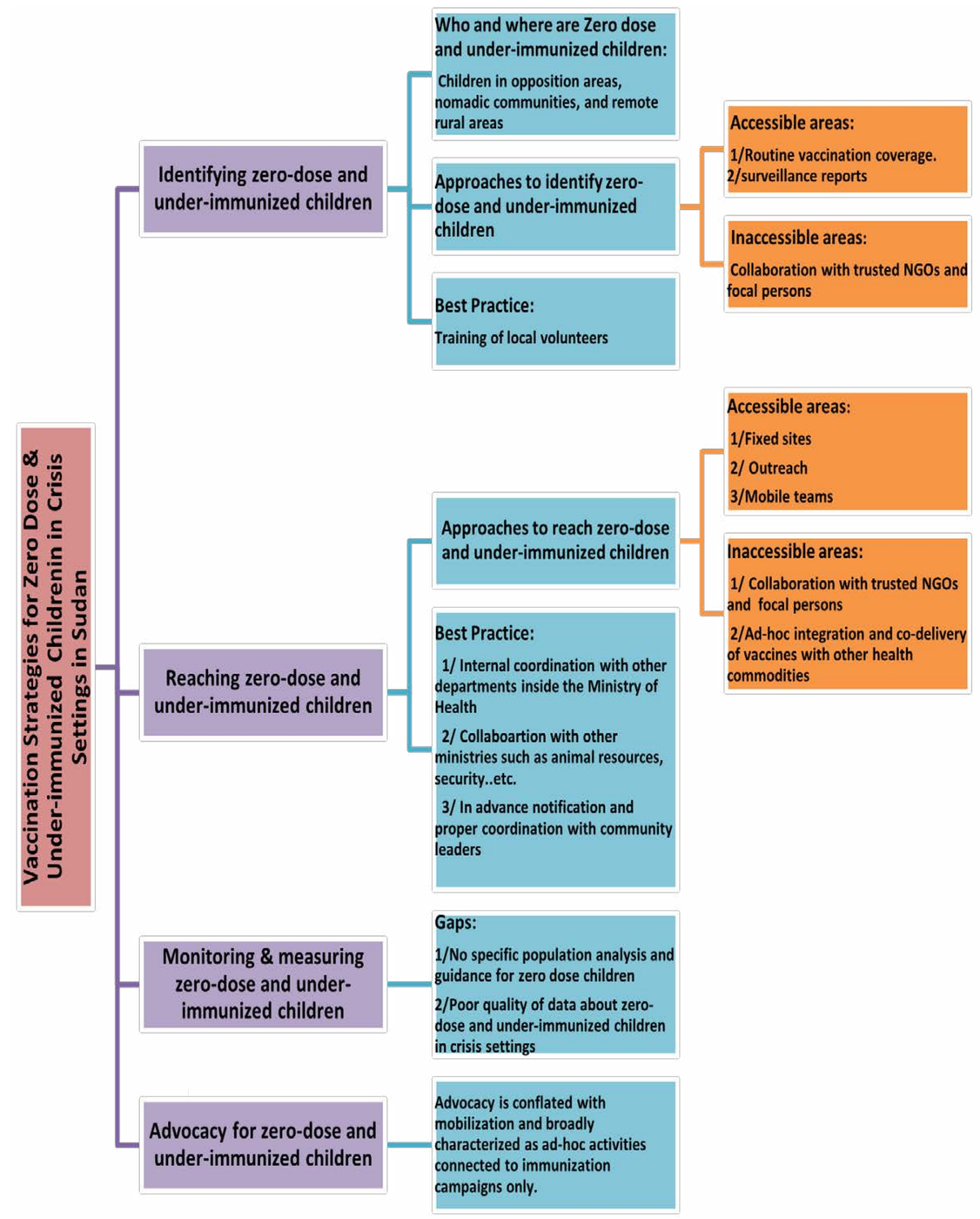
Measure and Monitor:

There are no specific strategies to measure and monitor vaccination amongst zero-dose and under-immunized children in crisis-affected settings.

Advocacy:

Advocacy is conflated with community mobilization and broadly characterized as ad-hoc activities connected to immunization campaigns only.

Figure 1: Existing vaccination strategies and best practices for zero dose & under-immunized children in crisis settings in Sudan



Recommendations

Quick fixes/short term

- ✓ Improve data collection and analysis to identify zero-dose children crisis-affected areas.
- ✓ Utilize existing cultural and social events at the community level to enhance catch-up campaigns and mobile services.
- ✓ Enhance coordination among relevant stakeholders at the national and local levels

Medium- to long-term

- ✓ Develop and implement tailored and specific-population immunisation strategies.
- ✓ Expand integration and co-delivery of health services, using the COVID-19 vaccination and mosquito net distribution experiences.
- ✓ Promote the ownership and sustain the participation of trusted NGOs and community members in immunization efforts.
- ✓ More research is needed to assess the effectiveness of localized vaccination strategies in reaching zero-dose children in crisis-affected areas.

ZERO-DOSE LEARNING WEEK
GHC, GENEVA – SEPTEMBER 2024

A Gender-responsive, Peer-to-Peer Strategy to Identify, Engage, and Immunize Under-Immunized and Zero-dose Children for Measles and Other Immunizable Childhood Diseases in Uganda

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1. Infectious Diseases Institute, Makerere University, Global Health security, Life Course Vaccination (2YL) Project
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ABSTRACT

Background:

- In Uganda, approximately 1.1 million children under five are under-vaccinated, with about 185,000 of these children never having received any vaccines (zero-dose children).
- We determined the feasibility of using a gender-responsive, peer-to-peer (P2P) strategy to identify and link under-vaccinated children to vaccination centers in Uganda.

Methods:

- In September 2022, a rapid community assessment was conducted in 18 Ugandan districts (eight with poor vaccination rates) to inform strategies for enhancing vaccination uptake.
- Based on findings, a gender-responsive P2P strategy was implemented from April to August 2024 in six districts in West Nile and Masaka regions, including hard-to-reach rural areas.
- Male and female caregivers and village health teams were identified and trained as peer educators within the six lowest-performing sub-counties. The training covered childhood vaccination knowledge, addressing gender-related barriers, engaging with vaccine-hesitant peers, and identifying, recording, referring, and following up with under-vaccinated children.
- Trained peers engaged other caregivers in vaccine conversations using motivational interviewing. Changes in children's vaccination status were examined after caregiver exposure to trained peer educators. Descriptive analysis was performed using Stata version 14.0.

Results:

- Preliminary assessment findings highlight gender-related barriers, including limited male participation and challenges during farming seasons when female caregivers were preoccupied. Gender-based violence further impeded vaccination efforts.
- Out of 300 identified peer educators, 279 (101 males) were trained. Strategies such as health education, community outreaches, targeting male peers in context-specific community gathering points, and using referral vouchers enhanced vaccination.
- Over the past three months, 16724 caregivers were engaged; 16,342 children under five were identified, with 12,451(76%) under-vaccinated and 210 (1.7%) zero-dose children. All under-vaccinated children were referred to vaccination services, and 5849 of 9380 (62%) children missing MR2 were vaccinated. All zero-dose children identified received DPT1 and MR1.

Challenges and Lessons Learned:

- The P2P strategy improved peer educators' vaccination knowledge from 41% to 75%.
- Endline assessment will examine peer educators' awareness of gender-related barriers and capacity to engage vaccine-hesitant peers and refer zero-dose children.
- This approach leverages trusted relationships to address gender-related barriers and may improve vaccination social norms.
- Challenges to P2P approach included lack of translated peer educators' toolkits, inaccessibility of hard-to-reach communities and tailoring training content for lower health literacy.

Conclusion:

- Preliminary results suggest that the P2P strategy improves immunization uptake, identifies zero-dose children, and increases caregivers' vaccination knowledge.
- Enhance male participation through targeted outreach programs and organize vaccination campaigns at community gathering points.
- Address gender-based barriers through community interventions, refresher training for peer educators, strengthening community engagement, and monitoring and evaluating implementation to support scaling up and sustaining the P2P strategy.

Keywords:

Peer-to-peer strategy, hard-to-reach, gender-related barriers, immunization, zero-dose children, vaccination, Uganda

This project has been funded by the US CDC.

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Closing equity gaps in immunization and primary care systems in Africa: Expanding vaccine zero dose by introducing the concept and indicator of 'multi-zero dose'

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JOHNS HOPKINS BLOOMBERG SCHOOL of PUBLIC HEALTH

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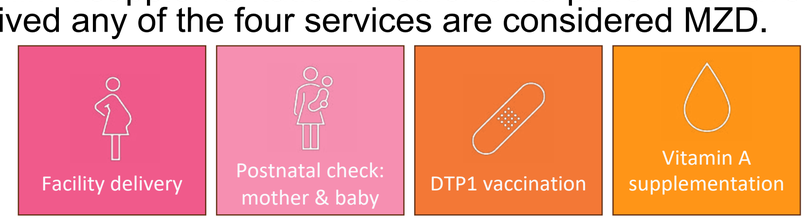
Background: The commitment to reach 14 million zero dose (ZD) children is largely motivated by the assumption that ZD children are in households that health systems consistently miss.[1-4] We need to better understand when, where, and why some ZD children are unreached by – or 'zero dose' for – other services so we can design solutions that reach the most vulnerable and strengthen both immunization and primary care systems.

Objective: This work tests the concept of 'multi-zero dose' (MZD) status, or households that have not received several primary services in maternal and child health care to guide ZD activities.

Methods:

- Data: Demographic and Health Surveys in African countries between 2014-2023; Uppsala Conflict Data Program
- Outcomes: Children 12-35 months without DTP1 were considered ZD; we developed the MZD indicator.
- Indicator development: Theory-driven approach with the Continuum of Care framework to develop an MZD indicator that maximized performance in identifying at-risk communities[5-6]
- Statistical analyses: Descriptive and geospatial analyses and weighted correlation tests to describe the populations of ZD and MZD children

Findings: We introduce an indicator for 'multi-zero dose' that includes four services: facility delivery, postnatal care, DTP, and Vitamin A supplementation. Mother-child pairs who have not received any of the four services are considered MZD.



Across 30 African countries in our analysis:

- 1 in 5 children (20.6%) are **zero dose**
- 1 in 10 (10.0%) mother-child dyads are **multi-zero dose**

What can ZD and MZD status tell us about health systems?

Half (49.8%) of zero dose children are multi-zero dose, showing that half of ZD children have some connection with the system. This is driven largely by a few countries:

- In 5 countries, over half of ZD children are MZD, representing countries where most ZD children are disconnected with the health system (orange in Table 1)
- In 10 countries, less than 1 in 10 ZD children are MZD, showing that over 90% of ZD children have some connection with the health system (purple in Table 1)

➢ ***Programmatic importance*** in understanding where ZD status is a health system issue vs. an immunization system issue

Table 1. National estimates and level of ZD and MZD status in 31 African countries

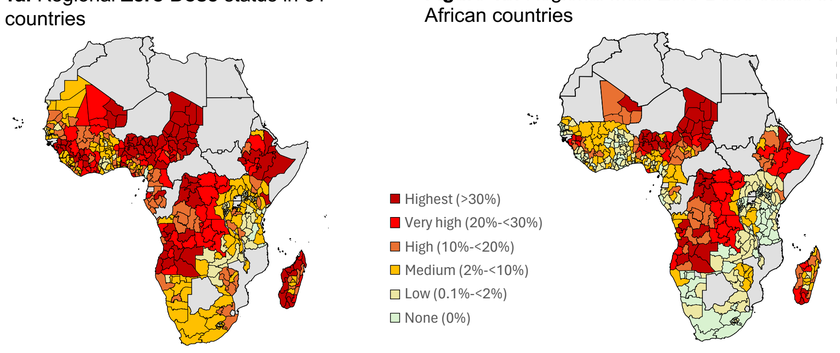
	Zero dose (ZD) status among children 12-35 months (%)	Multi-zero dose (MZD) status among mother-child pairs (%)	ZD children that are MZD (%)
Overall	**20.6**	**10.0**	**49.8**
Angola	33.0	20.6	65.9
Chad	43.5	28.1	65.2
Ethiopia	29.4	16.8	61.0
Nigeria	36.7	22.7	60.7
Madagascar	23.0	11.8	54.2
Guinea	37.2	15.1	41.2
Senegal	4.3	1.3	37.6
Cameroon	17.7	6.3	37.1
Zimbabwe	12.0	3.6	33.9
Benin	16.6	5.1	32.4
Mali	18.4	5.3	30.2
Zambia	2.3	0.5	29.5
DRC	18.2	5.0	26.6
Tanzania	5.3	1.1	25.2
Liberia	9.7	2.2	23.5
Kenya	3.8	0.6	20.0
Ghana	3.7	0.6	18.5
Togo	7.4	1.2	17.3
Burundi	1.4	0.2	16.5
Lesotho	2.7	0.4	14.2
Cote d'Ivoire	30.2	3.2	10.5
Uganda	6.3	0.6	9.9
Burkina Faso	6.2	0.6	9.9
Malawi	3.0	0.3	9.2
Gambia	2.3	0.2	8.1
Gabon	19.2	1.2	7.0
Namibia	6.8	0.3	4.2
Sierra Leone	6.3	0.2	2.9
South Africa	11.4	0.2	2.8
Rwanda	0.5	0.0	0.0
Mauritania	13.4	n/a	n/a

Data on Vitamin A is not available for Mauritania, so it is not included in MZD analyses.

At the state/regional level, maps of ZD and MZD status have similar patterns, showing that **areas with high ZD status have high MZD status** (Fig. 1). Exceptions include areas in West Africa and Southern Africa, where there is medium ZD status but very low MZD status.

Figure 1a. Regional **Zero Dose** status in 31 African countries

Figure 1b. Regional Multi-Zero **Dose** status in 30 African countries



At the community level, communities with high ZD prevalence and MZD prevalence are highly correlated (rho=0.71). While correlated, community ZD level does not signal MZD level 29% of the time.

Most MZD children (88.6%) are in communities with ZD prevalence above 30% (Table 2).

➢ ***Programmatic importance:*** Routine data on ZD status (DTP1) can be used by managers to understand the extent of MZD in communities

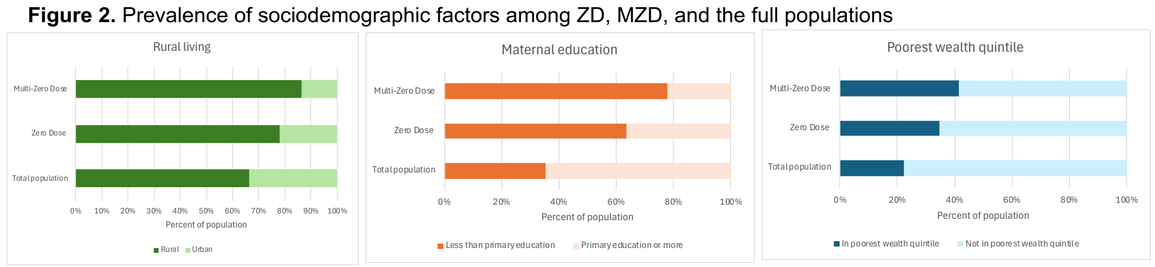
Table 2. Multi-Zero Dose status by community-level Zero Dose status

Community ZD level	Percentage of population	Percentage of MZD in community	Distribution of MZD population
Very low (<2%)	43.5	0.0	0.0
Low (2% to <10%)	6.3	1.4	0.8
Medium (10%-<20%)	13.1	3.6	4.6
High (20%-<30%)	9.0	6.8	6.0
Very High (>30%)	28.2	31.7	88.6

At the household level, most ZD and MZD households are in rural areas (78.2% and 86.5%, respectively), have mothers without primary education (63.6% and 77.9%), and are disproportionately concentrated in the poorest wealth quintile (34.7% and 41.6%), all higher than in the non-ZD population (Fig. 2).

➢ ***Programmatic importance:*** Most ZD and MZD mothers may be unable to read vaccination and health messages

Figure 2. Prevalence of sociodemographic factors among ZD, MZD, and the full populations

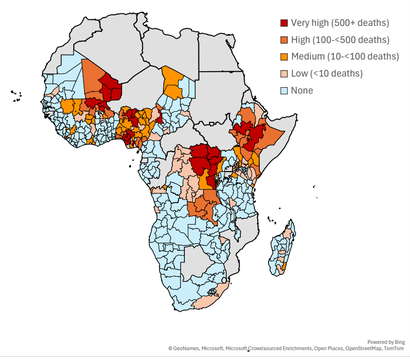


Children in conflict areas are nearly 3.5 times as likely to be MZD and 2 times as likely to be ZD than in areas without conflict. Areas with high conflict (Fig. 3) overlap with areas of high ZD and MZD status (Fig. 1). One third of children in the analysis live in areas with recent conflict.

➢ ***Programmatic importance*** in reaching MZD children in fragile settings

Figure 3. Level of Subnational Conflict in 31 African Countries

Based on number of conflict-related deaths per region recorded in the Uppsala Conflict Data Program in the 5 years preceding the most recent DHS survey



Recommendations:

- **Use routine data to identify vulnerable communities**: Managers can use routine data to identify communities with DTP1 coverage below 70% to reach most MZD children.
- **Integrate services**: In settings where the majority of ZD children are MZD, integrated interventions to reach ZD children must also connect them with primary care services, so the ZD efforts strengthen not only immunization systems but also primary care systems.
- **Focus on conflict-affected areas**: ZD children are very likely to be MZD in conflict areas.
- **Collaborate with non-health sectors**: Maternal education continues to be a driver for ZD and MZD status; action is needed now to improve education of girls to protect their health and the health of their future children.

References: **1.** WUENIC, 2024, **2.** Wendt et al., 2022. *Vaccines*. **3.** Hogan and Gupta, 2023. *Vaccines.* **4.** WHO *IA2030*, 2020. **5.** Tinker et al., 2005. *The Lancet*. **6.** Gebremedhin et al., 2023. *PLoS One.*

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Gavi The Vaccine Alliance

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Identifying Zero-Dose Children: Are more efficient FLW records the answer?

Thacker D[1], Choudhary K[1], Prakash R[2], Anthony J[2]

1. India Health Action Trust, India
2. University of Manitoba, Winnipeg, Canada

Background

India's immunization coverage has increased significantly over the past two decades, and the proportion of Zero-Dose (ZD) children has also declined. During the same time period, antenatal service coverage and institutional delivery have also improved significantly (Fig.1).

Uttar Pradesh (UP) is India's most populous state, with a population of ~238 million[1]. The annual infant cohort of UP is estimated at ~5.7 million, which is over a fifth of the country's annual infant cohort. The immunization services in the state are provided through a network of over 37,000 ANMs (vaccinators) with support from ~1,70,000 ASHA workers (Community Health Workers) and a similar number of Anganwadi workers acting as mobilizers at over 2.7 million RI sessions. Over 90% of these are outreach sessions delivering integrated Family Planning, ANC, Immunization, Child Health & Nutrition services and counselling.

Fig. 1 Key MNCH Indicators across DHS Surveys

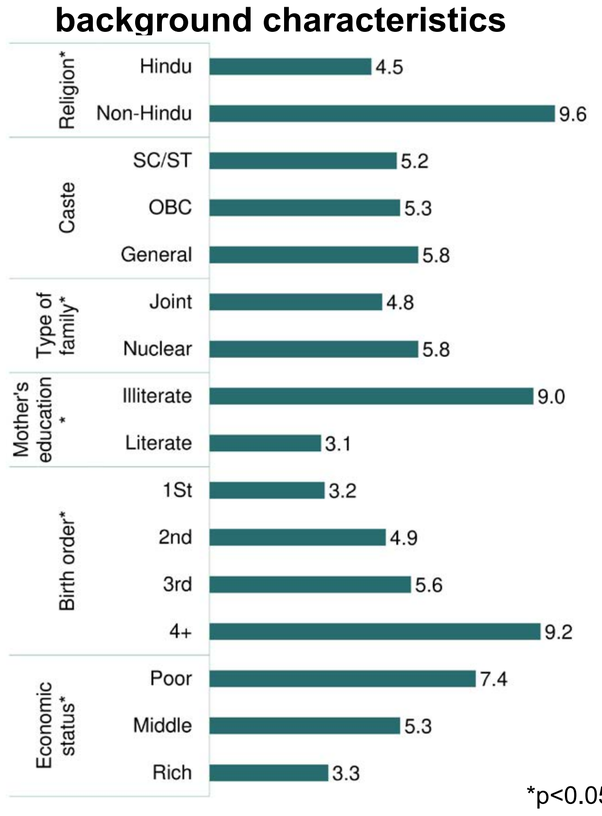
Findings

ZD prevalence was estimated at 5.3% (Fig.2). ZD children were identified in 63 of the 100 blocks, with 78% of the 465 ASHA areas having no zero-dose children.

70.5% of mothers of ZD children had received antenatal check-ups, 62% of the ZD children were born at health facilities, and 41 % of the ZD children had received some vaccines. Around 87% of ZD families had been in contact with the health system to receive at least one of the three services described above.

Fig.2 Immunization Coverage

Fig.3 Prevalence of ZD children by background characteristics



*p<0.05

MNCH services	Coverage (%)	N
Pregnancy Registration/Any ANC	70.5	139
Institutional Delivery	61.6	141
Any other vaccine	44.3	141
Any of the three services	86.9	141

Objective

The objective of this assessment is to estimate the prevalence of ZD children, understand their socio-demographic profile, and explore if ZD children can be identified using service delivery data available with frontline workers (FLWs).

Methods

RAS was conducted between July and November 2021 across 100 blocks of Uttar Pradesh to understand immunization coverage and gaps. 10591 mothers/caregivers of 0-15 month-old children across 479 ASHA Areas (Primary Sampling Unit) participated in the survey (Response Rate: 90.5 %).

Multistage stratified sampling was used to select the ASHA area, and all children aged 0-15 months in the area were eligible to participate in the survey. The ZD prevalence was estimated among 2528 children aged 12-15 months.

MNCH service contact amongst ZD children was estimated for ANC services, institutional delivery and any vaccine administered to the child.

Recommendation

Over 70%[2] of ANC services and over 90% of immunization services in rural UP are delivered at outreach sites, so the ASHAs and ANMs have the service delivery data in their paper-based and digital records. Additionally, since ASHAs accompany most women to the facilities for deliveries, they have information about births within the 200-250 households they cater to.

However, the present findings suggest that further optimization of the records/data systems to enable easy identification of ZD and under-vaccinated (UV) children by longitudinal tracking of pregnant women through their ANC period and delivery, as well as tracking of children after birth, is needed.

Investments in building FLWs' capacities to use the data already available to them could also significantly improve the identification of ZD and UV children.

The Uttar Pradesh Technical Support Unit (UP TSU) was formed in 2013 to provide techno-managerial support to the Government of Uttar Pradesh (GoUP) pursuant to the Memorandum of Cooperation between the GoUP and the Bill & Melinda Gates Foundation. The University of Manitoba (UoM) leads the program and has partnered with IHAT to support the government in strengthening its Reproductive, Maternal, Newborn and Child Health (RMNCH) and Nutrition programs.

[1] *Population projections for India and States, 2011-2036, Report of the technical group on populations (July 2020), National Commission on Population, Ministry of Health and Family Welfare, New Delhi. https://main.mohfw.gov.in/sites/default/files/Population%20Projection%20Report%202011-2036%20-%20upload_compressed_0.pdf on 05.11.2020*

[2] India Health Action Trust (2022), Strengthening Antenatal Care through Community Interventions, https://www.ihat.in/wp-content/uploads/2022/04/Strengthening-ANC-through-Community-Interventions-in-Uttar-Pradesh.pdf on 14.08.2024.

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Missed Community Or A Missed Opportunity?

Thacker D[1], Choudhary K[1], Prakash R[2], Anthony J[2]

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2. University of Manitoba, Winnipeg, Canada

Background

One of the major challenges to reducing the burden of zero-dose children has been identifying these children who are not reached by the immunization program, which is considered a program with the largest reach. Over the past few years, with advancing technology, many interventions have been targeted at estimating the denominators and identifying these children, including but not limited to geospatial analysis and electronic immunization registries.

It is also well-established that these Zero Dose (ZD) children belong to communities often facing multiple deprivations and vulnerabilities, including lack of services, socio-economic inequities, and often gender-related barriers[1].

Most efforts have limited this identification to socio-demographic-geographic profiling of ZD children, which, although quite insightful, has limited practical utility in identifying actual children in the field.

However, the coverage of primary healthcare services – especially MNCH services has improved across LMICs over the past two decades[2], with countries striving to achieve universal health coverage.

Objective

The objective of the study was to explore service contact for MNCH services amongst ZD children and their mothers.

Methods

The analysis was conducted for eight of the ten countries with a high ZD burden (India, Nigeria, Indonesia, Ethiopia, Philippines, Pakistan, Angola, Myanmar) using the most recent Demographic and Health Surveys data from 2015 to 2022 to estimate ZD prevalence and MNCH service contact.

Service contact among ZD families was analyzed for four MNCH services (Antenatal care visits, Institutional delivery, Vaccination, Vitamin-A within the last six months).

Findings

Over 92% of ZD children/their mothers in India, Indonesia, and Pakistan received at least one of the four MNCH services.

Service contact amongst ZD children/their mothers for the same four services stood at 89.5% in the Philippines, 86.1% in Myanmar, 73.2% in Nigeria, 67.1% in Angola, and 64.2% in Ethiopia. Service contact for postnatal care visits, birth registration & availability of vaccination cards added smaller incremental gains to the “Any Service Contact”.

Recommendation

Designing integrated digital systems to track service delivery information across the MNCH continuum of care could identify a significant proportion of ZD children across high-burden countries.

While this evaluation limited its scope to four MNCH services, countries could potentially evaluate service contact among ZD families for non-MNCH services like malaria, HIV, etc., and develop contextual strategies.

