Zero-Dose LEARNING HUB

Findings from the Zero-Dose Learning Hub (2022-2025)

April 2026

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The Geneva Learning Foundation

Zero-Dose LEARNING HUB

Acknowledgements JSI appreciates Gavi's Monitoring, Evaluation, and Learning (MEL) Division as we extend our deepest gratitude to Dr. Heidi Reynolds, Dr. Gustavo Corrêa, Dr. Esther Saville, and Daria Piccand for their leadership, technical expertise, and guidance. JSI also recognizes our excellent ZDLH consortium partners from The Geneva Learning Foundation and the International Institute of Health Management Research. Additionally, the authors would like to acknowledge the Country Learning Hub teams from Bangladesh, Mali, Nigeria, and Uganda, as their technical contributions were instrumental in shaping this resource.

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

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2022-2026

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Start Here

How to Use this Deck

Global View: Executive Summary and Cross-Country Insights

→ These sections present cross-country insights and implications to inform strategy and decision-making

Zero-Dose Learning Hub Overview: Approach and Tools

→ An overview of the ZDLH model and approach to provide context on how these findings were generated

Country Research Portfolios & Results: Bangladesh, Mali, Nigeria, Uganda

→ Country chapters provide detailed findings tailored to specific contexts and implementation realities

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Executive Summary

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ZDLH Rationale: What We Set Out to Do

- ☑ Provide timely, comprehensive information; strengthen evidence base and learning from the ZD learning agenda; ensure prospective measurement; and inform 5.0 implementation, as recommended by the Programme and Policy Committee and Gavi Board in 2020
- ☑ Generate learning on the barriers to reach ZD children
- ☑ Strengthen evidence base of effective interventions across IRMMA
- ☑ Improve metrics, measures, and methods to improve reach
- ☑ Ensure quality technical implementation of activities and troubleshooting
- ☑ Produce and share evidence; facilitate learning exchange across countries

Zero-Dose LEARNING HUB

Approaches that Show Promise
IDENTIFY

- **Granular, subnational data approaches improved identification of hidden zero-dose pockets.** Analysis and use of localized data (e.g., LQAS, sub-district DHIS2 analysis) surfaces variability masked by district- and national-level averages. *See Nigeria*
- **Iterative analysis enabled identification of dynamic and shifting zero-dose populations.** Ongoing analysis supports identification of evolving zero-dose populations across settings. *See Bangladesh*
- **Using multiple data sources improves visibility of missed communities.** Triangulating administrative and community-level data improves detection of missed communities not captured in routine systems.
- **Locally grounded identification approaches capture populations missed by routine systems.** Context-specific approaches help identify zero-dose children not reflected in administrative data. *See Bangladesh use of LQAS to validate identification of ZD clusters*

These approaches showed promise in specific contexts and are not universally generalizable. Effectiveness depends on local data systems, capacity, and population characteristics.

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Approaches that Show Promise

REACH

- **Flexible service delivery models improve access in underserved settings.** Adapting delivery approaches (e.g., mobile outreach, expanded service hours) helps reach populations not served by fixed-site models. *See Bangladesh*
- **Community-based approaches assess demand-side barriers to vaccination.** Engagement of trusted local actors and interpersonal communication approaches help assess demand-side barriers, including trust and social norms, responding to social, behavioral, and gender-related barriers. *See Nigeria study*
- **Targeted approaches tailored to specific populations address barriers more effectively than uniform strategies.** Interventions designed for specific ZD typologies (e.g., urban, remote, mobile populations) performed better than one-size-fits-all delivery models. *See Nigeria*
- **Task-shifting expands outreach capacity in resource-constrained settings.** Engaging non-traditional or lower-cadre workers helped address workforce constraints and improve outreach coverage. *See Bangladesh*
- **Gaps between identification and service delivery limit conversion to vaccination.** Findings across Learning Hubs highlight that identifying ZD children alone is insufficient without corresponding outreach and service delivery capacity to ensure children identified as ZD get vaccinated. *See Mali, Uganda*

These approaches showed promise in specific contexts and are not universally generalizable. Effectiveness depends on local data systems, capacity, and population characteristics.

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Approaches that Show Promise
MONITOR & MEASURE

- **Decentralized monitoring approaches support more timely, local decision-making.** Subnational monitoring systems help identify gaps and support more responsive program adjustments at local levels. *See Nigeria*
- **Routine data review processes link data to decision-making and adaptive program adustment**. Regular review meetings and use of data for decision-making supported adaptive management and course correction. *See Bangladesh*
- **Use of multiple data sources improved visibility of ZD populations.** Integrating administrative and community-level data strengthens monitoring completeness and addresses limitations of single data systems.
- **Granular data systems improved tracking of subnational variation.** More detailed data approaches helped detect variability and monitor changes in ZD populations over time.
- **Embedding monitoring into routine health system process supports more consistent data use.** Embedding data collection and review into existing health system processes strengthened ongoing monitoring capacity.

These approaches showed promise in specific contexts and are not universally generalizable. Effectiveness depends on local data systems, capacity, and population characteristics.

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Approaches that Show Promise
ADVOCATE

- **Embedding ZD indicators into routine governance structures supports greater visibility and accountability.** Integrating ZD metrics and findings into existing coordination and planning platforms (e.g. routine review meetings, accountability mechanisms such as scorecards) supports sustained attention to missed communities. *See Nigeria*
- **Engagement with government and uptake of evidence into planning and decision-making.** Engagement with government and partners helps translate findings into programmatic actions and policy discussions. *See Bangladesh, Mali, Nigeria, Uganda*
- **Use of data and evidence in routine review processes strengthened accountability.** Linking monitoring data to decision-making forums supports more responsive and accountable program management. *See Nigeria*
- **Integrating learning into existing systems facilitated institutionalization.** Embedding approaches within established structures (rather than standalone activities) supports sustainability and scale. *See Bangladesh*

These approaches showed promise in specific contexts and are not universally generalizable. Effectiveness depends on local data systems, capacity, and population characteristics.

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Zero-Dose Learning Hub Findings

New Perspectives on Persistent ZD Themes

ZD burden is dynamic, localized and obscured by current reporting systems

- DHIS2 data masks the fluidity of ZD populations
- Need for granularity of data to monitor specific sub-district variability in coverage

Fragmentation of data systems

- Data fragmentation as a barrier; generates discrepant ZD estimates
- System disconnects prevent tracking and triangulation

Read more on *VaccinesWork*: New Perspectives on Persistent Zero-Dose Themes

Gender, household dynamics and social norms systematically outweigh physical access

- Gender as primary barrier
- Socioeconomic concentration of ZD
- Behavioral barriers impede uptake even where services are available

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Zero-Dose Learning Hub Findings

New Perspectives on Persistent ZD Themes

The economics of reaching ZD children

- Inefficiency in uniform (one-size-fits-all) budgeting for zero-dose interventions
- Efficiency gaps and efficiency gains

Locally tailored innovations susceptible to upstream failures

- Administrative and operational bottlenecks
- Human resources drain
- Systemic administrative and political delays

Read more on *VaccinesWork*:
New Perspectives on Persistent Zero-Dose Themes

The effectiveness of data hinges on institutional factors

- Data and data systems are not enough to ensure data use
- Fragmentation across data systems, stakeholders, and governance
- Actors at subnational and frontline levels often lack authority or support to act on the data

Recommendations for Zero-Dose Programs

- **Prioritize subnational data systems and routine data use.** Findings across the Learning Hubs show that aggregated administrative data can obscure localized “blind spots,” while granular analysis, rolling reviews, and triangulation make zero-dose populations more visible and actionable.
- **Design interventions around local context rather than uniform models.** Across countries, *Identify* and *Reach* strategies are not “plug-and-play”; effectiveness varies by geography, mobility, fragility, and local social conditions.
- **Address demand-side and social barriers alongside service delivery.** The findings consistently show that physical access alone does not ensure uptake; gender norms, household dynamics, trust, and behavioral barriers continue to shape vaccination decisions.
- **Strengthen the pathway from identification to vaccination.** Findings indicate that identifying ZD children does not consistently lead to vaccination unless referral, outreach, transport, and service delivery capacity are in place.
- **Embed monitoring, accountability, and evidence use in routine systems.** Stronger results are associated with approaches that move ZD tracking and review into existing governance structures, coordination platforms, and regular decision-making processes rather than stand-alone project mechanisms.
- **Support differentiated financing and operational flexibility.** The findings show that reaching ZD children often requires different resource levels and delivery models across settings, and that locally adapted strategies remain vulnerable when workforce, supply, and financing constraints are not addressed.

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How to Interpret
Zero-Dose Learning Hub Findings

- **Findings are based on context-specific implementation research across diverse settings.** Interventions were designed and tested within specific zero-dose typologies and are not directly comparable across countries.
- **Insights reflect recurring patterns, not universal solutions.** Findings consistently indicate that evidence-based adaptation, not standardization, shapes performance in zero-dose programming.

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Zero-Dose Learning Hub Findings

Build on Learnings from ZDLH for Gavi 6.0

IRMMA	Actionable Recommendations
I	**Use standardized definitions:** Provide clear operational definitions for ZD and UI children to ensure consistent reporting, data comparability and appropriate targeting.
I, R	**Promote adoption of proven tools & approaches:** BeSD framework, targeted surveys, human-centered design, PEA.
R	**Embed the TOC in country M&L guidelines:** Improve IR design, clarify assumptions, and promote adaptive management given the complex, non-technical barriers to service delivery and uptake.
M	**Strengthen metrics and monitoring:** Enhance data quality and timeliness using multiple methods such as data triangulation and LQAS. Invest in approaches like DIM to enable regular monitoring of ZD/UI.
A	**Prioritize knowledge translation:** Embed KT planning in Gavi grants and country strategies to drive systematic evidence-to-action processes.
A	**Facilitate learning exchanges:** Evaluate the results and costs of highly promising peer learning approaches to better understand the pros and cons of this approach and potential for scale up.

Zero-Dose
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Overview
Cross-Country Insights

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Zero-Dose is Dynamic and Context Dependent

- **Zero-dose populations are dynamic and highly localized.** Findings across Learning Hubs show that ZD burden shifts over time and is concentrated in specific subnational pockets rather than evenly distributed.
- **Administrative data can misrepresent coverage and obscure true ZD burden.** District- and national-level DHIS2 data often obscure localized clusters of ZD children, limiting the ability to accurately identify missed communities.
- **Granular, subnational analysis is required to identify missed populations.** More detailed data approaches are needed to detect variability and track changes in ZD populations across settings.
- **Effective identification requires context-specific approaches.** Variation in geography, mobility, and population type requires context-specific strategies rather than uniform approaches.

Social and Behavioral Factors Shape Vaccination Uptake

- **Social and gender dynamics shape vaccination uptake.** Findings across Learning Hubs show that household decision-making, including gender norms, influences whether children are brought for vaccination.
- **Behavioral and trust-related barriers influence demand for services.** Perceptions of vaccines, prior experiences, and trust in health systems affect caregiver decisions to seek immunization.
- **Access to services does not consistently translate into uptake.** Evidence shows that geographic access and availability of services do not ensure vaccination when social and behavioral barriers persist.

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System Constraints Shape Program Performance

- **Data availability does not consistently translate into data use.** Findings show that fragmented systems and limited decision-making authority constrain the use of data for timely action.
- **Data fragmentation limits visibility and coordinated response.** Parallel data systems and incomplete integration reduce the ability to identify and respond to ZD populations effectively.
- **Governance and institutional factors shape how systems respond.** The effectiveness of data and interventions depends on leadership, accountability structures, and decision-making processes within health systems.
- **Identifying ZD children does not consistently lead to vaccination.** Findings show gaps between identification, referral, and service delivery pathways within health systems.

Delivery, Cost, and Adaptation Shape Effectiveness

- **Uniform delivery models do not perform consistently across settings.** Findings show that standard approaches (e.g., fixed-site delivery and national strategies) yield uneven results across different geographies and populations.
- **Effectiveness depends on alignment with local context and population needs.** Interventions designed for specific ZD typologies (e.g., urban, remote, mobile populations) are better suited to address local barriers than uniform approaches.
- **Costs of reaching ZD children vary significantly by context.** Evidence shows that reaching underserved populations often requires additional resources, reflecting differences in geography, access, and service delivery complexity.
- **Locally adapted approaches are constrained by system and resource limitations.** Findings indicate that even context-specific strategies face challenges when workforce, supply, and financing constraints are not addressed.

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Zero-Dose Learning Hub
How these Findings Were Generated

- Findings are based on implementation research across four Country Learning Hubs
- JSI, as ZDLH global learning partner, led demand-driven technical assistance to each Learning Hub
- The following section provides context on how evidence was generated

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Zero-Dose Learning Hub

Design & Approach

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Gavi ZDLH Model

- Hub-and-spoke model, with four country learning hubs (CLHs) in Bangladesh, Mali, Nigeria, and Uganda, comprised of local consortiums that generate and use country-level programmatic data and evidence.
- ZDLH collaborates with the four CLHs to advance the uptake of research and evidence to improve each country's immunization policy and programming, with a focus on subnational levels.
- At the global level, the ZDLH synthesizes and manages evidence and learnings on effective methods and approaches for identifying and reaching zero-dose children and missed communities.

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ZDLH Consortium Partners

Country Learning Hubs

- **Bangladesh**: Led by the International Center for Diarrhoeal Disease Research, Bangladesh (icddr,b) with partners Jhpiego and RedOrange Communications.
- **Mali**: Led by GaneshAID with the Center for Vaccine Development-Mali (CDV-Mali) and the University of Science, Techniques and Technologies of Bamako (USTTB).
- **Nigeria**: Led by the African Field Epidemiology Network (AFENET) with the African Health Budget Network (AHBN).
- **Uganda**: Led by Infectious Diseases Research Collaboration (IDRC) with partners PATH and Makerere University School of Public Health.

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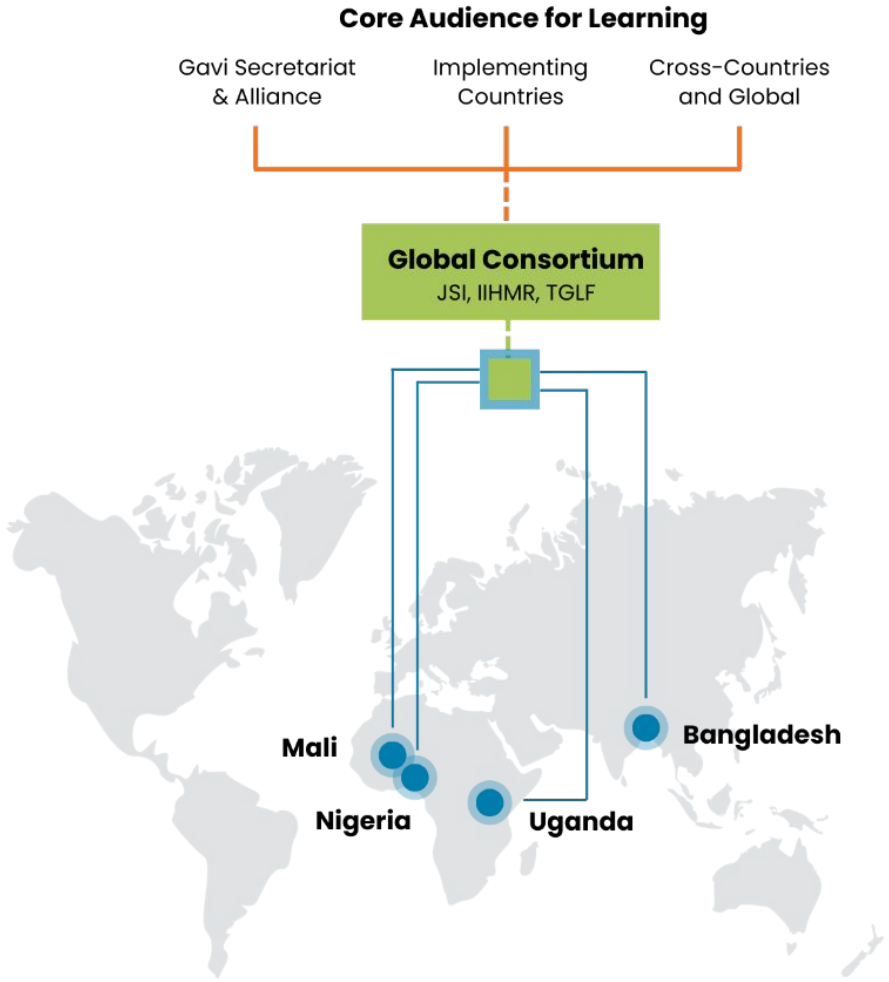
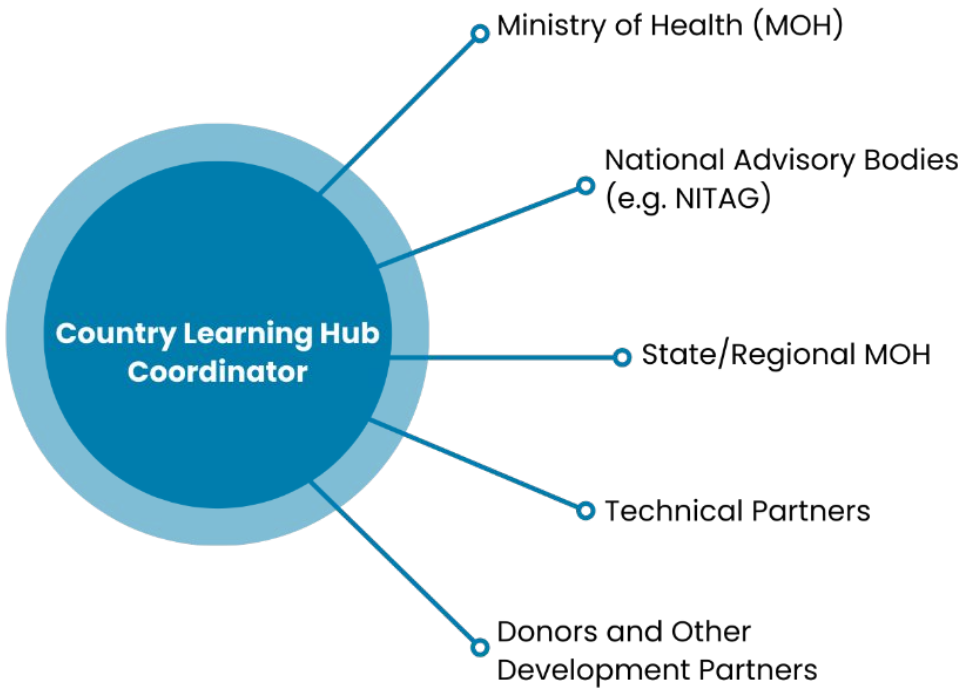
Country Learning Hubs





✳ Local partners: Generate evidence related to barriers and inequities faced by zero-dose children and missed communities through a range of MEL activities.

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ZDLH Objectives

- To **support implementation of the country learning hubs** through technical assistance, operational troubleshooting, and tailored capacity strengthening activities.

- To **synthesize and share evidence and learning** – country learning hubs and other Gavi countries and across the Alliance, other implementing partners and donors, and regional and global networks.

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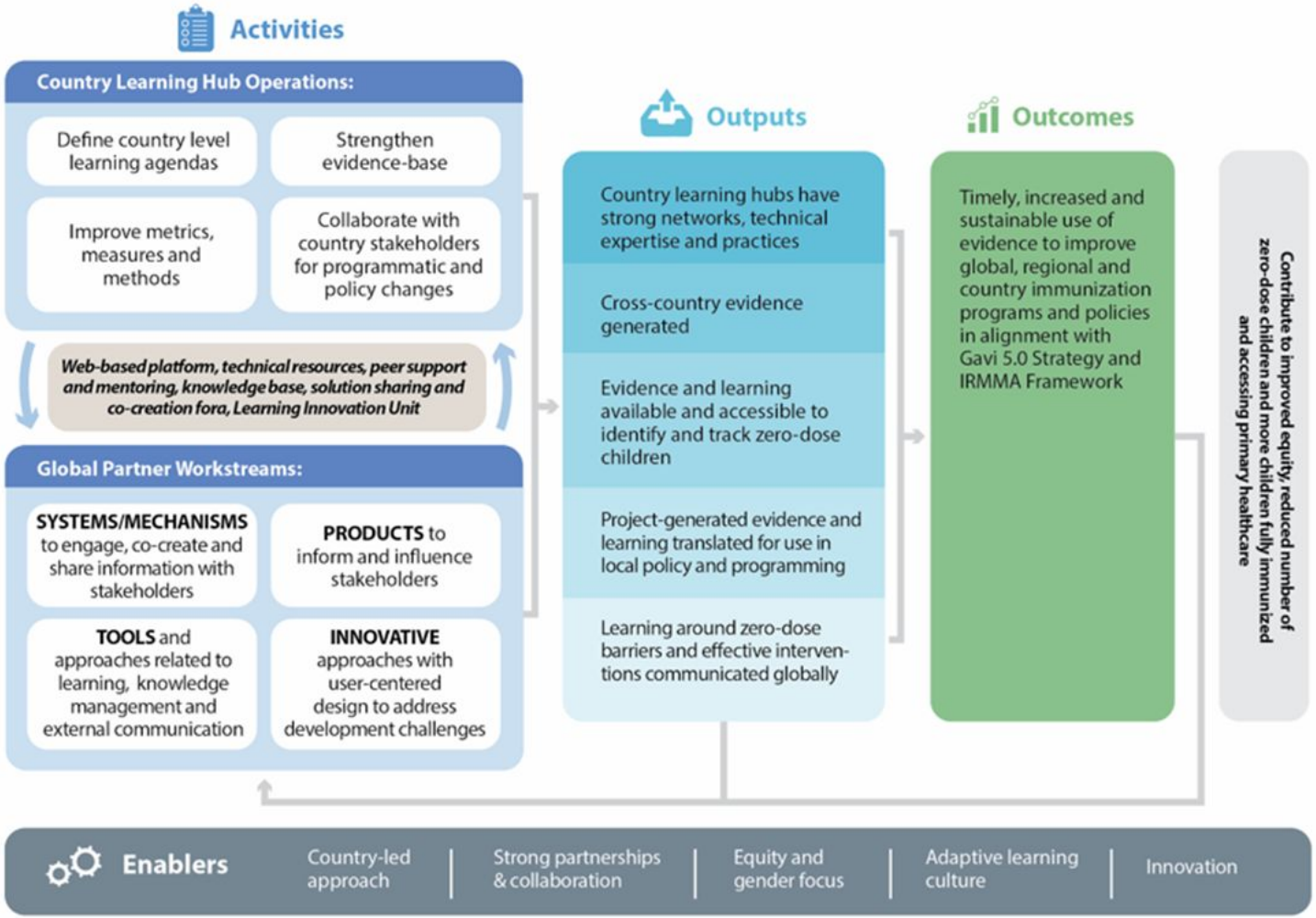
Zero-Dose Learning Hub
Theory of Change



Shift from *passive* data reporting to *active, evidence-driven* decision-making that is:

- Timely to guide immediate course correction.
- Increased to inform national strategies and operational microplanning.
- Sustained through accountability frameworks and financing mechanisms.

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Zero-Dose Learning Hub
Monitoring & Learning Plan

Goal: To support the monitoring, evaluation, and learning of the Zero-Dose Learning Hub to improve immunization equity and reduce the prevalence of zero-dose

The ZDLH MEL plan is designed to:

1. Monitor the progress and performance of the Consortium.
2. Enable adaptive management of the Learning Hub initiative.
3. Inform and align the specific monitoring and learning plans of the four Learning Hubs in Bangladesh, Mali, Nigeria, and Uganda.

Key Frameworks

- **IRMMA Framework:** All learning and evidence generation focuses on the five-step process: Identify, Reach, Monitor, Measure, Advocate.
- **Theory of Change:** Connects activities (establishing systems, tools, products, innovations) to the outcome of strengthened capacity and policy shifts.

Measurement Approach

- **Indicators**: Uses a mix of Core Performance Indicators (to track outputs like research capacity and evidence use), Context Indicators (external factors like political stability), and Gavi Priority Indicators.
- **Mixed Methods**: Combines quantitative data (surveys, routine reports) with qualitative insights (key informant interviews, case studies, complexity-aware monitoring).

Global Learning Agenda

- **Focus**: Prioritized questions guiding evidence-building on themes such as Equity, Partnerships, Health Systems, Community Demand, and Innovation.
- **Function**: Synthesizes evidence across countries to fill knowledge gaps and informs Gavi's strategy.

Learning from a Demand-driven TA Model

Tailored Support: A demand-driven TA model adapts to country-specific needs, ensuring relevance and flexibility.

Capacity Strengthening: TA focus on strengthening capacity through workshops, mentorship, reviews, standardized tools.

Collaborative Problem Solving: Facilitates co-creation of solutions with CLHs and Gavi to overcome barriers and improve ZD interventions based on evidence.

Knowledge Translation: Moves beyond data collection and analysis to actively using the findings for programmatic improvements

ZDLH identified gaps with the Learning Hubs and Gavi, and provided customized TA, with tools and resources to support.