Fig.1 Immunization Coverage

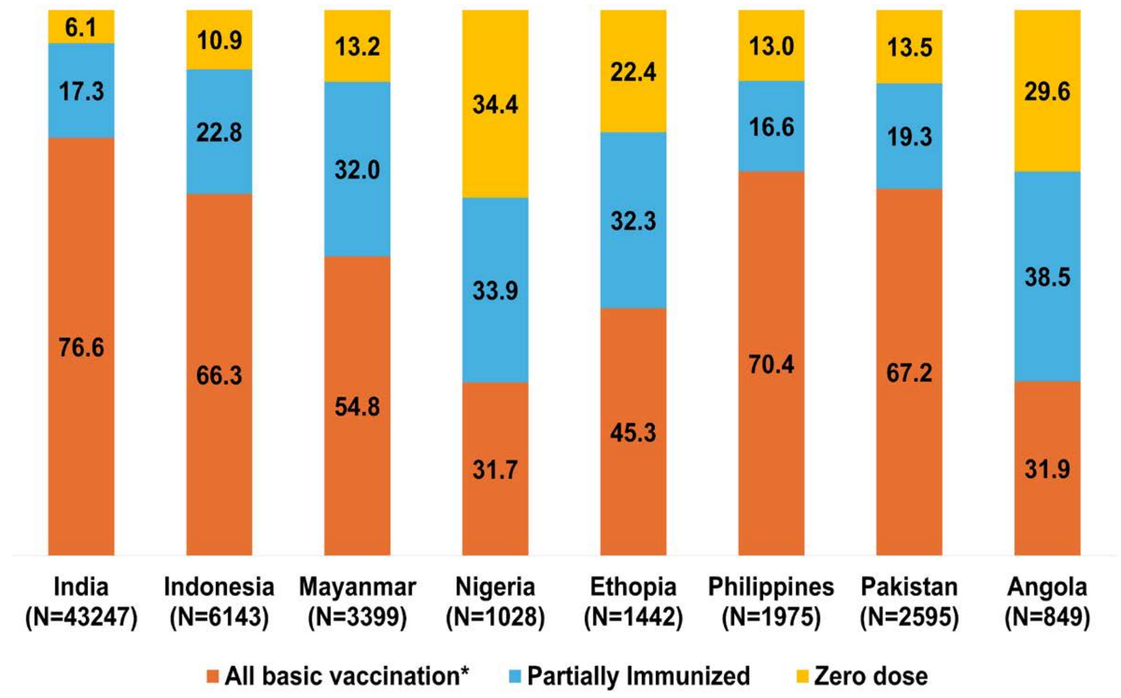
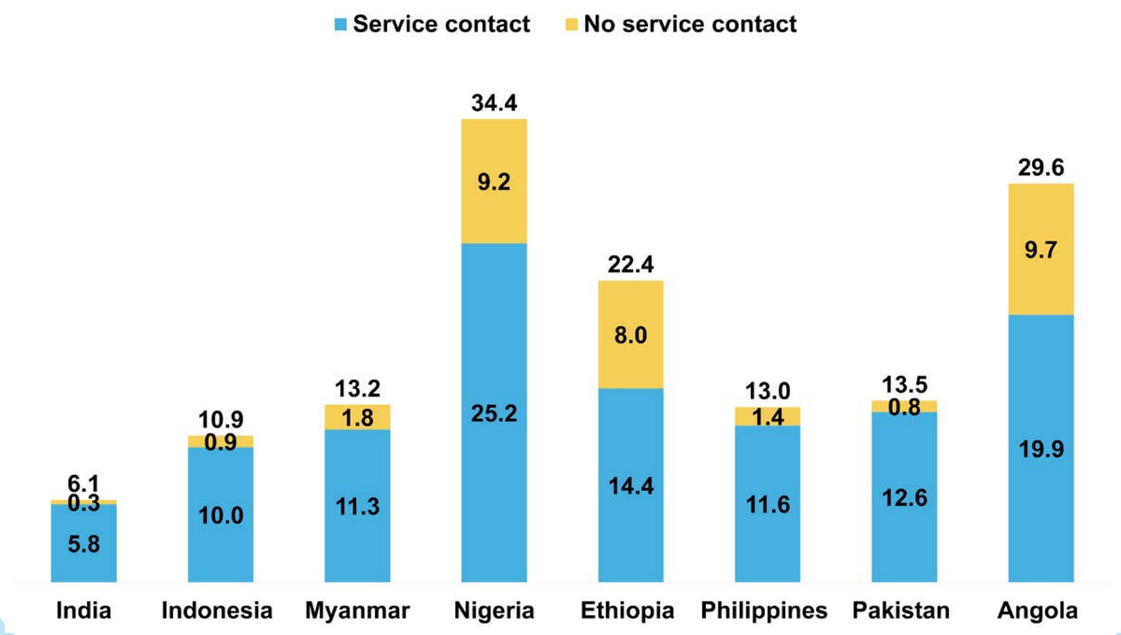


Fig. 2 MNCH Service Contact Among Zero Dose Families



Indicators	India	Indonesia	Myanmar	Nigeria	Ethiopia	Philippines	Pakistan	Angola**
	2019-21	2017	2015-16	2018	2019	2022	2017-18	2015-16
N	2648	370	112	2113	230	187	266	768
Institutional delivery	80.5	63.0	31.8	14.4	19.2	61.5	45.6	21.4
Atleast one ANC visit	78.9	84.9	74.4	47.8	43.1	69.1	58.7	48.8
Vitamin-A in last 6 months	51.3	52.5	17.0	24.4	22.9	59.3	60.9	-
Received any vaccine	41.4	37.3	39.9	43.8	14.4	14.2	72.3	35.7
Any contact (all of the above)	94.4	92.1	86.1	73.2	64.2	89.5	93.7	67.1

*All basic vaccination-BCG, MCV/Measles/MMR/MR, and three doses each of DPT/Penta and polio vaccine (excluding polio vaccine given at birth)
**data for “Vitamin-A in last 6 months” not available

[1]GAVI (2024) *Zero-dose children and missed communities*. Available at: https://www.gavi.org/our-alliance/strategy/phase-5-2021-2025/equity-goal/zero-dose-children-missed-communities (Accessed: 13 August 2024).
[2]Hasan, M.M., Magalhaes, R.J.S., Ahmed, S., Ahmed, S., Biswas, T., Fatima, Y., Islam, M.S., Hossain, M.S. and Mamun, A.A., 2020. Meeting the global target in reproductive, maternal, newborn, and child health care services in low-and middle-income countries. *Global Health: Science and Practice*, *8*(4), pp.654-665.

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Estimating prevalence and identifying predictors of zero-dose pentavalent and never-immunized children under two years of age in Kashmore and Sujawal districts of Sindh, Pakistan: an analysis of household survey data

Manaksha Memon[1], Sundus Iftikhar[1], Muhammad Siddique[1], Vijay Kumar Dharma[2], Ahsan Ahmad[3], Nauman Safdar[2], Mubarak Taighoon Shah[2], Hamidreza Setayesh[4], Danya Arif Siddiqi[2,5*], Subhash Chandir[1,2,6^]

[1] IRD Pakistan | [2] IRD Global | [3] Prime Consulting | [4] Bill & Melinda Gates Foundation | [5] London School of Hygiene & Tropical Medicine
[6] Johns Hopkins University

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1 Background

Globally

- 14.3 million children are zero-dose
- 1.5 million people die each year from vaccine-preventable diseases

Pakistan

- 0.4 million children are zero-dose
- Ninth-largest number of zero-dose children

2 Gap

- Lack of precise data to accurately assess the extent of zero-dose penta and never-immunized children

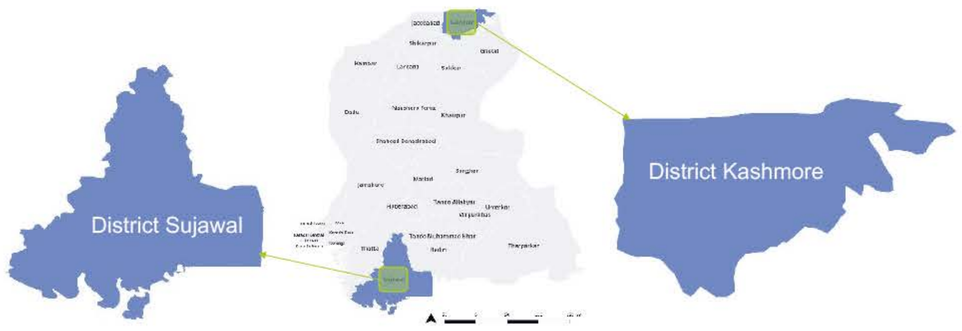
3 Objective

- To assess the community-based prevalence of zero-dose penta and never-immunized children aged 12-23 months in two low-coverage districts of Sindh Province and identify associated socioeconomic characteristics and risk factors

4 Methodology

4a: Study Sites

Districts Kashmore (50%) & Sujawal (48%) were selected as they had the lowest Pentavalent coverage at the time of study



District Sujawal		District Kashmore	
0.91M	Population	1.3M	Population
26	Union Councils	37	Union Councils
32	EPI Centers	43	EPI Centers
32K	Birth Cohort	45K	Birth Cohort

4b: Methods

Conducted a cross-sectional, door-to-door household survey in selected districts from August 10 to December 19, 2022. Using a three-stage cluster sampling technique, we selected 6,395 households

4c: Inclusion Criteria

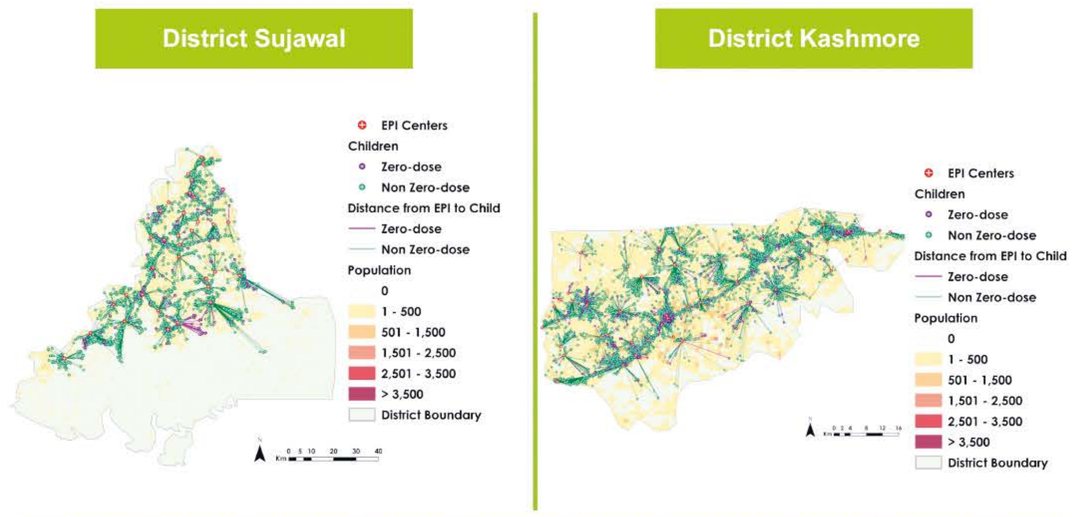
Caregivers of children aged 12-23 months who lived in the sampled houses for six months or more were eligible for inclusion in this study

5 Findings

- Of the 2,091 children surveyed, 23.8% (497) were zero-dose penta, and 28.1% (587) were never-immunized, amounting to a community-based prevalence of 51.9% (1,084/2,091)
- Over 70% (795/1,084) of these children came from households not visited by vaccinators, and 56% (606/1,084) were from households not visited by lady health workers (LHWs)
- Absence of antenatal care (ANC) significantly increased the risk of children being classified as zero-dose penta (RRR=1.68; 95% CI: 1.04-2.72; p<0.035) and never-immunized (RRR=2.07; 95% CI: 1.25-3.45; p<0.005)

6 Figures and Maps

Figure 1: Distance from EPI Centers to zero-dose vs. non-zero-dose children



Zero-dose children in both districts are located further from EPI centers compared to non-zero-dose children

7 Conclusion

- 1 out of 4 children were found to be zero-dose penta and 3 out of 10 were never-immunized in high-risk districts
- Zero-dose children were mainly located in households not visited by vaccinators or LHWs, highlighting the need for enhanced targeted outreach
- Lack of antenatal care is associated with a 68% increased risk of children being unvaccinated

8 Recommendations

- High prevalence of unvaccinated children is linked to a lack of healthcare worker visits and the absence of antenatal care
- Strengthening antenatal care programs and improving healthcare worker outreach are critical to increasing childhood immunization rates

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Leveraging Geo-technology to cover zero-dose children through a provincial electronic immunization registry in slum areas of Karachi, Pakistan

Muhammad Siddique[1], Waqar Fatima[1], Manaksha Memon[1], Sundus Iftikhar[1], Fatima Miraj[1], Vijay Kumar Dharma[2], Mubarak Taighoon Shah[2], Danya Arif Siddiqi[2,3*], Subhash Chandir[1,2,4^]

[1] IRD Pakistan | [2] IRD Global | [3] London School of Hygiene & Tropical Medicine | [4] Johns Hopkins University

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1 Background

Pakistan ranks fourth globally in contributing to 14.3 million zero-dose children

Geospatial technologies are crucial to effectively identify and reach children missing out on vaccines

Accurate geospatially disaggregated estimates of zero-dose children are required at a granular level

2 Objective

To deploy advanced geospatial techniques to identify and locate zero-dose children in Karachi's slums using the Government's Sindh Electronic Immunization Registry (SEIR; aka ZM-EIR)

3 Methods

- Individual child, geo-coded immunization records were extracted from the SEIR (2017-2024)
- Conducted geospatial analysis to identify the prevalence, location, and coverage of zero-dose children
- Examined the accessibility of health facilities to children in slum and non-slum areas

4 Findings

Prevalence of Zero-Dose Children

- 9.6% (186,224/1,947,661) of children were identified as zero-dose

Coverage of Zero-Dose Children

- 51.6% (3,477/6,732) of zero-dose children in slum areas were uncovered
- 46.2% (32,779/70,944) of zero-dose children in non-slum areas were uncovered

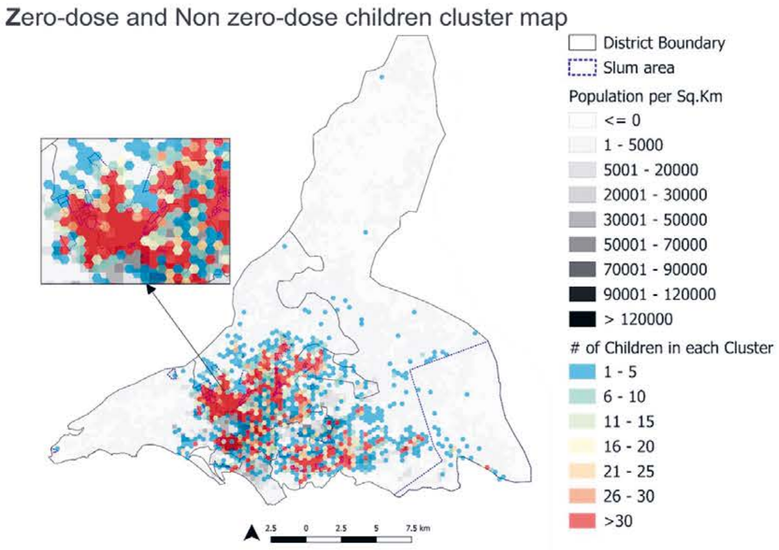
Health Facility Accessibility

- Non-slum areas had a closer median distance of 0.12 km (IQR: 0.39 km) to health facilities, compared to 0.27 km (IQR: 0.52 km) in slum areas

Zero-dose Clusters

- Slum areas showed a higher proportion of zero-dose clusters at 25.8% (46/182) whereas the proportion of zero-dose clusters in non-slum areas was 20.1% (187/932)
- Slum areas had 19 zero-dose children per cluster, while non-slum areas had an average of 35 zero-dose children

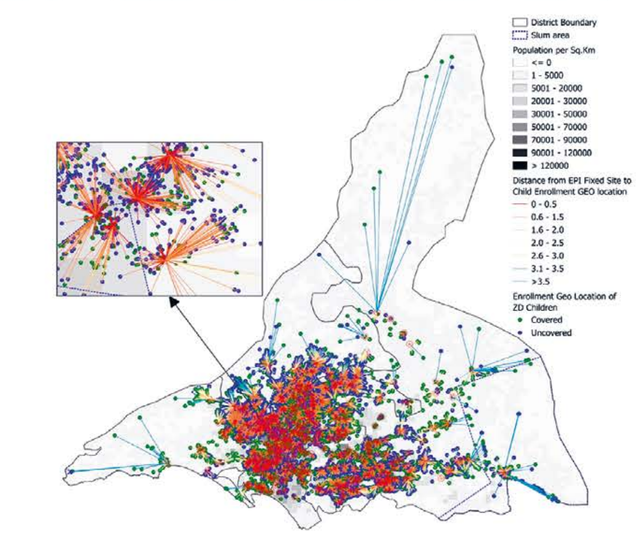
Figure 1: Zero-dose and Non zero-dose children cluster map



Spatial Distance Analysis

- Uncovered zero-dose children had a closer median distance of 0.30 km (IQR: 0.36 km) to health facilities, compared to 0.33 km (IQR: 0.43 km) of covered zero-dose[1]

Figure 2: Distance of covered and uncovered zero-dose children from EPI centers



6 Conclusions

- Slum areas had a higher proportion of zero-dose children and are further away from immunization clinics compared to non-slum areas
- Geospatial analysis can help identify locations of zero-dose children and precisely pinpoint high-risk areas and clusters
- Geospatial analysis can inform data-driven decisions on planning the locations of vaccination centers and outreach activities

7 Recommendations

- Boost vaccination coverage in slums using innovative interventions such as mobile vaccination units, intensified outreach by health workers and targeted community engagement initiatives
- Train health workers to collect household-level geocodes to allow geospatial analysis for informed decision-making
- Integrate GIS technology with EIRs for evidence-based decision-making, real-time monitoring and enabling rapid responses to close immunization gaps

[1]Covered zero-dose is defined as children who have received Penta-1 after 12 months of age
[2]Uncovered zero-dose is defined as children who have not received Penta-1 even after 12 months of age

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Leveraging Geographic Information System (GIS) and advanced geospatial analytics to identify, target, and track zero-dose hotspots across Sindh, Pakistan

Muhammad Siddique[1], Sadaf Khalid[1], Sundus Iftikhar[1], Fatima Miraj[1], Mariam Mehmood[1], Manaksha Memon[1], Vijay Kumar Dharma[1], Mubarak Taighoon Shah[2], Danya Arif Siddiqi[2,3*], Subhash Chandir[1,2,4^]

[1] IRD Pakistan | [2] IRD Global | [3] London School of Hygiene & Tropical Medicine | [4] Johns Hopkins University

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1 Background

Pakistan ranks among the top 10 countries contributing to 58% of the global 14.3 million zero-dose cases

Limited insight into the number, identities, locations, and risk factors hinders targeted interventions for zero-dose children

Geospatial analysis precisely locates zero-dose children, enabling tailored strategies to address vaccination inequities at the microgeographic level

2 Objective

- Identify the spatial distribution and prevalence of zero-dose children using data from Government's Sindh Electronic Immunization Registry (SEIR; aka ZM-EIR)

3 Methods

- Extracted longitudinal immunization records for children aged 0-23 months (2017-2024) from SEIR
- Used geospatial techniques to conduct:
  - Hotspot analysis
  - Gender inequity analysis
  - Rural-urban assessments
- Assessed geographic disparities, identified high-risk clusters, analyzed gender-based differences, and evaluated proximity to immunization services of zero-dose children

4 Findings

Enrollment

- Out of 10,727,353 children enrolled in SEIR (2017-2024), 9.6% (186,224/1,947,661) were zero-dose children

Geographic Distribution

- Significant variations in vaccination coverage were identified
- A cluster[1] with over 300 zero-dose children, was predominantly found in the Karachi division (56%; 89/158), with the rest spread across Sindh province
- 67% (125,137/186,224) of zero-dose children were found in urban areas, while 33% (61,087) were in remote rural areas[2]

Gender Distribution

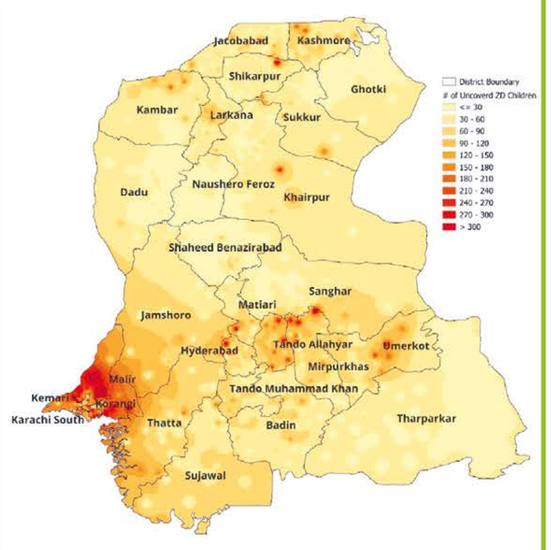
- Over 52.4% (55,573/106,089) of boys were covered zero-dose[3]
- The crude male-to-female ratio was 1.10 for covered zero-dose children, compared to 1.06 for uncovered children, indicating more girls were left uncovered

Distance to Immunization Sites

- The mean distance from fixed immunization sites to enrollment locations was 0.99 km for zero-dose children, compared to 1.32 km for non-zero-dose children

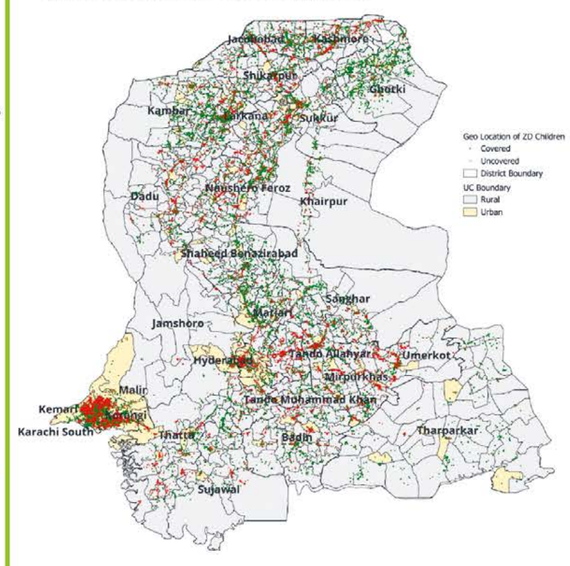
5 Figures and Maps

Figure 1: Hotspots of uncovered zero-dose children



Large zero-dose children hotspots were identified in the Karachi division

Figure 2: Geolocations of covered and uncovered zero-dose children



Zero-dose children exhibit dispersed patterns in urban areas, contrasting with the clustered distribution observed in rural settings

6 Conclusions

- 1 out of 10 children remain unvaccinated, with clusters concentrated in Karachi and a concerning gender gap leaving more girls uncovered
- Despite the proximity of zero-dose children to urban immunization clinics, significant vaccination gaps remain, highlighting the need to address non-physical barriers to access

7 Recommendations

- Intensify efforts in Karachi, where 56% of zero-dose clusters are found, using interventions such as mobile clinics, community outreach, and targeted communication
- Implement gender-sensitive interventions through female health workers, address social norms that impede vaccination for girls, and provide tailored education for caregivers
- Invest in real-time data systems to enable rapid, data-driven decision-making and targeted interventions in low-coverage areas to prevent disease outbreaks

[1]Clusters are defined as a union council
[2]Remote areas classified by the School Education and Literacy Department as 'hard area UCs' in remote coastal, desert, or mountainous regions
[3]Covered zero-dose is defined as children who have received Penta-1 after 12 months of age

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Interventions for reducing zero-dose and under-immunised children in eight countries in sub-Saharan Africa: A review

McGowan C[1], Venner G[1], Alhaffar M[1], Akande T[2], Hailemichael Y[3], Salaudeen A[2], Bolarinwa A[2], Abdissa A[3], Ahmar S[4], Clarke A[4], Valentine P[4], Ahmed T[4], Abdelmagid N[1]

[1] London School of Hygiene & Tropical Medicine, [2] University of Ilorin, [3] Armauer Hansen Research Institute, [4] Save the Children Fund

1 BACKGROUND

Despite the effectiveness of routine immunisation (RI) in reducing child illness and child mortality a significant number of children remain under-immunised (UI) or zero-dose (ZD). There are large vaccine equity gaps globally; however, these gaps are wider in certain settings including, for example, those characterised by high income disparity.

To understand the types of interventions used to reduce the numbers of UI/ZD children we carried out a systematic review of the empirical literature reporting on the design and implementation of interventions to reduce the number of UI/ZD children in eight countries in sub-Saharan Africa. Specifically, we aimed to determine which factors impact the success of these interventions.

2 METHODS

The review included the top three countries characterised by high numbers of ZD children (DRC, Ethiopia, Nigeria), high proportion of UI (Angola, CAR, Somalia), and high numbers of ZD children living in rural/remote areas (CAR, Madagascar, Mauritania) (see **FIGURE 1**).

We searched EMBASE, Global Health, and MEDLINE databases for papers published between 2013 and 2023. We included grey literature.

We used a narrative synthesis to describe challenges and success factors based on a typology of intervention types. We also extracted data about risk factors for UI/ZD.

Finally, we reviewed the included papers in the Gavi Pro-equity Evidence Map (1)

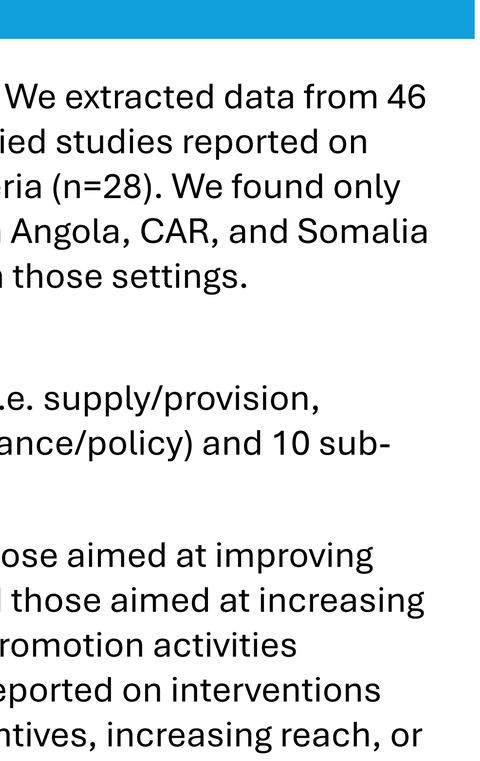

FIGURE 1: Eight countries included in the review: Angola, CAR, DRC, Ethiopia, Madagascar, Mauritania, Nigeria, and Somalia.

3 FINDINGS

A total of 14842 sources were identified. We extracted data from 46 studies. The majority of (85%) the identified studies reported on interventions in Ethiopia (n=11) and Nigeria (n=28). We found only four studies reporting on interventions in Angola, CAR, and Somalia despite high proportions of UI children in those settings.

Intervention design

Interventions fell into one of four types (i.e. supply/provision, demand/uptake, integration, and governance/policy) and 10 sub-types (see **TABLE 1**).

The most common interventions were those aimed at improving service/programme quality (supply), and those aimed at increasing community mobilisation and/or health promotion activities (demand). Proportionately few studies reported on interventions involving reminders (e.g. text/SMS), incentives, increasing reach, or improving policy. Few studies included a thorough description of intervention design.

TABLE 1: Interventions by country, type/subtype, and antigen (● Routine, ● Measles, ● Penta, ● Polio)

Angola							● Polio Eradication Initiative (PEI)			
CAR				● Post-conflict vaccination campaign						
DRC				● Global Polio Eradication Initiative (GPEI)			● Polio Eradication Initiative (PEI)		● The Mashako Plan	
Ethiopia	● Enhanced community engagement and defaulter tracing strategy (Fifth Child project) ● ● Mobile Phone Text Message Reminders	● 10+10+30 radio campaign ● Enhanced community engagement and defaulter tracing strategy ("Fifth Child" project) ● Community volunteers (CVs) the CORE Group Polio Project (CGPP)		● Global Polio Eradication Initiative (GPEI)			● Reaching every district (RED) strategy ● Solar direct drive (SDD) cold chain equipment ● Ethiopian Millennium Rural Initiative (EMRI)		● The three pillars approach ● Reaching Every District using Quality Improvement (RED-QI) approach ● Continuous Quality Improvement (CQI)	
Madagascar				● Vaccination weeks	● Health systems strengthening (HHS) intervention					
Mauritania							● Technical assistance services			
Nigeria	● A Vaccine Indicator and Reminder (VIR) band	● High-intensity CHW intervention delivering community-based service delivery (CBSD) ● Engaging traditional barbers to identify and refer newborns ● Volunteer community mobilisers (VCMs) COREGroup Polio Project (CGPP) ● Civil society organisations (CSOs) ● Community Theater for Immunization (CT4I) ● Youth Group Engagement	● Directly Observed Oral Polio Vaccination (DOPV)	● Supplementary immunization activities (SIAs) ● Directly Observed Oral Polio Vaccination (DOPV) ● Supplementary immunization activities (SIAs) ● Supplementary immunization activities (SIAs)	● Public-private partnership (PPP)	● Geographic Information System Technology ● Household-based microplanning exercise ● N-STOP ● Microplanning verification process ● Community surveys ● GIS ward maps ● Tracking Vaccination Teams using GIS	● State switch committees ● Participatory action research ● SMS reporting platform ● Geographic Information System Technology ● Integrated mobile vaccination ● Integrated supportive supervision ● Polio Eradication Initiative (PEI) ● Tracking Vaccination Teams using GIS	● Integrated mobile vaccination	● Traditional and Religious Leaders (TRL) engagement ● Various polio-related interventions	● Ensuring accountability in implementation of supplementary immunisation activities
Somalia			● ● Conditional cash transfers and mHealth audio messaging						● Cross-border health initiative	
	Communications	Community mobilisation	Incentives	Mass campaigns	Health system strengthening	Planning	Quality	Reach	Integration	Governance/Policy
	Demand/Uptake			Supply/Provision					Integration	Governance/ Policy

Success factors

All studies reported positive outcomes. Success factors included, engagement of political leadership, collaborative planning, leveraging existing structures, and uncomplicated intervention design.

Risk factors for ZD/UI

Reviewed papers have frequently (and uncritically) reported factors related to maternal knowledge, maternal literacy, maternal social status, etc. as determinants of immunisation uptake despite a wealth of qualitative studies describing shared-decision making or predominantly male decisional authority in decisions around vaccination of children.

4 RECOMMENDATIONS

Evaluation of integrated interventions is complex and requires careful planning and a clear understanding of limitations. Interventions should be simplified to improve design, implementation, evaluation, and sustainability.

Women's role is key in childhood vaccination; however, isolating these determinants without understanding and analysing how they interact with other determinants will hinder any progress in vaccination. Intervention design should address issues around male decision-making, and risk factor studies should be subject to greater scrutiny of assumptions implicating mothers in the status of children.

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Scan the QR code for a list of references of studies included in our review.

This review was funded by a grant from GSK to the Save the Children Fund.

Understanding the Factors Contributing to Zero-dose Children in Pastoralist areas: Evidence from Gavi project in Afar and Somali Regions of Ethiopia

Melaku Tsehay (MPH, PhD)

Consortium of Cristian Relief and Development Association (CCRDA) /CORE Group Partners Project (CGPP)

Background

Over the past several decades, immunization coverage in Ethiopia has shown improvement. However, challenges persist, including geographical inequities and a high number of zero-dose and under-immunized children. Ethiopia ranks fifth in the world among countries facing these challenges. To address these gaps, Ethiopia has committed to global agendas set out by Gavi's strategy for 2021–2025 (Gavi 5.0) and WHO's Immunization Agenda 2030 (IA2030).