Tool development:

- Knowledge Translation
- Zero-Dose Costing
- Theory-based Evaluation
- LQAS
- PEA protocol

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Range of IR Interventions Tested by Four CLHs with TA Support from ZDLH

Benefits of Demand-driven TA

Country	ZD Typology / Context	Selected IR Intervention	Primary Objective	Illustrative Results
Bangladesh*	Urban Slums & Hard-to-Reach	**Human-Centered Design (HCD)**	Adapt interventions to unique subnational & social barriers	Success was tied to localized sociocultural and logistical environments; HCD identified specific user-end hurdles.
Mali*	Urban, Rural Remote, Special Populations	**Coach2PEV (electronic supervision tool)**	Improve health worker motivation, competence, and accountability through digital coaching and self assessment.	Digital tools need adequate infrastructure, strong local leadership and regular feedback loops; without validation from supervisors, motivation drops. Technology alone is not a solution.
Nigeria*	Fragility (Sokoto) vs. Stability (Bauchi)	**Differentiated Outreach (IEV/ZDROP)**	Test national ZD strategies in different state/LGA contexts	A uniform national plan (Z-DROP) yields different results based on local context. Physical access solutions (more clinics) fail without addressing demand-side barriers like caregiver education, poverty.
Uganda*	Rural, Fishing, Mountainous	**House-to-House Registration through the BCU**	Integrate HTH registration data into immediate vaccination planning in the context of the BCU campaign.	*Identification* does not equal *vaccination*. Registering children works if "linkages" (transport/escorts) are funded. Gender norms and trust are stronger predictors of ZD status than distance.

**Full results are documented in each country's subsequent slide deck.*

Contextual Dependency: Findings across all four CLHs confirm that *Identify* and *Reach* strategies are not "plug-and-play." Their effectiveness is a direct function of local social and logistical conditions.

Differentiated Resource Allocation: As seen in Nigeria, a "one-size-fits-all" budget is inefficient. Fragile settings like Sokoto necessitate higher-cost mobile components, while stable areas like Bauchi can be managed through less expensive fixed posts.

Adaptation over Standardization: The success of the Bangladesh HCD model highlights that subnational adaptation is the most critical factor for overcoming barriers to immunization.

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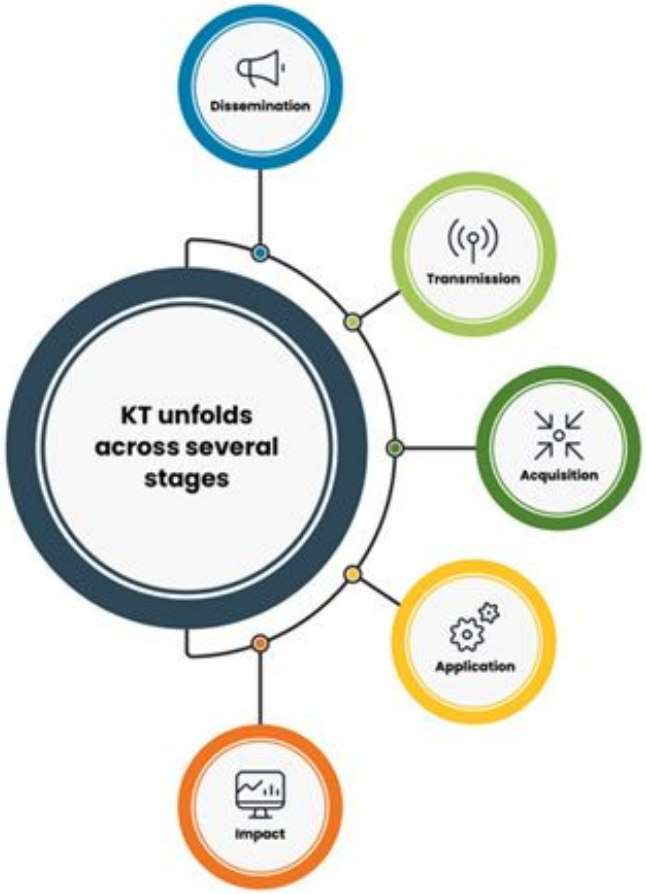
Bridging Evidence to Action in Zero-Dose Programming

ZDLH Knowledge Translation

Across Learning Hubs, translating evidence into action required structured approaches beyond dissemination



Global health research is a powerful tool for informing policies, shaping interventions, and improving health outcomes. However, research findings may not always lead to change.

To bridge the gap between knowledge and action, researchers need to implement strategic, well-designed **knowledge translation** (KT) plans that engage stakeholders to drive measurable impact.

Measuring KT means tracking its journey from dissemination to measurable impact. The KT process follows a continuum:

Dissemination: Sharing findings through reports, presentations, or policy briefs.

Transmission: Tailoring information so stakeholders understand its relevance.

Acquisition: Ensuring stakeholders comprehend the knowledge and recognize its value.

Application: Tracking whether stakeholders apply the research in decision-making.

Impact: Measuring policy, programmatic, or health outcome improvements.

Learn more: ZDLH Knowledge Translation Resources

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Zero-Dose Learning Hub
Tools and Resources

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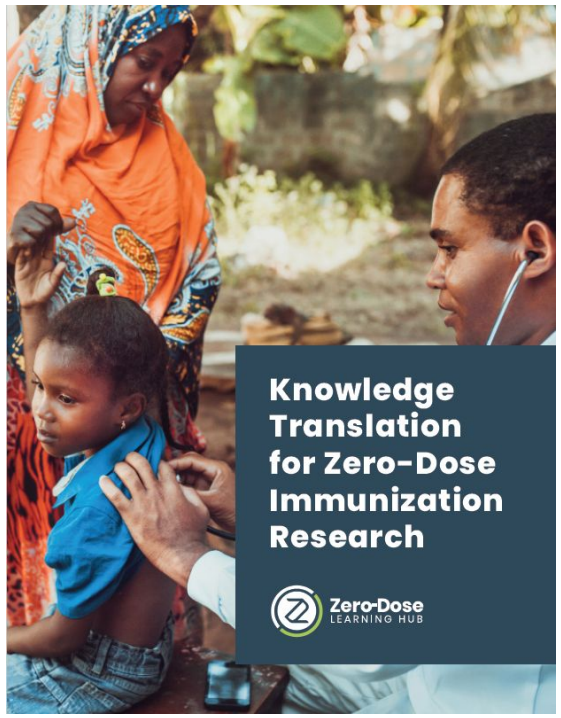
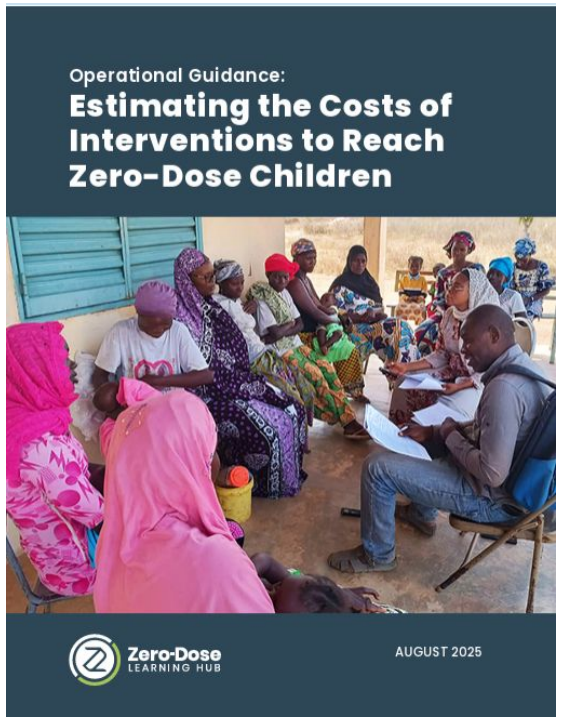
ZDLH Global Toolkits & Resources

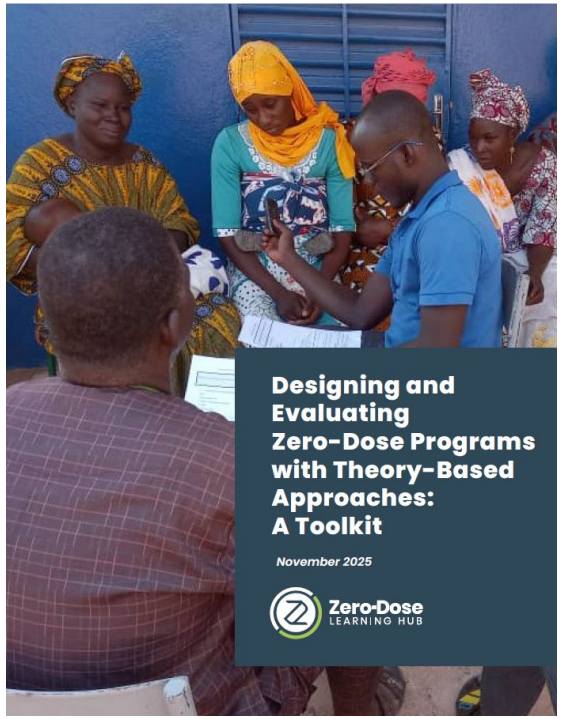
ZDLH identified gaps with the Learning Hubs and Gavi, and provided customized technical assistance and tools to address these gaps.



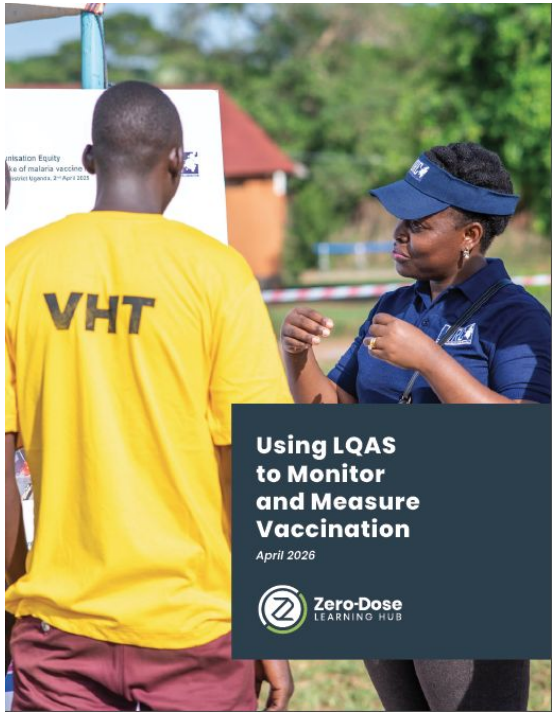
[Knowledge Translation for Zero-Dose Immunization Research]



[Estimating the Costs of Interventions to Reach Zero-Dose Children]



[Theory-Based Approaches for Zero-Dose Program Measurement and Evaluation]



[Using Lot Quality Assurance Sampling to Monitor and Measure Vaccination]

Zero-Dose LEARNING HUB

Addressing the Need for Standardized Methods
ZDLH Costing Toolkit

ZDLH identified a critical gap: few costing studies on zero-dose interventions

Most studies lack information on the **costing methods** used and existing costing guidance focuses on estimating costs of immunization programs more broadly.

- See ZDLH scoping review published in *Vaccines.*

Because costing data is frequently missing, yet **essential for planning, budgeting, and advocacy**, the ZDLH Costing Toolkit was created to serve as a practical, central resource for generating reliable financial and economic cost estimates.

Toolkit recommends methods for costing ZD interventions through IR:

- Measuring **incremental retrospective cost** of ZD interventions using ingredients costing
- **Reporting methods, analyses and findings** for understanding and uptake
- Complements *Immunization Economics* work

Inside the Costing Toolkit

- Specific **methodological** guidance
- Practical **tools** and examples
- Reporting **frameworks**
- Companion resources and **case studies**

Learn more: ZDLH Immunization Costing Resources

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Addressing the Need for Adapted IR Designs

ZDLH Theory-based Evaluation Toolkit

ZDLH identified a critical gap: Existing guidance for theory-based evaluations is not adapted to the immunization or ZD context

The TBE toolkit responds to a critical need for **adapted designs** in implementation research. Because ZD children often live in complex and rapidly changing environments, **flexible and responsive programming** is required.

TBE approach accommodates research challenges: unexpected funding delays or **lack of a comparison/control group**.

By centering evaluations around a **theory of change** (TOC), the toolkit fills a gap in aligning stakeholders around the expectations of an intervention.

The toolkit helps partners move beyond just measuring technical outputs, enabling them to **continuously adapt and learn** by checking whether their program assumptions and risks are holding up or changing over time.

Inside the Theory-Based Evaluation Toolkit

- Steps for developing a **Theory of Change**
- Revisiting and **revising** the TOC
- Considerations for immunization and **ZD programming**
- **Tools, templates, and resources**
  - Stakeholder Mapping
  - Outcome Mapping
  - Root Cause Analysis
- **Examples** of how the Learnings Hubs used TBE approaches

Learn more: ZDLH Theory-based Evaluation Resources

Zero-Dose LEARNING HUB

Addressing the 'Know-Do' Gap

ZDLH Knowledge Translation Toolkit

ZDLH identified a critical gap: the need for targeted technical assistance to facilitate the dissemination and uptake of those findings

Public health findings are not always implemented or integrated into **policies**, **programs**, or **day-to-day practices**.

The ZDLH KT toolkit bridges the **"know-do" gap** by transforming research into action for improving ZD outcomes.

Companion briefer **Measuring Knowledge Translation Efforts** presents a **theory of change** that links KT inputs, activities, outputs, outcomes, and long-term improvements; and describes practical indicator types—including process, reach, use, action, change, and outcome measures.

Learn more: ZDLH Knowledge Translation Resources

Inside the KT Toolkit

- **Step-by-step process** for developing KT plans
- **Guiding questions**
- Stakeholder identification and engagement strategies
- Guidance on **messaging and dissemination**
- Methods for **measuring impact**
- Links to **resources**

Also available in French: ***Application des connaissances pour la recherche sur la vaccination zéro-dose***

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Addressing the Need for Operational Guidance

Lot Quality Assurance Sampling (LQAS) Toolkit

ZDLH identified a critical gap: existing guidance was outdated and lacked practical support for the design and planning of LQAS surveys for immunization measurement

- **LQAS Toolkit** provides **operational guidance, tools and templates** for using the method in the immunization context
- Complements **WHO** targeted survey toolkit
- Case examples **from Nigeria and Mali Learning Hubs**
- Extensive **external review**

Learn more: ZDLH Lot Quality Assurance Sampling Resources

Inside the LQAS Toolkit

Key concepts

- Lots and sample size
- Upper and lower thresholds
- Statistically determined decision rule
- Classification errors
- Probability proportional to size (PPS), segmentation and parallel sampling

Tools & templates for survey planning

- Study protocol
- Questionnaires for RI and BeSD Indicators
- Decision rule table
- Training slides
- Data analysis formats
- Sample size calculator

Zero-Dose LEARNING HUB Behavioral & Social Drivers (BeSD) Synthesis

- Secondary analysis of pooled data from cross-sectional (baseline) surveys in Bangladesh and Nigeria
- Patterns and associations of selected BeSD indicators and vaccination outcomes
- ZD prevalence, under immunization, DTP1-DTP3 dropout, DTP3-MCV1 dropout

Research Questions

1. What are the patterns of subnational variation in key BeSD indicators when comparing high and low ZD prevalence, and how do these patterns differ between Bangladesh and Nigeria, and across urban versus rural settings within each country?
2. Which BeSD indicators are the strongest independent predictors for the immunization outcomes?
3. What are the significant effect modifications (interactions) between key sociodemographic variables and BeSD indicators in predicting immunization outcomes?
4. What lessons were learned regarding the utility and comparability of standardized BeSD indicators across contexts?

Analyses

- Normalization/weights to account for differences in sample sizes
- Descriptive comparisons (weighted Chi Square or ANOVA) for initial patterns of differences (Q1)
- Multilevel models or weighted multivariate logistic regression (Q2)
- Use of interaction terms (BeSD x sociodemographics) (Q3)
- Methodological assessment (Q4)

ZDLH Published Manuscripts

1. Measuring Zero-Dose Children: Reflections on **Age Cohort Flexibilities** for Targeted Immunization Surveys at the Local Level *(Vaccines, 13 February 2024)*
2. Scoping Review of Current **Costing** Literature on Interventions to Reach Zero-Dose Children in Low- and Middle-Income Countries *(Vaccines, 19 December 2024)*
3. Targeted Assessment of Prevalence of Zero-dose and Under-immunised Children in **Bangladesh** *(BMJ Global Health, 5 December 2025)*
4. Prevalence of and Factors Associated with Zero-dose and Under-immunized Children in Selected Areas of **Bangladesh**: Findings from Lot Quality Assurance Sampling Survey *(Vaccine, 10 May 2024)*
5. Identifying the Zero-dose and Under-immunized Children in **Bangladesh**: Approaches and Experiences *(PLOS One, 28 October 2024)*
6. Decentralized Immunization Monitoring: Lessons Learnt from a Pilot Implementation in Kumbotso LGA, Kano State, **Nigeria** *(Vaccines, 20 June 2025)*
7. Exploring the Landscape of Routine Immunization in **Nigeria**: A Scoping Review of Barriers and Facilitators *(Vaccine: X, October 2024)*
8. Gavi's Zero-Dose Learning Hub: Enhanced Approach for Evidence Generation and Use from Local to Global *(Health Policy and Planning, 10 March, 2026)*
9. A Learning Agenda to Address Immunization Equity and Access for Nigeria to End Zero-Dose Children by 2030: Report from a National Stakeholder Consensus Workshop *(The Nigerian Medical Journal, March 2026)*

vaccines

MDPI

Perspective

Measuring Zero-Dose Children: Reflections on Age Cohort Flexibilities for Targeted Immunization Surveys at the Local Level

Gustavo C. Corrêa [1,*], Md. Jasim Uddin [2], Tasnuva Wahed [2], Elizabeth Oliveras [3], Christopher Morgan [3], Moses R. Kamya [4,5], Patience Kabatangare [4], Faith Namugaya [4], Dorothy Leab [6], Didier Adjakidje [6], Patrick Nguku [7], Adam Attahiru [7], Jenny Sequeira [8], Nancy Vollmer [9] and Heidi W. Reynolds [1]

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Abstract: Zero-dose (ZD) children is a critical objective in global health, and it is at the heart of the Immunization Agenda 2030 (IA2030) strategy. Coverage for the first dose of diphtheria–tetanus–pertussis (DTP1)-containing vaccine is the global operational indicator used to estimate ZD children. When surveys are used, DTP1 coverage estimates usually rely on information reported from caregivers of children aged 12–23 months. It is important to have a global definition of ZD children, but learning and operational needs at a country level may require different ZD measurement approaches. This article summarizes a recent workshop discussion on ZD measurement for targeted surveys at local levels related to flexibilities in age cohorts of inclusion from the ZD learning Hub (ZDLH) initiative—a learning initiative involving 5 consortia of 14 different organizations across 4 countries—Bangladesh, Mali, Nigeria, and Uganda—and a global learning partner. Those considerations may include the need to generate insights on immunization timeliness and on catch-up activities, made particularly relevant in the post-pandemic context; the need to compare results across different age cohort years to better identify systematically missed communities and validate programmatic priorities, and also generate insights on changes under dynamic contexts such as the introduction of a new ZD intervention or for recovering from the impact of health system shocks. Some practical considerations such as the potential need for a larger sample size when including comparisons across multiple cohort years but a potential reduction in the need for household visits to find eligible children, an increase in recall bias when older age groups are included and a reduction in recall bias for the first year of life, and a potential reduction in sample size needs and time needed to detect impact when the first year of life is included. Finally, the inclusion of the first year of life cohort in the survey may be particularly relevant and improve the utility of evidence for decision-making and enable its use in rapid learning cycles, as insights will be generated for the population being currently targeted by the program. For some of those reasons, the ZDLH initiative decided to align on a recommendation to include the age cohort from 18 weeks to 23 months, with enough power to enable disaggregation of key results across the two different cohort years. We argue that flexibilities with the age cohort for inclusion in targeted surveys at the local level may be an important principle to be considered. More research is needed to better understand in which contexts improvements in timeliness of DTP1 in the

ZDLH Website & Resources

The **ZDLH website is a curated resource hub**: A one-stop shop for ZD resources, including research outputs, case studies, conceptual frameworks, webinar materials, and toolkits developed by ZDLH, the Learning Hubs, and other immunization experts.

On-Demand Learning Materials

1. From Evidence to Action: How Local Networks Accelerate ZD Evidence Uptake
2. Unlocking Tailored Solutions: Understanding Root Causes and Barriers to Reaching ZD Children
3. Vaccinating Every Child: Promising Strategies for Reaching ZD Children in Mali & Uganda
4. Vaccinating Every Child: Promising Strategies for Reaching ZD Children in Bangladesh & Nigeria
5. Country Learning Hub Spotlights: Reflections on Identifying and Reaching ZD Children
6. Pro-Equity Strategies to Reach Zero-Dose Children
7. Equity in Action: Local Strategies for Reaching Zero-Dose Children and Communities
8. ZDLH Inter-Country Peer Learning Exchange - Bangladesh & Mali (ZDLH-X1)
9. ZDLH Inter-Country Peer Learning Exchange - Nigeria & Uganda (ZDLH-X2)

Web Analytics Snapshot

April 2023 – March 2026

- **33,101** users
- Total downloads: **13,073**
- **185** countries sent visitors. Top countries: U.S., Nigeria, India, Switzerland, Uganda, U.K., Ethiopia, Netherlands

Learn more at **www.zdlh.gavi.org**

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- **Dan Hogan**—Head MSI
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Zero-Dose LEARNING HUB

Detailed Findings
Country Learning Hub Evidence

- The following country sections provide detailed, context-specific findings from each Learning Hub
- Findings are not directly comparable across countries

Gavi The Vaccine Alliance

JSI

IIHMR DELHI

THE GENEVA LEARNING FOUNDATION

Bangladesh Learning Hub

Led by the International Center for Diarrhoeal Disease Research, Bangladesh (icddr,b) with partners Jhpiego and RedOrange Communications

Gavi The Vaccine Alliance

jhpiego Johns Hopkins University Affiliate

redorange communications STRATEGY IMPLEMENTATION CREATION

icddr,b

Zero-Dose LEARNING HUB

Zero-Dose LEARNING HUB

Bangladesh Learning Hub
Overview

Country-led consortium funded by Gavi, the Vaccine Alliance and implemented in collaboration with the **Government of Bangladesh EPI** and local stakeholders.

Lead organization: International Centre for Diarrhoeal Disease Research, Bangladesh (**icddr,b**), with partners:

- **Jhpiego**: technical leadership and implementation support
- **RedOrange Communications**: communications and advocacy

Timeline: October 2022 – December 2025

- Established under Gavi 5.0 to address persistent gaps in reaching zero-dose (ZD) and under-immunized (UI) children

Geographic focus: Implementation Research (IR) conducted in **five rural districts** (Sunamganj, Gaibandha, Noakhali, Rangamati, Sherpur) and **one City Corporation** (DNCC). The study selected six intervention areas and matched them with six comparison areas. The study on Forcibly Displaced Myanmar Nationals (FDMN) was conducted in Cox's Bazar and Noakhali districts, covering both refugee camps and adjacent local communities.