Methods

Study Design: This study employed a community-based cross-sectional design utilizing both quantitative and qualitative methods.

Study Population/Targets: The study targeted mothers and caregivers of children aged 12-23 months for the survey. Additionally, it included mothers of zero-dose children for in-depth interviews (IDIs) and EPI-focal personnel for key informant interviews (KIIs).

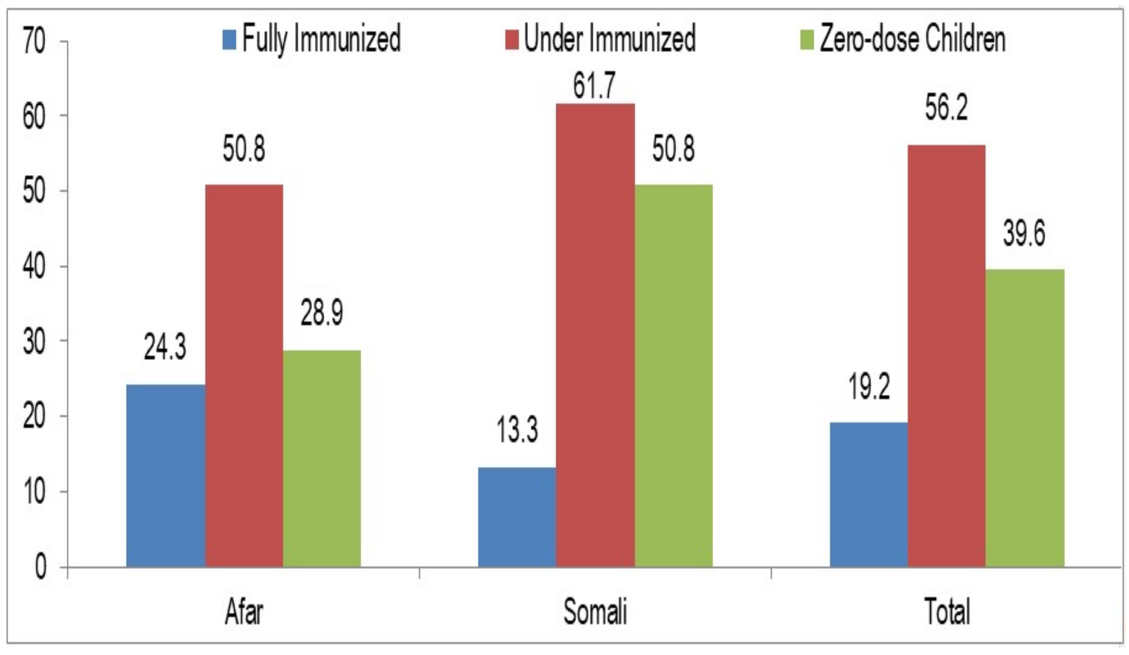
Sample Size: The sample size was determined using the EPI method, with 10 households per cluster, assuming the zero-dose rate in 2019, and accounting for the design effect for the cluster. In total, 240 households from 24 kebeles were included, along with 8 KIIs and 12 IDIs.

Data Collection and Analysis: Data were collected by trained data collectors using the Open Data Kit (ODK) to interview mothers with children aged 12-23 months. IDIs and KIIs were conducted with mothers of zero-dose children and EPI-focal personnel, respectively. The data were analyzed using SPSS for Windows version 25 and thematically. Ethical approval was obtained, and informed consent, privacy, and confidentiality were maintained at all levels of data collection.

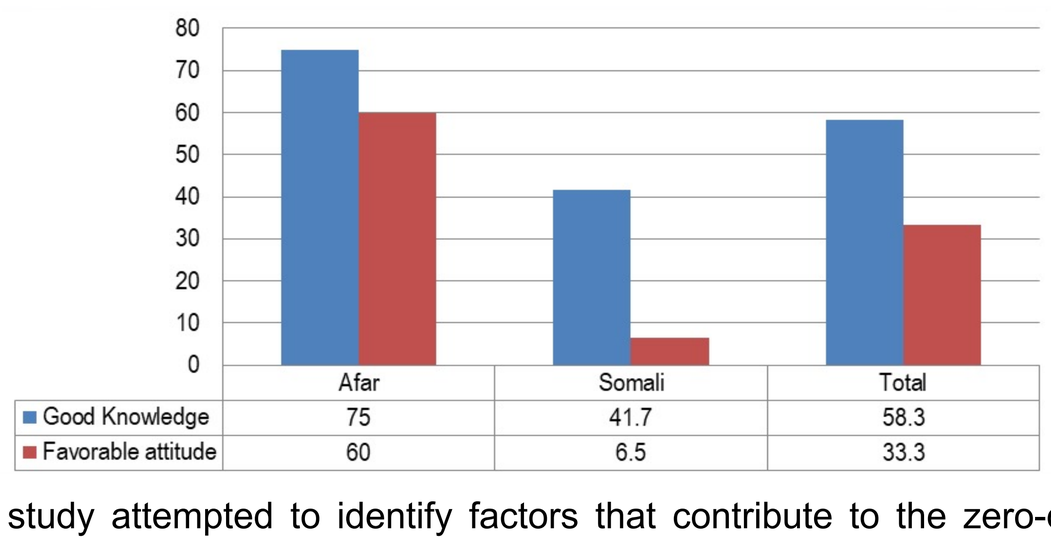
Findings

A total of 240 caregivers of children aged 12-23 months participated in the study, with 120 from each region. Of these participants, 95% were mothers of the child, and 54% were caregivers of male children. Nearly 5% of the caregivers lived more than a 60-minute walk away from the nearest health facility.

Zero dose, under immunized and fully immunized children



The Knowledge and Attitude of Mothers about Immunization



	Afar	Somali	Total
Good Knowledge	75	41.7	58.3
Favorable attitude	60	6.5	33.3

The study attempted to identify factors that contribute to the zero-dose immunization status of children in the project areas. Accordingly, the bivariate logistic regression analysis identified eleven variables as candidates for multivariable logistic regression analysis (P-value<0.25).

Nevertheless, in the multiple logistic regression analysis: age of the father, travel time to the nearest health facility, household visited by a health extension worker, a place where the mothers give birth, and knowledge of the caretaker about immunization were significantly associated with Zero dose immunization of 12-23 months years old children.

Factors contributing to ZD and UIC at facility and community level

At the facility level, key issues include staff shortages, high workloads, and poor immunization data quality. RED micro plans have poor quality, especially in denominators. High vaccine wastage is due to ledger and recording issues. Poor road infrastructure affects pastoralist communities, and there is high staff turnover with low accountability. Interaction between mothers and health workers is poor, and vaccine transportation to facilities is challenging.

At the community level, lack of transportation, distant vaccination sites, and fear of injections hinder access to immunization. Distrust in vaccines, forgetfulness, and the nomadic lifestyle of pastoralist communities complicate consistent healthcare access. The absence of health facilities and low awareness about vaccination further exacerbate the issue.

Recommendations

Enhancing immunization services and implementing context-based approaches in pastoralist areas is crucial. Improving healthcare worker accountability and supporting the EPI program with sufficient budget, transportation, and logistics are essential. Building healthcare providers' capacity and using a bottom-up approach for micro-planning can improve coverage. Strengthening newborn tracking, mapping zero-dose children, and involving community and religious leaders in demand activities are key steps.

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Multi-Sectoral Urban Immunization Enhancement Using IARMM in Mid-Level Towns in Ethiopia

Amsalu Shiferaw[1] Getachew Y.[2] Tekalign S.[3] Lemma K.[4] & Negussie S.[1]

1= UNICEF ECO, 2= Amhara Region, 3= South Ethiopia Region, 4= Central Ethiopia Region

I. Background

- **Diverse Urban Communities**: Urban areas in Ethiopia have widespread and uneven socioeconomic backgrounds, making it challenging to track and immunize all children effectively, especially in marginalized and urban slum communities (USAID, 2023; UNICEF, 2024).
- **Barriers to Access**: High population mobility, inconvenient health facility locations, long waiting times, computing priorities, providers attitude and misinformation contribute to low immunization rates, particularly among low-income families (WHO, 2022; USAID, 2023; UNICEF, 2024).
- **Differentiated Interventions**: Through financial support from CDC, UNICEF Ethiopia, with the Ministry of Health, has implemented multisectoral urban immunization improvement interventions during the first half of 2024 in six mid-level towns (UNICEF, 2024).

II. Purpose

- To document the process of multi-sectoral urban immunization interventions using the IARMM approach in mid-level urban areas of Amhara, Central Ethiopia, and South Ethiopia.

III. Methodology

- Implemented town-specific methods using the Identify, Advocate, Reach, Monitor, Measure (IARMM) approach.
- Conducted rapid community surveys and household headcounts to determine the immunization status, focusing on **identifying** zero-dose (ZD), and dropout children, as well as assessing nutrition interventions and the prevalence of birth certificates. The sample sizes for the assessment ranged from 222 to 21,823 children per town, culminating in a total sample size of 47,121 children across all towns.
- **Advocated** using preliminary results of the assessment for local stakeholders, including local political and administrative leaders, sectoral heads community leaders, and service providers to raise awareness and get support for service integration and multi-sectoral interventions.
- Implemented targeted home visits and community-based outreach sessions to **reach** ZD, and under-vaccinated children.
- Utilized different **monitoring** tools such as Kobo, ODK Collect, and paper-based approaches for ongoing data collection and tracking of immunization status, nutrition interventions, and birth certificate issuance. Analyzed data using STATA 15.1, employing descriptive, bivariate, and multivariate analyses to assess the urban immunization, identify key predictors influencing immunization coverage, and measure the impact on nutrition and birth registration.
- **Measured** coverage progress through DHIS2 and using survey and head count estimate in each town including tracking the identified and registered ZD and under vaccinated.

IV. Results

- The highest proportion of assessed children is in the 36-59 months age group (40.1%), followed by the 24-35 months group (37.4%) (Figure 1).
- Among the assessed children, 3.4% aged 12-23 months and 3.0% aged 24-35 months were identified as ZD. Additionally, 6.4% of children aged 12-23 months and 5.3% of those aged 24-35 months were under-immunized for Penta3. For MCV1, 13.1% of children aged 12-23 months and 9.9% of those aged 24-35 months were not vaccinated. Furthermore, 41.5% of children aged 12-23 months and 17.8% of those aged 24-35 months were under-immunized for MCV2 (Table 1).
- All identified ZD and under-immunized children vaccinated, others, screened for malnutrition, and provided deworming and Vitamin A.
- Advocacy efforts were emphasized developing tailored strategies, securing community support, and enhancing partnerships to improve immunization services.
- Improving maternal education, promoting health facility births, retaining EPI cards, and encouraging joint decision-making are key to improve Penta1 coverage (Table 2).

Figure 1: Proportion of assessed children by age and town

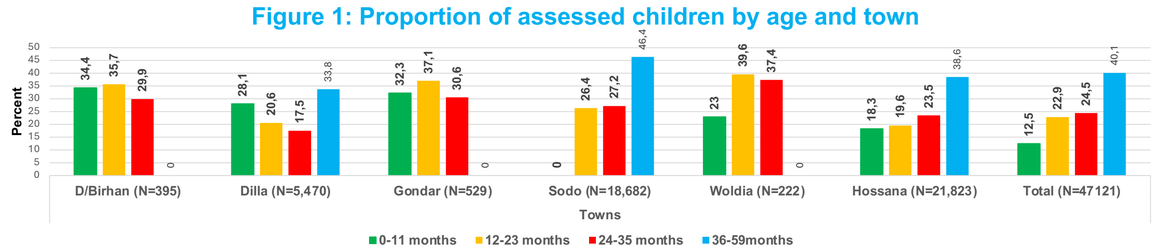

Table 1: Immunization coverage by key antigens and towns, 12-23 and 24-35 months aged children

Towns	Penta1		Penta3		MCV1		MCV2	
	12-23mos	24-35mos	12-23mos	24-35mos	12-23mos	24-35mos	12-23mos	24-35mos
D/Birhan (N=141/118)	97.9	96.6	96.4	94.9	90.1	90.7	53.2	80.5
Dilla (N=1228/960)	96.9	96.9	94.1	94.9	89.4	92.4	62.2	86.2
Gondar (N=196/162)	94.4	96.9	88.8	93.2	80.6	90.1	49.0	72.8
Hossana (N=4286/5129)	95.6	95.9	91.9	93.0	83.8	87.5	53.8	79.5
Sodo (N=4939/5078)	97.4	98.2	95.0	96.6	89.0	92.5	62.5	84.8
Woldia (N=88/83)	97.7	94.0	93.2	80.7	88.6	71.1	50.0	61.4
Total (N=10778/11530)	96.6	97.0	93.6	94.7	86.9	90.1	58.5	82.2

Figure 2: Dropout rates of for key antigens among children aged 12-35 months

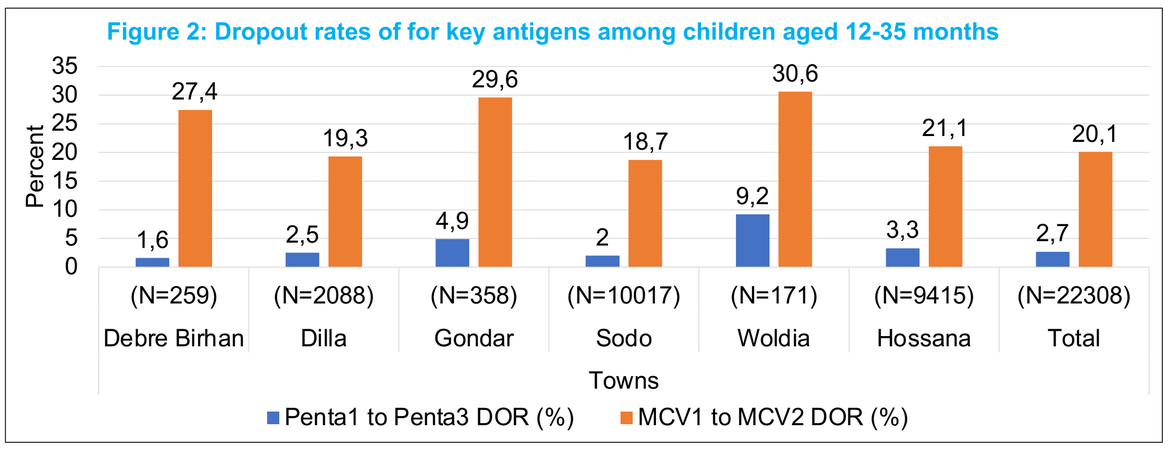

Table 2: Binary logistic regression analysis of Penta1 coverage by explanatory variables, N=16,573

Penta1 coverage	Odds	SE	z-value	p-value	[95% Conf Interval]		Sig
Education (No formal education)	1	.	.	.	.	.	
Primary education	2.33	.574	3.43	.001	1.437	3.776	***
Secondary and above	3.923	1.28	4.18	0	2.068	7.442	***
Marital status (Married)	1	.	.	.	.	.	
Single mother	1.92	1.22	1.03	.305	.552	6.677	
Perceived Wealth status (Low)	1	.	.	.	.	.	
High	1.299	.704	0.48	.629	.449	3.759	
Medium	2.003	.498	2.79	.005	1.23	3.261	***
CBHI (Not member)	1	.	.	.	.	.	
Member	1.431	.368	1.39	.163	.865	2.367	
Not defined	1.558	.861	0.80	.423	.527	4.6	
PSNP beneficiary status (Current ben.)	1	.	.	.	.	.	
Previous beneficiary	.247	.153	-2.26	.024	.073	.831	**
Not beneficiary	1.472	.486	1.17	.241	.771	2.811	
ANC visit (No)	1	.	.	.	.	.	
Yes	1.238	.564	0.47	.639	.507	3.021	
Place of birth (Home)	1	.	.	.	.	.	
Health facility	4.46	1.81	3.68	0	2.011	9.893	***
At least 1 PNC visit (Yes)	1	.	.	.	.	.	
No	1.005	.366	0.01	.988	.492	2.054	
Time to visit nearest HF (≥30 minutes)	1	.	.	.	.	.	
Less than 30 minutes	1.125	.258	0.51	.607	.718	1.765	
Card retention	1	.	.	.	.	.	
Yes	2.099	.603	2.58	.01	1.196	3.686	***
Decision for vaccination (Mother)	1	.		.		.	. .
Both	2.032	.572	2.52	.012	1.17	3.527	**
Take child to vaccination (Both)	1	.	.	.	.	.	
Husband or others	.535	.572	-0.58	.559	.066	4.353	
Mother	1.084	.365	0.24	.812	.56	2.096	
Ask permission for vaccination (Yes)	1	.	.	.	.	.	
No	1.396	.442	1.05	.292	.751	2.597	
Ask money from husband (No)	1	.	.	.	.	.	
Yes	2.165	.573	2.92	.004	1.289	3.636	***
Nutrition Screening (No)	1	.	.	.	.	.	
Yes	1.184	.365	0.55	.583	.648	2.166	
Vitamin A provision	1	.	.	.	.	.	
Yes	1.598	.472	1.59	.113	.896	2.852	
Constant	.831	.598	-0.26	.797	.203	3.404	
Chi-square	251.155		Prob > chi2		0.000		
Akaike crit. (AIC)	1031.835		Bayesian crit. (BIC)		1201.577		

*** p<.01, ** p<.05,

V. Recommendations

- Collaborate with relevant sectors, SCOs and communities to boost advocacy of Multisectoral approach and intervention in immunization.
- Reduce travel and waiting times and expand services in underserved areas.
- Apply human centered approach for enhancing demand
- Implement differentiated strategies to reach ZD and lower dropout rates and enhance monitoring systems.

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Predictive modelling of zero-dose children and vaccination dropout in India reveals common drivers of immunization shortfalls

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*Indian Institute of Technology Delhi, ^Université de Montréal

Background

- Addressing the persistent challenge of zero-dose children and understanding dropout trends where the system fails to retain children throughout the complete vaccination regimen is crucial to improving immunization coverage and reducing child mortality.
- We develop models for predicting zero-dose and Dropout children in India and evaluate the potential of neural network models to improve traditional targeting methods for immunization programs.
- Adopting a subnational perspective, we develop state and region-specific models to improve predictive accuracy.
- We also study if a similar modeling approach and features can be applied to predict both zero-dose and dropout children, enhancing our understanding of vaccination gaps.

Dataset and challenges

- The NFHS data (2019-2021) offers a robust, nationally representative dataset, with granular details down to the district level, collected through rigorous and standardized procedures, offering comprehensive insights into health and demographic indicators across diverse populations.
- Its granularity enables precise analysis of regional variations and supports the development of tailored public health interventions.
- The prevalence of zero-dose children is 6.82%, while the prevalence of BCG-MCV dropouts is 7.40%.
- Due to the low prevalence of both classes, models exhibit a tendency to predict the majority class (non-zero-dose and non-dropout).

Methods

Outcome variables

We selected children in the age range of 12-23 months.

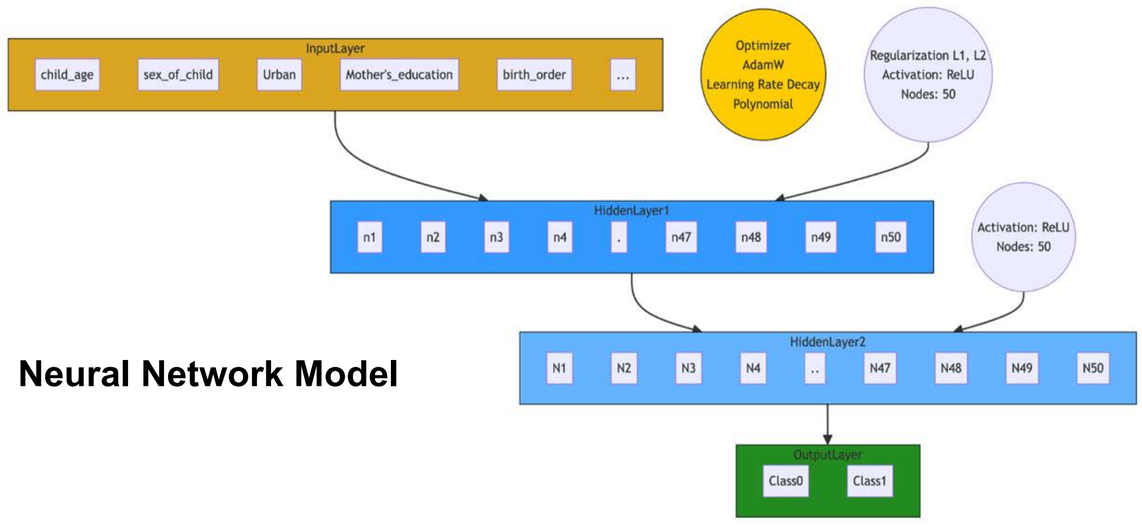
- **Zero-dose:** Zero-dose children are those who have not received the first dose of the diphtheria-tetanus-pertussis (DTP1) vaccine.
- **BCG - MCV Dropout:** When a child receives the BCG vaccine but misses the MCV vaccine.
- **DPT1 - DPT3 Dropout:** When a child receives the first dose of DPT but misses on subsequent doses.

Logistic Regression

- Used class weighting to assign higher importance to the minority class (zero dose, dropout).
- The model is adjusted to take errors in predicting missed vaccines more seriously, ensuring better accuracy for these cases.

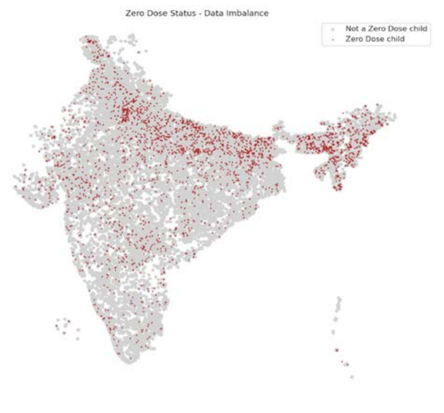
Neural Network

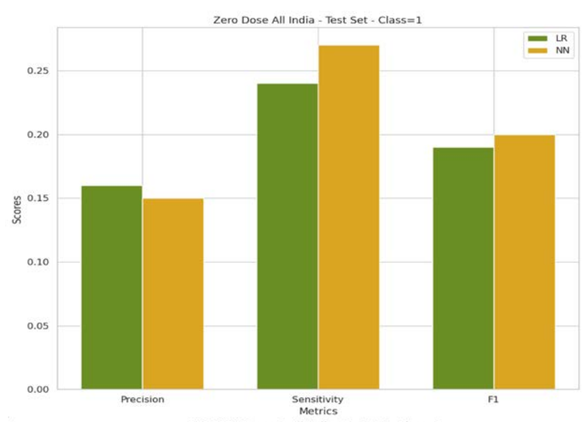
- The Neural Network has a structure where information flows forward through two hidden layers to make predictions.
- During training, L1 and L2 regularization techniques are used to prevent the model from overfitting, and focal loss is used to reduce the impact of clas, which means adding rules to limit the model's complexity.

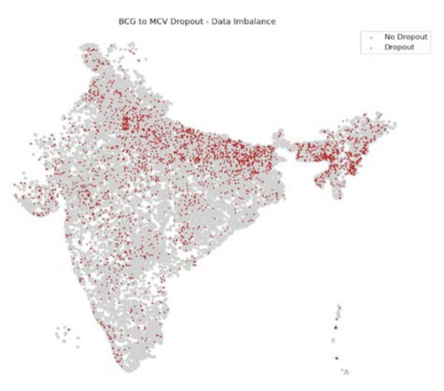


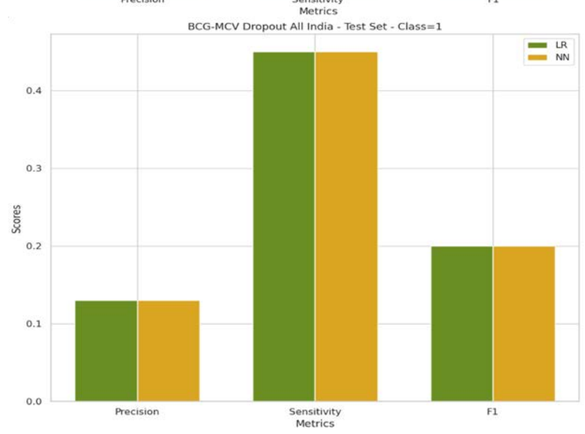
Neural Network Model

Neural network vs Logistic regression National modeling

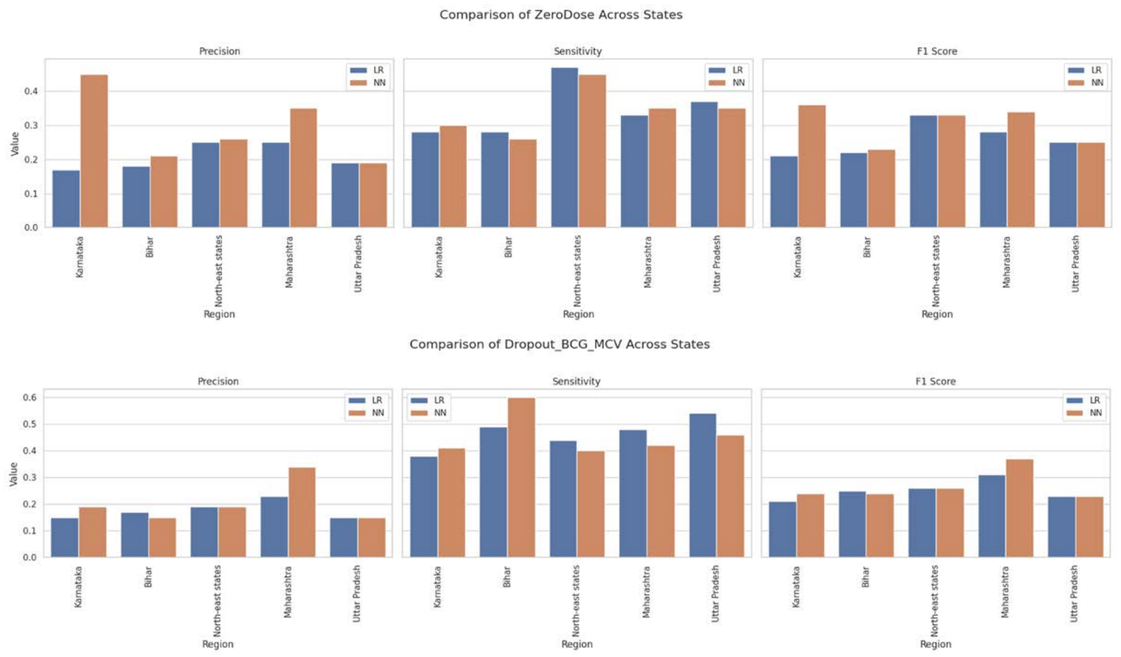




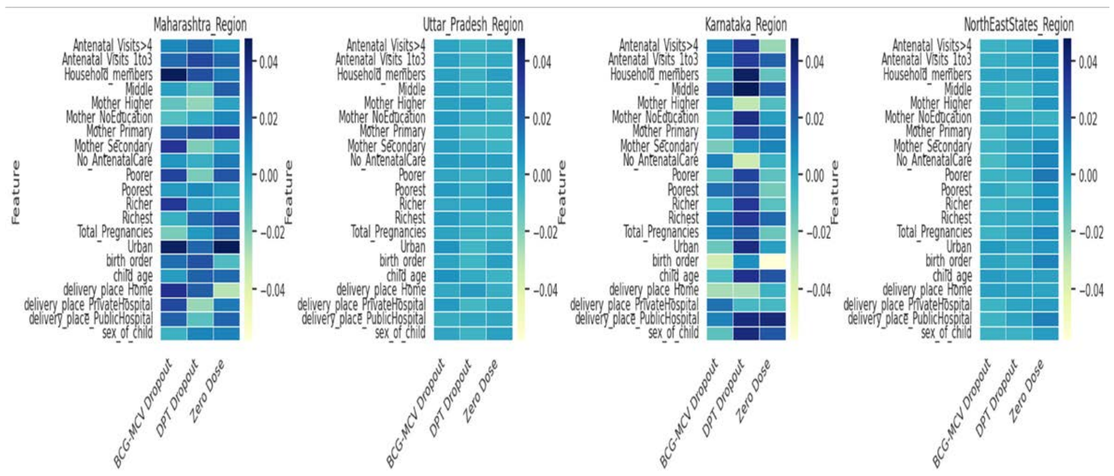




Sub-National modelling



Sub-National Feature Importance



Key takeaways

- Many factors influencing ZD and dropout are similar, suggesting a common approach for prediction.
- Certain features that are critical in certain states may have little to no effect in others emphasizing the need for state-specific modelling.
- Neural networks are better at identifying true dropouts
- Machine learning can effectively predict ZD and dropout, aiding in targeted interventions.