Context

- Bangladesh has high national immunization coverage (~82%), but 16–20% of children remain ZD or UI
- ZD/UI concentrated in hard-to-reach rural landscapes and urban slums
- Learning Hub created to identify these pockets and generate operational evidence on how to reach missed communities

Goals & Strategic Objectives

Using Gavi's IRMMA framework, the Learning Hub set out to:

- Develop and test practical approaches to reach ZD/UI children and integrate them into routine immunization
- Identify barriers and enabling factors affecting vaccination uptake
- Design and implement context-specific interventions within the existing health system
- Evaluate effectiveness and cost-effectiveness to inform national scale-up decisions
- Strengthen data use for tracking ZD status and monitoring progress

The Learning Hub's activities were structured around five core components:

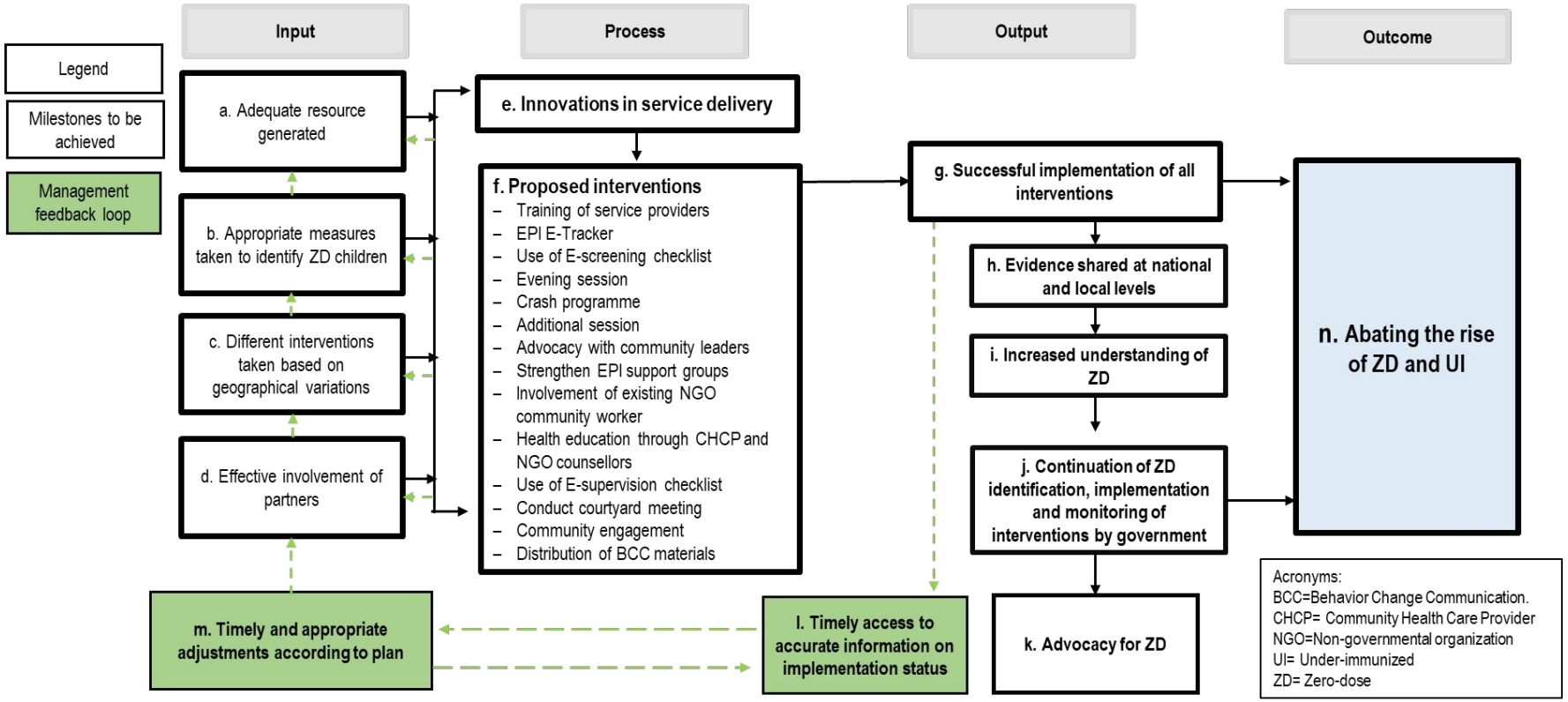
1. Partner engagement and government collaboration
2. Rapid and in-depth assessments
3. Implementation research in selected high-priority districts
4. Monitoring, learning, and knowledge products
5. Targeted studies in humanitarian and vulnerable populations

IR used a quasi-experimental design comparing intervention and comparison areas to test scalable solutions.

Zero-Dose LEARNING HUB

Bangladesh Learning Hub

Theory of Change



Assumptions: EPI program is functional in study areas; Study areas are accessible to the study team; EPI partners are on board the hub's suggestions for changing the design of reach interventions; local level EPI staff participate in data reviews

The Bangladesh Learning Hub followed a systematic pathway using the five strategic pillars of Gavi's IRMMA framework:

- **Evidence-Driven *Identification*:** Utilizing rapid assessments and rolling DHIS2 reviews to pinpoint "hidden" pockets of ZD and UI children.
- **Targeted Interventions (*Reach*):** Implementing context-specific strategies—including evening sessions for urban working parents and crash programs for Char areas—to overcome geographic and socioeconomic barriers.
- **Technical & Digital Strengthening *(Measure/Monitor):*** Strengthening visibility and routine use of subnational data for timely action.
- **Institutionalized *Advocacy*:** Integrating ZD/UI metrics into routine national & subnational health coordination meetings to ensure political commitment and long-term sustainability.

Zero-Dose LEARNING HUB

Bangladesh Learning Hub

Scope of Work and Approaches

	Overview	Geographic Coverage	Related Publications
Rapid Assessment	Rapid assessment to locate missed communities with clusters of ZD and UI children and identify the demand- and supply-side barriers to reaching them. This study aimed to inform the development of targeted implementation research interventions.	• Sunamganj • Gaibandha • Noakhali • Sherpur • Urban clusters within DNCC	Country Learning Hub for Immunization Equity in Bangladesh: Findings from Rapid Assessment Identifying the Zero-dose and Under-immunized Children in Bangladesh: Approaches and Experiences Targeted Assessment of Prevalence of Zero-dose and Under-immunised Children in Bangladesh
Implementation Research	IR in selected upazilas / wards across five districts and one city corporation, representing distinct geographical areas selected to represent hard-to-reach settings and urban zones, allowing the Learning Hub to test and evaluate interventions tailored to specific local needs. The IR areas include intervention and comparison sites that were matched based on similar demographic and health characteristics. The research sought to identify enabling factors and persistent barriers during the implementation process.	• Sunamganj • Gaibandha • Noakhali • Rangamati • Sherpur • DNCC	Strategies for Reducing ZD and UI Children in Bangladesh: Implementation Research Findings
Economic Evaluation	To measure the total and incremental costs of ZD/UI interventions and evaluate their cost-effectiveness in terms of DALYs averted. The aim was to provide evidence on the economic viability and scalability of these strategies within the national health system.	Comparative analysis across urban, rural, and hard-to-reach implementation sites	Implementation Research for Reducing ZD and UI Children in Selected Areas of Bangladesh: Findings from an Economic Evaluation
Forcibly Displaced Myanmar National Study	To assess EPI service delivery and vaccination coverage (including ZD and UI status) among Forcibly Displaced Myanmar Nationals (FDMN) and adjacent host communities. The study aimed to document supply chain processes and assess demand and willingness for immunization in humanitarian settings.	**Cox's Bazar** • Ukhiya (25 FDMN camps) • Teknaf (6 FDMN camps) **Noakhali** • Hatiya (Bhasan Char)	Assessing EPI Service Delivery and Immunization Status Among Forcibly Displaced Myanmar Nationals and Host Communities in Bangladesh
Rolling Review of DHIS2	To conduct nationwide analysis of administrative data to monitor immunization equity and pinpoint shifting ZD burdens. This iterative review serves as an early warning system to identify emerging hotspots and guide evidence-driven policy adjustments.	National level with deep-dives into 10 high-priority Upazilas.	—

Zero-Dose LEARNING HUB

Bangladesh Learning Hub

Research Methodology

Methodology	Description & Framework Utilization
Lot Quality Assurance Sampling (LQAS)	A quantitative monitoring tool used to validate "missed communities" identified in administrative data. Clusters were confirmed as high-priority if ZD/UI prevalence was >10 percent.
Mixed-Methods Implementation Research	Utilized a quasi-experimental pre-post design to assess intervention impact. This included large-scale household surveys (baseline and endline) triangulated with key informant interviews, focus group discussions, and in-depth interviews.
Secondary Data Triangulation	Harmonized and cross-verified data from the national DHIS2 dashboard, Coverage Evaluation Surveys (CES), and the Bangladesh Demographic and Health Survey (BDHS).
Human-Centered Design (HCD)	Applied human-centered design tools, including persona development and journey mapping, to understand caregiver drivers and refine area-specific intervention strategies.
Economic Evaluation & Modeling	Measured total and incremental costs using an "ingredients approach." Used the Lives Saved Tool (LiST) to estimate disability-adjusted life years (DALYs) averted and determine cost-effectiveness.
Geographic & Social Mapping	Conducted transect walks, spot-visits, and community consultations to create physical sketch maps of hard-to-reach pockets and document local landmarks/barriers.
Co-Creation & Validation Workshops	Facilitated multi-stakeholder sessions to validate research findings and jointly design locally-relevant solutions for both routine and humanitarian settings.

Mixed-Methods Design: FDMN & Host Communities

Conducted a **cross-sectional mixed-methods** study to assess immunization status and barriers among Forcibly Displaced Myanmar Nationals (FDMN) and adjacent host communities.

Phase	Activity	Sample / Scope	Analytical Approach
Mapping	Geographic & Social Mapping	Blocks, Landmarks, & Stakeholder consultations (Camp in Charge, Majhees, Imams)	**Contextual Mapping:** Thematic synthesis of migration and service landscape
Quantitative	Household Survey (Kobo Toolbox)	• n=6,026 households (4,470 FDMN; 1,556 Host communities) • Two-stage cluster & "Take-all" sampling	**Statistical (STATA):** Coverage rates, dropout analysis, and adjusted odds ratios for ZD/UI
Qualitative	KIIs, FGDs, & In-Depth Interviews	21 key informant interviews (UN, WHO, NGO), 3 FGDs (vaccinators), 12 IDIs (caregivers)	**Thematic (ATA):** Combined inductive/deductive coding to identify behavioral drivers
Validation	Co-creation Workshops	10 local and district-level sessions with service providers and community	**Joint Validation:** Stakeholder consensus to prioritize actionable solutions

Zero-Dose LEARNING HUB

Bangladesh Learning Hub
Stakeholder Engagement

Zero-dose evidence entered routine, existing decision forums and triggered scale discussions

Level	Key Activities & Platforms	Outcome & Evidence Uptake
National Governance	Formed a National Monitoring Committee chaired by the Additional Secretary of MOHFW, including WHO, UNICEF, and PATH.	Institutionalized zero-dose as a standing agenda item in monthly national and sub-national health review meetings.
Technical Integration	Engaged strategically with National Immunization Technical Advisory Group (NITAG) and Interagency Coordination Committee (ICC).	Integrated ZD/UI and Behavioral and Social Drivers (BeSD) indicators into National Coverage Evaluation Survey (CES).
Sub-national Leadership	Facilitated Subnational Committee Meetings with Civil Surgeons and Upazila Health Officers to troubleshoot operational barriers.	District managers in Sherpur and Sunamganj advocated for the scale-up of e-screening checklist and evening sessions.
Community Co-creation	Conducted Validation & Co-creation Workshops in FDMN (refugee) camps and urban slums with caregivers, Imams, and Majhees.	Developed locally-relevant solutions, such as using mosque announcements and issuing "recognition cards" for fully immunized children.
Digital Health Systems Strengthening	Supported development of a prototype ZD DHIS2 Dashboard for real-time data sharing.	Data and recommendations directly informed the Gavi Equity Accelerator Fund (EAF) application for Bangladesh.

Zero-Dose LEARNING HUB

Bangladesh Learning Hub
Drivers and Determinants of Zero-Dose

Access barriers differ by setting—the solution has to differ by setting

Category	Primary Zero-Dose Drivers & Key Findings from Rapid Assessment in Bangladesh
Socio-demographic	**Geography:** 2–3x higher risk in Haor (wetlands), coastal areas, and urban slums **Vulnerable Groups:** Female children (1.4x), male caregivers (2.3x), and large families (3+ children) **Socioeconomic:** Strongest prevalence among uneducated caregivers and lowest wealth quintile
Demand-Side Barriers	**Health/Fear:** Child illness is the primary reason for missing doses; fear of side effects is second **Logistics:** Work schedules (urban) and harvest seasons (rural) conflict with session times **Agency:** Lack of family/husband permission for mothers; high migration/mobility
Supply-Side Drivers	**Infrastructure:** 35% vacancy in vaccinator posts; national shortages of Pentavalent/PCV antigens **Access:** Households >1km from centers are 1.9x more likely to be ZD **Data:** Inaccurate target population estimates **Shocks:** Disruptions from political unrest
Contextual (FDMN / Refugee)	**Incentive Gap:** Incentives drive entry (high BCG uptake for ration cards), but not completion (high drop-out for later doses) **Communication:** Language barriers between Bengali providers and Rohingya caregivers and documentation issues affect follow-up

National averages are masking deep, localized inequities

A *one-size-fits-all* vaccination strategy is no longer sufficient—the research confirms that while Bangladesh has high national coverage (81.6%), ZD/UI children are concentrated in specific "blind spots" (specifically Haor, Coastal, Char, and urban slums) where the risk of being ZD is 2–3 times higher than in plain lands.

To close this gap, the system should pivot from broad, passive service delivery to **active, area-specific microplanning** that **adapts to the lifestyles of caregivers** (e.g., evening sessions for working mothers) and the **realities of geography** (e.g., crash programs for islands).

Learn more: Country Learning Hub for Immunization Equity in Bangladesh: Findings from Rapid Assessment

Zero-Dose LEARNING HUB

Bangladesh Learning Hub
Implementation Research Interventions Tested

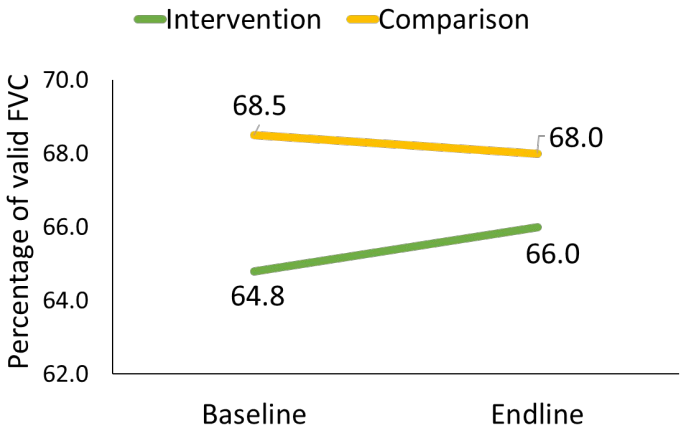
Intervention	Objective	Key Results	Strategic Takeaways
E-screening Checklist (Rural Hard-to-Reach)	**Mitigate HR Shortage:** Task-shift identification of ZD/UI children to *non-EPI* staff (Family Planning, Community Providers) during routine health visits.	• 1,138 ZD/UI children identified. • 963 (84.6%) of those identified were successfully vaccinated during the study. • 8.0% ZD/UI prevalence among users vs. 17.0% among non-users (p=0.006).	**Validated Workforce Solution:** Highly effective for task-shifting. Civil Surgeons in Sherpur and Sunamganj formally requested scale-up to offset the 35% vaccinator vacancy gap.
E-tracker (Urban)	**Prevent Dropouts:** Digital registration and SMS reminders to track individual children longitudinally and reduce dropouts.	• 4,263 newborns registered during the IR period. • ZD prevalence significantly lower among users (0.4%) vs. non-users (2.8%, p<0.001).	**Retention Tool:** Effective for retention, but field staff reported the volume of data entry is burdensome. National scale-up (ongoing) must simplify the interface to prevent worker burnout.
E-supervision Checklist (Coastal Hatiya)	**Ensure Accountability:** Monitor session quality and enforce field visits by supervisors (Health Inspectors).	• Improved initial accountability but usage declined over time. • Constraint: Supervisors stopped using it due to lack of travel allowances to reach remote centers and poor internet connectivity.	**Logistics Dependent:** Digital tools fail without operational budgets. Digital supervision requires a corresponding travel allowance in the Operational Plan; otherwise, supervisors cannot physically visit the field.
Modified EPI Sessions (Urban)	**Remove Time Barriers:** Accommodate working mothers in slums unable to attend standard 9-3 PM sessions.	• 1,099 children vaccinated across 119 sessions.• Expanded to non-intervention Ward 33 by local authorities due to high demand.	**Urban Policy Shift:** Fixed daytime schedules are structurally exclusionary. "Time-shifting" is operationally viable and essential for urban equity.
Crash Programs (Remote Char/Haor)	**Overcome Geography:** Deliver vaccines to isolated areas where routine monthly sessions are frequently missed.	• 1,834 children vaccinated (208 ZD, 436 UI) across 76 programs.• Reached deep pockets of exclusion missed by routine microplans.	**Budgetary Necessity:** Flexible scheduling works but is resource-intensive. Sustainability requires specific transport budget lines in the Operational Plan.
Expanded Sessions (Additional Fixed)	**Increase Access:** Increase frequency of sessions (e.g., from 2 to 4 days/week) in high-demand / large catchment areas.	• 15.1% ZD/UI prevalence among users vs. 16.9% non-users (p=0.089). • Implementation hampered by nurse shortages and conflicting duties.	**Capacity Dependent**: Increasing frequency is only effective if there is workforce capacity. Without filling vacancies, stretches staff too thin.
Advocacy Meetings (Char/Hilly)	**Mobilize Leaders:** Engage Union Parishad members, religious leaders, and teachers to champion vaccination.	• 12.5% ZD/UI prevalence among communities reached vs. 16.9% not reached (p=0.508). • Qualitative data showed improved community ownership.	**Foundational Step:** While statistically less potent alone, it is a prerequisite for access in conservative areas to counter misconceptions and allow vaccinators entry.
Courtyard Meetings & BCC (Plain/General)	**Generate Demand:** Address fear of side effects and lack of awareness through interpersonal communication.	• Courtyard: 3.9% ZD/UI prevalence (attendees) vs. 17.7% (non-attendees) (p<0.001). • BCC: 7.4% prevalence (recipients) vs. 17.0% (non-recipients) (p<0.001).	**High Impact:** The strongest statistical driver of coverage. Validates that Interpersonal Communication (IPC) is not "soft" work but a critical clinical intervention for demand.
Engaging NGO Workers (Hilly Areas)	**Extend Reach:** Utilize NGO "Para Kormi" to mobilize in difficult terrain where government staff is scarce.	• 7.4% ZD/UI prevalence in NGO-supported areas vs. 17.0% in unsupported areas (p=0.129). • Critical for reaching scattered populations in Rangamati.	**Last Mile Necessity**: In hilly terrain with high government vacancies, NGO collaboration must be formalized in micro-plans rather than treated as ad-hoc support.

Zero-Dose LEARNING HUB

Bangladesh Learning Hub Results
Findings from Implementation Research

Intervention areas were more protected from vaccination coverage declines than comparison areas—service delivery adaptations helped buffer vulnerable communities, within constraints of supply and workforce disruptions

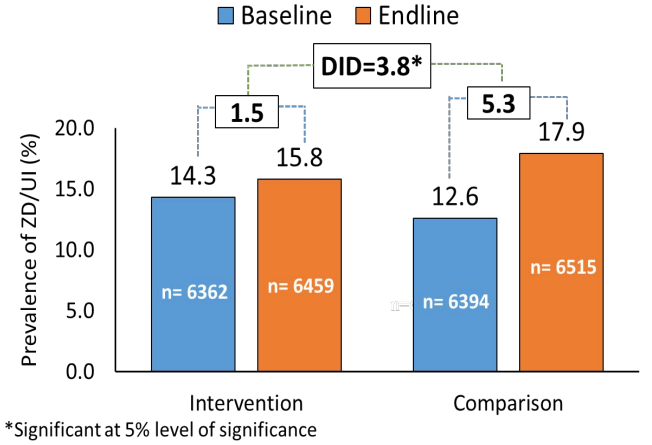
Valid Full Vaccination Coverage (FVC) Among Children aged 12-23 Months



The valid full vaccination coverage increased in the intervention areas as opposed to having declined in the comparison areas

- Valid, full vaccination coverage in intervention areas increased from 64.8% to 66.0%.
- In contrast, coverage in comparison areas declined from 68.5% to 68.0% over the same period.
- This resulted in a statistically significant Difference-in-Difference (DID) estimate of 3.8%, indicating the set of tested interventions successfully buffered vulnerable populations against coverage loss.

Prevalence of ZD/UI with Difference-in-Difference (DID) Estimates



*Significant at 5% level of significance

The DID estimate showed significant increase of prevalence ZD/UI in comparison areas compared to the intervention areas, indicating a positive impact of the implemented interventions

Learn more: Strategies for Reducing Zero-Dose and Under-Immunized Children in Bangladesh: Implementation Research Findings

Zero-Dose LEARNING HUB

Bangladesh Learning Hub Results

Tailored Service Delivery Models are Required to Close Equity Gaps

Immunization services should pivot from "provider-centric" (fixed hours/locations) to "user-centric" (evening/mobile) models to close the equity gap

Evidence: Rapid assessments and human-centered design identified that working mothers in urban slums (Zone 5 DNCC) could not vaccinate children during standard daytime hours.

Action: City Corporation decision-makers (CHO and AHO) approved and introduced evening EPI Sessions.

Change: Based on successful results (1,099 children vaccinated), the sub-national committee expanded these sessions to Ward 33, continued regularly without external ZDLH funding.

Sustainability: Vaccine stockouts, staff shortages, high NGO staff turnover and limited funding threaten sustainability and expansion. Continuous engagement of AHOs, EPI supervisors, and NGO workers is needed to:

- Integrate evening sessions into microplans
- Ensure adequate budget and human resources allocation

Key Takeaways and Strategic Shifts Recommended

1. Tailored, context-specific interventions successfully reversed coverage declines in hard-to-reach areas compared to control sites. Urban health policy should institutionalize flexible hours. Low urban coverage is often a result of temporal barriers, not vaccine hesitancy.
2. Tailoring services is not an "expensive luxury" but a "highly cost-effective" public health investment that justifies domestic financing.
3. The health system can address vaccinator shortages by task-shifting identification duties to the broader health workforce. Civil Surgeons in Sherpur and Sunamganj have already requested the scale-up of this tool to mitigate HR gaps.
4. Flexible delivery models (demand-side/access fixes) cannot overcome supply-side failures. Organizing an evening session is futile if the vaccines are not available. Ensuring uninterrupted vaccine supply through timely Operational Plan approvals is a prerequisite for these tailored models to function.

Learn more: Strategies for Reducing Zero-Dose and Under-Immunized Children in Bangladesh: Implementation Research Findings

Zero-Dose LEARNING HUB

Bangladesh Learning Hub Results
Reaching the Hard-to-Reach

While routine EPI sessions often fail in geographically isolated areas due to staff shortages and accessibility issues, short-term, intensive campaigns can successfully bridge the identify + deliver gap

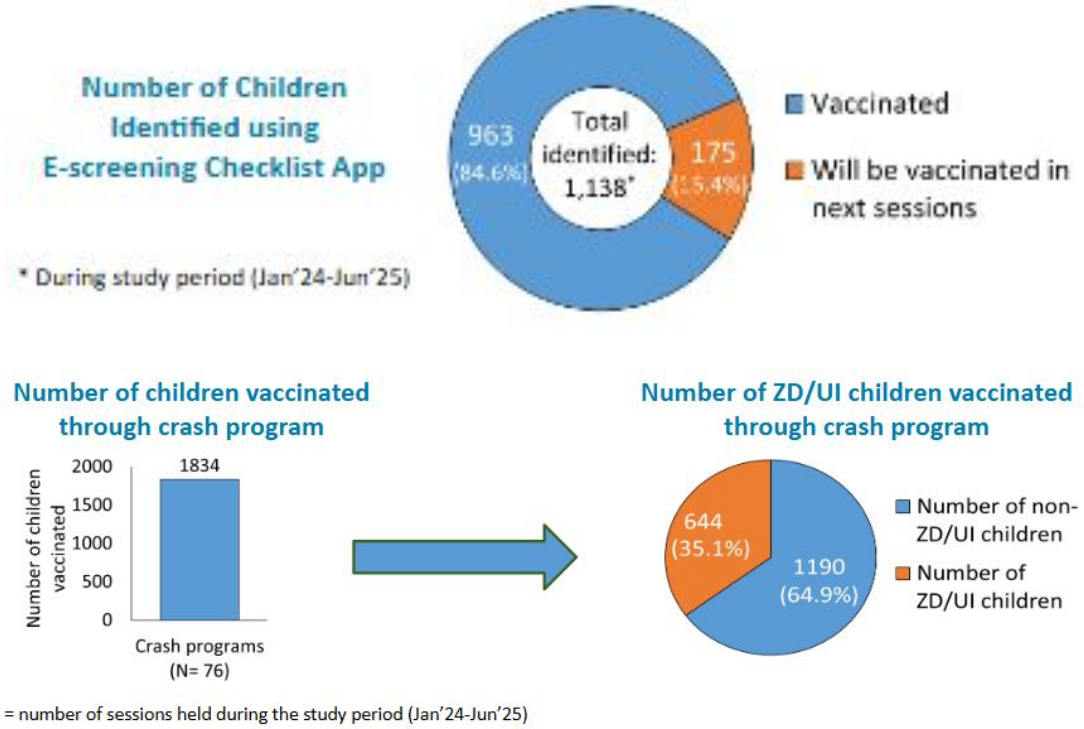
***(Identify)* E-Screening Checklist:** Mobile apps were deployed to non-vaccination health workers to identify ZD children during other household visits to address human resource shortage.

- **Result:** 84.6% (963) of identified ZD/UI children were successfully vaccinated.

***(Reach)* Crash Programs:** Special vaccination days were arranged for scattered populations in wetlands (Chars) and hilly areas.

- **Result:** These programs are now conducted regularly in hard-to-reach areas despite the end of ZDLH implementation research support.

→ ***What enables sustainability:*** *Transport funding + vaccine availability + local leadership ownership*



Learn more: Strategies for Reducing Zero-Dose and Under-Immunized Children in Bangladesh: Implementation Research Findings

Zero-Dose LEARNING HUB

Bangladesh Learning Hub Results

National Policy & Data Visibility

Sustainability requires institutionalization: embed zero-dose into routine tools, agendas, and microplans—not project cycles

ZD Should be “Business as Usual”

- The Learning Hub successfully advocated for ZD/UI children to be included as a **standing agenda item** in monthly coordination meetings at the division, district, and upazila levels – effective engines for translating data into immediate operational corrections.
- ZDLH successfully advocated for the inclusion of ZD and Behavioral and Social Drivers (BeSD) indicators into the **national Coverage Evaluation Survey (CES)** to allow future national datasets to capture equity data.

Granularity is the Key to Sustainability: The "Blind Spot" Fix

- A **prototype dashboard** was developed to visualize ZD status using DHIS2 data. Previously, the national DHIS2 dashboard only displayed immunization data up to district or upazila (sub-district) level, which masked localized pockets of under-immunization.
- Through ZDLH advocacy and technical support, the government expanded the **DHIS2 dashboard** to display data at the union, ward, and cluster (community) level, moving ZD children from "hidden" in aggregate data to being visible to local field staff.

Successful Interventions are Ready for Scale-Up

- **Digital checklists** (E-supervision) were adopted by MOHFW field staff to strengthen ongoing monitoring and accountability.
- District-level managers (Civil Surgeons) have explicitly requested the scale-up of multiple interventions based on generated evidence. The decision to expand **evening sessions** to non-intervention wards demonstrates that local ownership, a prerequisite for sustainability, has already begun.

Sustainability is not just about tools; it is about governance routines.

By embedding ZD discussions into the mandatory monthly meeting agendas, the system ensures that tracking missed children becomes a **routine administrative duty** rather than a special project activity.

The Government of Bangladesh has the economic justification and operational proof to move these from "project pilots" to **"national standard operating procedures"** to move from finding ZD children to institutionalizing the tools needed to keep them in the system.

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Bangladesh Learning Hub Results
Building Resilience Against Systemic Shocks

Immunization gains are fragile and require continuous monitoring—annual DHIS2 rolling reviews are critical for detecting emerging hotspots in real-time, allowing for adaptive management and rapid catch-up sessions

- **The Zero-Dose Landscape is Dynamic, Not Static:** The annual data reviews revealed an expansion of high ZD areas over time. The number of rural upazilas classified as "high ZD" increased from 149 in 2022 to 227 in 2023, and further to 385 in 2024; number of high ZD City Corporation zones doubled from 17 to 34 between 2023–2024.
    - **Zero-dose populations are not fixed solely in "hard-to-reach" geographies.** The landscape shifts rapidly, meaning one-off surveys (like the CES) are insufficient for operational planning. The rolling review serves as a necessary "early warning system" to detect emerging hotspots that stationary surveys.
- **Systemic Failures are Creating New ZD Pockets:** Analysis showed that high-ZD areas shifted geographically; only three areas identified in 2022 remained on the high-ZD list in 2023. The threshold for being a "top 10" high-ZD upazila rose from 12.6% ZD in 2023 to 21% in 2024. This challenges the assumption that ZD children are only found in systematically "missed communities" due to physical access barriers. Vaccine stockouts and human resource shortages (driven by delays in Operational Plan approvals and political unrest) are eroding coverage in areas previously performing well.
    - **Addressing ZD requires stabilizing the supply chain and workforce, not just demand-generation activities.**
- **District-Level Data is Blunt; Micro-Level Data is Essential:** Initially, DHIS2 data was only available up to the upazila (sub-district) level, which masked specific pockets of ZD prevalence.
    - **To be actionable, data must go deeper.** The Learning Hub advocated for and supported the expansion of the DHIS2 dashboard to include union, ward, and cluster-level data. This granularity is required to pinpoint specific "blind spots" rather than applying broad resources to a whole district that appears "green" on average but contains deep pockets of under-immunization.

DHIS2 Rolling Reviews are a Sustainable Policy Tool

Zero-dose populations are not static; they shift due to external shocks like political unrest or vaccine stockouts. Reliance on multi-year surveys (like the CES or BDHS) is too infrequent to catch these shifts.

The MOHFW should **institutionalize annual rolling reviews** combined with **monthly divisional data review meetings**.

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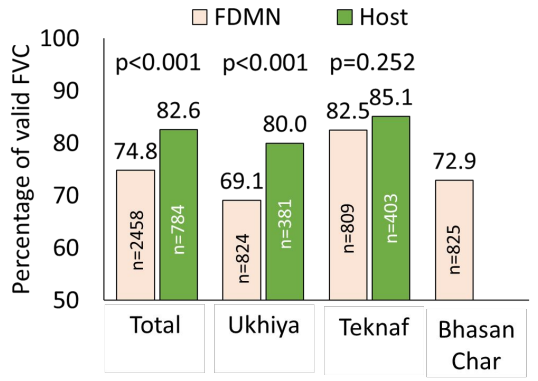
Bangladesh Learning Hub Results
Forcibly Displaced Myanmar Nationals Study

Humanitarian immunization strategies should prioritize a completion strategy (defaulter tracing, caregiver communication, reliable scheduling), not only first contact

Access is not coverage. While the humanitarian response has successfully established access points (low ZD), it has failed to sustain engagement (high UI). The system should move beyond the "ration card" incentive model toward a trust-based, culturally congruent service delivery model that engages fathers, utilizes the Rohingya language, and prioritizes completion over mere initiation:

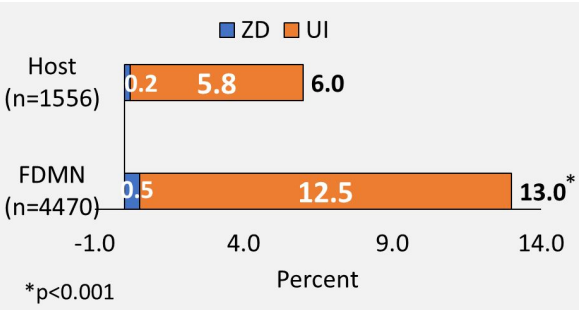
- **The "Incentive Trap" Drives Dropouts:** In FDMN camps, ZD prevalence is low (0.5%) but UI is high (12.5%) as families stop vaccinating once they secure "Family Counting Number" (FCN) card required for rations.
  - High initial access does not equal coverage. The response should pivot from incentive-based motivation (the card) to intrinsic motivation (health benefits) to ensure completion.
- **Language and Gender Barriers Persist:** Most frontline providers do not speak Rohingya, and cultural norms prevent female caregivers from accessing male vaccinators.
  - Programs should prioritize recruiting female vaccinators and utilizing Rohingya-speaking volunteers or community leaders (Majhees/Imams) to bridge the trust and communication gap.
- **Data Quality is a Critical Risk:** Immunization cards in camps frequently contain illogical or missing data (e.g., doses recorded before birth dates), undermining coverage estimates.
  - There is an urgent need to digitize records (e.g., e-tracker) and improve training on documentation to ensure continuity of care in this highly mobile population.

Valid FVC among Children Aged 12-23 Months of FDMN and Host Communities



Valid full vaccination coverage (FVC) is lower in FDMN children than host children

Status of ZD and UI among Children Aged 4.5-23 Months of FDMN and Host Communities



ZD/UI is more than double among FDMN children than host community children

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Key Takeaways

- **Data visibility drives decisions.** Moving DHIS2 visualization to the Union level made ZD children "visible" and actionable for frontline managers. Rolling review of DHIS2 data is an effective, practical, and low-cost approach to identify and track missed communities and monitor changes over time.
- **Human-centered design works.** Local context-specific interventions (evening sessions, crash programs) outperformed standard service delivery. The Learning Hub identified promising interventions through IR to address specific challenges:
  - ✔ to address human resource shortage - **E-screening checklist**
  - ✔ to vaccinate children in hard-to-reach areas - **Crash programs**
  - ✔ to vaccinate children of working mothers in urban areas - **Evening sessions**
  - ✔ to strengthen monitoring systems - **E-supervision checklist**
- **Effective stakeholder engagement is critical.** Knowledge translation at national and sub-national levels helped to implement interventions and overcome challenges. Using existing forums (ICC, NITAG) ensured that local evidence was validated and adopted into national policy, such as the CES survey.

Reaching the "Last Mile" is Highly Cost-Effective

Contrary to the perception that equity interventions are too costly, the economic evaluation provided a strong investment case.

The intervention package had an Incremental Cost-Effectiveness Ratio (ICER) of $442 (BDT 53,934) per DALY averted.

This figure is significantly below Bangladesh's GDP per capita (~$2,820), classifying the program as **"highly cost-effective"** and providing the Ministry of Health with fiscal justification to integrate these interventions into the national budget.

Learn more: Implementation research for reducing zero-dose and underimmunized children in selected areas of Bangladesh: Findings from an economic evaluation

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Challenges & Mitigation

	Key Challenges Identified	Mitigation Measures Adopted during Implementation Research
Vaccine Shortage	Persistent shortages of key antigens, specifically Pentavalent and PCV, which limits timely vaccination.	Raised supply issues in national/sub-national meetings; prioritized crash programs and catch-up sessions once vaccines were available.
Human Resource Shortages	Critical shortages of vaccinators and supervisors, particularly in hard-to-reach areas.	Optimized resources via E-screening checklists for non-EPI providers; used E-supervision and refresher training for newly reassigned staff.
Political & Administrative Issues	Political unrest and frequent government official transfers disrupted coordination and formal monitoring meetings.	Maintained flexible, informal communication; repeatedly shared findings with new officials to sustain momentum and coordination platforms.
Operational & Planning Delays	Delays in Operational Plan approvals hindered logistics and intervention expansion.	Coordinated closely with EPI HQ to flag bottlenecks; focused on community activities and session timing adjustments that required minimal approval.
Data Quality & Systems	Early-phase issues with routine data completeness and local-level tracking of ZD trends.	Conducted rolling DHIS2 reviews to monitor hotspots; built local capacity for data interpretation and usability.
Digital Tool Adoption	Technical glitches in early E-screening tools and limited digital literacy among frontline workers.	Upgraded applications; conducted field visits to update devices and provided hands-on training to increase tool acceptance.

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Call to Action

EPI Headquarters

- Ensure vaccine supply
- Ensure required human resources
- Conduct rolling-review and rapid assessment
- Emphasize on area-specific plans
- Special attention on high prevalent ZD/UI areas
- Further investigation related to illness of child

Gavi

- Support to scale-up promising interventions, including: staff training, improvising digital applications, monitoring
- Support in designing and implementation of interventions for reducing ZD and UI children in FDMN communities

Sub-district Level

- Scale up promising interventions on priority basis
- Provide training to newly recruited staff
- Ensure Interpersonal Communication (IPC) and awareness building sessions
- Strengthen monitoring and supervision
- Increase coordination with local NGOs/CSOs
- Requires special attention on high prevalence of ZD/UI areas

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ZDLH Resources & Reports
Bangladesh

- **Prevalence of and Factors Associated with Zero-dose** and Under-immunized Children in Selected Areas of Bangladesh: Findings from Lot Quality Assurance Sampling Survey
- **Identifying the Zero-dose** and Under-immunized Children in Bangladesh: Approaches and Experiences
- Country Learning Hub for Immunization Equity in Bangladesh: Findings from **Rapid Assessment**
- Assessing the **Governance and Political-Economy** Landscape for Evidence-Based Zero-Dose Programming and Policies in Bangladesh
- Strategies for Reducing Zero-Dose and Under-Immunized Children in Bangladesh: **Implementation Research Findings**
- Targeted **Assessment of Prevalence of Zero-dose** and Under-immunised Children in Bangladesh
- **Assessing EPI Service Delivery and Immunization Status Among Forcibly Displaced Myanmar Nationals and Host Communities in Bangladesh**
- Bangladesh **Zero-Dose Landscape**

Semiannual Updates

Gavi's ZDLH IRMMA Aligned Interventions: Semiannual Update—Bangladesh (October 2025)

Gavi's ZDLH IRMMA Aligned Interventions: Semiannual Update—Bangladesh (April 2025)

Gavi's ZDLH IRMMA Aligned Interventions: Semiannual Update—Bangladesh (October 2024)

Gavi's ZDLH IRMMA Aligned Interventions: Semiannual Update—Bangladesh (May 2024)

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MALI LEARNING HUB

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Centre d'Apprentissage pour l'équité en vaccination (CAPEV)

Led by **GaneshAID** with the C**enter for Vaccine Development-Mali (CDV-Mali)** and the **University of Science, Technique and Technologies of Bamako (USTTB)**

GaneshAID
Our Innovations Are Yours

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Mali Learning Hub

Overview

Country-led consortium funded by Gavi, the Vaccine Alliance and implemented in collaboration with the Government of Mali and subnational stakeholders.

Led by GaneshAid with partners Center for Vaccine Development-Mali (CVD-Mali) and the University of Sciences, Techniques and Technologies of Bamako (USTTB).

Timeline: November 2022–December 2025

Geographic Focus: Targeted four districts representing specific typologies of zero-dose (ZD) contexts:

- **Ségou**: Urban / Peri-urban (Pelengana Nord, Cinzana Gare)
- **Bougouni**: Special populations (migrants, gold miners, nomads) (Bougouni Est, Kologo)
- **Niono**: Rural / Remote (Niono Central, N'Debougou)
- **Yorosso**: Conflict-affected zone (Boura, Karangana)

Context

- **High Concentration in Vulnerable Zones:** In 2022, an estimated 294,111 children were ZD, with nearly 70% living in conflict-affected zones (~131,000) and remote rural areas (~70,000) where insecurity and geographic isolation severely limit access to health services.
- **Hard-to-Reach Populations:** Approximately 24% of ZD children belong to populations such as nomads, fishermen, and gold miners. Urban districts contain specific "pockets" of unvaccinated children within informal settlements, migrant groups, and among itinerant workers.
- **Complex Barriers:** Primary drivers include supply-side failures—such as frequent vaccine stockouts and insufficient cold chain capacity—compounded by demand-side barriers like cultural beliefs and gender dynamics that limit women's decision-making power regarding child health.

Goals & Strategic Objectives

- **Generate Evidence:** Produce actionable evidence on the barriers to vaccination and the effectiveness of strategies to reach ZD and under-immunized children.
- **Evaluate Innovations**: Conduct implementation research (IR) to assess the feasibility, fidelity, and impact of supply-side digital interventions, specifically Coach2PEV (performance coaching) and MEDEXIS (e-LMIS).
- **Strengthen Data Systems:** Improve the quality and use of immunization data for decision-making through the development of a Collaborative Intelligence Platform (CIP) and data triangulation studies.

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Theory of Change

The Learning Hub applied this ToC through a phased research approach:

- **Phase 1 (Baseline)**: Establish the baseline for ZD determinants and barriers.
- **Phase 2 (Process)**: Document the "lived experience" of implementation, assessing fidelity, feasibility, and adaptation of the ToC in real-world settings.
- **Phase 3 (Evaluation)**: Measure the immediate results and effects defined in the ToC (e.g., changes in staff performance, stockout reduction).

	Coach2PEV (C2P)	MEDEXIS (e-LMIS)
Goal	**Performance Management & Demand Generation:** Focuses on improving the skills, motivation, and supervision of health workers to better plan and execute services.	**Supply Chain Optimization:** Focuses on ensuring vaccine availability and reducing stockouts through digitized inventory management.
Inputs	**Digital Tool:** C2P application with vaccine product catalogue. **Training:** Modules including equity and gender dimensions. **Human Resources:** Coaches trained in community microplanning and social mobilization. **Data:** Local data on ZD children, sociocultural barriers, and gender inequalities. **Funding:** Budget for equipment, training, and supervision.	**Digital Tool:** MEDEXIS application adapted for ZD zones/needs. **Data:** Vaccine catalogue, logistical and sociodemographic data. **Infrastructure:** IT equipment (PCs, tablets) and connectivity (including offline capacity). **Human Resources:** Staff trained on MEDEXIS. **Funding:** Budget for equipment and supervision.
Activities	**Training:** Train coaches on performance coaching and C2P app usage. **Coaching Sessions:** Conduct sessions integrating micro-plans, community dialogue, and ZD targeting. **Monitoring:** Track individual and collective performance via the application. **Planning:** Produce micro-plans based on data and community feedback. **Mobilization:** Organize community meetings for validation and mobilization.	**Configuration:** System parameterized with disaggregated data (zone, sex, vulnerability). **Training:** Continuous user training on equitable data reading. **Integration:** Incorporating MEDEXIS data into microplans and performance reviews. **Monitoring:** Tracking stockouts specifically in zones with low coverage/high ZD prevalence. **Sharing:** Community dissemination of data to co-create local solutions.
Outputs	**Inclusive Plans:** Availability of micro-plans integrating disaggregated data (gender, barriers). **Skilled Agents:** Agents coached on community and equity themes. **Data Availability:** Performance data available in C2P to guide decision-making. **Implementation:** Community catch-up plans implemented. **Practices:** Implementation of adapted practices to improve vaccination services.	**Reports:** Stock and stockout reports ventilated by zone and risk group. **Visualization:** Logistics heat maps crossed with ZD data. **Alerts:** Prioritization alerts for struggling districts/CSComs. **Capacity:** Managers empowered to use data equitably. **Management:** Effective stock management at the community level.
Outcomes	**Access:** Increased access to in disadvantaged zones. **Retention:** Better retention of children in the vaccination pathway (reduced dropouts). **Visibility:** Availability of staff performance data via dashboards. **Supervision:** Improved monitoring of centers through documented supervision.	**Distribution:** Vaccine distribution adapted to real local needs. **Reduction of Stockouts:** Reduced stock ruptures specifically in zones with high ZD prevalence.
Shared Impact	**Reduction of ZD and Under-Immunized Children** By improving the skills/motivation of agents (C2P) and ensuring equity in vaccine availability (MEDEXIS), the program aims to close the gap in priority zones.	
Critical Assumptions	Engagement of local communities and leaders. Institutional commitment (CNI, Regional Directorates). Operational budgets (e.g., for mobile sessions) disbursed on time.	Availability of vaccines at the national level. Functionality of cold chain equipment. Support for data use at institutional and community levels.

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Scope of Work and Approaches

	Overview	Geographic Coverage	Related Publications
Rapid Assessment	Situational analysis and rapid assessment in Mali within the Gavi's IRMMA framework. The assessment highlights barriers such as geographic and security challenges, stockouts, and socioeconomic factors.	Ségou, Tominian (replaced Bourem), Kayes, and Commune VI of Bamako. 8 Catchment Areas: Including Katiéna, Banankoro, Tominian Central, Yasso, Khasso, Gouthioubé, Senou, Yirimadi	Evaluation Rapide Situation des Enfants Zéro-Dose et Sous-Vaccinés au Mali Identification des enfants zéro dose et sous-vaccinés au Mali en 2023 Obstacles courants et spécifiques à la vaccination au Mali en 2023
Implementation Research Phase 1: Baseline	A baseline study using Lot Quality Assurance Sampling (LQAS) household surveys to measure vaccination coverage and behavioral drivers (BeSD), combined with qualitative interviews on barriers and acceptability of planned interventions	4 Districts: Ségou, Bougouni, Niono, and Yorosso. 6 Catchment Areas (Quantitative & Qualitative): Pelengana Nord, Cinzana Gare, Bougouni Est, Kologo, Niono Central, N'Debougou. Qualitative Only: Yorosso (Boura, Karangana) due to insecurity	Recherche d'implémentation des interventions zéro dose au Mali (Phase 1)
Implementation Research Phase 2: C2P Process Evaluation	A study documenting the introduction, fidelity, and feasibility of the Coach2PEV (C2P) digital coaching tool, assessing its adoption through qualitative interviews and quantitative performance data	3 Districts: Ségou, Bougouni, and Niono. 6 Catchment Areas: Pelengana Nord, Cinzana Gare, Bougouni Est, Kologo, Niono Central, N'Debougou. Note: Yorosso was excluded due to security risks	Rapport de recherche d'implémentation des interventions zéro dose au Mali (Phase 2)
Implementation Research Phase 3	Phase 3 of the Mali Learning Hub's IR analyzes the early implementation of C2P and assesses the readiness of Mali's immunization system for the future introduction of MEDEXIS.	Ségou (Urban/Peri-urban): Pelengana Nord and Cinzana Gare. Niono (Rural/Remote): Niono Central and N'Debougou.Bougouni (Special Populations): Bougouni Est and Kologo.	Rapport de recherche d'implémentation des interventions zéro dose au Mali (Phase 3)
Remote Ecosystem Assessment of Digital Infrastructure	An assessment conducted to map available equipment and connectivity and examine the conditions for the Coach2PEV rollout. It aimed to identify technical and logistical risks prior to implementation.	Intervention Districts: Focused on the areas targeted for the C2P rollout (Ségou, Bougouni, Niono) to assess readiness	Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update—Mali (October 2025)
Exploratory Study: Improving Vaccine Equity through Better Use of Data	An exploratory study mapping existing data sources (DHIS2, surveys, administrative records) and using geospatial modeling to develop hybrid estimation methods for better identification of ZD "hotspots" and data triangulation	National Scope: For data analysis and modeling. Bamako: For primary qualitative data collection with national stakeholders (MOH, CNI, partners)	Exploratory Study: Improving Vaccination Equity in Mali Through Strengthened Data Use

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Research Methodology

Research Methodology	Description / Framework Utilization
Mixed-Methods Approach	Utilized across the Rapid Assessment and Implementation Research to combine quantitative data (surveys, DHIS2 analysis) with qualitative insights (interviews, focus groups). This allowed for the triangulation of findings to understand *what* is happening (coverage/dropout) alongside *why* it is happening (barriers/behaviors).
Lot Quality Assurance Sampling (LQAS)	A probability-based sampling method used during the IR Phase 1 Baseline household survey. Employed small samples (1,146 caregivers) to provide valid coverage estimates and identify low-performing "lots" (catchment areas) without the cost of a full census. This method helped pinpoint specific areas with coverage gaps.
Behavioral and Social Drivers (BeSD) Framework	Adapted from the WHO framework, this was integrated into the IR Phase 1 quantitative survey questionnaire. It was used to measure four specific domains driving vaccination uptake: thinking and feeling about vaccines, social processes, motivation, and practical issues (access/barriers).
District Typology Framework	A comparative analytical framework used across all studies to classify and analyze data according to four specific contexts: Urban/Peri-urban, Rural/Remote, Conflict Zones, and Special Populations. This allowed the research to identify context-specific barriers and tailor recommendations for differentiated interventions.
Data Quality Assessment (DQA)	A methodology used during the Rapid Assessment and IR Phase 2 to verify the reliability of administrative data. It involved comparing primary data sources (health facility registers/tally sheets) with aggregated reports in DHIS2 to calculate concordance rates and identify over- or under-reporting.
Secondary Data Triangulation & Hybrid Estimation	Used in the Exploratory Data Study and Rapid Assessment. This involves cross-referencing multiple datasets (DHIS2, IHME/WUENIC estimates, WorldPop, and census data) to identify denominator discrepancies and estimate ZD "hotspots" that single sources might miss.
Process Evaluation (Fidelity & Feasibility)	Used during IR Phase 2 to evaluate the Coach2PEV intervention. This methodology focused on documenting the "lived experience" of implementation, measuring fidelity (adherence to the planned intervention), feasibility (technical/logistical constraints), and acceptability among health workers.
"Gamification" Metrics (Championnats)	Quantitative method used during IR Phase 2. It utilized standardized scoring grids within the Coach2PEV app to measure and compare the competence and performance of health workers (vaccinators and directors) over time, fostering competition and motivation.
Geospatial Modeling	For the Exploratory Data Study, this methodology uses statistical software (R, Python, QGIS) to visualize spatial risk and predict ZD distribution at sub-district levels, moving beyond aggregated district averages.

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Mali Learning Hub Stakeholder Engagement
Collaborative Intelligence Platform

Centralized digital hub and coordination mechanism designed to connect the CNI with partners to align zero-dose efforts

The Mali Learning Hub co-designed the **Collaborative Intelligence Platform** and established its governance under CNI leadership:

- **Central Repository:** Hosts 80+ learning products, including research reports, policy briefs, and technical guidance notes.
- **Data Dashboards:** Visualizes critical metrics on ZD prevalence, coverage trends, vaccine stockouts, and digital tool rollout (C2P/MEDEXIS).
- **Activity Tracker:** Monitors the implementation status of interventions funded by Gavi's Full Portfolio Planning (FPP) to identify bottlenecks.

Strategic Impact

- **Breaks Down Silos**: mitigating data fragmentation by serving as a convergence point for partner data and activities.
- **Drives Decision-Making:** Used by 57 registered stakeholders to inform performance reviews and resource reallocation (e.g., Equity Accelerator Funds).

Strategic Shifts Recommended

- **Prioritize Functionality:** Focus on one or two key high-impact features (e.g., tracking Gavi FPP activities, triangulating data) rather than attempting to implement every stakeholder suggestion immediately, to manage expectations and ensure usability.
- **Secure Sustainable Funding:** Transition from project-based support to stable, long-term financing (potentially via Gavi's EAF) to maintain the platform and support the critical human processes, like regular quality review meetings, that make the data actionable.
- **Enhance Data Integration:** Move beyond a repository role by exploring ways to use the CIP to triangulate diverse data sources (census, LQAS, community data) to support the national Data Quality Group, addressing the fragmentation of current systems.
- **Expand Stakeholder Content:** Integrate CSO reporting into the platform (in collaboration with the Gavi CSO Fund Manager) to capture a complete picture of demand-generation and community mobilization activities alongside government data.
- **Institutionalize Usage:** Formalize the CIP as the standard mechanism for national planning and coordination, ensuring that evidence uploaded to the platform is systematically reviewed during ICC meetings and regional reviews to drive resource allocation.