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Leveraging rapid-cycle phone surveys for improved immunization: a case study for Madagascar

Azaïs V.[1], Neill R.[1], Reerinck I.[1], Rakotomanana A.H.[1], Sieleunou I.[1], Ramahatanaharisoa A.W.[3], Andriantavison R.L.[4], Yasmine L.L.[2], Hanitriniala S.P.[3], Randrianasolo F.H.[3], Rasamiharimalala L.Z.[3], Raharinivo M.S.M.[3], Andrianirinarison J.C.[3], Nomenjanahary N.P.M.[3], Rakotondratsara M.A.[3], Andriambelo M.M.[3], Lorin J.[5], Hansen, P[1].

[1]Global Financing Facility for Women, Adolescents, and Children, [2]Ministry of Public Health of Madagascar; [3]National Institute of Community and Public Health; [4]World Bank; [5]Gavi, the Vaccine Alliance

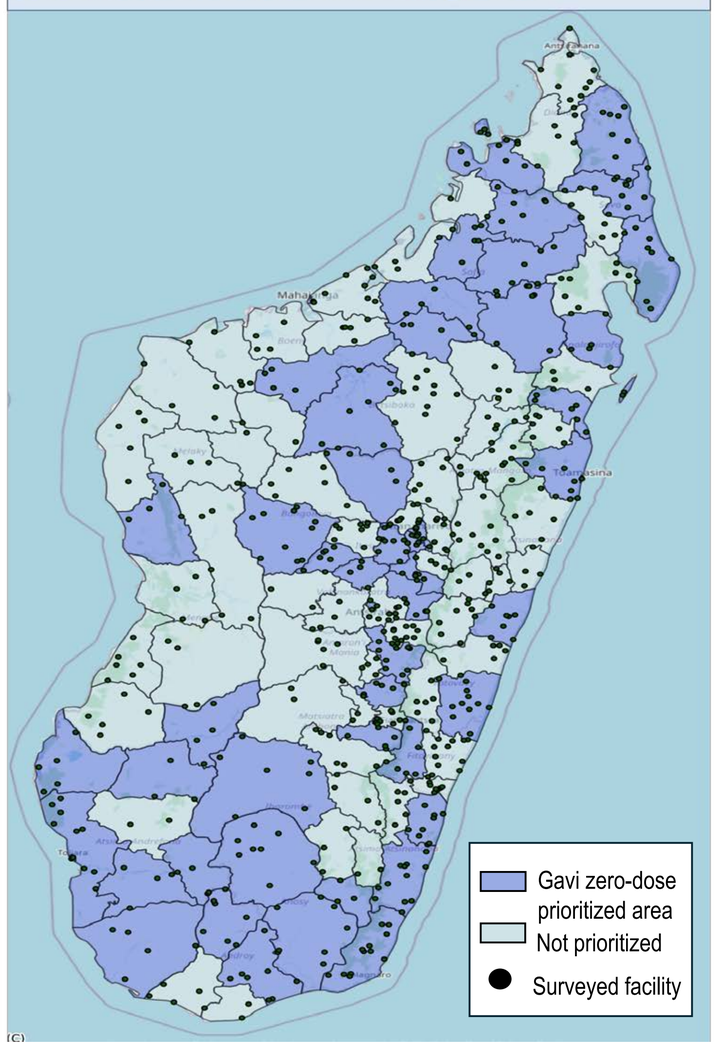
BACKGROUND

Addressing the needs of zero-dose children requires the timely identification of immunization barriers. The Madagascar Ministry of Public Health, in partnership with the Global Financing Facility and GAVI, is conducting a quarterly health facility panel phone survey to monitor immunization service readiness over time, capture the influence of external shocks on readiness, and compare readiness across zero-dose priority and non-priority geographies.

METHODS

The first round of the GFF's FASTR rapid phone survey was conducted in a representative sample of 656 basic health centers (CSB) (Figure 1). Probabilistic sampling was conducted with stratification by facility type, geography, and Gavi's zero-dose area priority status. Composite indicators were constructed to assess immunization service readiness. Two-sample tests of proportions compared results between Gavi high-priority zero dose and non-priority areas.

Figure 1. Surveyed facilities and Zero-dose prioritized districts in Madagascar



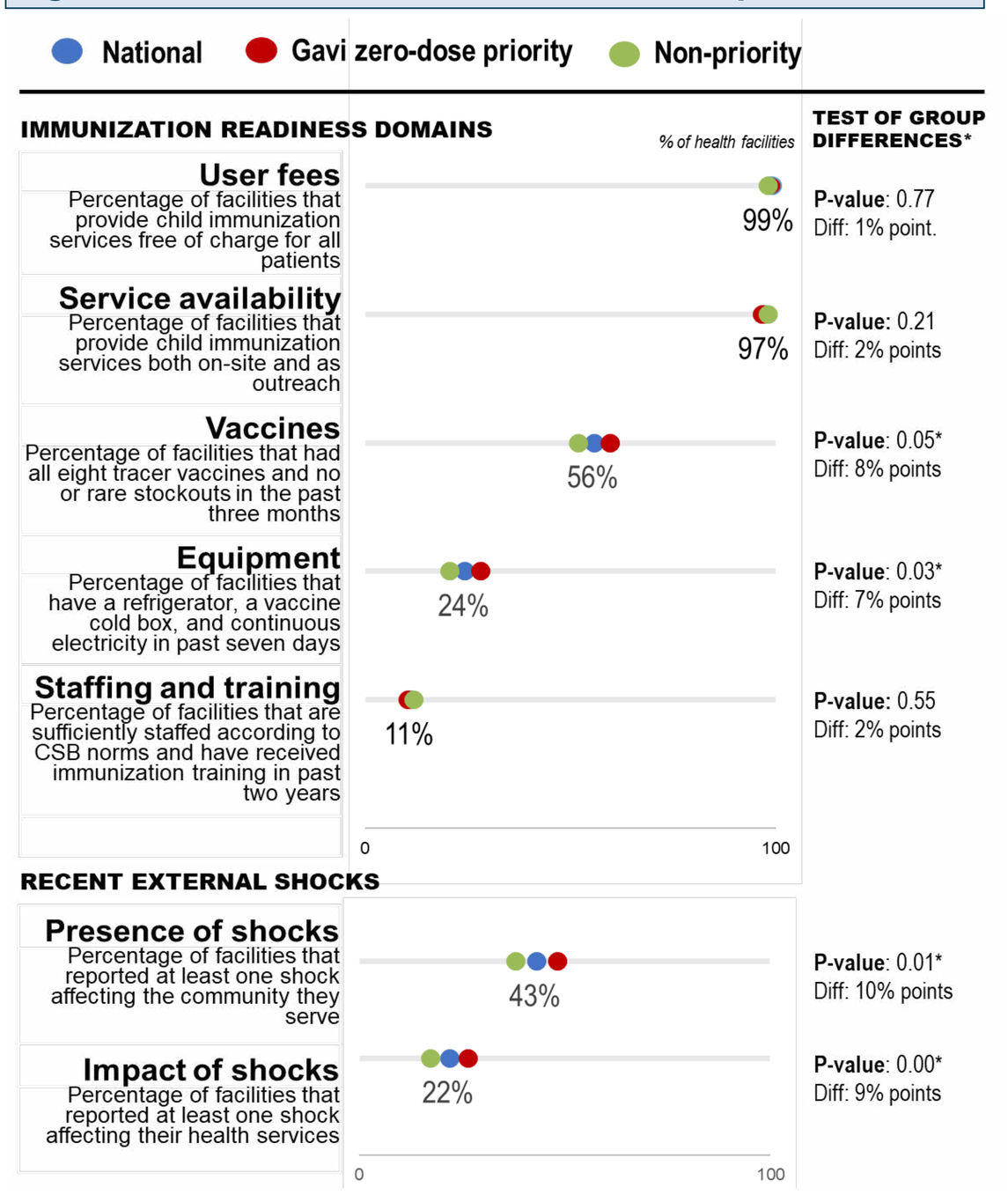
Survey sample:
N = 656 CSB
23% of all 2,817 functional CSB facilities

12 June-02 July
Data collection

42 minutes
Average call duration

CSB type	**38%** CSB1 **62%** CSB2
Geography	**8%** Urban **93%** Rural
Zero-dose priority status	**50%** high priority **50%** non-priority

Figure 2. Child immunization readiness snapshot



Note: * Indicates that the differences between the two groups are significant at the 5% level. All the indicators presented in this figure have been constructed by combining various survey questions.

RESULTS

#1 Health facilities in Madagascar met an average of 57% of the immunization service readiness tracer criteria. The rapid survey identified considerable gaps in immunization service readiness, particularly in the availability of tracer vaccines without stockouts, continuous electricity, and sufficient staffing and immunization training (Figure 2).

#2 Nearly half of surveyed facilities reported being affected by external shocks, mainly natural disasters and outbreaks (due to the malaria season) (Figure 2).

#3 Differences between high zero-dose priority areas and non-priority areas were minimal, though high-priority areas had relatively higher service availability and readiness scores. However, facilities in zero-dose areas were significantly more likely to report shocks in their catchment area that impacted service delivery.

RECOMMENDATIONS

Findings demonstrate the importance of capturing contextual information on shocks in addition to supply-side readiness indicators when monitoring the service availability and readiness of health facilities. Future rounds of this survey will capture additional indicators and qualitative insights related to immunization and will track the availability of key vaccines and related commodities at PHCs over time.

Reference: [1] World Health Organization and UNICEF. WHO-UNICEF Estimates of National Immunization Coverage, 1990–2022: Immunization Madagascar 2023 country profile

Transit point vaccination and care group mothers: An innovative model to identify, reach and vaccinate zero dose children

Josephine Ihahii[1*], Asha Osman[1], Somane Mohamed[1], Abubakar Salah[1] Abukar Siraj[1], Abdirashid Yussuf[1], Eunice Kilonzo[1], Abdinur Ahmed[1] Asma Ali[2]

[1]The CORE Group Partners Project, [2]Bill and Melinda Gates Foundation

Introduction

Immunization is one of the most cost-effective measures to prevent morbidity and mortality in children against common childhood illnesses. According to UNOCHA, two-third of the Somalia population cannot access health care, while world bank statistics records Somalia's infant mortality rate as high as 68/1000 live birth in 2022.

Health security has been threatened with the porous borders between Somalia, Kenya and Ethiopia, which has resulted in the international spread of polio cross these countries.

To support strengthening of Somalia's grappling health system, the CORE Group Partners Project (CGPP), with funding from the Bill and Melinda Gates Foundation, initiated transit point vaccination (TPV) sites along Somalia-Kenya, Somalia-Ethiopia borders, tracking of zero dose children (ZDC) from Somalia arriving in Dadaab refugee complex in Kenya, and utilization of care group mothers (CGM) model.
All these strategies aimed to reduce ZDC in Somalia.

Methods

The TPV sites were mapped in major informal crossing point with highest human traffic traversing Somalia-Kenya and Somalia-Ethiopia borders, and TPV teams deployed to screen and vaccinate under-immunized children. In the Kenya's Dadaab refugee complex, newly arriving ZDC from Somalia were tracked and vaccinated. Through CGM model, refugee women are empowered to participate and take ownership in immunization activities as well as make decisions regarding their children health.

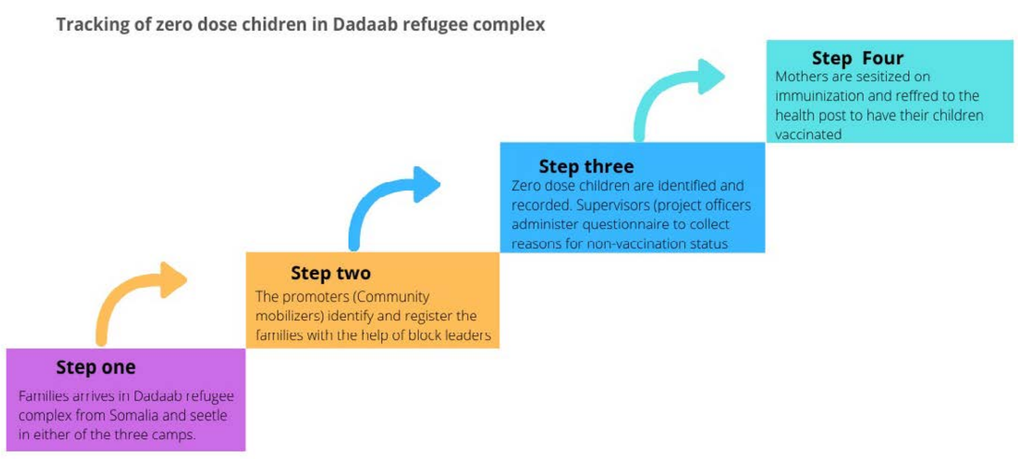


Figure 1: illustration of zero dose tracking process for new arriving families in the Dadaab refugee complex

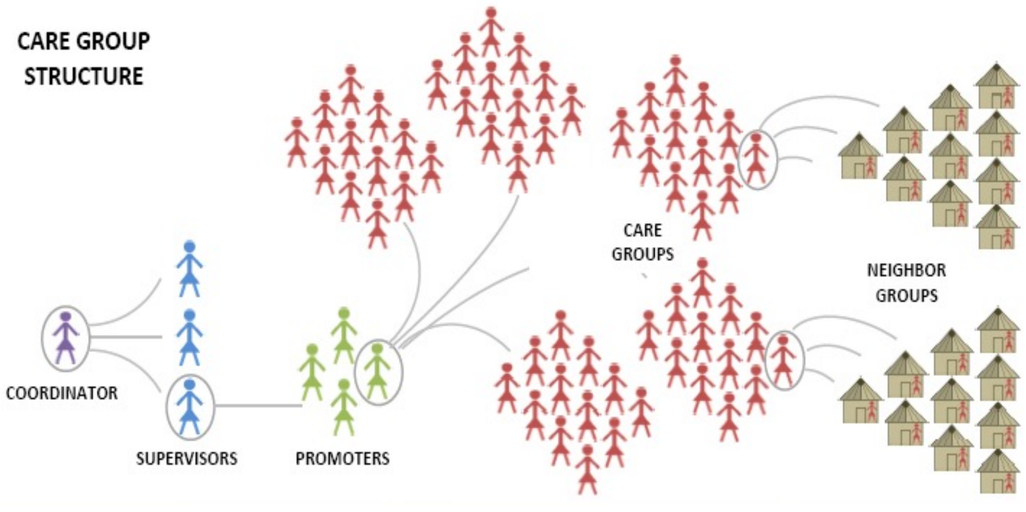


Figure 2 Care group mother model formation and its impact on childhood immunization awareness for mothers back in Somalia

Results

Between July 2023 to June 2024, a total of 3,949 under 5 children were screened and vaccinated in nine TPV sites, of whom 1,365 (35%) were ZDC. Majority of the zero dose children originated from Lower Juba (1,407), Gedo (1,581) and Middle Juba (435) regions. 3,132 of these children arrived in the Dadaab refugee camps while 561 crossed over to the and Somali region in Ethiopia.

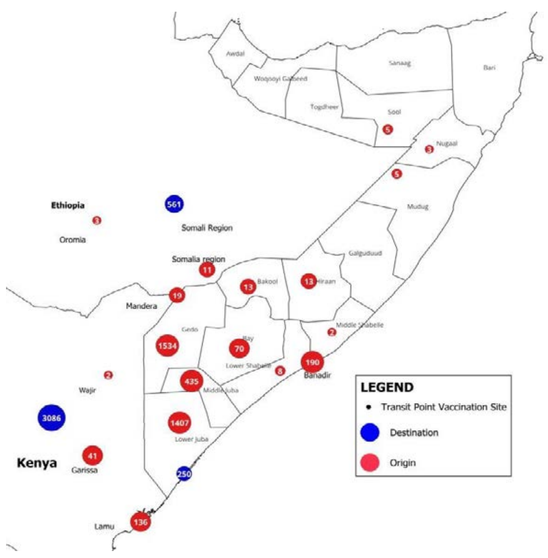
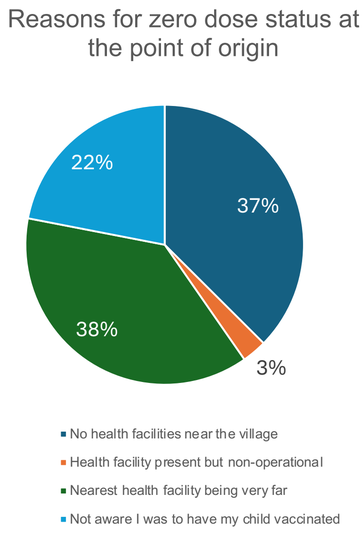


Figure 3: Geographical origin and destination of the children screened at transit points

Figure 4: A TPV team vaccinating a child on transist in Tulo-Barwaqo TPV site Somalai

A hundred CGM sensitized 660 neighborhood mothers back in Somalia, of whom, in total had 1,380 under 5 children, of whom 863 were ZDC. Lack of health facilities (247), non-operational health facilities (19) the nearest health facility being very far (549) were the main reasons the neighborhood mothers reported as the barriers to seeking vaccinations services for their children.

Figure 5: A project officer tracking a ZDC in one of the new arrival family in the refugee complex



Conclusion

Barriers to immunization services remains a challenge in Somalia, resulting to high number of ZDC. Efforts to screen and immunize moving populations along the international borders, tracking, monitoring and vaccination of ZDC in refugees' camps including sensitizing mothers on benefits of immunization is slowly addressing immunization barriers for special populations.

Acknowledgement

BILL & MELINDA GATES foundation

coregroup Partners Project

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Identifying the zero-dose child: Insights from the house-to-house registration of children by village health teams in Uganda.

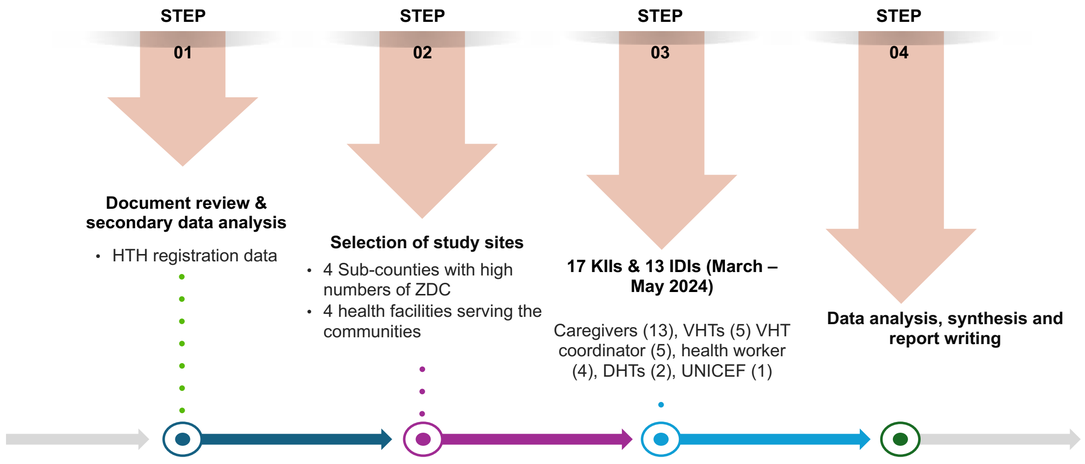
Namugaya F[1], Kamya C[1], Katamba P[1], Ipola A.P[1] , Kayendeke M[1], Kabatangare P[1], Stammer E[2], Namaalwa M[3], Kakeeto S[3], Banura P[3], Kabwongera E[3], Nankabirwa J[1], Kamya M[1]

[1]Infectious Disease Research Collaboration (IDRC), [2]John Snow, INC (JSI), [3]UNICEF Uganda.

BACKGROUND

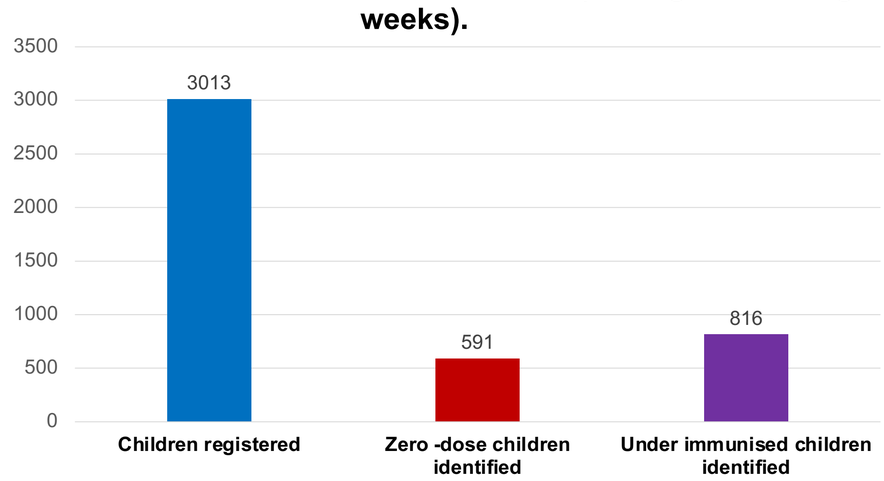
In 2023, the number of zero dose children (ZDC) in Wakiso district was estimated at 25,000 (DHIS2). To improve the coverage, UNICEF supported house to house (HTH) registration of children under 5 years by village health teams (VHTs) in Wakiso district in October and November 2023. Using the REAIM (Reach, Effectiveness, Adoption, Implementation and Maintenance) framework, the Uganda Learning Hub for immunisation equity (LH) evaluated the implementation of the HTH registration to inform the: i) planned scale-up of the HTH registration to other districts, ii) implementation of the interventions proposed under the Equity Accelerator Fund (EAF) and iii) ongoing drafting of the national zero dose guidelines. The objectives of the evaluation were to i) assess the reach, adoption, implementation, and maintenance of the HTH registration, ii) estimate the number and the proportion of ZDC and UI children identified and reached and iii) document the challenges and enablers of implementing the HTH registration.

METHODS



FINDINGS

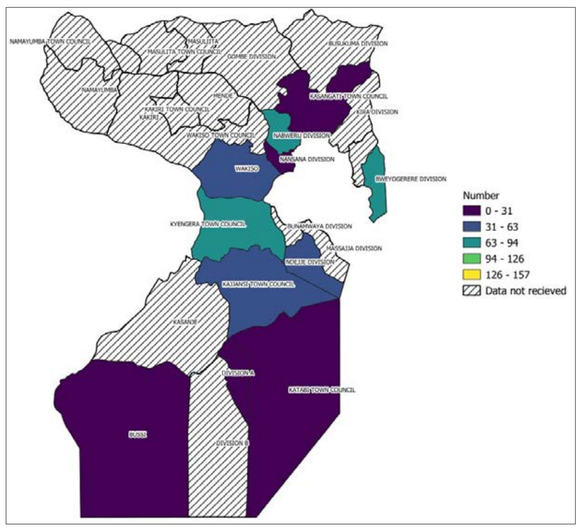
Figure 1: Number of ZD and UI children identified (among children aged 6-52 weeks).



REACH

- Secondary data analysed was from in 52% of the sub-counties in Wakiso district.
  - It is not clear whether the registration was conducted in other sub-counties.
- All the VHTs interviewed reported they didn't register children from all eligible households in their village due to:
  - Short timelines for data collection (3 days) with many households to cover.
  - Children without cards were not registered.
  - Lack of facilitation for registration.
  - Some village zones were not allocated VHTs for registration

Figure 2: Map of Wakiso district showing reach of house-to-house registration (October to November 2023).



ADOPTION

- Respondents reported that majority of the caregivers accepted the interventions.
  - Communities know the VHT and as such they are trusted in the community.
  - Communities complied by providing personnel information signaling acceptability.
- Some resistance from some caregivers was also reported due to;
  - Being tired of government programs
  - Immunisation fatigue (several new vaccines introduced, several immunisation campaigns).
  - lack of prior community sensitization about the registration

MAINTENANCE

- Some members of the District Health Team (DHT), health workers, and VHTs reported willingness to continue registration of children using PHC funds.
- Some VHTs reported unwillingness to continue house-to-house registration without facilitation.
- Some DHT members reported that they will not be able to continue implementing the house-to-house registration activities if UNICEF support stops because it's a funds intensive activity.

IMPLEMENTATION

- There was no detailed plan/guiding document on how the activities were to be executed by all key stakeholders.
  - LH developed an outcome map against which implementation was assessed.
- All VHTs interviewed reported that they were not trained, but rather received an orientation. This was attributed to inadequate funding.
- All the VHTs interviewed reported they didn't register children from all eligible households in their village.
- All the VHTs interviewed reported that they were not supervised. This was confirmed by VHTs coordinators and was attributed to inadequate funding.

IMPLEMENTATION CHALLENGES

Before registration 1

- VHTs were not adequately trained to utilize the registers, leading to sub-optimal data quality i.e. missing data, varying age groups registered and wrong data entries

During registration 2

- Inadequate budget for adequate training, supervision, and facilitation of VHTs to conduct house to house registration.
- Inadequate time allocated to VHTs for registration (3 days)
- Some VHTs received threats from community during the registration
- Lack of welfare logistics such as gumboots, bags, umbrellas, and raincoats.
- Some VHTs were old (60 years and above) and physically unfit to conduct the house-to-house registration.

After registration 3

- Inadequate budget to facilitate data entry and analysis
- Inaccurate data reported due to poor handwriting and incompleteness
- Data analysis was too technical for VHTs and health workers
- Challenges with referring the identified ZDC for vaccination:
  - refusal by fathers to get their children vaccinated
  - some caregivers wanted to be paid to immunise their children

ENABLERS

VHTs have **good social relations** in the community which can be leveraged to facilitate acceptability of the house-to-house registration.

Sometimes VHTs , health workers and VHT coordinators **used their own resources**, such as airtime, internet and transport, to ensure the smooth execution of their duties.

VHTs **leveraged their prior experience** from previous programs to refer zero dose and under immunised children during registration.

Despite challenges, VHTs showed a s**trong commitment to their roles** and advocated for financial recognition for work done, highlighting their dedication to community health.

LEARNINGS

1. House-to-house registration by village health teams identifies zero-dose and under-immunised children in the communities
2. House-to-house registration may identify children who have delayed vaccination but may not identify those systemically missed.
   i. There is need to register even those without cards.
   ii. Future registration should anticipate and plan for resistant families.
3. Identifying ZDC requires a data capture system that collects data at the community level and facilitates real-time use of data at all levels.
4. Inclusive planning is key to ensure acceptability and smooth implementation of the registration process .

RECOMMENDATIONS

1. Involvement of all stakeholders – including local community leaders, VHTs, care givers and DHT) at planning and implementation – is key to a successful house to house registration.
2. There is need to invest in digital community data capture systems to optimise analysis and utilisation at all levels.
3. Future studies should investigate the cost of identifying and reaching a ZD child using community health structures.
4. The sustainability of the HTH registration requires further thought, given that it is hinged on the voluntary nature of the VHT model.

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Decentralized Immunization Monitoring: A Pilot Study in Kumbotso District, Kano – Nigeria

Attahiru A[1], Mohammed Y[1], Mustapha T[1], Mikailu F[1], Bello TB[1], Waziri H[1], Lawong BD[1], Waziri NE[1], Kamateeka M[1], Adefisoye A[1], Abdullahi B[1], Magashi AG[2], Bello MM[2], Sunusi B[3], Bello IW[3], Lawan M[3], Voller N[4], Fisseha T[4], Valadez J[5], Vargas W[5], Correa GC[6], Reynolds HW[6], Nguku P[1]

[1] African Field Epidemiology Network (AFENET), Nigeria, [2] African Health Budget Network (AHBN), Nigeria, [3] Kano State Primary Health Care Development Agency, Kano State, Nigeria, [4] John Snow Incorporated (JSI), USA, [5] Liverpool School of Tropical Medicine, [6] Gavi, the Vaccine Alliance, Switzerland.

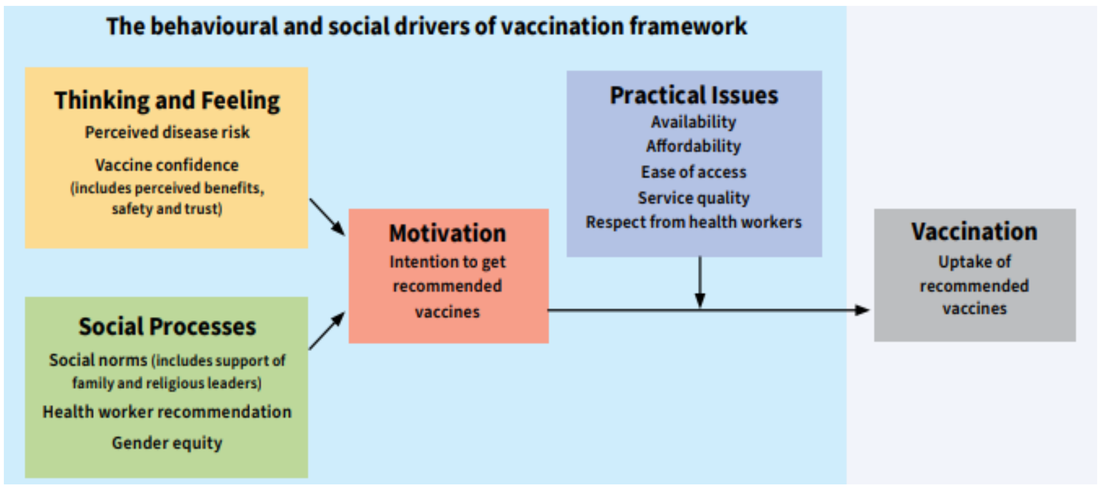
Background:

Immunization coverage in Nigeria is sub-optimal with about 2.3 million zero dose (ZD) children at increased risk of childhood morbidity and mortality especially in rural and fragile settings. To reduce the number of ZD, Government prioritized 100 districts with the highest number of ZD children across 18 states for targeted high impact innovative strategies towards reducing the number of ZD children by 15% by end of 2024.

Kumbotso District – one of the 15 LGAs prioritized in Kano had the highest number of ZD and have developed a ZD Reduction Plan (ZDROP) funded by Gavi to be implemented over 8 months. To effectively track and monitor reduction in ZD inline with IRMMA framework, the Decentralized Immunization Monitoring (DIM) was implemented with the following objectives:

1. Track Routine immunization performance, and lessons learnt
2. Identify prioritized sub-district (wards)
3. Estimate coverage at the district level and generate evidence for informed decision-making.

Method:



Cross-sectional design approach using the Behavioural and Social Drivers of Vaccination (BeSD) and Lot Quality Assurance Sampling frameworks. The LQAs adopted the district as the Catchment area and sub-districts as the supervisory areas (SA). Multi-stage sampling technique. where Population Proportionate to size (PPS) was used in the selection of 19 SA in each of the 11 sub-districts. In each SA, segmentation sampling approach was adopted in the selection of Households and parallel sampling approach for caregivers of 2 cohorts of children: 0-11 months and 12-23 months. In Kumbotso districts a total of 418 children were sampled.

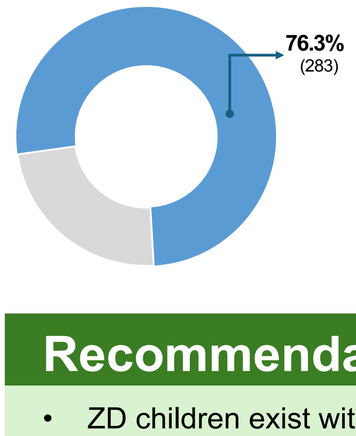
Findings

ZD prevalence rate of 23%. Common among children aged 12-23 months children. Education, Economic Status and Wealth index were key demographic determinants of ZD (Table 1). 83% ZD delivered non-institutionally.

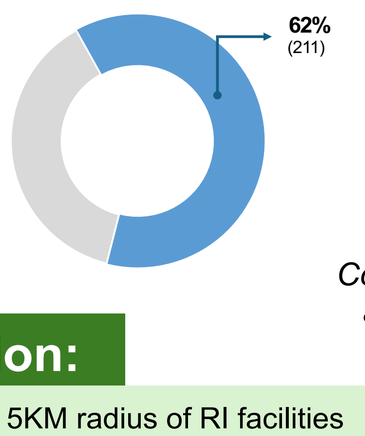
Table 1 Showing Demographic Characteristics of Respondents

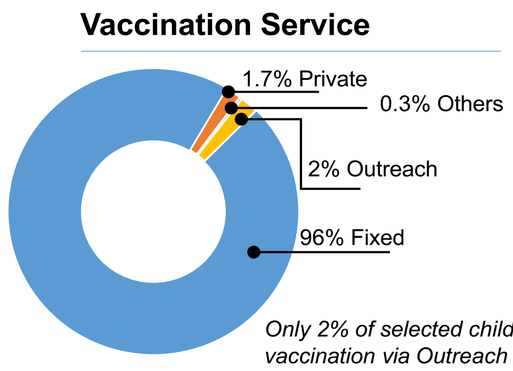
Characteristic	Overall, N = 418	NZD, N = 322	ZD, N = 96	p-value
Age of Caregiver	28 (24, 33)	28 (24, 33)	27 (25, 35)	0.8
Educational Status of Caregivers				<0.001*
Diploma/NCE/Technical	29 (6.9%)	27 (8.4%)	2 (2.1%)	
No Formal Education	147 (35%)	84 (26%)	63 (66%)	
Primary School Leaving Cert	44 (11%)	38 (12%)	6 (6.3%)	
Secondary School Cert	186 (44%)	161 (50%)	25 (26%)	
University / Masters/ Ph.D	12 (2.9%)	12 (3.7%)	0 (0%)	
Employment Status of Caregivers				0.023*
Yes, I'm formally employed	38 (9.1%)	36 (11%)	2 (2.1%)	
I'm self employed	277 (66%)	207 (64%)	70 (73%)	
Not engaged and no source of income	103 (25%)	79 (25%)	24 (25%)	
Average Monthly Income of Caregivers	3,000 (1,500, 10,000)	4,000 (2,000, 10,000)	2,000 (1,000, 3,250)	<0.001*

Penta 1 Coverage
(>10 weeks – 23 months) (n = 371)



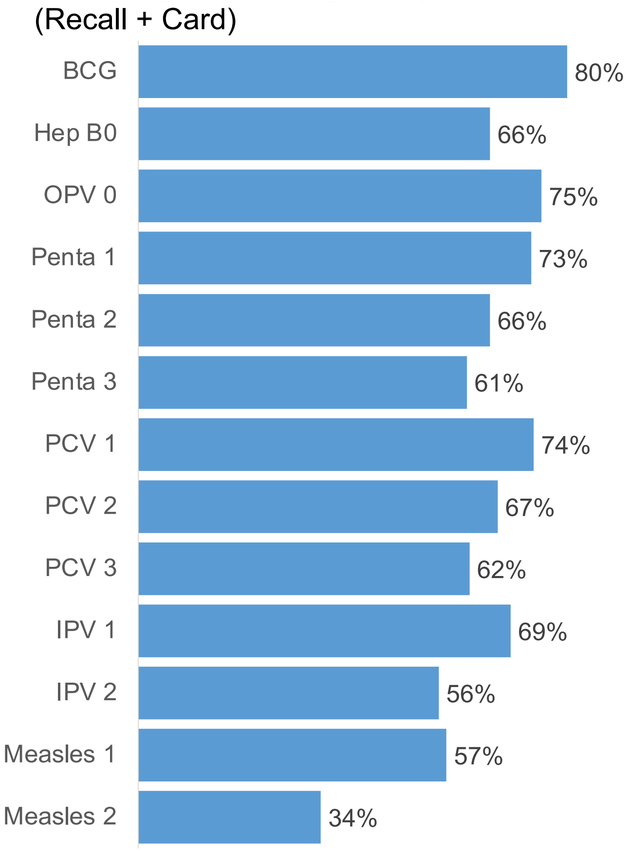
Penta 3 Coverage
(>18 weeks – 23 months) (n = 339)





Only 2% of selected children received vaccination via Outreach services

Coverage by Antigens (12-23 Months)
(Recall + Card)



Co-administered antigens with different coverages and ONLY BCG met the national target of 80%

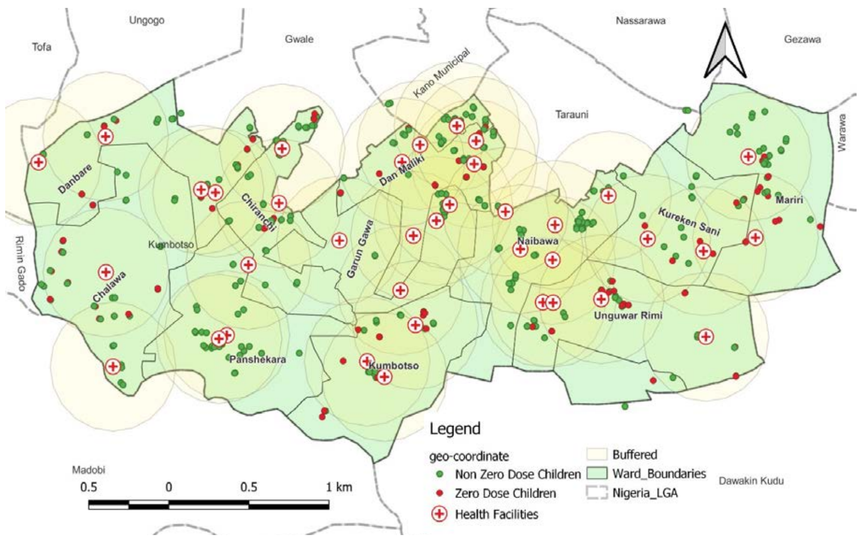
About 70% of ZD Caregivers reported little or no intention to vaccinated

46% of ZD Caregivers do not Trust HCW that vaccinates children

50% of ZD Caregivers do not believe in Vaccine Importance

Over 90% of ZD Caregivers require permission to vaccinate

Over 90% of caregivers knows where to vaccinate yet 60% of ZD live within 5KM radius to HF



Sub-district prioritization
3 Sub-districts - Kumbotso, Unguwar Rimi, and Kureken Sani failed all antigens (prioritized) while six sub-districts failed DPT1 and DPT 3 coverage

Recommendation:

- ZD children exist within 5KM radius of RI facilities
- Need to evaluate performance of Outreach services implementation for optimization
- Need for continuous evidence-based generation to inform allocation of resources and other decision-making process in low performing areas to maximize impact.
- Building trust through quality service (skilled personnel, availability of service), program integration, education on vaccine benefits is crucial.
- Strengthen social mobilization and engagement activities towards Household Heads through community/religious and other community systems.

ZERO-DOSE LEARNING WEEK
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Addressing Challenges to Reaching Zero-Dose Children in Nigeria: A Mixed-Methods Study

Mohammed Y,[1] Waziri H, [1] Attahiru A, [1] Mikailu F, [1] Lawong BD, [1] Bello TB,[1] Uba B,[1] Kamateeka M,[1] Waziri NE,[1] Nguku P,[1] Magashi AG,[2] Pitan O,[2] Usman M,[2] Nassor M,[3] Fisseha T, [3] Vollmer N, [3] Corrêa G,[4] Reynolds HW.[4]

[1] African Field Epidemiology Network (AFENET), Nigeria, [2] African Health Budget Network (AHBN), Nigeria,
[3] John Snow Incorporated (JSI), USA, Gavi, the Vaccine Alliance, Switzerland.

BACKGROUND

- Nigeria have the highest number of zero-dose (ZD) children in Africa and face significant health risks.
- Limited healthcare access, low socioeconomic status, and cultural barriers contribute to this disparity.

OBJECTIVE

- This study aimed to identify barriers hindering routine immunization (RI) access for ZD children and underserved communities in Nigeria (Figure 1).

METHODS

- We employed a rapid assessment using a cross-sectional mixed-method approach.
- We randomly selected 320 children (Figure 2) from eight Local Government Areas (LGAs) across four high-burden states. We assessed 32 health facilities (HFs), conducted household vaccination surveys, and interviewed key stakeholders.
- Univariate and bivariate analysis explored relationships between variables.

FINDINGS

- The majority (62.5%) of HFs were located in rural areas with limited resources, relying heavily on volunteers and lacking sufficient doctors (only 2%).
- While all facilities offered RI, some lacked essential vaccines. Rural areas had fewer vaccination sessions and limited training opportunities for healthcare workers compared to urban areas, contributing to higher vaccination dropout rates.
- Despite strong belief in vaccine safety amongst caregivers (over 90%), reliance on family/friends for support was higher in urban areas compared to rural settings, suggesting weaker community structures. Affordability (Figure 3) remained a concern, with higher prevalence in rural areas. Long wait times and service issues further hindered access. Notably, we identified 105 ZD children, primarily concentrated in Sokoto and Kano states (Figure 4).

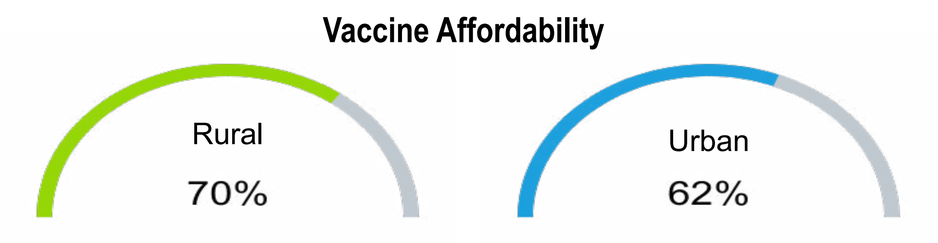

Figure 3: Vaccine Affordability perception from the study participants

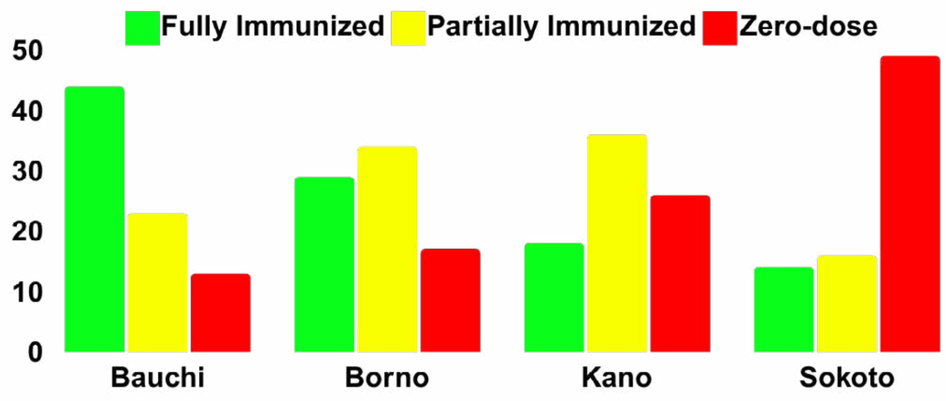

Figure 4: Immunization status of children surveyed across the four Learning Hub States

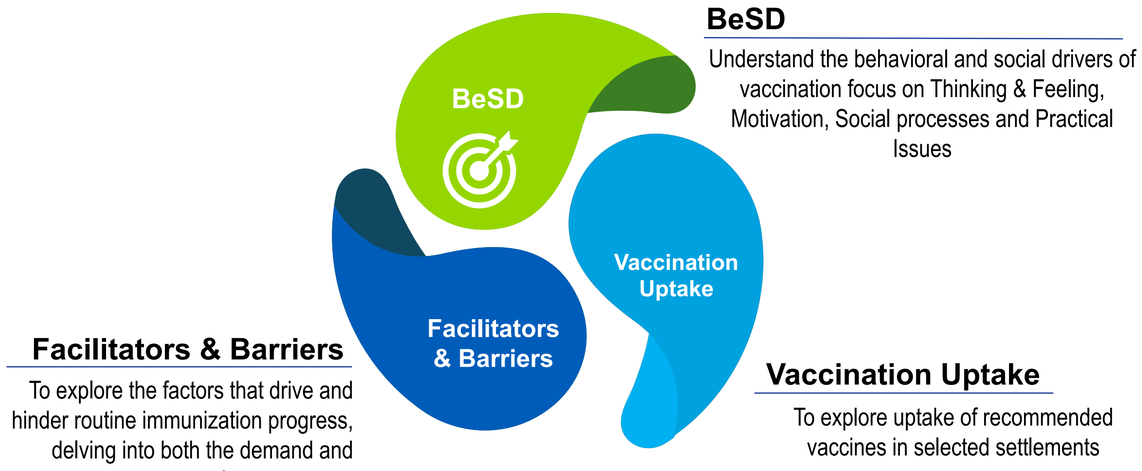

Figure 1: Major Study Objectives

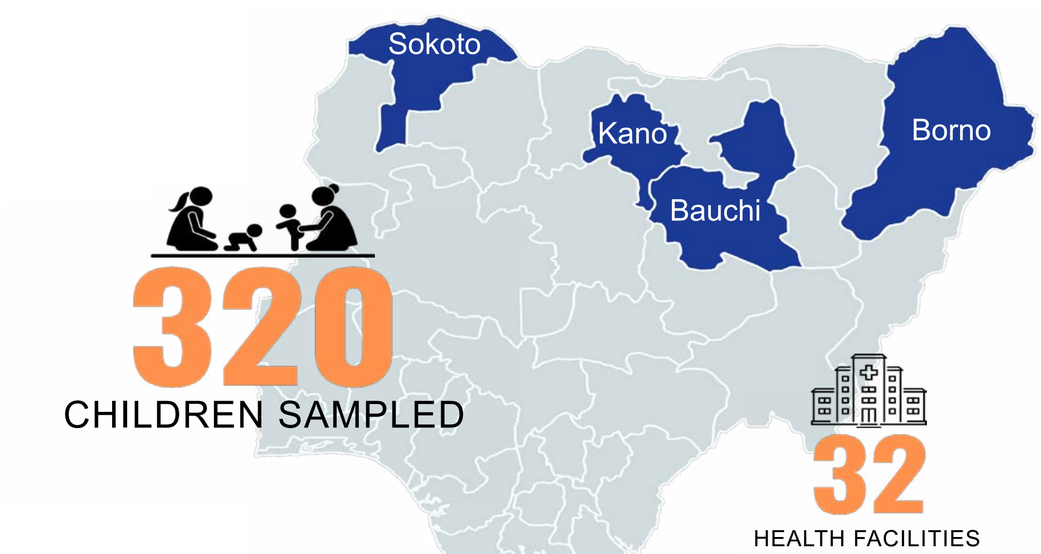

Figure 2: Map of Study Area and Number of Children and Health Facilities Sampled

CONCLUSIONS

- This study highlights the need for an inclusive and equitable approach to improve RI coverage.
- Collaboration via community outreach between healthcare workers, community leaders, and caregivers is crucial to build trust, address misinformation, and enhance service delivery.
- Strengthening healthcare infrastructure, staffing, and training across facilities is also essential for ensuring equitable immunization programs.

LESSONS / RECOMMENDATIONS

- This study addresses the IRMMA framework by identifying barriers (Identify), exploring ways to reach underserved communities (Reach), and highlighting the need for improved service delivery and monitoring (Monitor & Measure). The findings are particularly relevant to Equity Reference Group settings, focusing on challenges faced by rural communities.
- Our research emphasizes the importance of evidence generated at the community level for informing programmatic improvements. We highlight both successes and limitations, aiming to contribute to Gavi's strategy and future programming.
- By prioritizing community outreach, strengthening rural health facilities, and addressing affordability concerns, Gavi can support Nigeria in reaching zero-dose children and achieving equitable routine immunization coverage.

Keywords: *Zero-Dose Children, Equity, Routine Immunization, Health Systems, Service Delivery*

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Innovative approach for immunizing zero-dose children in Somalia

Hussein,M[1]., Liban, A[1]., Ali, A[2]., Shah, R[3].

[1]Save the Children International - Somalia, [2]Bill Melinda Gates Foundation, [3]Save the Children - US

Save the Children

Background

Somalia faces significant challenges in providing equitable and accessible health services due to decades of active conflict and political instability, compounded by limited capacity and infrastructural challenges. Somali Demographic and Health Survey (SDHS 2020) revealed that 60% of children received no vaccinations at all, and only 11% of children were fully immunized.

We implemented "Health Camps" across 10 conflict-prone, hard-to-reach districts in the Galmudug and Hirshabelle states from October 2022 to June 2024. Considering social and structural gender barriers, this 'Health Camp' model functioned as mobile outreach health facilities, providing integrated essential primary health care and nutrition services for women and children.

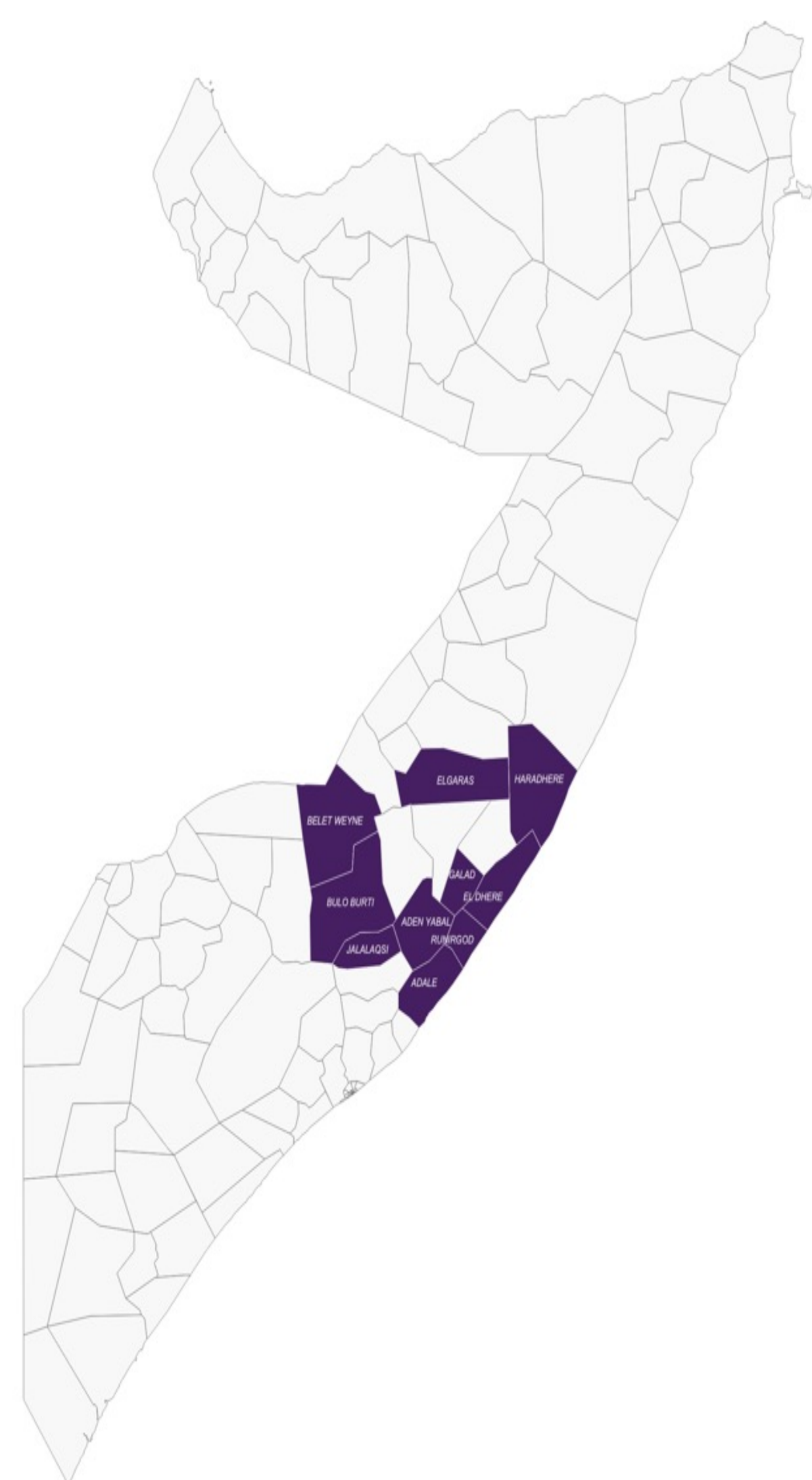

Fig. 1: Map showing Project districts

Objective

This innovative approach was specifically aimed to reduce the number of zero-dose children within the project catchment areas. Empirical evidence suggests these health camps as cost-effective service delivery model, as they provide integrated services rather than operating through a vertical, siloed program delivery approach.

Recommendation

Most importantly, this innovative service delivery approach has been built on strong partnerships with local authorities, elderly clan leaders and community members who provided valuable support and insights for addressing complex challenges within target areas controlled by non-state armed actors in Somalia. In addition, innovative use of GIS mapping ensured that the health camps reached the targeted population effectively.

Methods

The cornerstone of this innovative initiative is clan-mediated access negotiation and community trust-building through informal engagement. Local elders and clan leaders established 30 Community Health Committees (CHCs) for rejuvenating community level health systems. These CHCs facilitated scheduling, organizing and managing health camps across multiple villages.

Two local community-based organizations recruited 38 mobile health teams to implement health camps, while another local consultancy firm conducted monthly monitoring and generated quarterly evaluation reports on implementation progress.

Within targeted 10 districts, we trained 132 immunization service providers,140 community health workers on a diverse range of topics including immunizations, data management, emergency care and health promotion; additionally, 140 Outpatient nurses also received training on integrated management of childhood illnesses and disease surveillance and 128 received training on the integrated management of acute malnutrition.

Findings

During October 2022 – June 2024 following key essential health and nutrition services were delivered through 396 health camp sessions and vaccinated 67,133 zero dose/missed children (6-23 months), 63,311 pregnant women; 98,039 children aged 6-59 months received growth monitoring and nutrition screening, 9,784 had severe acute malnutrition and 37,547 had moderate acute malnutrition.

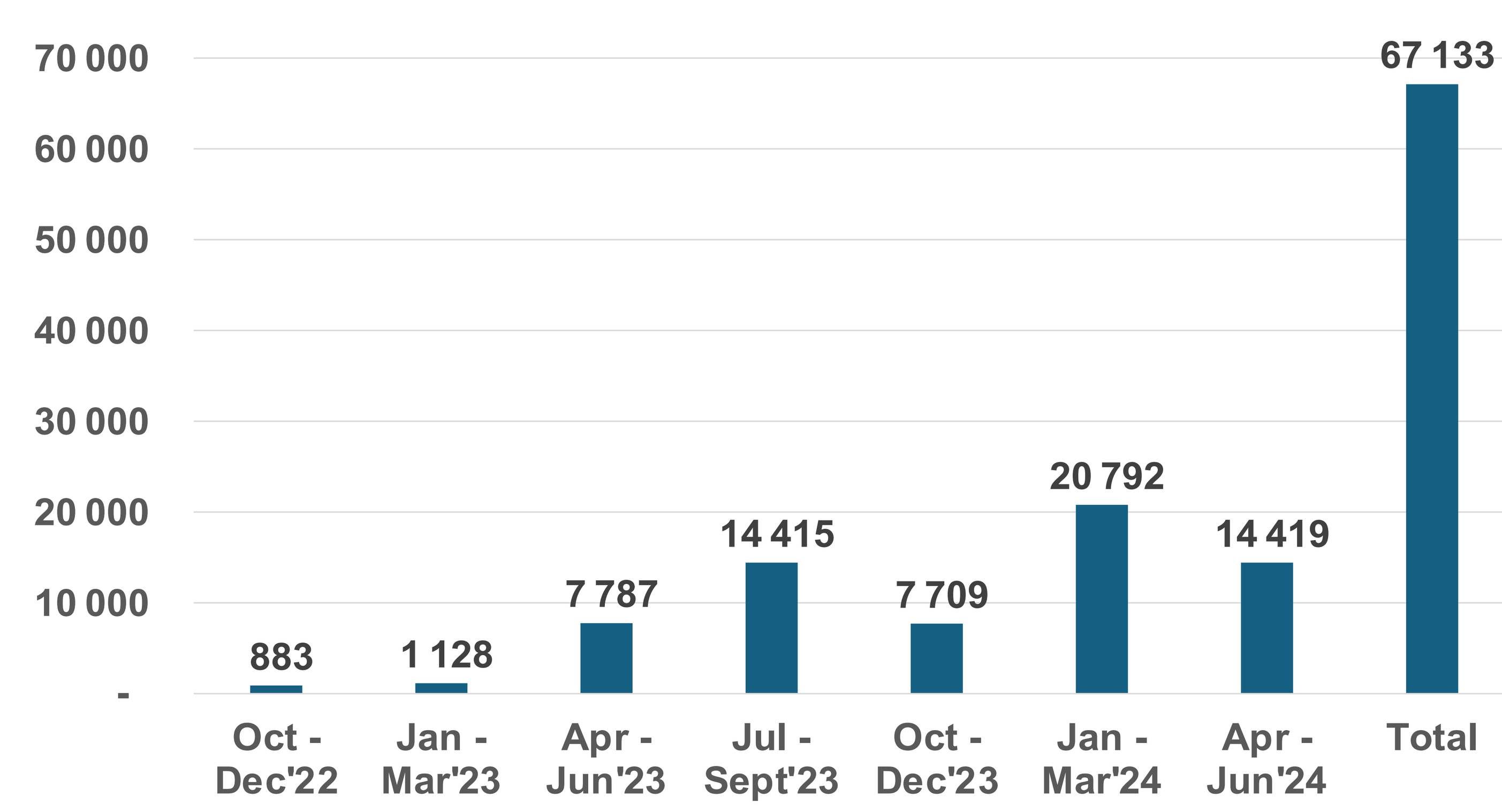

Fig. 2: Zero dose children (6-23 months) vaccinated

Acknowledgement: This project has been implemented by Save the Children International – Somalia with funding support from the Bill Melinda Gates Foundation. We gratefully acknowledge all necessary support from Ministry of Health in Somalia, communities within project area, and relevant partners (including local NGOs, WHO, WFP) for successful implementation of this innovative approach.