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Drivers and Determinants of Zero-Dose

Learn more: Evaluation Rapide Situation des Enfants Zéro-Dose et Sous-Vaccinés au Mali

Category	Primary Zero-Dose Drivers & Key Findings from Rapid Assessment in Mali
Supply-Side *(Service Availability & Quality)*	• **Vaccine Stockouts**: 37% of caregivers cited vaccine stockouts as the primary reason for non-vaccination. • **Geographic Inaccessibility**: Difficulties in accessing health centers cited by 23% of caregivers (long distances, lack of transport, and seasonal barriers). • **Cold Chain Infrastructure:** 36% of health facilities lack cold chain equipment, only 57% have sufficient capacity, making storage in remote areas risky/impossible. • **Human Resources**: Chronic insufficiency of qualified and motivated staff, particularly mobile and advanced strategies required to reach remote populations.
Socio-Cultural and Behavioral *(Demand)*	• **Fear of Side Effects:** Caregivers of ZD children are significantly more likely to fear side effects (69%) compared to caregivers of vaccinated children (40%). • **Misinformation and Trust:** Rumors and disinformation, particularly in urban areas. Refusal linked to religious beliefs or preference for traditional medicine. • **Lack of Information:** A lack of knowledge regarding the vaccination schedule and the benefits of immunization remains a key barrier.
Gender Dynamics and Decision-Making	• **Decision-Making Power**: Among caregivers of ZD children, 86% required permission to vaccinate, compared to 75% among caregivers of vaccinated children. • **Economic Dependence:** Women face domestic workloads that conflict with vaccination schedules.Financial dependence limits ability to pay for transport or ancillary costs associated with visiting health centers.
Context-Specific Determinants *(District Typologies)*	• **Conflict Zones**: Facility closures, staff flight, and inability of mobile teams to operate due. ~70% of ZD children live in conflict-affected or remote rural areas. • **Remote/Rural Areas**: Physical isolation, lack of infrastructure (electricity/internet), and seasonal inaccessibility. • **Urban/Peri-Urban**: Primarily demand-side, including economic fragility, high mobility of populations, and exposure to rumors/misinformation. • **Special Populations**: Nomadic, gold mining communities, and island populations face exclusion due to mobility, incompatible with static health facility schedules.
Data System Failures	• **Data Fragmentation**: Inconsistent denominators between DHIS2, census data, and IHME estimates make it difficult to accurately target ZD children. • **Hidden Pockets**: District-level aggregates mask sub-district "hotspots" of ZD children. Without granular data, resources are often misallocated to better-performing areas rather than the most vulnerable pockets.

Implementation Research	Intervention Objective(s)	IR Results, by Objective	IR Learnings/Stakeholder Takeaways
Coach2PEV (C2P) A digital performance coaching application replacing traditional supervision. It features self-assessment, dashboards, and gamification ("Championnats") to improve health worker motivation, competence, and accountability. **Pilot Districts:** Bamako (Commune VI), Ségou, Bougouni Niono	**Strengthen Formative Supervision:** Transform supervision from a traditional "control" mechanism into supportive, ongoing coaching **Enhance Competence**: Improve skills of health workers **Boost Motivation and Accountability:** Increase motivation and engagement through "gamification" and digital performance dashboards **Improve Planning and Data Use:** Facilitate creation of inclusive, data-driven microplans that integrate community feedback **Reduce ZD Prevalence**: Improve quality and reliability of immunization service delivery	• 91% completion rate for planned coaching sessions. • Increased proportion of high-performing agents (scores ≥80%) from 58% to 84% through targeted digital coaching. • Triggered "constructive emulation" and professional pride through gamified performance championships. • Closed gap between planning and action, raising the execution rate of vaccination microplans to 86%. • Strengthened service resilience in pilot zones (e.g., Ségou), which defied national declines and reduced ZD prevalence despite external challenges.	**Transformation of Supervision:** Shifted management from punitive to supportive "coaching." **Boosting Motivation with Visible Results:** Allowing health workers to track and compare their performance scores fostered peer learning and professional pride, which drove an increase in staff competence. **Operational Discipline:** Digital tracking bridged gap between planning and action, increasing the execution rate of vaccination microplans to 86% and significantly improving DHIS2 reporting completeness. **The "Leadership Effect":** Success correlated with local governance; districts with active Medical Chiefs who reviewed dashboards saw high adoption (e.g., Ségou), while usage dropped in areas lacking strong oversight. **Infrastructure Barriers**: A "digital divide" threatens equity; poor connectivity and lack of electricity in rural zones (like Niono) hindered synchronization, necessitating investment in offline-first functionality and solar equipment. **Sustainability Imperative:** Beyond pilot, C2P should be institutionalized into national budget and made fully interoperable with DHIS2.
MEDEXIS (e-LMIS) An electronic logistics management information system for vaccines that aims to digitize stock management, provide real-time visibility, reduce wastage, and prevent stockouts through automated ordering. **Target Districts:** Ségou, Bougouni, Niono *(Note: Evaluation focused on ecosystem readiness as full rollout was delayed)*	**Digitize Supply Chain**: Replace paper-based management with an electronic Logistics Management Information System (e-LMIS) for real-time tracking **Improve Visibility**: To provide real-time end-to-end visibility of vaccine stocks. **Reduce Stockouts**: To use automated ordering and low-stock alerts to prevent ruptures. **Data Reliability**: To automate data entry to reduce errors associated with paper registers.	• Due to significant delays, research pivoted from measuring "impact" to evaluating "ecosystem readiness." • While 85% of facilities have dedicated logistics staff, only 49% have been trained on digital tools/e-SIGL. • Readiness varies drastically by geography; urban district of Ségou scored 90% on readiness index, while rural district of Niono scored only 73% due to infrastructure deficits. • Functional internet is available in 92% of sites in Ségou but only 54% of sites in Niono, posing a risk for real-time synchronization. • During the observation period, vaccine availability was generally high (>90%), but 20% of structures faced stockouts of essential consumables (vaccination cards/registers). • While 84% of sites possess cold chain equipment, only 76% is fully functional, and rural areas lack transport (only 29% availability) for mobile logistics.	**Training is a Prerequisite:** Rollout cannot succeed without massive investment in digital literacy; staff are present but unskilled in the necessary digital tools. **Infrastructure First**: Deployment should be phased, prioritizing urban centers; rural zones require offline-first functionality and solar kits due to severe connectivity/power gaps. **Maintenance is Critical**: Digitization will fail if physical equipment fails; a preventive maintenance plan for cold chain and IT equipment is required before software deployment. **Interoperability is Essential**: Stakeholders emphasized that MEDEXIS must be interoperable with DHIS2 to avoid "double entry" of data, which overburdened staff during the pilot. **Sustainable Financing**: Long-term success relies on securing national budget lines for recurring costs (internet data, device maintenance) rather than relying on donor project funding.

Zero-Dose LEARNING HUB

Mali Learning Hub Results

The "Hidden" Burden: Geography and Data Blind Spots

District averages mask critical sub-district inequities and underestimate the zero-dose burden in conflict-affected areas

- **Invisibility in Conflict Zones:** The ZD burden is likely significantly higher than reported because security risks prevent standard surveys in conflict-affected districts (e.g., Yorosso), creating a critical data blind spot.
- **The Sub-District Mask:** National and district-level data obscure "hotspots" of exclusion. While overall Penta 1 coverage in pilot zones appeared high (81–88%), specific pockets of ZD children persist due to micro-level barriers masked by aggregates.
- **Denominator Crisis:** Persistent discrepancies between population estimates (DHIS2, IHME, Census) lead to unreliable coverage rates, often exceeding 100%, which complicates accurate planning.

Strategic Shifts Recommended

- **Shift to Geo-Targeting:** Abandon "one-size-fits-all" planning. Operationalize geo-targeted mapping and subdistrict microplanning to locate specific vulnerable settlements.
- **Innovate Data Collection:** Develop flexible, context-sensitive data collection methods (e.g., remote mobile surveys, community informants) specifically for insecure zones where standard surveyors cannot go.
- **Scale LQAS:** Expand the use of lot quality assurance sampling as a cost-effective method to identify local performance gaps without relying on faulty census denominators.

Zero-Dose LEARNING HUB

Mali Learning Hub Results

Barriers to Vaccination: Supply Failures and Gender Dynamics

Vaccine stockouts and limited female decision-making power act as reinforcing structural and social barriers that sustain the zero-dose burden

- **The "Twin Drivers":** The research confirms that barriers are rarely isolated. On the supply side, 37% of caregivers cite vaccine stockouts as the primary reason for non-vaccination. On the demand side, 86% of caregivers of zero-dose children require permission (usually from a husband) to access healthcare, compared to 75% for vaccinated children.
- **The Trust Gap:** Fear of side effects is nearly double among caregivers of ZD children (69% vs 40%), often exacerbated by misinformation and a lack of trusted information sources.
- **Fragile Logistics:** Despite high reported availability of vaccines (>90%), the management of consumables (carnets, registers) remains irregular, and functionality of cold chain equipment is inconsistent (76%), creating bottlenecks at the point of service.

Strategic Shifts Recommended

- **Embed Gender Metrics:** Integrate specific indicators on women's decision-making power and vaccine hesitancy into routine monitoring (e.g., the new Gender and Equity Scorecard) to track demand-side barriers alongside supply metrics.
- **Hardwire the Supply Chain:** Prioritize the full rollout of MEDEXIS (e-LMIS) to ensure real-time stock visibility and automate ordering to prevent the stockouts that turn caregivers away.
- **Targeted Engagement:** Institutionalize the engagement of religious and traditional leaders to negotiate access and influence male heads of households, unlocking the "permission" barrier.

Zero-Dose LEARNING HUB

Mali Learning Hub Results

Limits of Campaigns: Catch-up vs. Retention

Emergency catch-up campaigns effectively reduce zero-dose prevalence in the short term but fail to address the systemic dropout rates that drive under-immunization

- **Campaign Success vs. System Failure:** The "Big Catch-Up" (Grand Rattrapage) campaigns (October 2024) successfully reduced ZD prevalence in targeted sub-districts (e.g., Ségou dropped from ~23% to 19%). However, gaps between Penta 1 and Penta 3 persisted, indicating that while campaigns "catch" children, the routine system loses them.
- **The Dropout Trap:** High dropout rates reveal that children identified during campaigns are not being effectively reintegrated into the routine system for follow-up doses, often due to the same structural barriers (distance, cost, welcome) that excluded them initially.
- **Data Silos:** Standard monitoring tools often fail to distinguish between doses delivered via routine services versus catch-up/mobile outreach, obscuring the true performance of the static health system.

Strategic Shifts Recommended

- **Link Campaigns to Routine:** Cease viewing catch-up campaigns as standalone solutions. Use campaign data to immediately update routine microplans and identify children requiring follow-up for Penta 2 and 3 to prevent them from becoming dropouts.
- **Differentiate Data:** Modify DHIS2 and district review tools to introduce a standard flag that distinguishes doses delivered via routine services versus catch-up/outreach. This is critical to accurately evaluating the resilience of the routine system.
- **Focus on Retention:** Shift performance incentives (like those in Coach2PEV) to reward full course completion (Penta 3/Measles) rather than just initial contact (Penta 1).

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Mali Learning Hub Results

Digital Interventions (C2P & MEDEXIS): Potential vs. Infrastructure Reality

Digital innovations improve performance and motivation but fail to scale equitably without strong local leadership and infrastructure investment

- **Leadership is the Driver:** The success of the digital coaching tool (Coach2PEV) was correlated with local leadership. Districts with active Medical Chiefs (e.g., Ségou) saw high adoption and improved data completeness, while those without strong oversight (e.g., Niono) saw usage drop.
- **Gamification Works:** The "Championship" model within the app successfully triggered "constructive emulation," raising competence scores for vaccinators (from 61% to 82.4%) and fostering professional pride. It transformed supervision from a punitive "control" mechanism to a supportive "coaching" model, driving rapid competence gains among staff.
- **The Digital Divide:** A stark infrastructure gap threatens equity. Urban districts had 92% internet connectivity compared to only 54% in rural areas, severely limiting digital adoption in the "last mile."

Strategic Shifts Recommended

- **Institutionalize Digital Supervision:** Formally integrate Coach2PEV indicators into national supervision protocols and budgets to ensure continuity regardless of individual leadership changes.
- **Invest in "Digital Equity":** Mandate a "digital readiness" package (solar chargers, offline-first apps, and data bundles) as a prerequisite for scaling digital tools to rural areas.
- **Train Managers, Not Just Users:** Shift training focus from simple tool usage to management and data interpretation for district chiefs to ensure they use dashboards for decision-making.

Zero-Dose LEARNING HUB

Mali Learning Hub Results

Institutionalization and Sustainability

Sustaining progress requires transitioning digital tools from donor-led pilots into national systems and using evidence to drive resource allocation

- **Project Dependency Risk:** Success in pilot districts (like Ségou) is fragile and dependent on external project funding; without state takeover, progress risks collapsing post-project.
- **Evidence Drives Funding:** The Learning Hub demonstrated that evidence accelerates resources. Learning Hub data directly influenced the reallocation of Equity Accelerator Funds (EAF) to conflict areas and supported the CCEOP cold chain application.
- **Integration is Key:** Standalone tools struggle. The "Big Catch-Up" campaigns reduced ZD prevalence temporarily but failed to fix systemic dropout, proving that campaigns should link back to routine systems.

Strategic Shifts Recommended

- **Budget for Sustainability:** The Ministry of Health should secure domestic budget lines for the recurring costs of digital health (maintenance, internet data, server hosting) to ensure tool survival.
- **Unify Data Systems:** Ensure a "single source of truth." Integrate C2P and MEDEXIS data directly into DHIS2 to prevent fragmentation and support national ownership.
- **Institutionalize Evidence Use:** Formalize the Collaborative Intelligence Platform (CIP) as the standard national mechanism for planning, ensuring resource allocation is always evidence-based.

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Mali Learning Hub

Key Takeaways

Collaborative Intelligence Platform (CIP) The Learning Hub co-created a centralized digital platform to connect stakeholders (CNI, WHO, UNICEF, CSOs). It served as a repository for 80+ learning products and a dashboard for monitoring Gavi investments, moving beyond simple dissemination to co-creation and coordination.

Strong Institutional Leadership The research was conducted under the direct leadership of CNI. This ensured that findings were not just "academic" but directly influenced policy, such as the reallocation of Equity Accelerator Funds to conflict areas.

Mixed-Methods Approach & Triangulation By combining quantitative data (LQAS surveys, DHIS2) with qualitative inquiry (interviews, focus groups), the Learning Hub could explain why coverage was low (e.g., gender barriers) rather than just reporting that it was low. The "Hybrid Estimation" study further refined data accuracy by triangulating fragmented sources.

"Gamification" of Performance The introduction of "Championnats" (competitions) within the C2P app proved to be a powerful motivator. It transformed supervision from a punitive "control" mechanism to a supportive "coaching" model, driving rapid competence gains among staff.

Mali's zero-dose burden is significantly underestimated and concentrated in conflict-affected and remote areas, where district-level data **averages mask critical sub-district inequities** driven by vaccine stockouts and gender barriers.

While digital innovations like Coach2PEV successfully improve supervision and staff motivation, their ability to sustainably reach these missed communities is currently limited by a stark **"digital divide" in infrastructure** and the **need for strong local leadership**.

Zero-Dose LEARNING HUB

Mali Learning Hub
Challenges

	Challenge	Impact on Research Findings
Security & Access	**Cancellation of sites due to insecurity:** Data collection in the conflict-affected district of Yorosso was cancelled, and the survey in Bourem was replaced by Tominian due to terrorist attacks.	Created a "data blind spot" regarding the most vulnerable populations. The ZD burden is likely significantly underestimated because the research could not cover the highest-risk zones.
Methodological Biases	**Positive Selection Bias:** To test digital tools, the Learning Hub selected sites with minimum infrastructure (electricity/staffing), meaning study sites were better equipped than the national average.	Results likely reflect a "best-case scenario" and underestimate the severity of operational challenges in more precarious or typical health facilities.
	The "Denominator Crisis": Reliance on outdated census projections (2009) led to administrative coverage rates frequently exceeding 100% in DHIS2.	Made it difficult to establish accurate baselines for ZD children or accurately track vaccination trends over time.
	Recall Bias: Approximately 9–14% of children in the survey lacked vaccination cards, forcing researchers to rely on caregiver memory.	Introduced potential inaccuracies in vaccination status classification, as caregivers may not accurately remember specific doses received.
Operational & Logistical	**Seasonality and Harvests:** The Phase 1 survey coincided with the harvest season, making many respondents unavailable during the day.	Forced logistical adaptations, such as night visits or renting motorcycles to reach caregivers in the fields, complicating fieldwork.
	Infrastructure Gaps: Poor internet connectivity (only 54% in rural Niono) and unstable electricity (26% of sites without stable power).	Hindered real-time data synchronization for digital tools (Coach2PEV), leading to data lags and limiting the evaluation of the tools' full potential in rural areas.
Implementation Delays	**Delayed Intervention Rollout:** Significant delays in deploying MEDEXIS (e-LMIS) and parts of Coach2PEV meant they were not fully operational during the evaluation period.	Forced the cancellation of the post-intervention household survey (Phase 1) and shifted Phase 3 to evaluate "ecosystem readiness" rather than the impact of MEDEXIS.
Ethical & Social	**Social Desirability Bias:** During qualitative interviews, some health agents were interviewed in the presence of supervisors.	Potential for staff to exaggerate their use of digital tools or downplay difficulties to appear competent to their superiors.

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Mali Learning Hub

Call to Action

Shift to Geo-Targeting: Abandon "one-size-fits-all" planning based on district averages. Operationalize geo-targeted mapping and sub-district microplanning to locate specific vulnerable settlements.

Invest in "Digital Equity": Do not scale digital tools without a "digital readiness" package. Funding should include solar chargers, offline-first app functionality, and guaranteed data bundles for rural vaccinators to prevent technology from deepening inequality.

Institutionalize Digital Supervision: Move C2P from a "project" to a national standard. Integrate digital supervision indicators into national protocols and budgets to ensure continuity regardless of leadership turnover.

Hardwire the Supply Chain: Prioritize the full rollout and interoperability of MEDEXIS (e-LMIS) with DHIS2 to ensure real-time stock visibility and automate ordering, targeting the "last mile" where stockouts are most frequent.

Embed Gender Metrics: Integrate specific indicators on women's decision-making power and vaccine hesitancy into routine monitoring dashboards (Gender & Equity Scorecard) to track and address demand-side barriers.

To sustainably reduce the zero-dose burden, Mali should shift from broad district-level planning to **granular, sub-district targeting** driven by **triangulated data**, while securing the **digital infrastructure** necessary to sustain innovations and simultaneously addressing the critical vaccine stockouts and gender-based barriers that drive exclusion.

Zero-Dose LEARNING HUB

Key ZDLH Reports
Mali

- Mali Zero-Dose Landscape
- Evaluation Rapide Situation des Enfants Zéro-Dose et Sous-Vaccinés au Mali
- Identification des enfants zéro dose et sous-vaccinés au Mali en 2023
- Obstacles courants et spécifiques à la vaccination au Mali en 2023
- Application des connaissances pour la recherche sur la vaccination zéro-dose
- Recherche d'implémentation des interventions zéro dose au Mali (Phase 1)
- Rapport de Recherche d'Implémentation des interventions zéro dose au Mali (Phase 2)
- Rapport de recherche d'implémentation des interventions zéro dose au Mali (Phase 3)

Semiannual Updates

Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update—Mali (October 2025)

Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update—Mali (April 2025)

Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update—Mali (October 2024)

Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update—Mali (May 2024)

Gavi's ZDLH IRMMA Aligned Interventions Semiannual Update—Mali(October 2023)

Zero-Dose LEARNING HUB

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Nigeria Learning Hub

Led by the **African Field Epidemiology Network (AFENET)** with the **African Health Budget Network (AHBN)**

Gavi The Vaccine Alliance

AFENET African Field Epidemiology Network A healthier Africa

AFRICA HEALTH BUDGET NETWORK

Zero-Dose LEARNING HUB

Zero-Dose LEARNING HUB

Nigeria Learning Hub
Overview

Country-led consortium funded by Gavi, the Vaccine Alliance and implemented in collaboration with the Government of Nigeria and subnational stakeholders.

Led by the African Field Epidemiology Network (AFENET) with the Africa Health Budget Network (AHBN)

Timeline: April 2023–December 2025

Geographic Focus: Four high-burden northern states focusing on eight priority local government areas (LGAs). These sites were selected to generate localized evidence in settings with a high concentration of zero-dose (ZD) children.

- **Bauchi State:** Bauchi, Ganjuwa
- **Borno State:** Maiduguri, Jere
- **Kano State:** Kumbotso, Sumaila
- **Sokoto State:** Wamakko, Tambuwal

Context

- Nigeria has one of the largest ZD populations globally (~2.2–2.3 million children), with the highest burden concentrated in northern states affected by conflict, displacement, and health system gaps.
- Despite progress in national coverage, routine immunization remains uneven — under-five mortality is among the highest globally, and a substantial share of deaths are vaccine-preventable.

Goals & Strategic Objectives

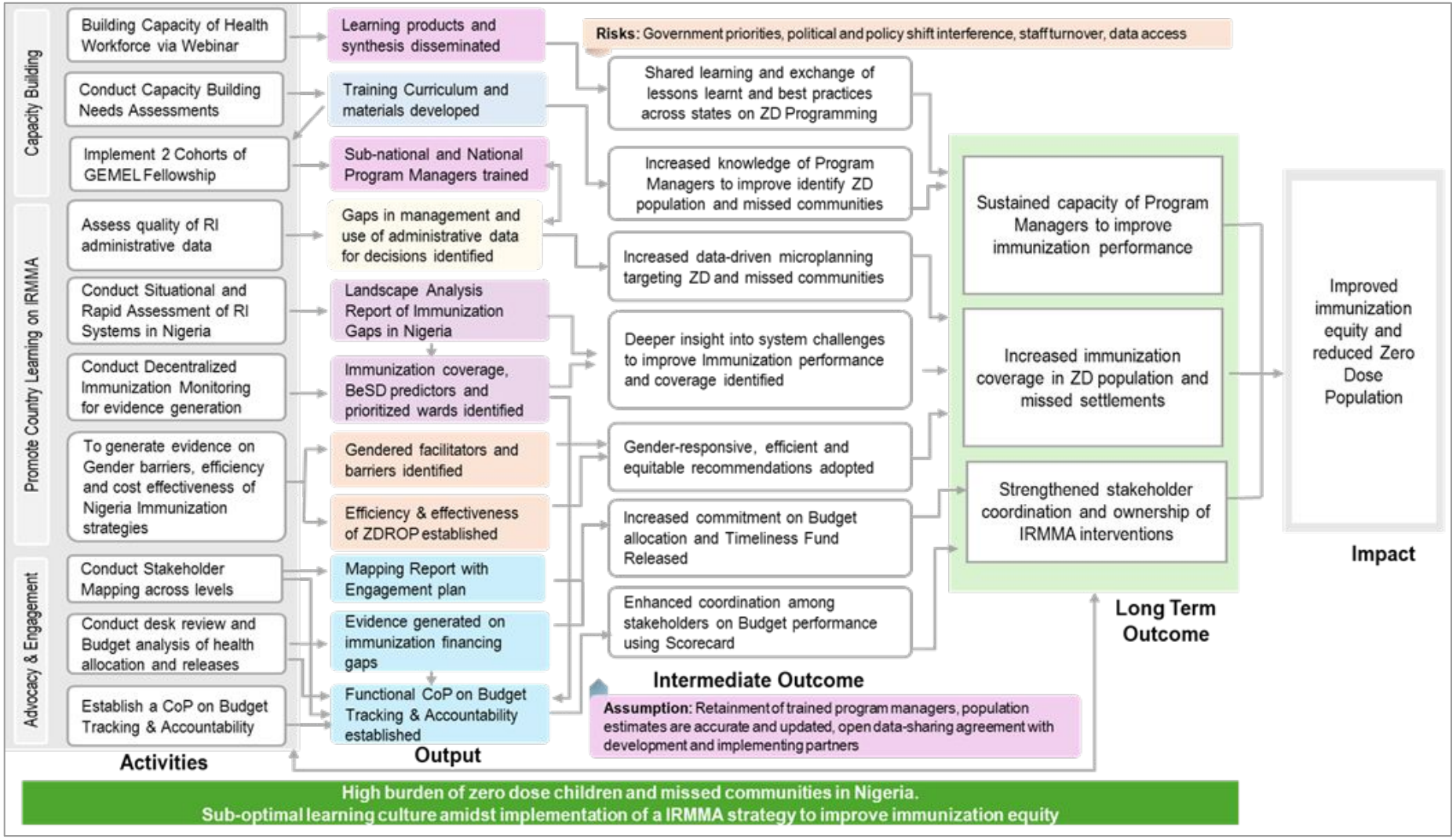
Operating under Gavi's IRMMA framework, the Learning Hub aimed to provide a framework for Nigeria to promptly generate evidence on strategies that can be leveraged to successfully identify, reach, measure, and monitor ZD children and missed communities in which they live. Its core objectives were to:

- To generate learning on barriers to reaching children, thereby influencing program planning and implement tailored strategies to identify and reach ZD children and missed communities
- To generate evidence for the effective strategies for identifying and reaching ZD children and missed communities by identifying successful, scalable, and effective/ineffective methods
- To improve metrics, measures & methods to enhance regular data access and utilization to reach of ZD children and missed communities

Zero-Dose LEARNING HUB

Nigeria Learning Hub

Theory of Change



The Nigeria Learning Hub aimed to generate evidence, build local capacity, and strengthen stakeholder coordination to enable data-driven action that increases coverage among ZD children and improves immunization equity.