Gavi The Vaccine Alliance

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Optimizing Primary Health Care to Reach Every Zero Dose Child in Urban Poor, Peri Urban and Rural Communities in Zimbabwe

Gabida M[1], Adjagba A[1], Hama N[1], Machacha R[2], Makwabarara E[1], Kusano L[1], Kazonga E[3], Shahabuddin A[4], Mwamba R[4]

[1]UNICEF Zimbabwe; [2]Ministry of Health and Child Care, Zimbabwe; [3]School of Medicine and Health Sciences, University of Lusaka, Zambia; [4]Health Programme, UNICEF Headquarters, New York, USA

Background

- Zimbabwe witnessing rapid demographic, epidemiological and socioeconomic transition and over stretched health system
- Rapid urbanization from 33% (2015) to 39% (2022), mobile population (60% informal settlements); increasing urban poverty (21% to 38%) [1]
- 17% of children under 1 unprotected against vaccine preventable diseases (VPDs)
- Country committed towards the Immunization Agenda 2030 and Gavi's 5.0 Strategy [2]

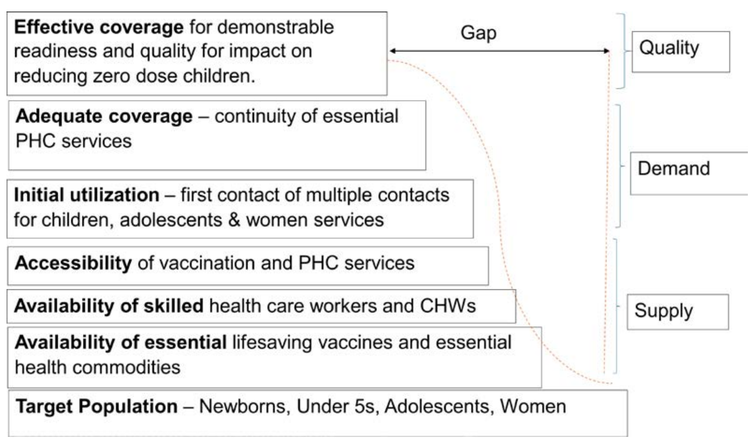
Broad Objective

- Identify, reach, co-design strategies, monitor and measure the burden of zero-dose, missed and under vaccinated children

Methods

- **Initiative:** Reaching Every Child and Adolescent through Primary Health Care Optimization (RECA-PHCO) initiative (June 2022–July 2024)
- **Setting:** 11 low performing districts for immunization with DTP3 coverage below 70% (Fig 1)
- **Intervention:** 3 phases to respond and close persistent gaps in reaching zero dose children
- **Inception Phase** – Hybrid approach: Rapid head count mapping, GIS enabled ODK questionnaire targeting households with under 5, desk reviews and gender analysis.
  - Village Health Workers (VHWs) electronically register every child
  - Microplanning with community leaders & VHWs
- **Co-creation Phase** – development of package of interventions (Table 1) with subnational structures guided by the Modified Tanahashi Model (Fig 2)

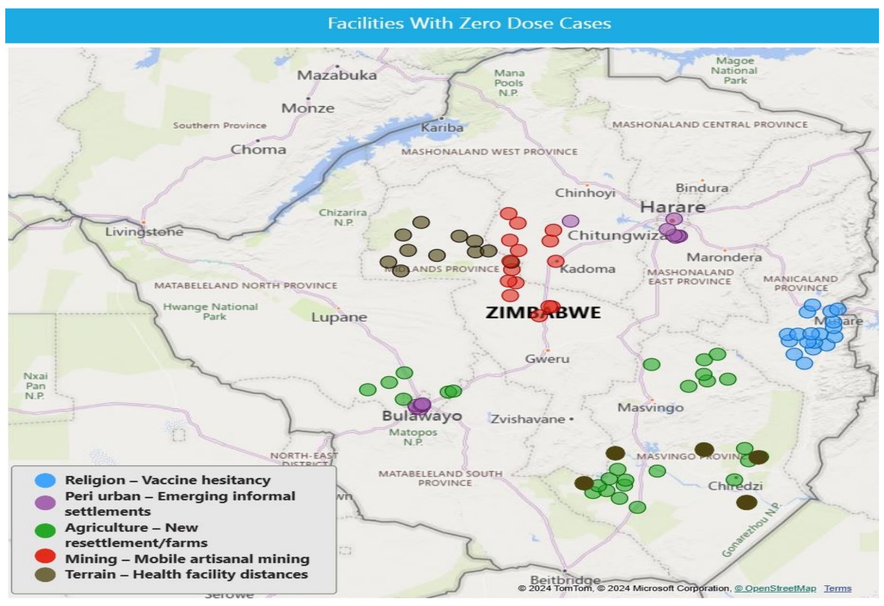
Figure 2: Modified Tanahashi Model to analyse bottlenecks in reducing Zero Dose Children



- **Implementation at scale** - Integrated service delivery platforms
  - Household visitation and tracking
  - Multidisciplinary Monthly and Quarterly integrated outreach/ mobile clinics (Table 2) & Super Sunday" initiative
  - Deployment of climate smart transportation system
  - Engage Mobile App for tracking, reporting, follow up

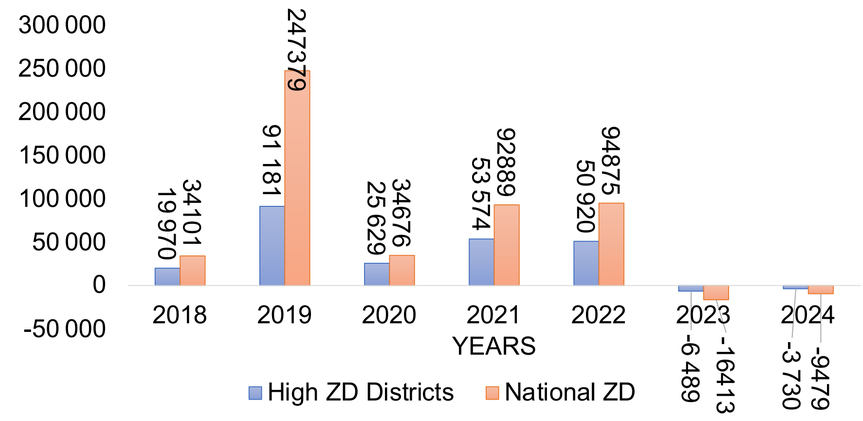
Findings/Results

Figure3: Description of Zero Dose Children by Place



- 51.9% of ZD concentrated in selected population groups (Fig 3)

Figure 4: Intervention Districts Zero Dose Analysis



- Overall, the 11 districts contributed 35% to 68% of the total national zero-dose children (Fig 4)
- Most reasons for being unvaccinated were religion (38.4%), chronic illness (12.6%), no birth certificate (52.6%), challenges in accessing service delivery points (23.4%)
- Cities managed to track and vaccinate 100% of the identified zero dose children.
- 11 districts are contributing 39.4% of the unaccounted population

Conclusion

Evidence showed that communities where children do not have access to PHC services are more likely to be zero dose

Recommendations

- Implementing tailored programs and strategies codesigned with marginalized communities to be prioritized
- Revitalize/ establish multi-sectoral coordination platforms for community oversight on reaching ZD children
- Expand electronic registration and tracking systems for all children under five to reduce missed opportunities.

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2. **Gavi 5.0 Strategy**

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Identifying zero-dose and under-immunized communities using lot quality assurance sampling (LQAS) method: Evidence from Bangladesh

Das H[1], Jannatul T[1], Jannat Z[1], Ali MW[1], Morgan C[2], Oliveras E[2], Correa GC[3], Reynolds H[3], Uddin MJ[1], Chowdhury MEK[1], Alam N[1]

[1] Health System and Population Studies Division, icddr,b, Mohakhali, Dhaka-1212, Bangladesh
[2] Jhpiego, the Johns Hopkins University affiliate, 1615 Thames Street, Baltimore, MD 2231, USA
[3] Evaluation and Learning Measurement, Evaluation & Learning (MEL), Gavi The Vaccine Alliance

Background

Gavi 5.0 vision aims to achieve global immunization equity through reducing zero-dose (ZD- missed Penta1 vaccine) and under-immunized (UI- received Penta1 but missed Penta3 vaccine) children (1). Around 15%-20% children in Bangladesh are ZD/UI but the pockets of high ZD/UI children remain unknown (2). Aligned with the Gavi's mission, Bangladesh Country Learning Hub (BCLH) is implementing activities following Identify, Reach, Monitor, Measure, and Advocate (IRMMA) framework where the first step was to identify the pockets of ZD and UI in Bangladesh (3). However, the identification of missed communities including children with ZD and UI through conventional sampling is resource intensive. Lot quality assurance sampling (LQAS) is a quick low-cost method to identify the pockets of ZD and UI children (4).

Objective

To identify and confirm missed communities- the pocket areas of high ZD and UI children in Bangladesh.

Methods

A rapid assessment (RA) conducted by BCLH included analyses of survey and DHIS2 data on immunization to identify 30 areas from diverse landscapes of Bangladesh- haor/wetlands, hilly, coastal, char/silty lands, plain land and urban slums. Two sub-districts within the same geo-located districts and two wards from the zone of City Corporation (CC) with high ZD identified through RA were selected for LQAS

LQAS Process

- LQAS infers about a lot or cluster based on the probability of having inadequate service to be less or equal to a specified number (5)
- LQAS method under single sampling plan was applied to select clusters with high (≥ 10%) ZD/UI for this study
- Required sample size in each cluster was 28 households to detect the ZD/UI prevalence ≥0.10 and decision value 5
- If any cluster had five or more households with ZD or UI children, it was identified as a missed community

Study population

Caregivers of children aged 4.5 months to 23 months were interviewed

Findings

- Except one, all areas identified by rapid assessment were found missed communities
- The LQAS found that about 32% of children were ZD/UI and 8% belonged to ZD (**Figure 1**)
- Urban slums had the highest percentage of ZD/UI (59%), followed by rural haors (38%). Plain area had the lowest prevalence of ZD/UI (22%). The percentage of ZD/UI for coastal and char area were 29.5% and 24.1% respectively (**Figure 2**)

Findings (cont.)

Figure 1: Prevalence of ZD and UI children

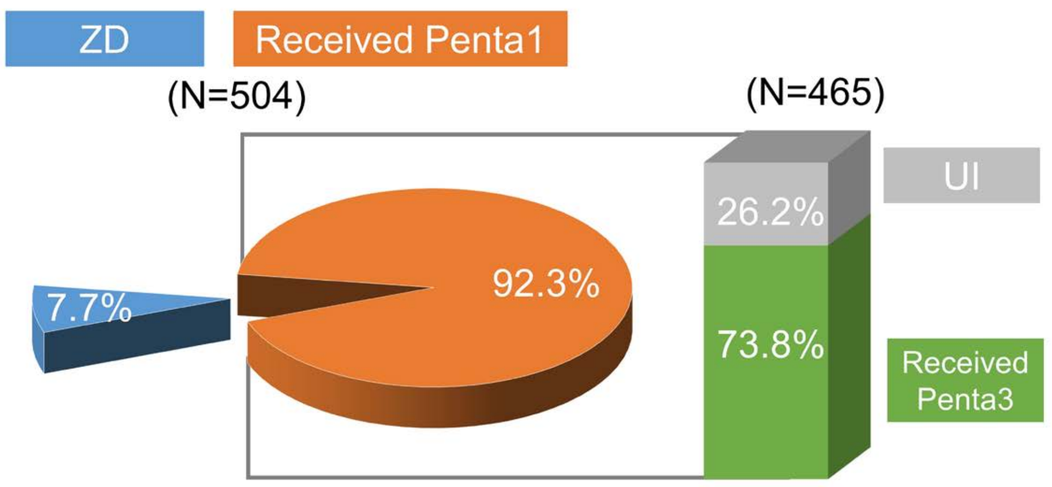
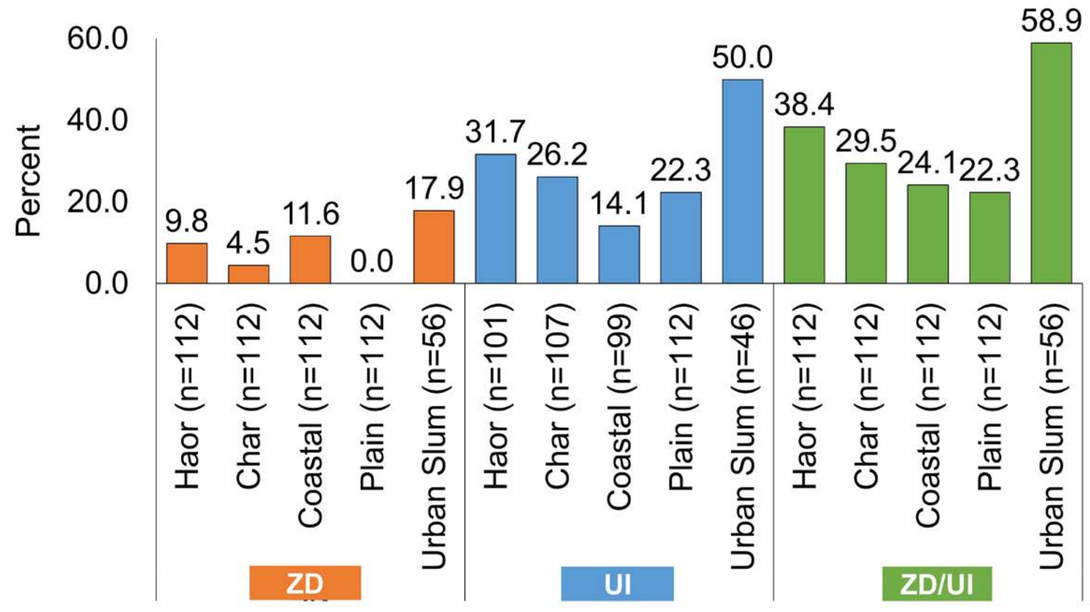


Figure 2: Prevalence of ZD and UI children at missed communities by study areas



Recommendations

- Though administrative data are ideal for primary identification of missed communities, micro-level information on immunization is needed for confirmation of ZD and UI children areas
- LQAS can be utilized to confirm missed communities with ZD and UI and monitoring changes over the time
- Evidence based effective interventions should be implemented in these six geo-locations, especially in hoar and urban slums, to mitigate ZD/UI cases

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Targeted assessments of prevalence of zero-dose and under-immunized children in Bangladesh

Uddin MJ[1] ,Das H[1], Jannatul T[1], Ali MW[1], Jannat Z[1], Morgan C[2], Oliveras E[2], Alam N[1]

[1] Health System and Population Studies Division, icddr,b, Mohakhali, Dhaka-1212, Bangladesh
[2] Jhpiego, the Johns Hopkins University affiliate, 1615 Thames Street, Baltimore, MD 2231, USA

Background

Every year, nearly 10 million of the 72.5 million children that Gavi aims to reach in low-income countries do not receive the first essential vaccination (1). Zero-dose (ZD-missing 1st dose of pentavalent) children account for nearly half of all vaccine-preventable deaths, however, the prevalence of ZD and under-immunized (UI- missing of 3rd dose of pentavalent) children is understudied (2). In Bangladesh, 16-20% of children remain unvaccinated or under-vaccinated which leaves critical gaps in protection and renders vulnerability to outbreaks (3).

Objective

To understand the prevalence of ZD and UI children in selected rural and urban areas of Bangladesh

Methods

A cross-sectional household survey was conducted in 10 high ZD/UI sub-districts and two urban wards during September to December 2023 to collect information on child vaccination. The areas identified through a rapid assessment were from diverse landscapes of Bangladesh- haor/wetlands, hilly, coastal, char/silty lands, plain land and urban slums (3).

Study population

The study population included children aged 4.5 months to 23 months; respondents were their caregivers (usually mothers)

Sample size

- World Health Organization (WHO) recommended two-stage random cluster sampling methodology was followed to estimate the required sample size for each sub-district/slum
- The sample size in each site was 1150 considering 6% prevalence of ZD, 5% significance level, a design effect of 1.58 and 10% non-response rate
- Total sample size was 13,800 (=1150*12) eligible respondents

Data analysis

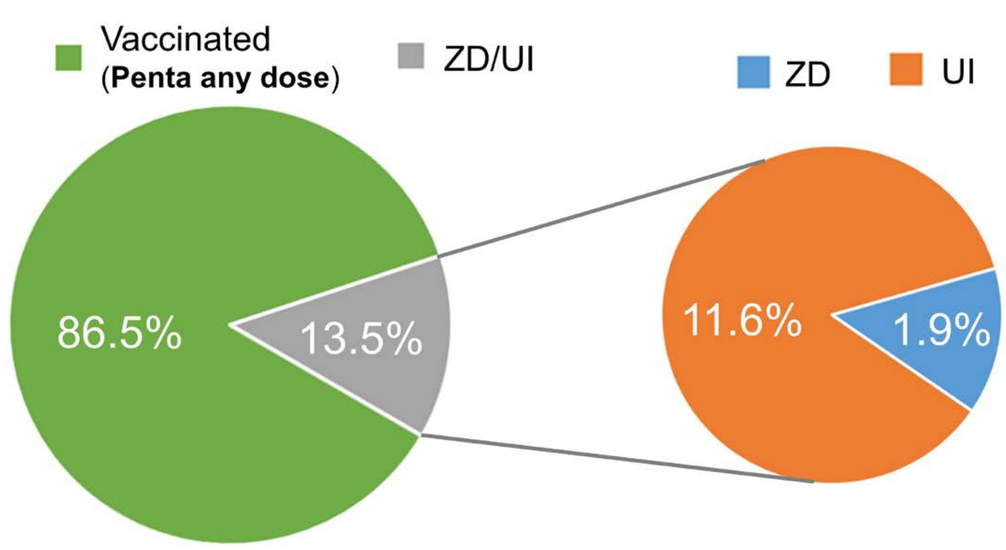
- Chi-square tests were used to measure the association of the outcome variables- ZD and ZD/UI with each covariate
- Binary logistic regression was used to estimate the net effects of the covariates on each outcome (ZD and ZD/UI) variable, adjusting for clustering effects
- Analysis was conducted using STATA software (version 15)

Findings

- We found 1.9% of the children ZD, 11.6% UI and 13.5% ZD/UI (**Figure 1**)
- The prevalence of ZD and ZD/UI children were associated (p-value<0.05) with a number of background characteristics including geographical region, age and education level of caregivers, wealth quintile, parity, and child's age

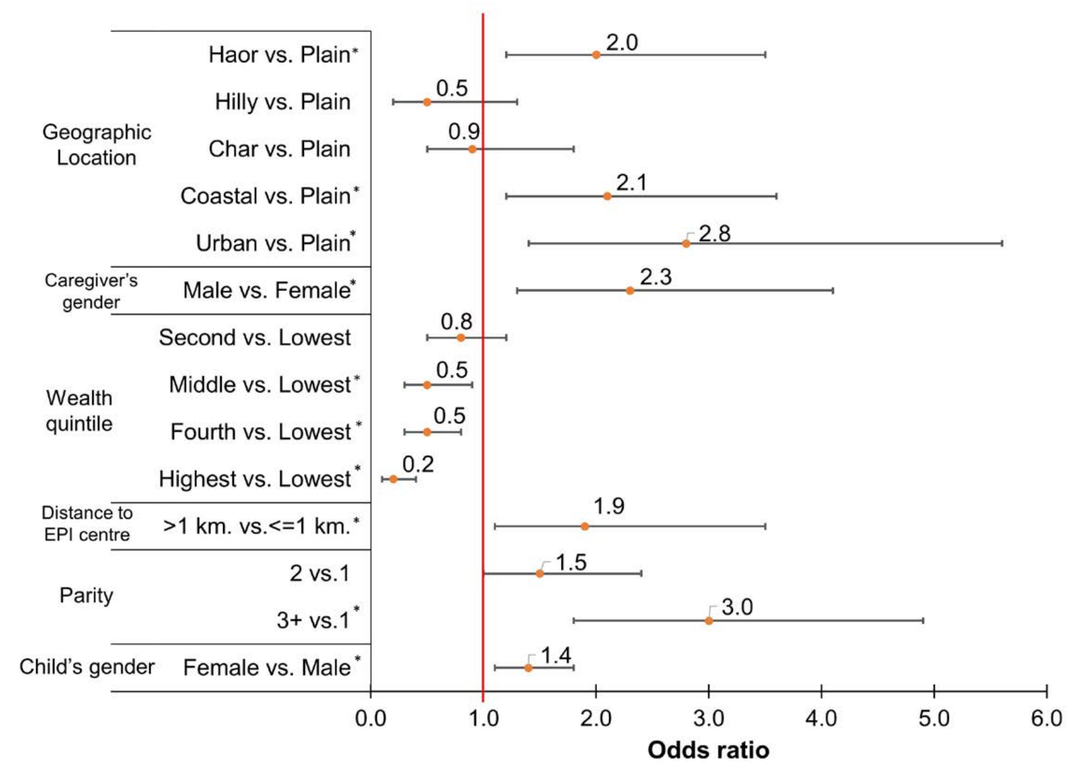
Findings (cont.)

Figure 1: Status of ZD and UI children aged 4.5-23 months at study areas (N=12,756)



- Findings from a binary logistic regression model revealed that children residing in rural remote and urban slum areas were approximately 2 to 3 times more likely to be ZD compared to children living in plain areas. Female children were 1.4 times more likely to be ZD than male children (**Figure 2**)

Figure 2: Forest plot on adjusted odds ratio of ZD from binary logistic regression model (N=12,756)



* Statistically significant at 5% level of significance

Recommendations

- The study findings confirmed the presence of ZD and UI children in Bangladesh, which demands responses to address inequity and improve herd immunity
- Associations we found can guide policy and program managers considering new approaches to reduce ZD and UI children in the geographies and community types where ZD and UI is particularly high

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3. Chowdhury ME AN, Sarker BK, Das H, Shiblee SI, Jannat Z, Rahman M, Ali MW, Rahman MM, Rahim MA, Oliveras E, Mahmood SS, Morgan C, Wahed T, Uddin MJ. Country Learning Hub for Immunization Equity in Bangladesh: Findings from Rapid Assessment. Bangladesh: icddr,b; 2023.

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CHAN Nigeria reaches children with full immunisation in humanitarian and conflict areas

Ratcliffe[1], A., Nshe, M.[2], Idah M.A.[2], Haruna G.[2], and Oriaku A.D[2].

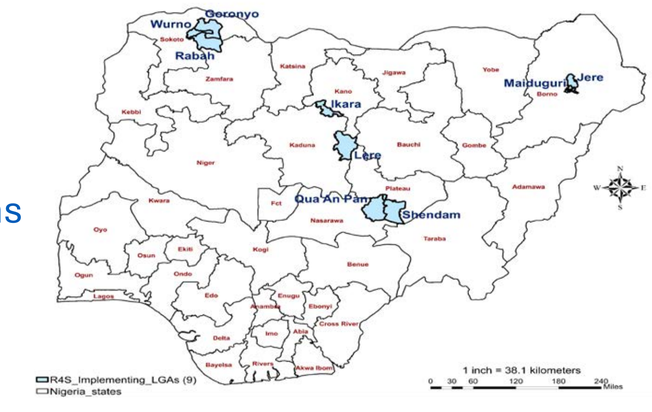
1. ZIP Gavi's Humanitarian Partnerships, 2. Christian Heath Association of Nigeria (CHAN)

Immunisation session in Rugan Alhaji Lelu, Kudaru ward Lere LGA, Kaduna State-Nigeria © CHAN-R4S 2024

Background

ZIP, Gavi's Humanitarian Partnerships, is a three-year $100M programme to establish full immunisation programming where government health systems cannot operate safely or coordinate effectively. With Gavi resources through ZIP, The Christian Health Association of Nigeria (CHAN) implements within the World Vision RAISE 4 Sahel (R4S) consortium in Nigeria. CHAN is working in four states: Plateau, Borno, Kaduna and Sokoto in missed communities that experience criminal risk and threats from non-state armed groups.

CHAN Implementing Local Government Areas



Lessons Learned

Unique Challenges

ZIP programming requires nongovernmental partners to identify supply and demand-side challenges and overcome barriers. The programme has surfaced a set of challenges unique to ZIP, including access to communities, trust from caregivers, and security for staff and vaccinators.

Identify

The catch-up policy in Nigeria excludes certain vaccines for children above the age of two years. Federally, Pentavalent (Penta) 1 is not permitted for catch-up beyond the age of two years. The team has set targets for 2024 as 37,052 infants 0-11 months old through routine immunisation programming 47,149 zero-dose children, and 4,847 under-immunized children up to age two years.

Rapid community vaccination planning with a walkthrough is better suited to humanitarian contexts than traditional EPI microplanning tools and processes. Identifying ZDC and UIC in humanitarian settings is an iterative process and must continue throughout the life course of the project.

Reach

Access negotiation to reach communities has been led by locally trusted community leaders (traditional and religious) and community groups through consultative meetings using humanitarian access negotiation tools. CHAN has meticulously line-listed all eligible children and collaborated with community leaders to cluster them for quick in/quick out vaccination during follow-up sessions. This proactive strategy ensured the full vaccination of ZDC and UIC.

Recruiting **local health workers has** reduced risk and increased community access and acceptance.

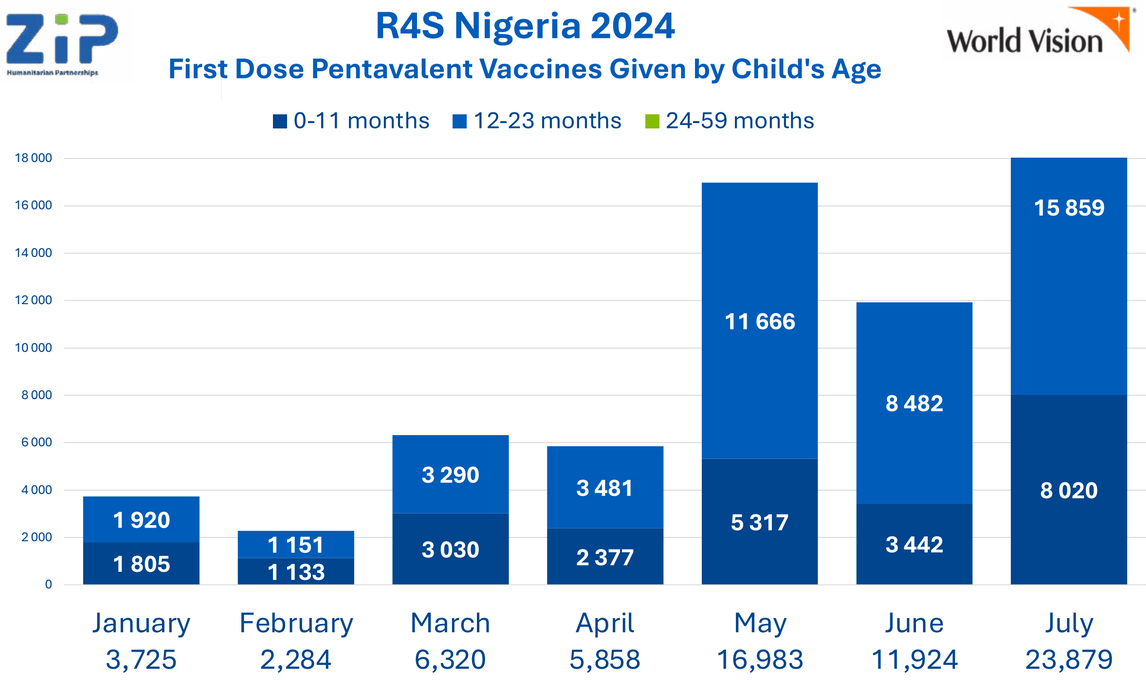
Bundling vaccine services with WASH, nutrition, tree planting, and other services has significantly improved uptake for vaccination.

Measure and Monitor

Strong team coordination and management have been crucial for the follow-up of the children to ensure full vaccination. This is done through intensified monitoring and daily data call-in, ensuring no child is left behind in the vaccination process.

Results

The R4S CHAN team in Nigeria offers all approved age-appropriate antigens and reports key doses within the vaccination calendar to Gavi ZIP. Penta1 is used as an indicator of first engagement for vaccination.



Catch-Up for ZDC ages 1 to 2 years old

In the first half of 2024, 65%% of the Penta1 doses went to zero-dose children above age one year. Over the last six months, outputs have increased considerably. In January, the team delivered 3,725 doses of Penta1, and 52% of the doses were for children above the age of one year. By July, 23,879 doses of Penta1 were given, with 66% going to ZDC between 1 and 2 years old.

Conclusion

CHAN has successfully delivered the Pentavalent vaccine to more than 45,000 ZDC above the age of 1 year in 2024 in communities where the government cannot operate safely or coordinate effectively. This demonstrates the potential to reach older children elsewhere in Nigeria.

Vaccinating ZDC during climate shocks

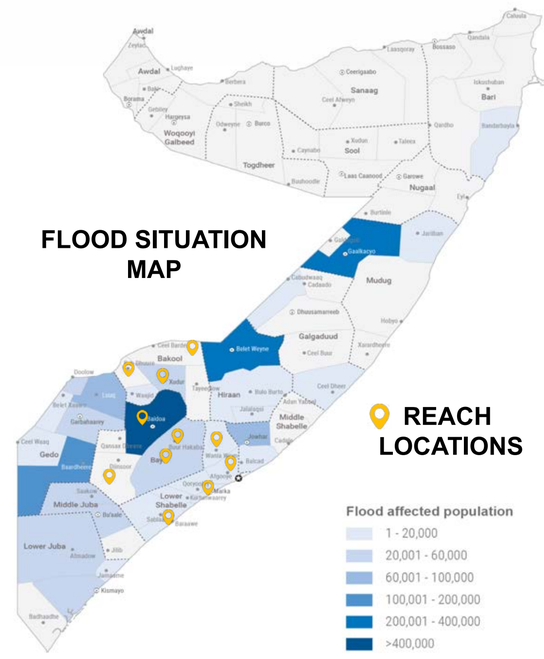
Ahmed, L.[1], McGill, C.[2], & Ratcliffe, A.[3]

1. International Rescue Committee's REACH programme, 2. CORE Group, 3. ZIP Gavi's Humanitarian Partnerships

A team of vaccinators with REACH visits a temporary camp for displaced persons in South West Somalia. © READO, 2023.

Overview

Despite the most severe flooding in decades affecting over 1.7 million people and displacing 695 thousand in Somalia from October 2023 to December 2023, the International Rescue Committee's REACH programme, continued to successfully deliver catch-up immunisation services to ZDC and UIC in humanitarian conflict zones in the South West region.



REACH is part of ZIP, **Gavi's Humanitarian Partnerships**, three-year $100M programme to establish full immunisation programming where government health systems cannot operate safely or coordinate effectively. The South West state's protracted conflict, characterized by the presence of armed non-state actors, impedes government-led health services. With Gavi resources, the REACH project which has been immunizing in 12 districts of Somalia since 2023. **REACH maintained its immunisation efforts during extreme flooding by prioritizing anticipation, readiness, and response coordination**. Notably. in Baidoa, home to a large IDP community and the largest flood affected population, REACH achieved 111% of its quarterly dose target.

Successful Mitigation Strategies

Anticipation

Based on weather forecasts from Somali Water and Land Information Management, a flood warning was issued at the beginning of August 2023, anticipating a level of flood devastation not seen since 1997. Working with the WHO Health Cluster, the Somali government, and community leaders, **REACH performed a situational assessment and developed an immunization risk management** plan with their local partners READO, GREDO, and SHACDO.

Readiness

- **Coordinated** with the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) and the World Food Programme (WFP) to acquire mobile clinic supplies.
- **Prepositioned immunisation and essential medical supplies** at strategic high elevation locations.
- Worked with District Medical Team on cold chain hubs and **strengthened cold chain** infrastructure with solar direct-drive refrigerators/freezers to avoid shortages.
- Deployed additional 4WD vehicles.

Response

When flooding began, REACH immunisation activities were put on hold for two weeks in some locations, while they continued throughout the crisis in other locations. Health challenges included funding inadequacy for overall flood response, lack of mosquito nets, need for essential medicine to respond to Acute Watery Diarrhea and provision of NFIs for displaced communities.

Successful immunization strategies included:

- Ongoing coordination with the WHO Health Cluster and UNICEF for supplies.
- Deployment of a classified protocol system for safe sites to deliver services.
- Distribution of unconditional cash assistance and hygiene kits with immunisation for the most vulnerable households.
- Provision of primary healthcare alongside immunisation.
- Strengthening community mobilization using extra hired Community Health Workers who spread messages about the danger of the floods and importance of immunization.

Results

In ZIP, all routine antigens are delivered to with the goal of full immunisation for children ages 0-5 years old. In Somalia, REACH successfully advocated with the government for permission to vaccinate ZDC and UIC to age 5 years. Key doses are recorded as performance indicators.

Pentavalent 1 (Penta 1) shows reach to Zero-Dose Children, while PENTA 3 shows continued immunisation progress.

Measles Containing Vaccine (MCV) 1 and 2 show continuation along the immunisation schedule.

Locations
Baidoa, Awdinle, Hudur, and Afgoye

Implementing Partners
READO and SHACDO

Time Period
October to December 2023

Doses Administered

PENTA 1	PENTA 3	MCV
7,737	7,384	6,767

Locations
Bardale, Burhakaba, Dinsor, Elbarde, Yeed

Implementing Partner
GREDO

Time Period
November 2023 (includes 2 week pause due to flash floods)

Doses Administered

PENTA 1	PENTA 3	MCV 1	MCV 2
4,191	2,987	3,549	1,097

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IRC South Sudan Success Reaching ZDC

Ratcliffe[1], A., McGill, C.[2], Okech, O[3]., Njenga, G.[4]

1. ZIP Gavi's Humanitarian Partnerships 2. CORE Group
3. International Rescue Committee's REACH programme

Background

In the last 18 months in South Sudan, vaccination teams with the REACH project have delivered more than 45,000 first doses of Pentavalent to Zero-Dose Children through age 5 years, despite working in places that require negotiated humanitarian access and where government programming cannot successfully operate or coordinate immunisation programming. Led by the International Rescue Committee, REACH is funded by **ZIP, Gavi's Humanitarian Partnerships programme which is set up to establish full immunisation programming where government health systems cannot operate safely or coordinate effectively.** South Sudan is one of REACH's four implementing countries and contributes to the **425,000 doses of Pentavalent 1** that REACH has administered so far in its program.

Challenges

REACH's success in immunizing zero-dose children is especially notable, given the challenges that the communities and vaccine teams have faced in areas like the Abyei Administrative Area.

Humanitarian Crisis: Abyei is administratively under South Sudan but remains a disputed border area between Sudan and South Sudan. The presence of state armed actors from both countries, inter-communal conflicts, crime along supply routes, and perennial flooding makes some of its locations highly fragile, insecure, and hard-to-reach.

Weak Health Infrastructure: There has been a reluctance by both governments to invest in this disputed area, leading to severe poverty and debilitating infrastructure for health and immunization.

Catch-up vaccine restrictions by age: Because the national immunization policy only allows the vaccination of children up to age 2 years, the programme, which had been given special permission to vaccinate children to age 5 years, encountered vaccinators who were hesitant to vaccinate older children.

Solutions

Coordinating for Humanitarian Access: REACH intensified outreaches and mobile vaccination activities during windows of relative calm, despite episodes of insecurity. REACH worked in close coordination with local security organs and the United Nations Interim Security Force.

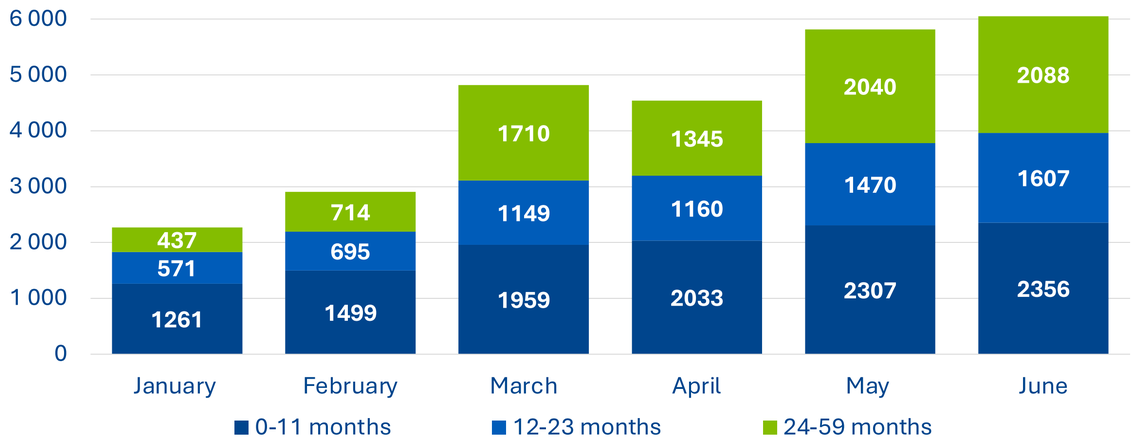
Emphasizing Community-Led Solutions: REACH used the Problem-Driven Iterative Adaptation (PDIA) approach to mobilize community-led solutions. Each REACH team worked with local leaders who identified key problems affecting vaccination activities in their communities and suggested actionable solutions.

Enabling Mobile Outreach: REACH obtained Arktek devices from UNICEF's Vaccine Supply Division and trained vaccinators on the program's permission to vaccinate children up to age 5 years.

Results

REACH, South Sudan, 2024

First Dose Pentavalent Vaccines Given by Child's Age



REACH delivers all vaccines in the country's schedule with the aim of full immunization. ZIP gives considerable attention to tracking the first Pentavalent dose because PENTA1 indicates the program's ability to deliver a critical first dose of vaccine to infants and zero-dose children.

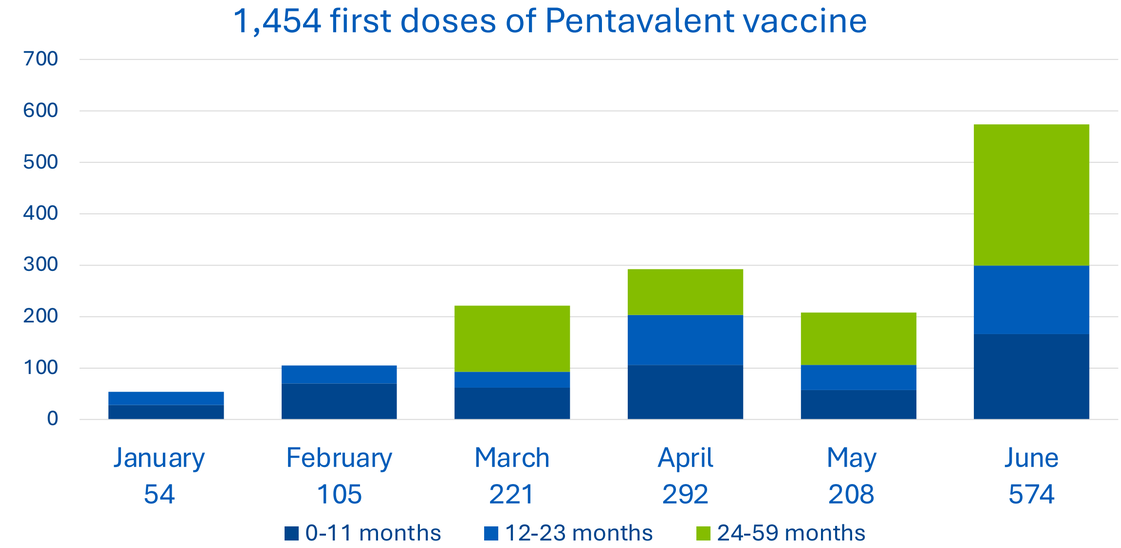
Critically, the share of these first Pentavalent doses going to children above age 2 years has increased month-by-month. In first year, REACH South Sudan had administered 12,000 first doses of Pentavalent to children over age one-year, accounting for roughly half of the 25,000 first Penta doses administered in 2023.

For 2024, the South Sudan REACH team set out to increase the total number of doses and achieve a higher proportion of the doses for children past their first birthday to increase catch-up coverage before these children age out of eligibility.

- In the first five months of 2024, the team has already administered 20,000 first doses of Pentavalent and the share of doses that have gone to children over age one-year has increased each month.
- In June, 60% of the first doses of Pentavalent that were administered were to children past their first birthday.
- In the Abeyi Administrative area in June 2024, 71% of the first doses of Pentavalent were given to children past their first birthday.

Abeyi Administrative Area 2024

1,454 first doses of Pentavalent vaccine



Conclusion

REACH South Sudan has successfully reached zero-dose children up to age 5 with adaptive, community-led, and mobile approaches. This demonstrates the potential for similar strategies to be adapted and implemented in other contexts, contributing to the global effort to reach zero-dose children with full immunization.

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Impact of demand-side incentives in increasing childhood immunization coverages in Kwara and Oyo States Nigeria – Insights from baseline assessment

Kaduru C[1], Ebirim O[1], Adegoke K[1], Eshikhena G[1], Ibe U[1*], Nwoke U[1], Ashinze N[1], Mbagwu G[1], Akeboi O[1], Tehna P[1], Oguntoye M[3], Osoko J[4], Afolabi K[5], Oyeyemi A[1,2]

1 Corona Management Systems, 2 Niger Delta University Wilberforce Island Bayelsa State Nigeria, 3 Kwara State Primary Health Care Development Agency, 4 Oyo State Primary Health Care Board, 5 Foundation for Integrated Care

Background

Vaccination programs have significantly reduced global child mortality rates, with deaths in children under five dropping from 12.6 million in 1990 to 5.4 million in 2017. Despite the efforts of the Expanded Programme on Immunisation (EPI) in Nigeria, the country faces substantial challenges, with over 2.3 million zero-dose and under-immunised children. The Demand Side Incentives (DSI) project, supported by GAVI, seeks to boost immunization coverage and timeliness, particularly in underserved communities. The baseline study aimed to estimate the proportion of zero-dose (ZD) children, identify the factors contributing to ZD children, and gather insights from caregivers and immunization managers on demand-side incentives to address immunization challenges.

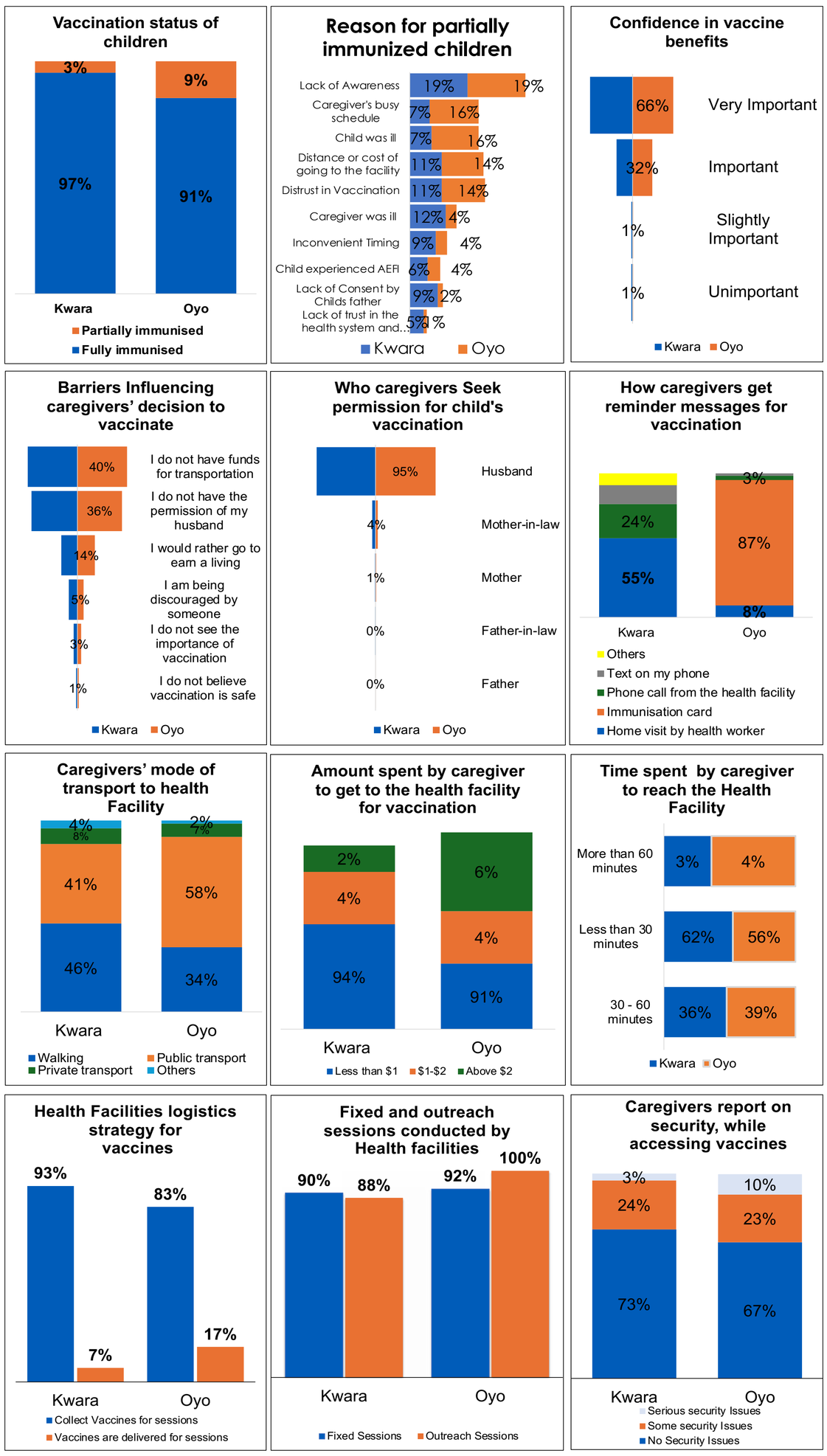
Method

This study employed a cross-sectional design using a mixed-methods approach. Data collection involved both quantitative and qualitative methods. Structured questionnaires were administered using the Open Data Kit (ODK) to gather information from 765 caregivers of children under two years in each state. Additionally, qualitative data were collected through Key Informant Interviews (KII) with 12 facility officers and 8 in-depth interviews (IDIs) with community stakeholders..

Results

Despite the high immunisation rates in both Oyo and Kwara States, gap of 9% and 3% persists primarily and is attributed to key barriers such as lack of awareness, caregivers' busy schedules, and child illness. The financial burden of transportation significantly affects caregivers, with costs ranging from less than $1 to $2 in Oyo and Kwara. Approximately 60% of caregivers reported that transportation costs were a concern, and 40% cited inadequate funds for travel. Many caregivers resorted to walking (46% in Kwara, 34% in Oyo) or using public transport (41% in Kwara, 58% in Oyo) to access health services. Most caregivers in both states recognize the importance of vaccines, with recognition rates of 69% in Kwara and 66% in Oyo. Caregivers' vaccination choices are influenced by gender dynamics, as 93% reported a lack of travel autonomy and needed spousal approval. There is a notable need for improved reminder systems, especially in Oyo, where only 32% of caregivers received vaccination reminders compared to 65% in Kwara.

A well-established pull vaccine delivery system in Kwara (93%) and Oyo (83%) supports high vaccination session completion rates, which range from 90% to 92% for fixed sessions and 88% to 100% for outreach sessions. Interviews with Healthcare workers (HCWs) and community stakeholders revealed challenges to immunization, including insufficient resources, operational hurdles, and community barriers, caregiver awareness, access to health facilities, and vaccine misinformation, while also suggesting community-driven strategies as potential solutions



Conclusion

This study in Oyo and Kwara States uncovered persistent immunization challenges, including knowledge gaps, high transportation costs, security issues, and gender dynamics that influence caregivers' vaccination decisions, and access to vaccination.

Recommendations

The potential challenges to vaccine uptake highlighted can be solved by demand-side incentives by employing a transport voucher or by incentivizing the health facility through a direct facility financing to close the geographical access gap experienced by caregivers.

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Case study: Early learnings from innovative border post vaccination outreach to tackle zero-dose children of migrant communities in Cambodia

Ork V[1], Khoun V[1], Kang S[2], Bryer S[2], Tun S[3], Lak S[2]

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BACKGROUND

- Large migration flows between the Cambodian-Thailand borders for economic opportunities pose difficulties to provide and track immunizations among children of migrant worker communities, one of the four types of zero-dose communities in Cambodia. These children are often missed by routine services and routine data reporting systems.
- Using the Gavi Equity Accelerator Fund, the National Immunization Program of Cambodia launched an innovative, locally tailored border post vaccination outreach in four districts across two northwest provinces (Banteay Meanchey and Battambang in Figure 1) during major holidays characterized by high population mobility. The estimated number of zero-dose children in three target districts in Banteay Meanchey are 519 (65.9% of four target districts).[1]
- This case study presents findings and recommendations from implementation in Banteay Meanchey to inform future strategies for reaching zero-dose children of migrant communities.

Figure 1: *Map of northwest provinces of Cambodia*

Figure 2: *Border vaccination setup at Poipet border crossing, in front of the border post quarantine service room*

METHOD

- Provincial and district EPI staff and CHAI conducted a joint monitoring visit to one of three implementing districts, Poipet district, in Banteay Meanchey province during the Cambodian New Year in April 2024.
- Interviews were conducted with key stakeholders (e.g., healthcare workers, caregivers) and immunization data was collected through standard paper-based tally sheets.

FINDINGS

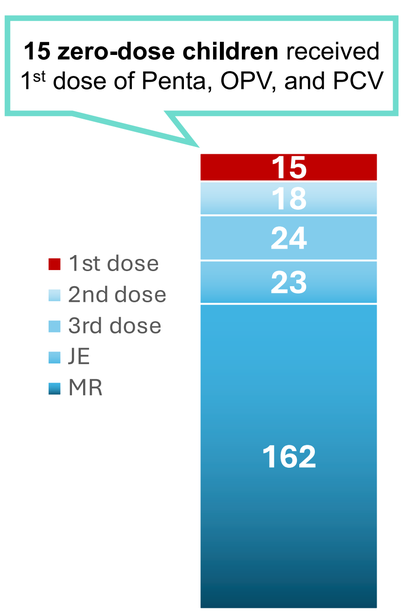


Chart 1: *Number of vaccinated children over one year old by type of antigen*
Note: Numbers overlap where multiple doses received

Successes

- Border vaccination posts were set up and conducted over 10 days in three districts at various border crossings (see Figure 2).
- The EPI team vaccinated 57 children over one year old with OPV, Penta, PCV, and IPV, 15 of whom were zero-dose children (see Chart 1). JE and MR vaccines were also provided.
- The outreach provided integrated primary health care services, including nutrition and de-worming.
- Immunization at the border site was quickly and successfully organized, supported strongly by NIP leadership and cooperation from provincial administration.

Lessons to improve operationalization and sustainability

- Border sites are managed by the Ministries of Interior and the Ministry of Economy and Finance. Additional official engagement beyond the provincial governor's letter is needed for inter-ministerial coordination.
- Implementation beyond routine working hours (8 am – 5 pm) during peak border mobility times i.e., early mornings and evenings could reduce missed opportunities for vaccination.
- The delayed annual operational planning (AOP) by both NIP and Gavi hindered timely planning and implementation of the innovative model. District EPIs implemented border outreach with limited guidance. Key budget gaps were identified, such as for site setup and communication materials.

RECOMMENDATIONS

Establish new partnerships with relevant ministries

- Establish inter-ministerial level partnerships to facilitate impactful border vaccination outreach to mobile community
- Leverage local administrative and community-based networks within the province to strengthen cooperation particularly with the immigration office

Early involvement of sub-national level stakeholders

- Involve provincial and district EPI staff in activity design to tailor activities to detailed local contexts, such as working hours, staff mobilization, and communities
- Include sub-national perspective in budgeting process, especially as additional domestic funding may need to be mobilized in advance

Timely AOP process by the govt and approval by Gavi

- Timely develop national and provincial AOPs, with support from Gavi country management, to secure sufficient lead time for guidance, planning, and provincial resource mobilization
- Advocate for provincial resources to ensure integration with routine service delivery for sustainability after EAF

Reference: *[1]National Institute of Statistics (NIS) [Cambodia], Ministry of Health (MoH) [Cambodia], and ICF. 2022. Cambodia Demographic and Health Survey 2021–22 Key Indicators Report. Phnom Penh, Cambodia, and Rockville, Maryland, USA: NIS, MoH, and ICF.*

Engaging Beach Management Units to Identify and Reach Zero-Dose Children in Kenya

Otiangala, D., Mugoya, I., Onyango, P., Ebeling, E., Grapa, E.

MOMENTUM Routine Immunization Transformation and Equity

BACKGROUND

More than half of the administrative wards in Rachuonyo North sub-county, Homabay Bay County, Kenya are located along the beaches of Lake Victoria where fishing is the main economic activity. As of 2023, the sub-county had a population of 202,512 people, including 6,521 children under one year. The communities along the beaches are controlled by beach management units (BMUs), which are registered by the Kenya Fisheries Service and comprise elected officials and an assembly of community members. The BMUs manage the fishery resources and advocate for the overall economic and social well-being of beach communities. Rachuonyo North consistently has low routine immunization coverage. In December 2022, more than one-third of surviving infants under 12 months were zero-dose children, and Penta1 coverage was 65 percent, which is 25 percent below the national target.

Homa Bay County, Kenya

MOMENTUM Routine Immunization Transformation and Equity (the project) applies best practices and explores innovations to increase equitable immunization coverage. The project has worked to identify and reach zero-dose children in Homa Bay County since October 2021.

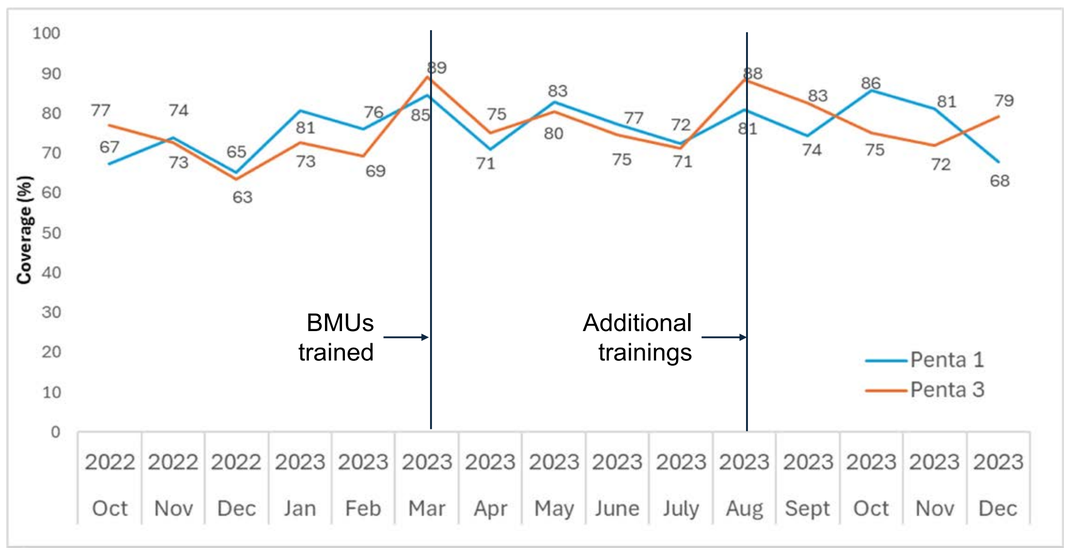
METHODS

To address the root causes for the high number of zero-dose children, the project engaged community health promoters, opinion leaders, and caregivers through community meetings and dialogue days. The project identified BMUs as key stakeholders that could help identify, document, and refer unimmunized children to health facilities.

In March 2023, the project trained 84 officials from 48 BMUs to be immunization champions, with the aim of collaborating with community health promoters to ensure uptake of immunization services. The BMUs partnered with health facilities and community health units to sensitize community members on routine immunization and refer children due for immunization. The project held additional trainings in August 2023 with more BMU officials from the same 48 BMUs.

In March 2023, the project joined the Sena BMU to encourage its members to be immunization advocates; Photo credit: Calvin Odhiambo

Figure 1. Penta1, Penta3 coverage in Rachuonyo North sub-county from October 2022 to December 2023



Source: Kenya Health Information System (KHIS)

FINDINGS

This approach has increased and improved collaboration between the BMUs and healthcare providers. During routine BMU general meetings, community health teams are often invited to educate the community members on the importance of routine immunization and check on the immunization status of children within the community. This contributed to an observed increase in Penta1 and Penta3 coverage in Rachuonyo North in March 2023, when the initial training took place, and in August 2023, when additional trainings were held (see Figure 1). From December 2022 to August 2023 the number of zero-dose children in the sub-county decreased by nearly half.

Over time, broad recognition of the partnership between BMUs and the health system resulted in the integration of BMUs into existing User Advisory Groups (UAGs). UAGs are dedicated groups embedded within community health services that work in synergy with community health promoters and play a key role as champions to promote health services, including immunization. BMUs continue to attend UAG meetings as a result of the project's facilitation of their engagement and partnership with the health sector, which has also improved linkages between health workers and the community.