- **Generate and use evidence:** Through implementation research, decentralized immunization monitoring, and stakeholder learning, the Learning Hub strengthens data quality and produces actionable evidence on barriers and effective strategies to reach ZD children.
- **Build capacity and coordination:** Training program managers and convening stakeholders improves data-driven planning, budget advocacy, and shared ownership of immunization performance.
- **Translate learning into results:** Sustained capacity and coordinated action increase coverage among zero-dose populations, contributing to improved immunization equity and reduced zero-dose burden.

Zero-Dose LEARNING HUB

Nigeria Learning Hub
Scope of Work and Approaches

	Overview	Geographic Coverage	Related Publications
Rapid Assessment	Conducted in eight local government areas across four states, the study utilized a mixed-methods approach, including evaluations of immunization reporting systems, health facility assessments, household vaccination surveys, and qualitative interviews	Bauchi (Bauchi and Ganjuwa LGAs), Borno (Maiduguri and Jere LGAs), Kano (Kumbotso and Sumaila LGAs), and Sokoto (Wamako and Tambuwal LGAs)	Closing The Immunization Gap: Enhancing Routine Immunization in Nigeria by Reaching Zero-Dose and Under-Immunized Children in Marginalized Communities: Report of a Rapid Assessment
Decentralized Immunization Monitoring (DIM)	DIM is a probability household survey using Lot Quality Assurance Sampling (LQAS) to estimate immunization coverage, classify ward-level performance, and identify behavioral drivers of vaccination	Bauchi (Bauchi and Ganjuwa LGAs), Borno (Maiduguri and Jere LGAs), Kano (Kumbotso and Sumaila LGAs), and Sokoto (Wamako and Tambuwal LGAs)	Round Three - Decentralized Immunization Monitoring Baseline from Four States in Nigeria: Bauchi, Borno, Kano, and Sokoto Decentralized Immunization Monitoring: Lessons Learnt from a Pilot Implementation in Kumbotso LGA, Kano State, Nigeria
Sub-national Budget Analysis	This analysis assesses funding mechanisms, coordination, and government/partner investments in immunization to identify gaps and inform advocacy for equitable reach to zero-dose children	Bauchi, Borno, Kano, and Sokoto states	Sub-National Budget Analysis Focusing on Immunization Under the Nigeria Zero-Dose Learning Hub Consortium in Nigeria Budget Accountability Scorecards: Bauchi, Borno, Kano, Sokoto
Implementation Research	This quasi-experimental, mixed-methods study assesses the effectiveness, efficiency, and cost-effectiveness of national strategies like the Zero-Dose Reduction Operational Plan (Z-DROP) and the Identify, Enumerate, and Vaccinate (IEV) strategy	Bauchi (Bauchi and Ganjuwa LGAs) and Sokoto (Wamako and Tambuwal LGAs)	Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update—Nigeria (October 2025)
Data Quality Assessment	This periodic evaluation assesses data reliability by comparing tally sheets, monthly summaries, and DHIS2 entries, while also checking for stockouts and data tool availability in selected health facilities	23 health facilities in Bauchi (Bauchi, Ganjuwa LGAs), Borno (Maiduguri, Jere LGAs), and Kano (Kumbotso, Sumaila LGAs)	Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update—Nigeria (October 2025)
Political Economy Analysis (PEA)	This problem-driven analysis maps the regulatory framework, interests, and power dynamics influencing the generation and use of evidence for zero-dose programming and policies	National and Subnational Levels (stakeholders from the federal government and state-level actors)	Assessment of the Political Economy Context Surrounding Evidence Use for Zero-Dose Programming and Policies in Nigeria

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Nigeria Learning Hub

Research Methodology

Methodology	Description & Framework Utilization
Decentralized Immunization Monitoring (DIM)	Probability household surveys based on LQAS to estimate LGA-level coverage and classify ward-level performance while assessing behavioral drivers of vaccination
Lot Quality Assurance Sampling (LQAS)	A statistical classification method used within DIM to categorize wards as high or low performing against a predetermined coverage threshold using small sample sizes, enabling targeted local decision-making
Mixed-methods Implementation Research (IR)	IR employed a quasi-experimental, mixed-methods design (including household surveys and qualitative interviews) to evaluate the effectiveness, efficiency, and cost-effectiveness of national strategies like Z-DROP and IEV
Problem-Driven Political Economy Analysis (PEA)	Qualitative analysis used key informant interviews and desk reviews to map stakeholder interests, power dynamics, and institutional factors influencing the generation and use of zero-dose evidence
Behavioral and Social Drivers (BeSD) Framework	Integrated into surveys (DIM and IR), this framework assesses factors influencing vaccination uptake across four domains: thinking and feeling, social processes, motivation, and practical issues
Delphi Method	Structured communication technique employed during learning agenda workshops to systematically aggregate expert opinions for prioritizing and validating the country's learning questions
Co-creation Workshops	Participatory sessions bring together diverse stakeholders (government, partners, and implementers) to collaboratively map data sources and define national learning agenda priorities
Gender Analysis	Integrated into implementation research, this analysis examines how gender norms, female autonomy, and decision-making power influence immunization access and uptake to inform gender-responsive programming

Granular Performance Management via LQAS: The shift from LGA-level snapshots to ward-level "Supervision Areas" using LQAS allows for a rapid "pass/fail" classification of performance. This provides local managers with the precision needed to target resources specifically where they are failing, rather than applying broad, inefficient interventions.

Quantifying the "Intent-Action" Gap: By integrating the BeSD framework, the methodology moves beyond simple coverage numbers to isolate *why* caregivers with high intention still fail to vaccinate. This allows teams to distinguish between demand-side misinformation and supply-side "practical issues" like respectful care and facility wait times.

Triangulation of Evidence Streams: The methodology overlaps statistical household surveys (DIM), administrative data (DHIS2/SMS), and deep-dive qualitative insights (PEA/gender analysis). This triangulation ensures that "what" is happening (coverage rates) is immediately contextualized by "how" it is happening (social norms and power dynamics).

Evidence-Led Governance and Accountability: The use of Problem-Driven PEA and co-creation workshops identifies the structural "power dynamics" and data silos that often prevent evidence from reaching policymakers. This approach treats the *use* of data as a political act that requires targeted advocacy and inter-agency collaboration to be effective.

The "Surveillance-Action" Interface: A strength of this decentralized approach is its ability to serve as an informal early-warning system. Field teams using these methodologies incidentally detected suspected disease outbreaks, demonstrating that robust MEL processes can directly trigger immediate public health responses beyond original study objectives.

Human-Centered Gender Lens: By embedding gender analysis into IR, the methodology surfaces the critical "permission-seeking" dynamic as a major determinant of ZD status. This evidence forces a transition from generic health education to specialized programming focused on male engagement and female decision-making autonomy.

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Nigeria Learning Hub
Stakeholder Engagement

Level	Key Activities / Platforms	Outcome / Evidence Uptake
National *(Governance & Strategy)*	Collaboration with NPHCDA and NERICC through co-creation workshops using the Delphi method to validate the national learning agenda and align research with Z-DROP strategy	NPHCDA adopted five prioritized learning questions as high-level national priorities, and recommendations were made to expand the Decentralized Immunization Monitoring approach to all 100 zero-dose LGAs.
National *(Legislative)*	Facilitated high-level engagements and a legislative retreat with National Assembly members and the Nigerian Governors Forum to advocate for immunization funding and accountability	These engagements contributed to the development of the "Lagos Declaration" and garnered high-level political commitments to prioritize immunization financing.
Sub-National *(Budget)*	State-level communities of practice, co-chaired by government and civil society established to conduct quarterly budget tracking using Immunization Accountability Scorecard	Advocacy led to creation of dedicated ₦870 million immunization budget line in Bauchi, increased allocations in Borno and Kano, release of delayed funds in Sokoto.
Sub-National	Civil society organizations and Learning Hub partners formally integrated into State Immunization Task Forces and technical working groups to review findings from research and monitoring activities	Following the presentation of implementation research findings, Bauchi and Sokoto state agencies committed to integrating gender-responsive activities and mobilizing traditional leaders to address cultural barriers.
Local Government Area (LGA)	Debriefing meetings and workshops were held with LGA Chairmen and health management teams to disseminate findings from Decentralized Immunization Monitoring regarding coverage gaps and zero-dose pockets	In Tambuwal LGA, authorities used the evidence to expand routine immunization facilities from 27 to 32, while Bauchi authorities increased outreach stipends to improve access to hard-to-reach areas.
Health Facility / Workforce	Implemented Growing Expertise in Monitoring, Evaluation, and Learning (GEMEL) Fellowship to train and mentor state and facility-level officers on data quality, reporting, and budget tracking	Fellows improved reporting timeliness and strengthened defaulter tracking systems, which led to the identification and vaccination of zero-dose children in Borno.
Community	Engaged community leaders (traditional and religious) through interviews and town hall meetings to validate findings and co-create demand-generation strategies	In Borno and Sokoto, engaged community leaders actively supported defaulter tracking and addressed cultural barriers, contributing to the vaccination of identified zero-dose children.

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Drivers and Determinants of Zero-Dose

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

Category	Primary Zero-Dose Drivers & Key Findings in Nigeria
Socio-demographic	**Household Wealth:** Children from lowest wealth quintiles are significantly more likely to be ZD or experience delayed vaccination compared to those from wealthier households. **Maternal Education:** Lack of formal education among caregivers is a strong predictor of ZD status; educated caregivers are less likely to have children with delayed vaccination. **Place of Delivery:** Children born at home (non-institutional deliveries) have higher odds of being ZD compared to those born in health facilities. **Residence:** Rural residence is strongly associated with ZD status, though urban slums also present high numbers. **Antenatal Care:** Lack of ANC attendance is a critical determinant; only 45% of caregivers of ZD children had contact with a facility for ANC.
Gender & Social Norms	**Spousal Permission:** A vast majority of caregivers (reported as 93% in IR baseline) require spousal (husband's) permission to vaccinate their children, restricting female autonomy. **Decision-Making Power:** Women often lack control over household resources (only 14% reported access in IR baseline), limiting their ability to pay for transport or access services. **Cultural Practices:** Patriarchal norms, such as *purdah* (female seclusion) and the 40-day postpartum seclusion period, restrict women's mobility and access to immunization services. **Workforce Gender Gap:** A shortage of female health workers creates a barrier in communities where cultural norms prefer women to be attended by women.
Demand-Side	**Trust:** Low trust in health workers is a major barrier; preliminary DIM results indicated 42% of ZD caregivers do not trust the health workers administering vaccines. **Perception of Safety:** Negative perceptions regarding vaccine safety and importance are significant factors associated with delayed immunization. **Fear & Misinformation:** Fear of adverse events following immunization, pain, and general misinformation contribute to hesitancy. **Motivation & Intent:** While general awareness is often high, there is a gap between intent and action; caregiver intention to vaccinate is a protective factor against ZD status.
Supply-Side	**Availability:** Frequent vaccine stockouts and stockouts of data tools (cards, registers) disrupt services. **Service Quality:** Long waiting times, disrespect or poor treatment by health workers, and short notice for data submission serve as deterrents for caregivers. **Access & Logistics:** Long travel times, distance to health facilities (especially in rural areas), and high transportation costs are major practical barriers. **Data Quality:** Inconsistencies between tally sheets, registers, and DHIS2, along with fragmented data systems, hinder the accurate identification of ZD children.
Political & Governance	**Funding:** Delays in the release of government counterpart funding and budget disbursements disrupt program execution and outreach activities. **Political Commitment:** Historical neglect of routine immunization in favor of vertical campaigns (like polio) and lack of accountability mechanisms have limited progress. **Coordination:** Poor coordination between federal, state, and local governments regarding funding and responsibilities impacts service delivery. **Insecurity:** Ongoing conflict and insecurity (particularly in the North East/Borno) displace populations and make settlements inaccessible to health workers.

Nigeria Learning Hub

Implementation Research Interventions Tested

Interventions	IR Objectives	Highlights of Results & Findings	Key Takeaways & Learnings
***Tested as a <u>combined</u> approach in Bauchi & Sokoto States*:** **Zero-Dose Reduction Operational Plan (Z-DROP)** A Gavi-funded strategy in 100 prioritized LGAs, including Bauchi and Ganjuwa LGAs in Bauchi State and Wamakko and Tambuwal LGAs in Sokoto State. ● **Reduce ZD Burden**: Achieve a 15% reduction in zero-dose (ZD) children by March 2025. ● **Coverage**: Reach 85% Penta 1 coverage. ● **Retention**: Reduce Penta 1-3 dropout rate to <10%. ● **Service Availability**: Ensure 90% of planned vaccination sessions are successfully conducted. ● **Demand**: Increase community engagement to boost overall vaccine demand. **Identify, Enumerate, and Vaccinate (IEV)** National strategy utilizing technology and community structures to locate missed children in Bauchi and Ganjuwa LGAs of Bauchi State and Wamakko and Tambuwal LGAs of Sokoto State. ● **Precision Identification**: Use GIS technology to precisely map households and missed settlements. ● **Enumeration**: Line-list all women of reproductive age and children under the age of five. ● **Linkage**: Utilize a coupon system to physically link identified ZD/UI children to health facilities for vaccination. ● **Reach**: Operate effectively within security-compromised areas.	**Effectiveness** (Reach & Equity)	**Uneven Performance by Context:** The combined strategy is performing better in Bauchi (16.2% ZD prevalence) compared to Sokoto, where prevalence remains critically high (Tambuwal 59.4%, Wamakko 46.5%). **Determinants**: Sociobehavioral factors (wealth, education) and gender norms were found to be stronger predictors of ZD status than geographic distance alone.	**One Strategy Does Not Fit All:** A uniform national plan (Z-DROP) yields different results based on state context. Success in Bauchi suggests the model works in stable environments, but it fails in the security-compromised, deep rural contexts of Sokoto without significant adaptation. **Geography vs. Behavior**: Physical access solutions (more clinics) will fail without addressing demand-side barriers like caregiver education and poverty.
	Efficiency (Technical Efficiency)	**Facilities Underperforming:** Stochastic Frontier Analysis (SFA) revealed an average technical efficiency score of 0.60 (ranging 0.21–0.89). This means facilities are producing only 60% of the immunization outputs they *could* achieve with their current inputs (staff, vaccines, cold chain). **Urban Advantage**: Urban facilities and maternity centers consistently outperformed rural primary health centers in efficiency.	**Fix Management Before Funding:** There is "slack" in the system. Before pouring in new resources for Z-DROP/IEV, simple management fixes (reducing stockouts, ensuring staff adherence to schedules) could potentially increase immunization output by 40% using existing resources.
	Cost & Cost-Effectiveness	**Divergent Cost Drivers**: Bauchi: "Fixed-post" delivery (clinics) was cost-effective driver of high coverage. Sokoto: Requires expensive outreach and mobile sessions to reach remote settlements. While less "efficient" per dollar, this is the only way to reach these populations. **Caregiver Burden**: Indirect costs (transport/lost time) for caregivers are substantial (estimated ₦2.04 million in Bauchi study area alone), acting as a major barrier.	**Equity Has a Cost**: Reaching the "last mile" in Sokoto will fundamentally cost more per child than in Bauchi. Budgeting based on "efficiency" alone will systematically exclude ZD children in hard-to-reach areas. Mobile teams should be fully funded despite higher unit costs.
	Barriers (Gender & Trust)	**Gender as "Gatekeeper"**: 93% of caregivers in the study area require husband's permission to vaccinate. Only 14% of female caregivers control household resources. **Trust Deficit**: 48.2% of ZD caregivers expressed distrust in health workers, compared to lower rates among vaccinated groups.	**Supply-Side Fixes are Insufficient**: Z-DROP and IEV cannot succeed through logistics (maps/vaccines) alone. The "missed" children are often hidden behind gendered barriers. Interventions should include funded mandates for male engagement (to grant permission) and the deployment of female health workers to enter culturally restricted households.

Zero-Dose LEARNING HUB

Nigeria Learning Hub Results

Hyperlocal Data Serves as "Active Surveillance"

Traditional administrative data (DHIS2) and national surveys often mask deep pockets of zero-dose children and are too slow for immediate course correction—routine decentralized monitoring does more than track coverage; it functions as an active surveillance tool

Decentralized immunization monitoring using LQAS proved that granular, ward-level data is operationally feasible and reveals what aggregate data hides.

The implementation of DIM using LQAS has proven to be a practical, cost-efficient, and operationally feasible method for generating timely, ward-level data that administrative systems often miss:

- **Outbreak Detection:** DIM field teams identified unreported clusters of suspected whooping cough and measles in Sumaila LGA (Kano), triggering immediate government response.
- **Granular Failure Points:** While aggregate data showed progress, DIM identified 41 specific wards prioritized for DTP1 failure and 68 for Measles failure, allowing for precision targeting that state-level data missed.
- **Missed Settlements:** Geospatial mapping during monitoring identified settlements previously excluded from microplans, such as specific nomadic or displaced communities in Borno.

Strategic Recommendations

- **Institutionalize & Scale**: Expand the DIM approach to all 100 prioritized ZD LGAs and embed biannual rounds into state planning cycles to ensure routine data generation.
- **Trigger Rapid Response:** Utilize DIM findings to immediately alert Emergency Preparedness and Response teams to investigate disease clusters and launch reactive vaccination campaigns.
- **Strengthen Local Workforce:** Engage and fund ad hoc health workers (e.g., JCHEWs) to support ongoing ZD identification and surveillance, scaling the successful model from Sumaila LGA.
- **Enhance Local Accountability:** Institutionalize quarterly ward and LGA data review meetings to ensure monitoring findings lead to timely corrective actions.
- **Refine Microplanning:** Integrate geospatial data and settlement lists from monitoring rounds to update "Reach Every Ward" (REW) microplans and map previously missed communities.

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Nigeria Learning Hub Results

Gender Dynamics and Trust are Primary Barriers

While geographic distance is a factor, the research consistently identifies sociobehavioral and gender dynamics as more potent determinants of zero-dose status

While distance to health facilities remains a challenge, Learning Hub evidence indicates that **sociodemographic and behavioral factors** are often stronger determinants of ZD status than geographic access alone.

- **Gender dynamics:** Gender-related barriers are critical and pervasive. IR found that 93% of caregivers in surveyed areas required husband's permission to vaccinate their children, and only 14% had access to household resources for health needs. In Sokoto, 64% of unvaccinated children belonged to households where the mother was excluded from joint decision-making on health. Patriarchal norms, such as *purdah* and postpartum seclusion, severely restrict women's mobility and decision-making power.
- **Household poverty is a statistically significant predictor of ZD status:** Children from the poorest wealth quintiles are disproportionately vulnerable, with IR baseline data indicating they are approximately twice as likely to be ZD or experience delayed vaccination compared to those from wealthier households, and pilot monitoring data revealing that 90% of ZD caregivers fall within the lowest socioeconomic brackets.
- **The trust gap:** Negative perceptions of vaccine safety and low trust in health workers are significant drivers of ZD status, even among caregivers who generally intend to vaccinate: 42% of ZD caregivers explicitly reported not trusting health workers.

Strategic Recommendations

- **Operationalize Gender-Responsive Strategies:** Fund and launch targeted male engagement campaigns involving husbands and traditional/religious leaders to address spousal permission barriers and grant the necessary "social license" for vaccination.
- **Deploy Female Health Workers:** Increase the recruitment and deployment of female health workers and community volunteers to access households in culturally conservative areas (e.g., those practicing purdah) where male vaccinators are restricted.
- **Adapt Data Systems for Equity:** Advocate for the revision of national data systems (NHMIS/DHIS2) to capture sex-disaggregated and social data, ensuring microplans target high-risk social groups rather than just geographic settlements.
- **Address Demand-Side Barriers:** Co-locate immunization with antenatal care (ANC) to capture the 45% of ZD caregivers who miss ANC and institutional delivery and invest in sustained community dialogue to rebuild trust in the health system.

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Nigeria Learning Hub Results

Delivery Models Should Be Context-Specific for Efficiency

A uniform national strategy fails because "efficient" fixed-post delivery works in stable areas but leaves children behind in security-compromised zones.

Implementation research reveals that a "one-size-fits-all" approach to service delivery is inefficient. Costing and efficiency analyses showed divergent optimal strategies for different states.

- **Divergent Performance:** The national Z-DROP strategy works well in Bauchi (16.2% ZD prevalence), but struggles in Sokoto (Wamakko 46.5%), proving that one operational model does not fit all contexts.
- **Cost Realities:** Costing analysis proves that while fixed-post delivery is efficient in Bauchi, Sokoto requires expensive mobile outreach to reach remote settlements.
- **IEV Strategy:** The *Identify, Enumerate, Vaccinate* strategy achieved 95% reach in pilots but is "capital intensive," requiring adaptation before it can be scaled sustainably.

Abandon the "one-size-fits-all" allocation model–budgeting should be context-responsive

- **Equity-Based Budgeting:** Accept higher per-child costs for equity; policymakers should fully fund outreach and mobile sessions for security-compromised areas like Sokoto.
- **Context-Specific Models:** Maintain fixed posts in stable areas but mandate and fund mobile teams for "last mile" settlements in difficult terrains.
- **Adapt IEV:** Simplify the IEV protocol to reduce costs while retaining community-gatekeeper components for security.

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Nigeria Learning Hub Results

Evidence-Based Advocacy Unlocks Financing

Allocating budgets is not enough; the challenge lies in the release and utilization of funds which can be achieved through evidence-based accountability tools.

The combination of **Immunization Accountability Scorecards** and state-level **Communities of Practice** has successfully translated advocacy into tangible financial releases. By linking budget performance directly to immunization coverage data in high-level forums, the Learning Hub helped secure significant domestic funding commitments.

Tangible Results: Advocacy efforts led to the creation and full release of a dedicated ₦870 million immunization budget line in Bauchi State, a budget increase to ₦1.5 billion in Kano, and the release of delayed funds in Sokoto and Borno.

Key Learning: Integrating civil society organizations into formal accountability structures (like State Immunization Taskforces) and using validated scorecards makes government budget execution more transparent and responsive.

Evidence should be mobilized as a catalyst for advocacy

- **Institutionalize Oversight:** Formally integrate CSOs into state technical working groups to maintain pressure for releases.
- **Track Releases:** Shift advocacy focus from budget allocation to budget release and utilization using the Scorecard tool.
- **Legislative Champions:** Use data to engage high-level political champions (e.g., Legislative Health Committees) to ring-fence immunization funds.

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Nigeria Learning Hub Results

Mentorship is Critical for Data Quality and System Strengthening

Data quality assessments revealed systemic issues like stockouts and inconsistent reporting, which one-off trainings failed to fix—the GEMEL Fellowship model, which embedded mentors into government systems, produced immediate, measurable improvements

Data quality assessments (DQAs) consistently revealed systemic weaknesses, including vaccine stockouts, shortages of data tools (registers/cards), and discrepancies between tally sheets and digital reporting (DHIS2). The **Growing Expertise in Monitoring, Evaluation, and Learning (GEMEL) Fellowship** model demonstrated:

- **Improved Timeliness:** In areas supported by GEMEL fellows, vaccine utilization reporting timeliness improved from 69.1% to 96.7%.
- **Defaulter Tracking:** Fellows in Borno established tracking systems that directly identified and vaccinated 16 ZD children who had fallen through system cracks.
- **Data Quality:** Quarterly DQAs combined with on-site mentorship resolved chronic issues like correct use of tally sheets and led to the restocking of data tools in 99 facilities.

Strategic Recommendations

- **Institutionalize Fellowships:** Adopt the GEMEL model into state civil service structures to create a pipeline of skilled M&E officers who can interpret data for action.
- **Mentorship over Workshops:** Redirect capacity-building funds from classroom training to on-the-job mentorship and supportive supervision.
- **Close the Loop:** Empower local officers to use DQA findings immediately to fix operational gaps (e.g., tool stockouts) rather than just reporting them.

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Key Takeaways

- **Institutionalize Hyper-Local Monitoring (DIM):** Scale Decentralized Immunization Monitoring (using LQAS) to function as active surveillance—detecting unreported outbreaks (e.g., whooping cough in Kano) and identifying specific "failing wards" that aggregate data hide.
- **Operationalize Gender-Responsive Strategies:** Move beyond logistics to address the "permission barrier" with 93% of caregivers requiring spousal approval, programs must fund male engagement campaigns and deploy female health workers to reach secluded households.
- **Align Funding with Accountability:** Transition advocacy from budget allocation to timely release by institutionalizing Accountability Scorecards and Civil Society participation, which successfully unlocked domestic financing.
- **Tailor Delivery to Context (Equity > Efficiency):** Abandon "one-size-fits-all" models; maintain efficient fixed posts in stable areas (Bauchi) but mandate and fund higher-cost mobile teams for security-compromised zones (Sokoto) where structural barriers prevent access.
- **Transform Capacity Building:** Shift investment from classroom training to embedded mentorship, like the GEMEL Fellowship model, which has proven to sustainably improve reporting timeliness (from 69% to 96% in Bauchi) and effective defaulter tracking.

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Challenges

	Challenges	Mitigation Strategies
Security & Access	**Insecurity and Conflict:** Active insurgency, banditry, and kidnapping restricted access to certain communities. **Inaccessible Settlements:** Geographic barriers and security risks led to "missed settlements" or "orphan settlements" excluded from microplans.	**Use of Local Guides/Gatekeepers:** Engaged community gatekeepers and local guide. **Localized Workforce:** In high-risk areas, avoided deploying external staff, instead relying on locals or "local guides" to conduct activities. **Low-Profile Data Collection:** Recommendations included avoiding use of conspicuous technology (GPS/tablets) in security-compromised areas to avoid raising suspicion.
Data Quality & Systems	**Tool Stockouts:** Frequent stockouts of essential data tools (ledgers, summary forms, cards) were found in facilities (e.g., 34% of facilities across 5 LGAs lacked forms), leading to data loss and use of improvised notebooks. **Data Discrepancies:** Significant inconsistencies were found between tally sheets, facility registers, and DHIS2 entries (e.g., discrepancies >30% in Bauchi). **Reporting Timeliness:** Late reporting hindered understanding of facility performance.	**Partner-Led Printing:** Partners intervened to print and distribute data tools to health facilities when government stockouts occurred. **GEMEL Fellowship:** GEMEL Fellowship embedded trained officers into LGAs improving reporting timeliness and data quality. **On-the-Job Training:** During DQAs, immediate feedback and mentorship were provided to staff on proper documentation.
Political & Financial	**Funding Delays:** Delays in the release of government counterpart funding and basket funds often stalled implementation. **Lack of Accountability:** Weak accountability mechanisms meant funds allocated in budgets were not always released or utilized for immunization.	**Communities of Practice:** ZDLH established state-level CoPs involving CSOs and government to track budgets and pressure for releases. **Accountability Scorecards:** ZDLH co-developed Immunization Accountability Scorecards to visualize budget performance. **Legislative Engagement:** Engaging the National Assembly and Governor's Forums to secure high-level political commitment.
Human Resources	**Staff Shortages:** A critical lack of human resources, particularly female health workers, impeded service delivery. **Reliance on Volunteers:** Many routine immunization providers are unpaid volunteers who "cannot be forced to work" and lack accountability. **Surveillance Gaps:** Routine systems missed disease clusters due to lack of personnel.	**Ad Hoc Recruitment:** Following the detection of an outbreak in Sumaila LGA (Kano) by ZDLH, the LGA Chairman was lobbied to fund 100 ad hoc staff (JCHEWs) to support ZD identification and surveillance. **Capacity Building:** Needs assessments to design training curricula to upskill program teams.
Socio-cultural	**Gender Barriers:** Spousal permission was required in 93% of cases; women lacked financial autonomy and mobility (purdah) to access clinics. **Mistrust:** High levels of mistrust in health workers and fear of adverse events deterred caregivers.	**Male Engagement:** Targeted campaigns engaged husbands and religious leaders to grant "social license" for vaccination. **Community Gatekeepers:** Traditional leaders and "Bulamas" were used to mediate refusals and track defaulters. **Female Influencers:** In Borno, wives of LGA Chairmen were engaged as culturally relevant influencers to reach women.
Method-ological	**Recall Bias:** Reliance on caregiver recall when vaccination cards unavailable potentially biased coverage estimates. **Sampling Limitations:** Transient populations and newly relocated residents were sometimes excluded or hard to sample. **Attribution:** Difficulty in isolating specific contribution of activities due to the presence of multiple partners.	**Triangulation:** ZDLH crossed-referenced survey data with administrative data (DHIS2) and qualitative findings to validate results. **Institutionalization:** Recommending the embedding of DIM into routine government cycles to create time-series data that smooths out seasonal or one-off sampling biases. **Card Retention Efforts:** Encouraging husbands to keep cards to improve data accuracy.

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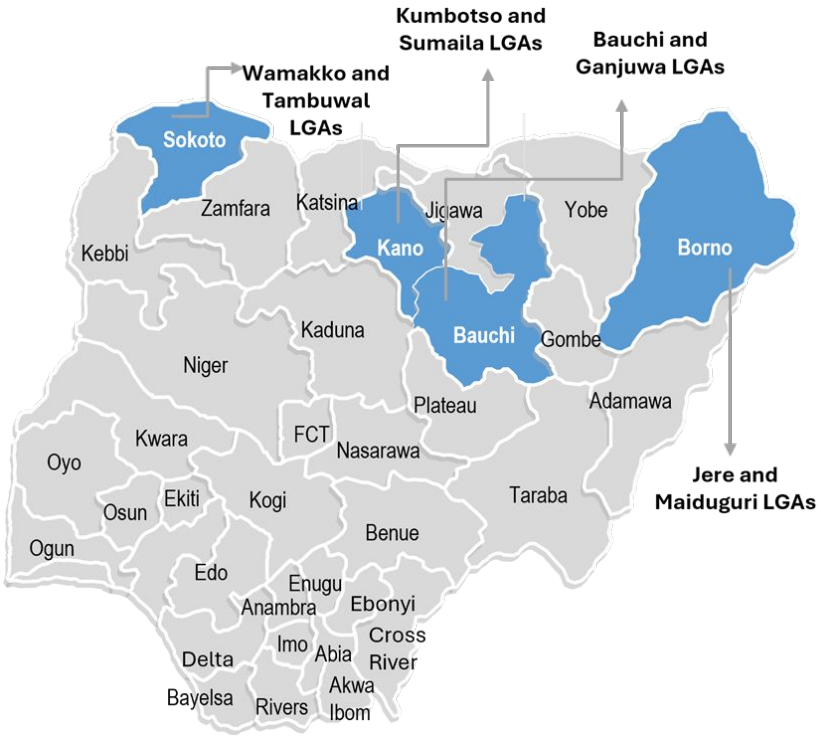
Nigeria Learning Hub

Call to Action

- **Institutionalize Decentralized Monitoring:** Government and partners should mainstream the DIM methodology into state and LGA immunization programs. Specifically, stakeholders are called to scale the DIM approach to all 100 prioritized zero-dose LGAs and embed biannual rounds in state planning cycles to generate timely, granular data.
- **Align Funding with Accountability:** Policymakers should sustain subnational budget releases and oversight by using validated Immunization Accountability Scorecards and Community of Practice platforms. These tools should link financial performance directly to coverage results to ensure transparency and responsiveness.
- **Shift from "One-Size-Fits-All" to Adaptive Implementation:** Stakeholders should use implementation research and costing insights to tailor state-specific delivery strategies. This includes prioritizing fixed-post models where efficient (e.g., Bauchi) and scaling outreach/mobile sessions where structural barriers persist (e.g., Sokoto), while evaluating national strategies like Z-DROP for cost-effectiveness.
- **Build Long-Term State Capacity:** There is a critical need to institutionalize mentorship models, such as the GEMEL Fellowship, within state systems. This is needed to ensure a pipeline of officers with skills in measurement, evaluation, and budget tracking to sustain zero-dose identification and response.



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Key ZDLH Reports
Nigeria

- Round Three - **Decentralized Immunization Monitoring** Baseline from Four States in Nigeria: Bauchi, Borno, Kano, and Sokoto
- **Decentralized Immunization Monitoring**: Lessons Learnt from a Pilot Implementation in Kumbotso LGA, Kano State, Nigeria
- **A Learning Agenda to Address Immunization Equity and Access for Nigeria to End Zero-Dose Children by 2030: Report from a National Stakeholder Consensus Workshop**
- Assessment of the **Political Economy Context** Surrounding Evidence Use for Zero-Dose Programming and Policies in Nigeria
- Immunization **Budget Accountability Annual Scorecards**: Bauchi, Borno, Kano, Sokoto
- Exploring the Landscape of Routine Immunization in Nigeria: A **Scoping Review of Barriers and Facilitators**
- Zero-Dose Learning Hub Nigeria **Learning Agenda** Workshop Report
- **Sub-National Budget Analysis** Focusing on Immunization Under the Nigeria Zero-Dose Learning Hub Consortium in Nigeria
- Enhancing Routine Immunization in Nigeria by Reaching Zero-Dose and Under-Immunized Children in Marginalized Communities: Report of a **Rapid Assessment**
- Nigeria **Zero-Dose Situation Analysis**
- Nigeria **Zero-Dose Landscape**

Semiannual Updates

Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update—Nigeria (October 2025)

Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update—Nigeria (April 2025)

Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update–Nigeria (October 2024)

Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update (May 2024)

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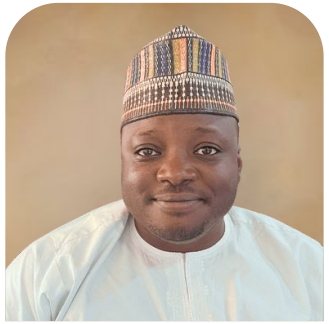

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Uganda Learning Hub

Led by **Infectious Diseases Research Collaboration (IDRC)** with partners **PATH** and **Makerere University School of Public Health**

April 2023 – December 2025

IDRC | PATH

Zero-Dose LEARNING HUB

Zero-Dose LEARNING HUB

Uganda Learning Hub Overview

Country-led consortium funded by Gavi, the Vaccine Alliance and implemented in collaboration with the Government of Uganda and subnational stakeholders.

Lead organization: Infectious Diseases Research Collaboration (IDRC), with partners PATH and Makerere University School of Public Health (MakSPH).

Timeline: April 2023–December 2025

Geographic Focus

- Kasese District
- Mubende District
- Wakiso District

Context

- Missed communities include diverse settings (e.g., urban informal settlements, pastoralist/migrant groups, mountainous/border areas, fishing/island communities, and other hard-to-reach populations).
- High administrative coverage can mask unreached children; the Learning Hub's work focused on making ZD/UI children visible at community level and understanding barriers to reaching the "last mile."

Goals & Strategic Objectives

Using Gavi's IRMMA framework, the Learning Hub set out to:

- Generate and apply learnings on barriers to reaching ZD children to improve program planning and tailoring approaches
- Strengthen the evidence base on effective approaches to identify and reach ZD children
- Improve metrics, measures, and methods to routinely access and use data to improve outreach to ZD children and missed communities
- Through implementation research: assess ZD burden, barriers to identification/vaccination, and effectiveness and costs of targeted interventions

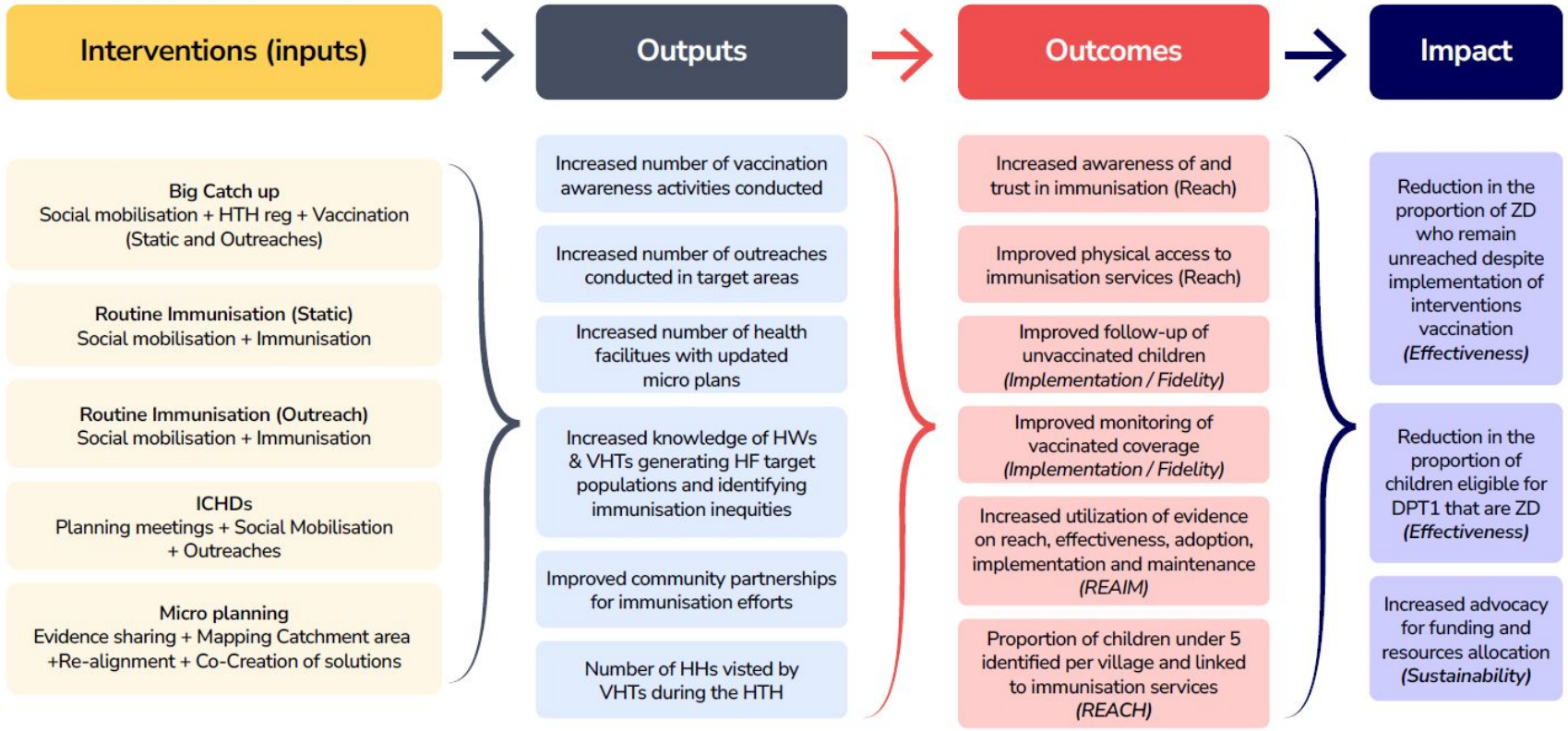
In light of **delays in the Equity Accelerator Fund** (EAF), the Learning Hub pivoted to focus its research on existing EPI programming, including Uganda's Big Catch-Up (BCU) campaign and routine immunization, with an array of studies including: evaluation of house-to-house registration, health facility assessments, costing case study, intervention mapping, data systems assessment, and follow-up of ZD children.

This **adaptive approach** produced timely findings that support real-time decision-making and future planning for equity-focused immunization strategies.

Zero-Dose LEARNING HUB

Uganda Learning Hub
Theory of Change

Objective: To generate evidence on identifying and reaching zero-dose children, under-immunized children, and missed communities in Uganda to inform immunization equity interventions.



The Uganda Learning Hub's ToC **adapted the RE-AIM framework** (Reach, Effectiveness, Adoption, Implementation, and Maintenance) and hypothesized that activities implemented through targeted interventions to identify and reach ZD children aimed to increase the proportion of children reached with routine vaccines in the study districts.

Although the ToC shows a linear pathway from inputs to impact, the LH also investigated **non-linear, iterative, and emergent outcomes** that arise when complex interventions interact with dynamic health systems, including feedback loops and contextual factors that shape implementation and results.

Zero-Dose LEARNING HUB

Uganda Learning Hub

Scope of Work & Approaches

	Overview	Geographic Coverage	Related Publications
Rapid Assessment	Mixed-methods study to characterize ZD and UI children and identify cross-cutting barriers to vaccination in three districts with high burden of ZD.	Wakiso, Kasese, Mubende	Report on a Rapid Assessment of the ZD Situation in Uganda
Immunization Data Ecosystem Assessment	Evaluated the utility, interoperability, and data quality of national platforms (DHIS2, eCHIS, SPT) for identifying ZD clusters.	National (with focused review of Mubende, Lira, and Mukono)	Utility of Data Capture Platforms for Identifying ZD Children
Evaluation of UNICEF-supported House-to-House Registration	Utilized the RE-AIM framework to assess the reach, adoption, and implementation of Village Health Team-led house-to-house (HTH) child registration.	Wakiso and Kamuli Districts	Identifying the Zero-Dose Child: Insights from the UNICEF-Supported House-to-House Registration of Children by Village Health Teams in Uganda The Cost of Identifying and Reaching Zero-Dose Children in Uganda: A Case Study of House-to-House Registration and Targeted Immunization Outreaches
Big Catch-Up (BCU) Evaluation & Incremental Costing	Process evaluation to assess implementation fidelity and bottom-up ingredients-based costing to estimate incremental financial and economic costs per ZD child identified and vaccinated.	Kasese, Mubende, and Wakiso	Identifying and Reaching ZD Children in Uganda: Implementation, Effectiveness, and Costs of Targeted Interventions
Mapping of Interventions to Reach ZD Children	Systematic documentation of strategies, enablers, and challenges of implemented interventions targeting ZD hotspots.	Mubende District	Identifying and Reaching ZD Children in Uganda: Implementation, Effectiveness, and Costs of Targeted Interventions
Follow-up of 99 ZD Children Identified from Baseline Targeted Community Survey	Longitudinal follow-up of 99 ZD children identified at baseline to measure real-world conversion rates and reasons for persistent non-vaccination.	Mubende District (Kigando, Kiruuma, and Butoloogo subcounties)	Burden of ZD Children in Pastoralist, Hard-to-Reach and Underserved Communities: A Case Study of Mubende District
Health Facility Assessment	Mixed-methods assessment of supply-side constraints, including outreach regularity and staff capacity across six facilities.	Mubende District (six health facilities across three subcounties)	Identifying and Reaching Zero-Dose Children in Uganda: Implementation, Effectiveness, and Costs of Targeted Interventions

Zero-Dose LEARNING HUB

Uganda Learning Hub
Research Methodology

The Uganda Learning Hub utilized a **multi-phased, mixed-methods implementation research** design to characterize ZD burden, assess intervention effectiveness, and analyze delivery costs.

Core Analytical Frameworks

- **RE-AIM Framework:** Evaluated the Reach, Effectiveness, Adoption, Implementation, and Maintenance of targeted ZD interventions.
- **Outcome Harvesting:** Applied to identify and verify unintended consequences and behavior change drivers among caregivers who previously defaulted.
- **BeSD Analysis:** Behavioral and Social Drivers of Vaccination quantified caregiver intent versus structural access barriers.
- **Root Cause Analysis:** Utilized the "5 Whys" technique during qualitative debriefs to synthesize recurring thematic barriers to vaccination.

Study Design	**Prospective Implementation Research:** Multi-phased approach including rapid assessments, baseline/repeat community surveys, and process evaluation of national campaigns
Sampling Strategy	**Purposive & Probability-Based:** Purposive selection of three high-burden districts (Kasese, Mubende, Wakiso). Village-level sampling utilized Probability Proportional to Size (PPS) to mitigate selection bias
Quantitative Methods	**Household Surveys (N=1,193):** Longitudinal follow-up of 99 baseline ZD children using GPS coordinates; secondary analysis of DHIS2 and eCHIS data
Qualitative Methods	**Triangulated Insights:** 40+ key informant interviews, in-depth interviews, participant dialogues, and structured field observations of campaign implementation
Costing Analysis	**Incremental Bottom-Up Costing:** Applied ingredients-based costing to estimate financial and economic costs per ZD child identified and vaccinated during the national Big Catch-Up campaign
Evidence Validation	**Robustness Ranking:** Findings were ranked on a four-point scale adapted from Gavi FCE 2.0 to assess strength through source triangulation

Zero-Dose LEARNING HUB

Uganda Learning Hub
Stakeholder Engagement

Strategic engagement across the health system to ensure research fidelity and policy uptake

National Level: Policy & Strategy Integration

- **Ministry of Health (MoH) & UNEPI:** Direct partnership with the National Task Force and Expanded Programme on Immunisation to align the Learning Hub's agenda with the national Gavi 5.0/6.0 roadmap.
- **Digital Health Division:** Technical advisory engagement to address registration data delays, leading to the development of real-time digital submission systems for national campaigns.
- **Civil Registration (NIRA):** Collaboration to advocate for linking birth registration data with immunization tracking to eliminate the "denominator problem."

Sub-National Level: Operational Adaptation

- **District Health Teams (DHTs):** Deep-dive collaboration in Mubende, Wakiso, and Kasese to validate survey findings and triangulate administrative DHIS2 data with community reality.
- **Sub-County Technical Planning Committees:** Direct dissemination of "hotspot maps" to local leaders in Kiruuma, triggering an increase in outreach sessions.
- **Health Facility In-Charges:** Engagement with 18 facilities to conduct supply-side assessments and health worker dialogues regarding attitudes and stockout barriers.

Frontline & Community Level: Evidence Co-Creation

- **Village Health Teams (VHTs):** Participatory engagement with VHTs to conduct house-to-house registration and identify the root causes of low motivation.
- **Local Council (LC1) & Faith Leaders:** Leveraging community trust to address vaccine hesitancy and myths in high-risk "Resistance Hubs."

Strategic Partner Alignment: Resource Leveraging

- **International Partners (UNICEF/Gavi):** Evaluation of pilot programs (RE-AIM) to provide the "so-what" evidence needed for national scale-up.
- **Implementing Partners (AMREF/HEPS-Uganda):** Strategic alignment sessions that influenced AMREF to fund district-wide data quality assessments and HEPS to finance targeted ZD interventions in Mubende.

Zero-Dose LEARNING HUB

Uganda Learning Hub

Drivers and Determinants of Zero-Dose

Learn more: Report on a Rapid Assessment of the Zero-Dose Situation in Uganda

Zero-Dose Driver	Research Findings	Key Takeaways for Immunization Stakeholders
The "Grandmother Effect" (Caregiver Vulnerability)	**Finding**: Children cared for by grandparents are more likely to be ZD compared to those cared for by biological parents. **Why**: Elderly caregivers face physical frailty (cannot walk to outreaches), extreme poverty, and fear of being scolded for lacking birth documentation.	**Go beyond designing for "mothers" only.** Mobilization strategies should target elderly caregivers who require home-based services or transport support rather than just education. VHTs should be trained to flag "grandparent-led households" for follow-up.
The "Birth-at-Home" Trap (The Linkage Gap)	**Finding**: Children born at home or with Traditional Birth Attendants are 2.27–2.32 times more likely to be ZD. **Why**: The ban on TBAs has created a "shadow system." TBAs hide home births to avoid legal repercussions and do not refer mothers for the birth dose (Polio 0/BCG), severing the child's first link to the health system.	**Criminalization drives invisibility.** Stakeholders should pivot from penalizing TBAs to re-engaging them as "identification agents." Strategies should incentivize TBAs to refer newborns for immunization without fear of punishment to bridge the gap between home births and the health system.
The Proximity Paradox	**Finding**: Proximity does not guarantee access. In pastoralist communities like Kigando, 37.2% of ZD households were located within 3.2 km of a health facility. **Why**: Barriers are behavioral and economic, not just geographic. Caregivers cited negative health worker attitudes (scolding), hidden costs (informal fees), and competing economic priorities as deterrents.	**Static clinics are insufficient.** Building more facilities will not solve the ZD problem for this subgroup. Investments should shift toward quality of care (respectful maternity care training) and trust-building. Zero-tolerance policies for informal payments are required to remove economic barriers.
Gender Dynamics & "Permission" Barrier	**Finding**: Immunization is viewed as a "woman's responsibility," yet men control the resources (transport fare) and decision-making power. **Why**: Women unable to vaccinate children because husbands refused to provide transport fare or forbade vaccination due to beliefs.	**Move from "female-focused" to "gender-transformative."** Demand generation targeting only women is flawed. Programming should engage men as active participants (e.g., via male savings groups) to shift from a "woman's chore" to a "father's duty."
Systemic Invisibility (Sects & Migrants)	**Finding**: Specific groups remain "invisible" to DHIS2 data. The "New World Order" religious sect rejects biomedicine and registration; 29 ZD children were found in one village only after targeted dialogue. **Why**: Migrants and religious isolationists actively hide from the system, meaning facility-based data systematically undercounts them.	**Facility data is a "statistical mirage."** Routine data cannot see these children. Stakeholders should fund participatory microplanning that includes religious leaders and immigrant representatives to uncover "hidden" pockets that standard enumeration misses.
The "Survey Effect" (Trust as Intervention)	**Finding**: The research process itself acted as an intervention. The act of respectfully asking about vaccination status prompted caregivers to seek services (7 out of 75 tracked ZD children vaccinated without a campaign). **Why**: Many caregivers are not "anti-vaccine." Being "seen" and treated with respect triggered latent demand.	**Interpersonal communication is a potent intervention.** The "identification" phase should be linked to "action." Programs should budget for VHTs to have quality conversations (not just headcounts) as respectful interaction can be a driver of behavior change in itself.