The project is continuing to work in the sub-county to support the sustainability of these partnerships, and to identify other root causes that need to be addressed to have sustained impact.

RECOMMENDATIONS

This activity highlights the importance of community-level partnerships, particularly with community organizations that may not have previously collaborated closely with the health sector.

We recommend:

1. Mapping and collaborating with existing community structures to champion immunization services in the community.
2. Facilitating integration between the health sector and non-health partners to encourage long-term sustainability of partnerships.

Joint animal and human vaccine delivery: A scoping review of operational feasibility

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[1]World Bank Group [2]Institute of Infection, Veterinary and Ecological Sciences, University of Liverpool

Background

Nearly half of zero-dose children reside in hard-to-reach areas; there is need to shift towards more innovative and differentiated approaches to vaccine delivery.

Multisector, One Health approaches, including joint animal and human vaccination (JAHVax) delivery, have been positioned as a potentially cost-effective, underutilised way to reach both human and livestock vaccine targets among remote rural and nomadic pastoralist communities in low- and middle-income countries (LMICs).

The aim of this review was to assess operational feasibility of JAHVax, including opportunities for scale up in expanded and diverse geographies.

Methods

A systematic review of the literature was guided by the PRISMA extension for scoping reviews[1] (Figure 1).

Publications reporting an operational or feasibility study on integrated vaccine delivery where both humans and at least one non-human animal species were vaccinated were included for analysis. Keyword combinations were developed and run through Web of Science, PubMed and Scopus databases. No geographic or animal species limitations were applied. The time period was restricted to 1980-2023.

A multi-disciplinary team screened results and data were extracted from included publications using a purposely-developed template.

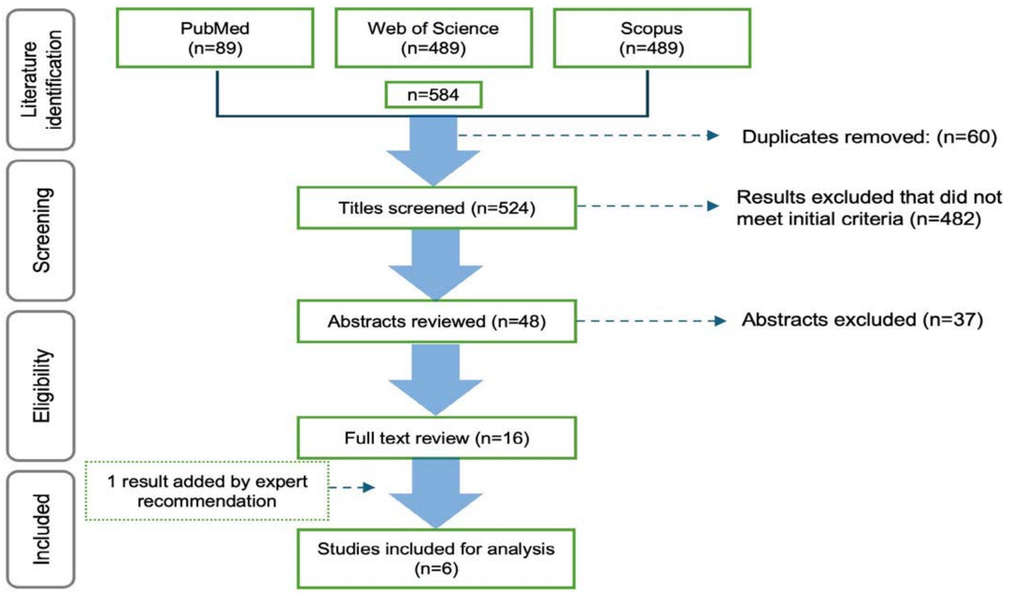

Figure 1. Flow diagram of systematic review results detailing publication selection

Results

- Six studies published between 1998-2021 were identified[2-7]
- All publications focused on nomadic pastoral communities in four countries in Africa; half the studies were located in Chad (Figure 2).
- High incidence of polio was the primary campaign driver reported in most operational literature.
- JAHVax is an effective method of increasing childhood and maternal vaccinations in nomadic pastoral communities, including among individuals who have never been vaccinated.
- Integrated delivery of other essential health services alongside vaccines may enhance community engagement and willingness to participate in immunisation campaigns.
- Key operational aspects attributed to increased reach of zero-dose children include: intersectoral collaboration between human and animal health professionals; mobile, rather than fixed-site vaccination services; and community participation and social mobilisation in planning, outreach, and facilitation.

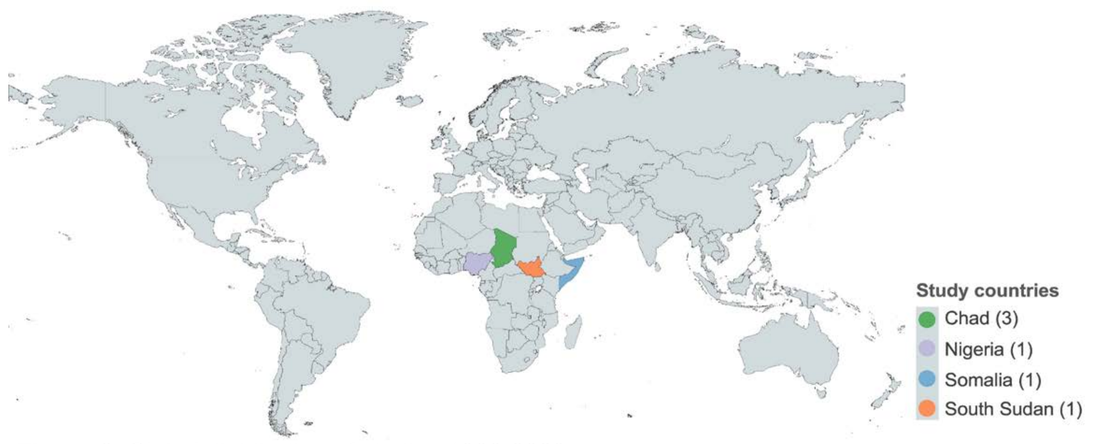

Figure 2. Global distribution of studies 1980-2023

Key operational findings

Pastoralists place considerable value on their livestock and, concurrently, experience limited access to fixed-site health facilities. By combining human and livestock vaccine delivery, JAHVax provides a people-centred outreach approach that aligns health needs with sociocultural and economic priorities of nomadic pastoral communities. This approach has shown potential to enhance vaccine acceptance and uptake.

In addition to an increased opportunity to reach zero-dose children, integrating human and animal health service delivery to improve coverage of essential health services, including but not limited to immunisation, is a promising One Health approach to: strengthen demand for health services; share resources across sectors (e.g., transport, cold chain, etc.); increase nutrition and food security through improving livestock health; and could support reduction of the multi-sector burden of zoonotic diseases.

Recommendations

Provision of animal vaccines and other community-tailored health services alongside human immunization delivery can boost community engagement in health outreach initiatives. Accordingly, vaccination campaigns aimed at reaching zero-dose children should consider pre-campaign engagement with community stakeholders to align service delivery and advocacy with community priorities.

While veterinary services have historically been leveraged to reach mobile pastoral communities for human vaccination, more research is needed to understand the One Health benefits, including the multi-sector economic advantages of joint animal and human health service delivery.

Peer-reviewed literature is currently limited to operational evidence of JAHVax among nomadic pastoralists in Africa; research is needed to explore the utility of this approach in other communities.

The authors of this study are engaged in an ongoing rapid appraisal through expert elicitation of the impact, enablers, and barriers to operational success, including the potential for sustainable scaling in diverse geographies and communities.

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Does embedded implementation research lead to changes in immunization policies, programmes and ensure immunization equity? Experiences from low- and middle-income countries

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Introduction

- Embedded implementation research is a multi-stakeholder approach to identifying and tackling critical implementation bottlenecks in service delivery
- Since 2015, with funding from Gavi, UNICEF in collaboration with AHPSR-WHO has supported over 25 embedded IR projects focusing on immunization programming in 10 countries
- This study summarises the results of Gavi supported IR projects to tackle immunization service delivery bottlenecks and reach zero-dose children across multiple countries

Outputs from embedded IR

In ***63%*** of evaluated IR projects, IR led to changes in immunization policy, programmes, and/or practice	Capacity building in IR led to transferable competencies: ***85%*** of respondents used their acquired skills elsewhere	Wide stakeholder involvement from the start is seen as a condition for IR success

"[Findings from the research led to] improved routine immunization coverage in the two wards in which the research was conducted it has also improved our community engagement strategy." ~ an EPI implementer

Challenges for research uptake

- Lack of political will and support from policy makers
- Inadequate engagement of policymakers and implementers through research process
- Lack of budget to ensure implementation of the findings

Data collection & analysis

Online survey → **43** IR stakeholders invited from **22** completed immunization IR projects → **25** stakeholders participated from **19** IR projects

7 countries participated: Kenya, Nigeria, India, Chad, Pakistan, Ethiopia, Uganda

Both qualitative and quantitative data were collected, and a thematic analysis approach was applied to analyze and present data

Changes made due to embedded IR

Improved mobilization and communication strategies in two wards that helped to increase immunization coverage	**Nigeria**
Introduction of mHealth technology and recruitment of new vaccinators	**Pakistan**
Scale-up of pain management strategy in several hospitals	**Kenya**
Enhanced communication strategies to reach nomadic communities for vaccination	**Chad**

Conclusions and recommendations

- IR can play a role in improving immunization coverage and ensuring equity
- Involvement of all relevant stakeholders from the start is critical
- Increased follow-up ensures integration of research findings into policies and programmes
- Dedicated funding is necessary to support effective implementation of the recommendations

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Pro-equity interventions to improve vaccination among zero-dose children and missed communities: Results from rapid evidence syntheses

V. Fonner[1], A. Sullivan[1], A. Wittcoff[2], J. Ducharme[3], H. Reynolds[3], and G. Caetano Correa[3]

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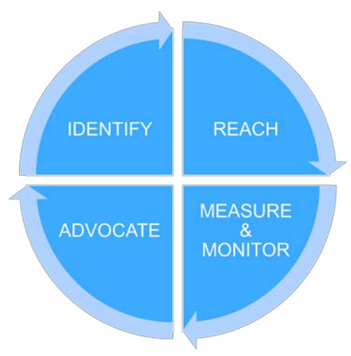
Background

- Equity is the organizing principle of the Gavi Alliance's 2021-2025 strategy, yet gaps exist in understanding which interventions hold promise in addressing inequities.
- It is critical to understand which equity-focused interventions "work" and in what contexts so that these interventions can be scaled-up and adapted to advance pro-equity programming.
- Pro-equity interventions exist for each domain of the IRMMA (Identify—Reach—Measure & Monitor—Advocate) framework.

Objective: We undertook a rapid review of existing literature to understanding both the effectiveness and implementation considerations for reaching zero-dose (ZD) children and missed communities for a collection of 13 pro-equity interventions.

Figure 1. IRMMA Framework



Methods

- Rapid reviews of published and grey literature were conducted, which included:
  - Developing general and topic-specific methodologies
  - Systematic literature searches using multiple strategies, screening articles for eligibility, extracting data using standardized forms, and synthesizing results narratively.
  - Classifying interventions on level of effectiveness using standardized rubric.
- Synthesizing evidence into Evidence Briefs, made available online with an interactive evidence map.

What is an "effectiveness" study?

A study that uses a pre/post or multi-arm design or time trend analysis AND reports on an intervention meeting the study's definition AND provided results of relevant quantitative outcomes (e.g., identification of ZD children, immunization reach).

What is an "implementation" study?

A study or report containing descriptive or comparative data (qualitative or quantitative) relevant to intervention implementation as defined by Proctor's Taxonomy (acceptability, feasibility, adoption, appropriateness, cost, sustainability, penetration, and/or fidelity)

Findings

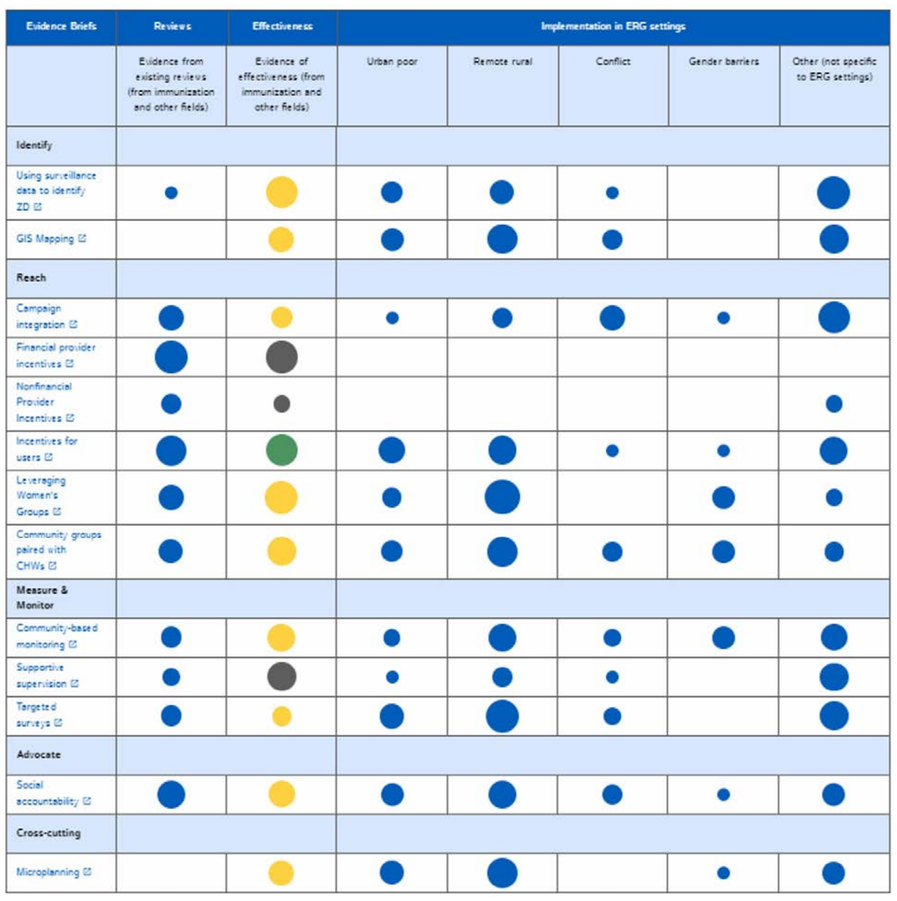
Effectiveness

- Nine topics had promising evidence of effectiveness.
- One intervention, providing incentives for users, was categorized as proven.
- Three interventions had insufficient evidence to determine effectiveness.
- On the map, colors correspond to effectiveness categories and size of circles reflect size of evidence base

Table 1. Rubric for categorizing effectiveness

Effectiveness category	Definition
Potentially ineffective	At least one study of relatively good quality found the intervention had no significant impact on outcome(s) of interest, and no additional studies were found showing effectiveness.
Inconclusive	Used across several scenarios, including: • Only studies of low-quality have evaluated the intervention • More than one study has evaluated the intervention, but findings were inconsistent (i.e., some show benefit, others show no benefit or harm) • No studies were identified that evaluated the intervention's effectiveness
Promising	At least one study of relatively good quality found the intervention to be beneficial, but more evidence is needed to determine impact and guide implementation.
Proven	Sufficient evidence exists to recommend widespread implementation of the intervention, assuming no major concerns regarding implementation have been identified.

Figure 2. Evidence map containing effectiveness and implementation results



Implementation

- Extent of implementation across ERG settings varied.
- **Common enablers:** Community-led/supported/owned, clear and effective coordination, adequate implementer training, results communicated to decision-makers, use of existing tools.
- **Common barriers:** Sustainability challenges, logistical issues, cost/budget, systemic constraints, data quality/access to accurate data, existing norms/stigma in communities.

To view the evidence map and read the full evidence briefs, please visit: https://zdlh.gavi.org/resources/evidence-map or scan the QR code.

Conclusions

- **Context and implementation matter**
  - Effectiveness is dependent on critical contextual issues and on how interventions are implemented.
- **Importance of community**
  - Meaningful, sustained involvement of communities contributed to success. "Instrumental" use of communities was unsuccessful.
- Important to **leverage existing data** and **involve stakeholders** in decision-making and results dissemination.

Recommendations

- To ensure development of successful pro-equity immunization strategies, **evidence-based programming should form a key principle of Gavi's model**, with implementation and future study of **promising and proven interventions prioritized**.
- Continuously **updating and assessing the evidence-base**, through **fit-for-purpose and adaptable scoping reviews** will be necessary to ensure programming guidance is kept up to date. **The model described herein could inform this work.**

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The Immunization Agenda 2030 strategy to reach zero-dose children in low- and middle-income countries: a living scoping review

Beaulieu A.[1-2-3], Ducharme J.[2-3], Thibeault C.[2], Akani B.C.[1-2], Ziegler D.[4], Hogan D.[3], Correa G.C.[3], Reynolds H.W.[3], Johri M.[1-2]

1. École de Santé Publique de l'Université de Montréal (ESPUM); 2. Centre de Recherche du Centre Hospitalier de l'Université de Montréal (CR CHUM); 3. Gavi, the Vaccine Alliance; 4. CHUM.

Background

In 2023, an estimated 14.5 million children worldwide remained unreached by routine immunisation ("zero-dose" (ZD) children). The Immunization Agenda 2030 (IA2030) aims to reduce by 50% the number of ZD children by 2030. We undertook a living scoping review to map and synthesise what is known from the scientific literature on ZD children in low- and middle-income countries since the launch of IA2030. This review will be updated annually or bi-annually until 2030, to inform refinements to the IA2030 strategy and Gavi 6.0.

Methods

We searched MEDLINE (Ovid), CINAHL Complete (EBSCOhost), EBM Reviews (Ovid), EMBASE (Ovid), LILACS, and Google Scholar for studies including quantitative evidence on ZD children published between January 2020 and January 2024. Using the Covidence© platform, two independent reviewers used a two-stage (titles/abstract + full text) screening process to select studies for inclusion and conducted data charting using a pre-tested data charting form developed for this review. Any disagreements were resolved by consensus, or by consulting a senior reviewer.

Findings

We included 82 studies (79 primary research and 3 reviews).

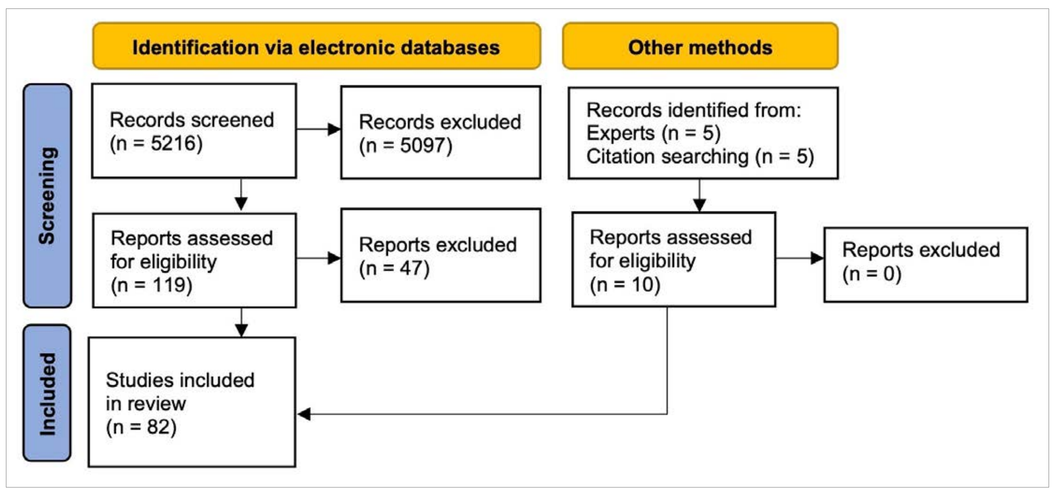

Figure 1: PRISMA-Flow Diagram – Selection of sources of evidence

Thematic coverage

Of the 82 studies included in the review:

73	provided evidence on prevalence and distribution in defined contexts.
57	provided evidence on barriers and forms of disadvantage faced by ZD children, their households and their communities.
0	provided evidence on interventions that focused specifically on the delivery of routine immunisation to ZD children.

Note: articles may cover more than one topic.

Prevalence and distribution

A total of 73 articles provided evidence on prevalence and distribution, with 41 studies highlighting subnational variations in the prevalence of ZD children within countries.

Findings (continued)

Barriers to vaccination

A total of 24 articles discussed factors impeding vaccination delivery to ZD children. The majority focused on the intent to vaccinate (n=20), while fewer addressed barriers related to community access (n=10) and facility readiness (n=3).

Forms of disadvantage

A total of 44 studies discussed deprivations experienced by ZD children, their households, and communities (Figure 2).

n = 11	**Related to access to immunization services** Such as: low coverage of maternal tetanus toxoid vaccination; lack of co-delivery of other vaccines/completing full immunisation; missed opportunities for vaccination.
n = 23	**Related to access to other health services and commodities** Such as: low coverage of antenatal and postnatal care, skilled birth attendance, family planning; lack of care-seeking for childhood illnesses; low coverage; lack of insecticide-treated nets.
n = 7	**Related to access to other non-health services and commodities** Lack of health insurance; lack of access to a bank account.
n = 41	**Related to deficits in important indicators of development** Low socioeconomic status; poor maternal education/literacy; low maternal empowerment; malnutrition; lack of improved WASH; poor learning attainment in preadolescence.

Note: articles may cover more than one category.

Figure 2: Deprivations faced by ZD children, their households and communities

Interventions

Despite a substantial body of evidence on interventions to strengthen immunisation, we found no studies (n=0) on interventions that focus specifically on the delivery of routine immunisation (with or without other services) to ZD children.

Implications

Our review highlights the need to:

1. implement integrated PHC services and multisectoral strategies that comprehensively address deprivations, focusing on root causes, for ZD children and missed communities.
2. prioritise high-need areas where ZD children and their communities are most likely to face overlapping deprivations.
3. generate evidence on interventions that focus specifically on the delivery of routine immunisation to ZD children, and their implementation outcomes, cost-effectiveness, and impact.

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Full list of references available upon demand.

Corresponding author: Dr. Mira Johri, (CRCHUM); mira.johri@umontreal.ca

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Service Delivery and Vaccine Demand Challenges and Solutions in Zero dose Communities in Nigeria: A Qualitative Exploration Using Human Designed Centred Approaches

A project by Johns Hopkins International Vaccine Access Centre (IVAC) in collaboration with Direct Consulting and Logistics (DCL) Limited NHREC Approval No: NHREC/01/01/2007-30/09/202

Hadley, G.I[1], Arogundade, T[2], Angioha, P.U[2], Abdulrasheed, A.A[2], Ezeanya, N[2]., Okpe, I.A[2], Adetola, A. A[2]., Ebong, A.S[1]., Adegbola, J.B[2], Olisa, J[2] & Wonodi, C. B[3]

[1]Women Advocate for Vaccine Access, [2]Direct Consulting and Logistics Ltd, [3]Johns Hopkins Bloomberg School of Public Health, International Vaccine Access Center (IVAC), Baltimore

Background

Nigeria contributes disproportionately to the global zero dose (ZD) burden, with 2.25 million children never being vaccinated with the DTP1 in 2022 [1]. Insufficient attention has been paid to reaching zero-dose children because previous efforts have addressed under-vaccinated and unvaccinated children as one large group. It became imperative to understand the factors affecting equity, access, and effective delivery and demand for RI services in zero dose communities and provide a pathway to design contextual solutions.

Objectives

Through a Gavi-funded project, the team aimed to explore factors influencing routine immunization service delivery and demand in communities with high ZD burden, to guide intervention efforts

Scope

This study was conducted from June 2021 to May 2022 in 12 Local Government Areas (LGAs) across 7 states from the six geopolitical zones in Nigeria. These LGAs were part of the 100 ZD LGAs identified by the EPI, and included remote rural, riverine, security-challenged and urban poor settings. See figure 1

Methods

Seventy-nine Key Informant Interviews (KIIs) and In-Depth Interviews (IDIs) with state and LGA level immunization program managers, healthcare workers (HCWs), community leaders, and parents of ZD children were conducted, to understand supply and demand-side drivers of ZD. Semi-structured interview guides reflected domains from WHO BeSD and UNICEF Journey Mapping frameworks. After preliminary analysis, we conducted feedback FGDs with a selection of respondents to reflect on the KIIs and IDIs findings. Next, we trained program managers and HCWs (online) on the principles and approaches of Human-Centered Design (HCD) to build their capacity for co-creating contextualized solution. Then 12 HCD co-creation sessions with HCW and parents of ZD children, drawing insights from the interviews. We generated action plans from the HCD sessions, using a template adapted from the UNICEF HCD training modules. KIIs and IDIs transcripts were thematically analyzed using Dedoose to identify context-specific ZD challenges and solutions.

Findings

For specificity, service delivery challenges were categorized using the WHO health systems building blocks model and the demand-side issues were thematically categorized using the BeSD framework. See figure 2.

Most frequently mentioned barriers affecting immunization **service delivery** were;

- Lack of human and financial resources

  "Yes there are challenges. We have less manpower. We have shortage of manpower. We might have the vaccine but we don't have enough hands to do it. We have inadequate funding for outreach and other RI activities, quality supervision. We cannot afford all these because of funding constraint".
  Program manager, South South

- Service unavailability

  "The major challenges we have … (is) non-availability of health care facilities. What I mean is that the major settlements in this LGA have no major access to immunization services because they are far from the health facilities, that is why there are so many children that are unimmunized.
  Two, there are no health workers, trained health workers, especially from school of nursing and school of nursing health technologies. We do not have much health care providers to cover as expected".
  Program manager, North Central

- Rising and chronic insecurity

  "There is issue of insecurity because we have areas that people can't go to or let me say you can't go whenever you want to because of security or problem of insecurity because we have ward, at least 8 wards that are insecure, they have places that you can't access anytime you wish to, you have to informed about the level of security there, if it's a little bit secure then you can go and work and come back. And huge issue with those places is the problem of kidnappers, we have them here in Alkaleri LGA and aside of kidnappers there are bandits a lot in those areas".
  Program manager, North East

On the **demand-side** barriers include;

- Thoughts and feeling ranging from Ignorance on RI efficacy and benefits, ambivalence, and zero trust in vaccines

  "The problem is that, this immunization of a thing I personally I don't understand it, the reason why I don't want to participate on it. So sometimes before even backing into something you need to understand it. So actually I don't understand the function of the immunization. That is why I don't have interest"
  Father of zero dose, North Central

  "They are thinking that this immunization will not stop their children from contracting this diseases. They believe immunization brings these diseases when they are small like cough, fever, polio, and sickle cell. This is why they don't take it"
  Religious leader, North West

- Social Processes such as religious and cultural norms and lack of spousal support

  "Honestly, we don't do this because we have a traditional medicine for this that is why we don't do it. Our elders also instructed us not to take our children for immunization. If we do, he will not forgive us. He gave us herbal drugs in form of milk. This is what we use"
  Father of zero dose, North West

- Practical issues including far distance, financial constraints, unfriendly HCW attitude, and other felt need

  "I don't want to give my children vaccine, I don't know why you are bothering me. I don't have money I told you. Where the health facility is too far from me. I don't go there. Sometimes when I go there they do tell me to bring money. I don't have money to give to them. And the place is far".
  Mother of zero dose, South East

  "Sometimes, health workers are funny. Attitude of insensitivity, being insensitive to your plight. If a health facility person keeps shouting on the little thing, it discourages you from having access to whatever you came for".
  Father of zero dose, South East

Recommendations

Solutions were collaboratively developed by community HCWs, leaders and members. They include;

Service delivery

- Institute strategies to improve motivation and access (non-monetary incentives, mobile services)
- Conduct a comprehensive health workers gap analysis assessment, needs assessment, and develop tailored capacity building sessions to improve interpersonal communication skills
- Implement innovative strategies to reach children in hard-to-reach areas, IDP Camps, hit &run strategies, use of military and vigilantes for vaccination of children in security compromised areas

Demand

- Tailored and appropriate messaging targeting caregivers of zero dose children to understand benefits of immunization
- Traditional and religious leaders engaged as gatekeepers to change norms and beliefs
- RI champions amongst community members to encourage peer-to-peer mobilization
- Target heads of households with HCD strategies to increase their awareness on RI, thereby influencing increased RI demand
- Improve communication on expected side effects and managing caregiver expectations

Conclusion

The variety and range of drivers indicates that strategies to increase demand and optimize RI service delivery in special populations must be tailored to the specific community. Gavi's global call for equitable access to vaccines to reduce the number of zero-dose children by 25% by 2025 and by 50% by 2030 [2,3] and WHO's global goal of reducing by 50%, the number zero dose children by 2030 [4] will only be achieved through context-specific strategies. Continuous investigations of these vulnerable settings are critical to keep abreast of the changing dynamics affecting the effective supply and sustained demand for immunization and other health interventions

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