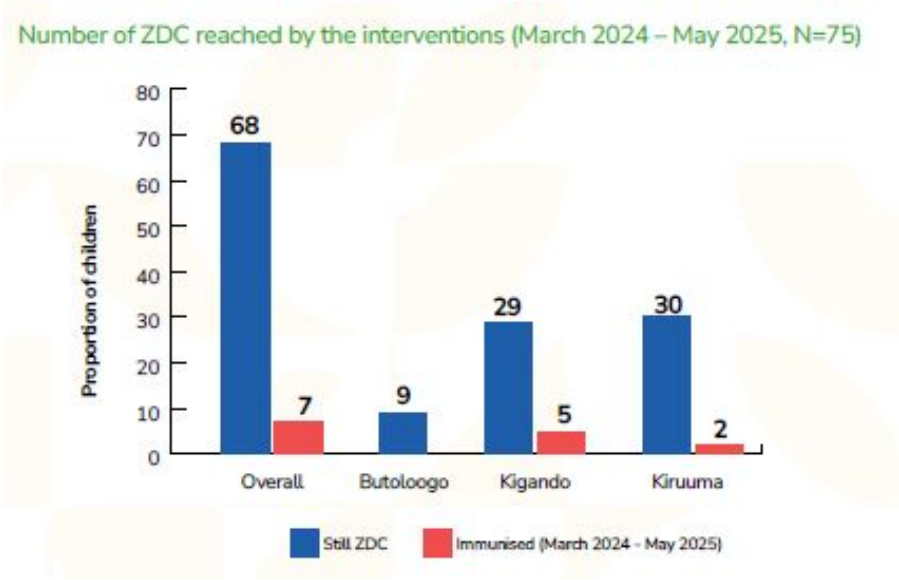
IR Intervention *Geographic Focus*	Objective(s)	Results, by Objective	Key Takeaways of Implementation Research
House-to-House (HTH) Registration *Wakiso & Kamuli (UNICEF Pilot) National (BCU, with deep dives in Mubende, Kasese, Wakiso)*	(1) To identify ZD/UI children at the household level. (2) To link identified children to health facilities for vaccination. (3) To track defaulters using updated community registers.	(1) Identified ZD/UI children (3,501 ZD children in Wakiso/Kamuli pilot) demonstrating the feasibility of VHT-led identification. (2) Identification did not guarantee vaccination. Approx. 38% of caregivers did not seek services after registration due to weak "community-to-facility linkages" and lack of follow-up support/transport. (3) Lack of vaccination cards and short implementation windows hindered accurate verification & tracking.	**Identification does not equal vaccination:** Funding identification (registration) without funding the "warm handoff" (transport, escorts) generates data but does not increase coverage. Future programs should budget for the "linkage" step. **Data Speed**: Real-time digital entry is required; manual paper registers are too slow to inform immediate campaign actions.
Uganda's National "Big Catch-Up" (BCU) Campaign *Kasese, Mubende, Wakiso*	(1) To rapidly increase coverage through mass mobilization and outreach. (2) To deliver vaccines cost-effectively using a campaign mode. (3) To integrate HTH registration data into immediate vaccination planning.	(1) ZD children were vaccinated (15,881 DPT1 in Wakiso). (2) While effective in high-density areas, unit costs were high in hard-to-reach areas (up to US$68.70 per ZD child in Kasese vs. US$8.30 in Mubende). (3) Manual data aggregation was too slow to generate line lists to target vaccinators effectively during the campaign.	**Abandon Uniform Budgeting:** The variation in unit costs proves that "one-size-fits-all" allocation fails. Funding should be typology-based, allocating significantly more for pastoral/mountainous regions. **Process Disconnect**: Registering children is futile if the data cannot be processed fast enough to direct vaccinators to those specific households.
Routine Immunization Strengthening *Mubende (Kigando, Kiruuma, Butoloogo)*	(1) To provide consistent, predictable access to vaccines. (2) To build caregiver trust through regular service availability. (3) To sustain reductions in the ZD burden over time.	(1 & 2) Caregivers explicitly preferred RI over campaigns due to predictability and lack of suspicion associated with ad-hoc events. (3) RI was the primary driver of the significant ZD reduction observed (12.7% → 6.5%) in the survey areas, outperforming the campaign in sustainable impact.	**Consistency Builds Trust**: Caregivers trust the predictability of routine services. **Investments** in strengthening routine systems yield better sustainable ZD reduction than sporadic campaigns, which can sometimes breed suspicion.
Targeted Integrated Outreaches (Supported by AMREF/Partners) *Mubende (Kiruuma & Kigando)*	(1) To extend services to underserved/static populations. (2) To reduce inequities in specific "high-risk" sub-counties. (3) To redeploy staff to under-resourced facilities (e.g., Kituule HCII).	(1 & 2) Successful in the underserved/static community (Kiruuma), reducing ZD from 17.9% to 4.1%. Failed in the pastoralist community (Kigando) initially because static outreach points could not serve mobile populations (ZD reduction insignificant: 15.9% → 13.4%). (3) Staff were successfully redeployed from regional hospital to support Kituule HCII.	**Context Determines Success**: Standard outreaches work for static populations but fail for mobile ones. "One-size-fits-all" outreach models waste resources in pastoralist settings. **Resource Dependency**: Success was contingent on external partner funding (AMREF) for fuel/transport, raising sustainability concerns.
Participatory Microplanning *Mubende*	(1) To correct erroneous population denominators (UBOS projections). (2) To reallocate resources based on actual community data. (3) To include VHTs and local leaders in the planning process.	(1) Local knowledge corrected denominators that were masking ZD pockets. (2) Led to the inclusion of Private Not-for-Profit facilities in the outreach network and harmonization of catchment areas across district borders. (3) Bottom-up planning validated target populations.	**Bottom-Up Planning**: Centralized planning misses local realities (e.g., gold mines, migrations). Microplanning should be decentralized and participatory to accurately place outreaches where the "missed" children actually are.
Digital Data Systems *National (Focus on Lira, Mukono, Mubende)*	(1) To capture individual-level data on children to identify ZD status. (2) To integrate community data with facility records (DHIS2).	(1) eCHIS identified higher ZD numbers than DHIS2, proving it can "see" children facility data misses. (2) eCHIS is not yet fully interoperable with DHIS2; community data remains siloed from facility reporting, preventing a complete view of the child.	**The "Statistical Mirage"**: Reliance on facility data (DHIS2) creates false coverage rates. Stakeholders should invest in interoperable community-level systems that link home births directly to facility registries to prevent children from remaining invisible.

Zero-Dose LEARNING HUB

Uganda Learning Hub Results
Identification to Vaccination Gap

Funding identification (registration) without explicitly funding and designing the "linkage" mechanism results in data collection without disease protection

- **Identification is a Process, Not an Outcome**: Among 99 ZD children identified in Mubende, only 7 had received DPT1 one year later; in the UNICEF HTH pilot, 38% of caregivers did not seek services after identification, showing identification can end as data without protection when linkage is weak.
- **The Data Disconnect: Information without Action**: During the Big Catch-Up, HTH registration data was collected but manual aggregation was too slow to produce actionable line lists before the campaign ended; eCHIS data is also not interoperable with DHIS2, so facility teams can't readily act on children identified in communities.
- **The "Warm Handoff" is Missing**: Reliance on verbal referrals fails to address the barriers that led to zero-dose status (distance, poverty, fear); the research indicates conversion was associated more with interpersonal communication/prompts than passive referral.
- **The Cost of Conversion is Higher than Identification**: The average cost to identify a ZD child was US$3.07, while the cost to vaccinate was US$12.30 (up to US$68.70 in hard-to-reach terrain), implying the service-delivery step is far more resource-intensive than registration.
- **VHTs as Navigators, Not Just Enumerators**: VHT performance is constrained by delayed payments and fear of accountability; some avoided registering children from resistant households, indicating the volunteer model can weaken data quality and post-identification linkage.
- **Operational Disconnect**: During the Big Catch-Up, 73.2% of ZD households reported never being visited by a VHT for registration, and 85.3% of caregivers remained unaware of existing outreach sites—signaling major breakdowns in last-mile execution and service awareness.



Strategic Shifts Recommended

1. Programs should stop treating registration as a proxy for coverage. Success metrics should shift from "number of children registered" to "number of registered children vaccinated within 30 days."
2. Investment should pivot from collecting more data to connecting existing data. Stakeholders should enforce interoperability standards that allow community registries to populate facility "due lists" automatically, enabling immediate defaulter tracking.
3. Budgets should include line items for "linkage logistics" (e.g., transport vouchers for mothers, escort fees for VHTs) to physically bridge the distance between the home and the facility.
4. Abandon uniform budgeting. Adopting typology-based financing is essential, where resource allocation is significantly higher for pastoralist/mountainous regions to cover the high operational costs of mobile vaccination teams required to close the gap.
5. To close the gap, VHTs should be incentivized/paid specifically for the conversion (vaccinating the child), not just the identification. This aligns incentives with the desired health outcome.

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Uganda Learning Hub Results

Cost Analysis of the "Last Mile"

One national average can't price the last mile: vaccinating ZD children in Uganda is highly geography-dependent and costlier than identification

- **Uniform budgeting fails ("average cost" is misleading):** Unit costs vary sharply by district typology—Mubende: US$8.98, Wakiso: US$10.10, Kasese: ~US$68.70–$85.18 per ZD child vaccinated. Flat per-district allocations will systematically under-resource hard-to-reach areas.
- **High price of the last mile (diseconomies of scale):** As coverage improves, the marginal cost rises; Kasese had the highest costs but vaccinated 100 ZD children (vs 894 in Mubende), driving much higher unit costs for the remaining unreached children.
- **Sustainability and the campaign trap:** Extrapolated nationally, reaching 188,349 ZD children via this campaign approach would cost ~US$2.32M for a single round, underscoring that repeated, donor-funded campaign delivery is difficult to sustain.
- **Efficiency losses from analog systems:** Personnel time and data processing were a major cost driver (36% of district-level costs); slow, paper-based aggregation prevented real-time targeting of vaccination teams and wasted resources, highlighting the operational value of digital microplanning/ registration tools (e.g., eCHIS).

Incremental Costs per ZD Child Identified and Vaccinated

	Mubende	Kasese	Wakiso
Costs per Zero Dose Child identified			
Total costs attributable to DPT1 registration	$2,258	$2,963	$1,396
Costs per child identified (Zero Dose Child)	$4	$6	$1
Overall average		$3	
Costs per Zero Dose Child vaccinated			
Total costs (vaccine delivery costs + vaccine costs)	$8,031	$8,518	$8,267
Revised number of children vaccinated for DPT1*	$894	$100	$818
Costs per child vaccinated for DPT1 (Zero Dose Child)	$9	$85	$10
Overall average		$14	

Learn more: The Cost of Identifying and Reaching Zero-Dose Children in Uganda: A Case Study of House-to-House Registration and Targeted Immunization Outreaches

Zero-Dose LEARNING HUB

Uganda Learning Hub Results

Systemic, Data & Governance Challenges

Institutional weaknesses and inaccurate data frameworks create "systemic blind spots" that render zero-dose children invisible to national and district planners

- **The "Statistical Mirage":** DHIS2 can show >100% coverage (e.g., Mubende) while community surveys still find clusters of ZD children, driven by flawed denominators, service-user reporting, and non-interoperable eCHIS–DHIS2 systems that don't generate actionable "due lists."
- **Fragile last-mile workforce:** ZD identification depends on unpaid/undertrained VHTs; delayed/inadequate payments and fear of blame/conflict led to omissions, avoidance of resistant households, and data quality risks.
- **Governance:** Political interference can divert resources away from technical need/ZD burden; weak accountability enables informal charges and suppresses reporting of misconduct or misuse.
- **One-size-fits-all planning failure:** Central guidelines (e.g., standard outreach frequency) are unrealistic in sparse/mobile pastoralist settings; uniform planning/budgeting limits flexibility for mobile/door-to-door approaches needed to reach "invisible" groups.
- **Supply chain ripple effects:** Stockouts of specific antigens or Child Health Cards/registers disproportionately exclude ZD children—failed trips reduce return likelihood, and missing cards force ad hoc records, creating data loss and unverifiable status.

Strategic Shifts Recommended

- **Stop relying on DHIS2 coverage rates alone for equity;** shift to individual-level, longitudinal tracking by linking identity/birth registration (e.g., NIRA) to health records so mobile/migrant populations don't disappear across district borders.
- **Budget for workforce sustainability at the last mile** with regular, timely financial incentives for VHTs; redesign incentives toward linkage/conversion (vaccination) rather than identification-only to reduce omission/avoidance behaviors.
- **Strengthen governance and accountability** by enforcing zero-tolerance monitoring for informal charges and ensuring resource allocation is evidence-based (tied to ZD burden rather than political influence).
- **Replace one-size-fits-all planning with bottom-up microplanning** (co-created with local leaders) and allow flexible financing/fiscal autonomy so districts can shift resources to mobile logistics (fuel/transport) based on real-time needs.
- **Prioritize "tools + vaccines" together** by funding Child Health Cards, registers, and reliable supplies as core inputs, because without them, children's status can't be verified and they remain functionally invisible in future follow-up.

Zero-Dose LEARNING HUB

Uganda Learning Hub Results

What Worked – Strategic Enablers

Strategic Enabler	Evidence of Effectiveness	Operational Takeaway
Routine Immunization	Significant reduction in ZD burden in Mubende (12.7% to 6.5%) driven primarily by strengthening routine systems, not the "Big Catch-Up" campaign. Caregivers reported trusting the consistency of RI over the unpredictability of campaigns.	**Invest in Consistency**: Funding should prioritize the reliability of the routine cold chain and schedules. Sporadic campaigns provide volume, but consistent routine services build the trust required for sustainable equity.
Adaptation (Door-to-Door)	Standard static outreaches worked in static communities (Kiruuma ZD drop: 17.9% to 4.1%) but failed in pastoralist areas (Kigando ZD stagnation: 15.9% to 13.4%). Success only occurred when teams pivoted to a mobile "door-to-door" model.	**Abandon "One-Size-Fits-All":** Mobile populations require mobile strategies. Guidelines and budgets should allow districts the flexibility to deploy door-to-door teams for pastoralists rather than enforcing fixed outreach points.
Interpersonal Communication	The "Survey Effect" proved that respectful inquiry acts as a clinical intervention. 7 out of 75 tracked ZD children were vaccinated because the research visit made caregivers feel "seen" and valued, triggering latent demand.	**Budget for Dialogue:** Soft skills are hard enablers. Programs should budget for VHTs to have quality conversations, not just headcounts. Respectful interaction is a low-cost, high-impact conversion tool.
Participatory Microplanning	Engaging VHTs and local leaders in planning corrected erroneous census denominators (UBOS) that masked ZD pockets. This led to the redeployment of staff from the regional hospital to under-staffed facilities like Kituule HCII.	**Democratize the Data:** Microplanning cannot be a desktop exercise. It should be a participatory field activity that validates target populations with local knowledge to ensure resources go where the children actually are.
Male Engagement	Success was often contingent on spousal support. Innovative "Male Savings Groups" (SACCOs) initiated by VHTs successfully engaged men, who control transport funds and decision-making, to view immunization as a father's duty.	**Target the Gatekeepers:** Demand generation targeting only mothers is structurally flawed in patriarchal settings. Strategies should engage men to unlock the financial resources required to access care.
Data-Driven Co-Creation	Sharing granular ZD heatmaps with partners (AMREF, HEPS) led to precise funding for operational gaps. AMREF funded 10 specific additional outreaches/month and fuel for hard-to-reach areas based on this data.	**Data Enables Efficiency:** Use ZD data to enable partner coordination. Direct external funding to specific logistical voids (fuel, per diems) rather than duplicating general support.

Zero-Dose LEARNING HUB

Uganda Learning Hub – Evidence to Action

Transforming Implementation Research into Systemic and Subnational Health Reforms

Impact Category	The Evidence (Trigger)	KT Mechanism (The "How")	Validated Action (The Impact)
Reforming National Strategy *(Policy Impact)*	Evaluation of house-to-house (HTH) registration pilots proved that personalized identification was more effective than mass mobilization.	**National Task Force Collaboration:** Direct Hub partnership with MOH/UNEPI to validate learning agendas.	**National Policy Reform:** UNEPI adopted the HTH model for the nationwide 2024 "Big Catch-Up."
Institutionalizing Guidelines *(Sustainability Impact)*	Research identified that previous guidelines lacked specific targeting for ZD and UI clusters.	**Technical Guideline Revision:** Integration of ZDLH findings into national Integrated Child Health Day (ICHD) protocols.	**Permanent Policy Shift:** Evidence-based strategies for reaching ZD embedded into the National ICHD Technical Guidelines and materials used by all districts.
Operationalizing Evidence *(Subnational Impact)*	Disaggregated data revealed Kiruuma sub-county was underserved, with one facility serving five parishes.	**Local Dissemination & Dialogue:** Presenting granular "hotspot maps" directly to district and sub-county planning committees.	**Operational Pivot:** Kiruuma expanded outreaches and redeployed hospital staff to bridge gaps.
Digital Transformation *(Systems Impact)*	Process evaluations identified that paper-based delays (up to 2 weeks) prevented timely campaign follow-up.	**Technical Advisory Engagement:** Presenting data flow bottlenecks to the MOH Digital Health Division.	**Real-Time Data Systems:** Prompted development of a digital system for daily data submission during campaigns.
Catalyzing External Funding *(Partner Impact)*	Learning Hub evidence identified specific funding gaps for data quality and "last-mile" outreach.	**Strategic Partner Engagement:** Joint planning with AMREF and HEPS-Uganda to align donor priorities with evidence.	**Partner Alignment:** Influenced AMREF to fund district-wide DQAs and HEPS to finance targeted ZD interventions in Mubende.
Correcting Systemic "Blind Spots" *(Data Impact)*	DHIS2 administrative data showed "impossible" coverage (>100%), masking actual ZD clusters and misinforming targets.	**Methodological Workshops:** Technical triangulation sessions with District Biostatisticians to compare UBOS projections with HTH data.	**Systems Correction:** DHTs moved toward using VHT-led household registration data as the primary microplanning denominator.
Advocating for Sustainability *(Workforce Impact)*	Qualitative findings identified that low VHT motivation was driven by delayed payments, not just a lack of training.	**Participatory Root Cause Analysis:** Synthesizing worker "voices" for policy briefings with MOH commissioners.	**National Advocacy:** Learning Hub findings drove national policy discussions on institutionalizing VHT remuneration.

Zero-Dose LEARNING HUB

Uganda Learning Hub
Key Takeaways

Sustainable zero-dose reduction requires abandoning uniform strategies in favor of context-specific delivery models that are supported by typology-based financing to cover the high operational costs of the "last mile" and interpersonal communication to bridge the persistent gap between identifying a child and actually vaccinating them

- **Knowledge Translation as a Catalyst for Action:** Moving from "knowing" to "doing" requires a continuous cycle from dissemination to impact. This process moves beyond one-off reports to institutionalize evidence; for example, disseminating granular data and engaging with sub-county leaders triggered local staffing and outreach adjustments to reach more ZD burden.
- **The Intent-Action Gap:** Research revealed that 71.9% of ZD caregivers strongly intend to vaccinate, but only 17.5% find services easy to access. This critical insight shifts the institutional focus from "behavior change" to removing systemic economic barriers, such as transport costs (US$1.40–$2.00) and informal card fees.
- **Closing the "Identification Loop":** Identification should be a process, not an endpoint; finding a child does not guarantee vaccination, as only 9.3% of identified ZD children were successfully reached a year later. Sustainability requires linking HTH registration to individualized longitudinal registers to prevent children from becoming "invisible" post-registration.
- **Stakeholder-Led Co-creation for Workforce Sustainability:** Reaching the "last mile" depends on the VHT workforce acting as active partners in microplanning rather than just data sources. Learning Hub findings have driven national advocacy to address delayed VHT payments and training gaps, which are the primary drivers of low morale and poor data quality.
- **Precision Targeting of Hidden Vulnerabilities:** Disaggregating data allowed the Learning Hub to identify overlooked high-risk clusters, such as grandparent-led households, who are 2.45 times more likely to be ZD. This evidence enables partners to move beyond "one-size-fits-all" models to tailor investments to specific community typologies.

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Challenges & Limitations

Research Methodology	• **Generalizability Constraints**: The study was limited to three purposively selected districts and specific sub-counties, meaning findings may not represent the entire country or regions with differing contexts. • **Lack of Control Groups:** Without a comparison group, researchers relied on a pre-post design (baseline vs. repeat survey) as a proxy for effectiveness, which limits the ability to definitively attribute changes solely to interventions. • **Respondent Bias**: Overlapping participants across multiple sub-studies may have introduced respondent fatigue or social desirability bias, where caregivers provide answers they believe researchers want to hear.
Data Quality & Visibility	• **Administrative Denominator Inaccuracy**: Relying on UBOS population projections often resulted in "impossible" coverage rates (>100%), masking the true ZD burden and misinforming target setting. • **Documentation Gaps**: Persistent stockouts of child registers forced health workers to use tally sheets; these capture numbers but lack individual-level longitudinal tracking needed to follow children across facilities.
Sustainability & Finance	• **Donor Dependency**: High-impact interventions like house-to-house registration and intensified outreaches are resource-intensive and relied heavily on short-term funding (e.g., AMREF, UNICEF), raising significant continuity concerns once donor support ends.
Governance & Coordination	• **Workforce Morale**: The sustainability of social mobilization is threatened by low VHT morale driven by inadequate, delayed, or missed payments for previous activities. • **Guideline vs. Reality Mismatch**: National outreach targets fail to account for vast rural villages and difficult terrain, making service delivery inherently difficult to maintain without increased logistical support. • **Political & Systemic Risks**: Political interference in resource allocation and fragmented coordination between districts and sub-counties can lead to funds being diverted from frontline services.

Zero-Dose LEARNING HUB

Uganda Learning Hub
Call to Action

Strategic Pillar	Priority Actions & Calls to Action
Collaboration & Engagement	• **Multisectoral Action:** Strengthen ties between health, education, and community development to address social determinants like poverty and gender barriers • **Community & Faith Leadership:** Actively engage faith leaders and influencers to build trust and bring resistant communities into the health system • **Stakeholder Participation:** Ensure community-level stakeholders participate in design to make activities context-sensitive and adaptable
Governance & Accountability	• **Enhanced Leadership:** Improve performance management through confidential reporting channels and clear follow-up mechanisms • **Resource Integrity:** Enforce strict financial tracking and ensure facility upgrades follow technical, equity-based criteria rather than political influence • **Guideline Alignment:** Align national guidelines with local realities, prioritizing additional logistical support for hard-to-reach areas
Service Delivery & Workforce	• **Routine & Integrated Platforms:** Prioritize integrated delivery to maximize efficiency and ensure consistent, predictable routine outreach • **Workforce Support:** Strengthen VHT functionality through regular incentives, improved remuneration, and mentorship for ZD follow-up • **Targeting Home Births:** Systematically link children born at home to services through VHT, TBA, and community development officer networks
Data & Long-Term Systems	• **National Longitudinal Tracking:** Develop a digital, interoperable tracking system linked to birth registration to follow children regardless of where they seek care • **Data Capture Tools:** Ensure consistent availability of child registers to improve documentation and prevent ZD misclassification • **Transforming Gender Norms:** Operationalize male involvement strategies and integrate them into school curricula for generational shifts

For detailed recommendations see Identifying and Reaching Zero-Dose Children in Uganda: Implementation, Effectiveness, and Costs of Targeted Interventions

Key ZDLH Reports
Uganda

- Identifying and Reaching Zero-Dose Children in Uganda: **Implementation, Effectiveness, and Costs of Targeted Interventions**
- The **Cost of Identifying and Reaching Zero-Dose Children** in Uganda: A Case Study of House-to-House Registration and Targeted Immunization Outreaches
- Identifying the Zero-Dose Child: Insights from the UNICEF-Supported **House-to-House Registration of Children** by Village Health Teams in Uganda
- **Utility of Data Capture Platforms** for Identifying Zero-Dose Children in Uganda
- Burden of Zero-Dose Children in Pastoralist, Hard-to-Reach and Underserved Communities: A **Case Study of Mubende District, Uganda**
- Report on a **Rapid Assessment** of the Zero-Dose Situation in Uganda
- Uganda Zero-Dose **Learning Agenda**
- Uganda **Zero-Dose Landscape**

Semiannual Updates

Gavi's ZDLH IRMMA Aligned Interventions: Semiannual Update—Uganda (October 2025)

Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update—Uganda (April 2025)

Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update (October 2024)

Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update (May 2024)

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