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

October 2024

Gavi Zero-Dose Learning Hub (ZDLH)

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

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Contact Information

CONTENTS

ACRONYMS

C2P	Coach2PEV
CAPEV	*Centre d'Apprentissage pour l'équité en vaccination* (Country Learning Hub)
CLH	Country Learning Hub *(Centre d'Apprentissage pour l'équité en vaccination)*
CNI	Centre national d'immunisation (National Immunization Center)
CPS	Centres de Promotion Sociale
CSO	civil society organization
DHS	Demographic and Health Survey
DPT	diphtheria, pertussis, tetanus
DQA	data quality assessment
EPI	Expanded Programme on Immunization
FPP	Full Portfolio Planning
IHME	Institute for Health Metrics and Evaluation
IR	implementation research
JSI	JSI Research & Training Institute, Inc.
LQAS	lot quality assurance sampling
NGO	non-governmental organization
UI	under-immunized
UNICEF	United Nations Children's Fund
WHO	World Health Organization
ZD	zero-dose
ZDLH	Zero-Dose Learning Hub

MALI COUNTRY LEARNING HUB

The Zero-Dose Learning Hub (ZDLH), established by Gavi, addresses immunization equity by generating data, evidence, new insights, and learning to better understand the factors influencing implementation and performance of approaches to identify and reach zero-dose (ZD) and under-immunized (UI) children and missed communities. The ZDLH consortium is led by JSI Research & Training Institute, Inc. (JSI), in collaboration with The Geneva Learning Foundation and the International Institute of Health Management Research. ZDLH works to address immunization equity through the generation of evidence and learning around effective methods and approaches for identifying and reaching ZD and UI children. Four Country Learning Hubs (CLHs) in Bangladesh, Mali, Nigeria, and Uganda advance the uptake of research and evidence to improve immunization policy and programming, especially at subnational levels. In 2023, Gavi selected GaneshAID as the country learning partner for Mali. Together with the Center for Vaccine Development—Mali and the University of Bamako, GaneshAID established the Mali CLH, known in French as *Centre d'Apprentissage pour l'equité en vaccination (CAPEV).*

ZDLH TECHNICAL ASSISTANCE

During the period January–June 2024, JSI, as the global learning partner, continued to provide technical assistance, collaborate, and co-create with the Mali CLH. JSI provided final comments on the Mali CLH's rapid assessment and engaged in discussions alongside Gavi regarding potential methodological issues with the CLH estimates for ZD children in Mali, which are derived from administrative data and the Institute for Health Metrics and Evaluation (IHME) extrapolations. Although the formula developed by the CLH was ultimately not used, their efforts to produce more accurate immunization coverage estimates were valued, particularly considering the unreliable DPT1 (diphtheria, pertussis, tetanus) coverage calculated using DHIS2 data. JSI conducted a review of the CLH's implementation research (IR) protocol and offered multiple rounds of feedback related to the theory of change, the indicators to be measured, and the methodology of the proposed household coverage survey, including the number of subnational areas and typologies to include and the pros and cons of including a comparison group. The Mali CLH is preparing to conduct a household coverage survey in eight health facility catchment areas using lot quality assurance sampling (LQAS). JSI is assisting in finalizing the IR protocol and data collection instruments and will be leading an LQAS Training of Trainers workshop for the Mali CLH.

ADDITIONAL RESOURCES

- Mali Zero-Dose Landscape
- ZDLH Semiannual Update (May 2024) (July–December 2023)
- ZDLH Semiannual Update (October 2023) (January–June 2023)
- Early Learning from Zero-Dose Practitioners in Bangladesh and Mali: Gavi ZDLH Inter-Country Peer Exchange

IDENTIFY

RAPID ASSESSMENT

In 2023, the Mali CLH, with support from GaneshAID and the CNAM/CVD-Mali (Centre National d'Appui à la lutte contre la Maladie), conducted a ZD rapid assessment in collaboration with the Centre National d'Immunisation (CNI) and its partners. Initial findings were described in [Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update (May 2024)](link). This semiannual update provides more detailed information on the findings.

The Mali rapid assessment aimed to:

- Identify and quantify the characteristics of ZD and UI children across different districts, including those in conflict zones, rural or remote areas, and districts with special populations.

- Evaluate the performance of existing interventions designed to overcome barriers to vaccination coverage and equity. This included assessing human resource adequacy, vaccination coverage, data quality, and management of stock and cold chain logistics.

The assessment sought to provide a detailed view of vaccination coverage and equity challenges, including barriers to vaccination, across four study districts in Mali. Data sources included:

- Desk review of 62 strategic and technical documents related to the immunization system,

- 24 focus group discussions with community members,

- 32 semi-structured in-depth individual interviews with local health authorities and vaccination staff at eight selected community health centers,

- Secondary analysis of DHIS2 and IHME data to estimate and triangulate the number of ZD and UI children in Mali, and

- Data quality assessment (DQA) of routine facility data in eight selected community health centers.

Initially, the assessment targeted four districts—Ségou, Kayes, Bourem, and Commune IV of Bamako—but Bourem was later replaced by Tominian due to security reasons. The data collection process involved visiting eight health facility catchment areas within these districts to gather information on vaccination coverage and identify ZD children.

Findings

In 2022, an estimated 227,189 children in Mali had not received the first dose of DTP1 according to IHME estimates. Nearly 70 percent of these children live in conflict zones and remote rural areas. Additionally, 24 percent of ZD children are found in communities of nomads, fishermen, farmers, gold miners, and other remote populations. Urban districts have fewer ZD children, but there are pockets of unvaccinated children in informal settlements around large cities, hilly areas, and peri-urban regions,

primarily among vendors, gardeners, domestic workers, seasonal laborers, and migrants. Trends from 2018 to 2022 show an increase in ZD children, indicating the need for targeted actions to reach these communities.

- **Increase in ZD children:** Between 2019 and 2022, there was a noticeable increase in the number of ZD children based on IHME estimates, from 176,319 in 2019 to 227,1891 in 2022. This upward trend was observed across various districts, highlighting an escalating issue with vaccination coverage. However, it is crucial to note that some of this increase may be attributed to changes in IHME estimation methods rather than actual programmatic challenges. Given the fluctuations in data quality and the assumptions underlying official estimates, IHME data may not be suitable for measuring progress or changes in the estimated number of ZD children on a yearly basis. However, it is very useful for identifying priority areas based on best available information. To gain deeper insights into the reasons behind the estimated rise in ZD children (beyond those related to changes in the methods used to generate the IHME estimates), the CLH sought feedback from government and partner organizations. The details of this feedback are outlined in the subsequent section on stakeholder feedback.

- **Data quality issues:** The rapid assessment identified issues with routine data quality, including overestimation of vaccination rates and gaps in the accuracy of primary data sources. An analysis of DHIS2 data showed downward-trending estimates of ZD children in Mali, ranging from -87,598 in 2019 to -58,392 in 2022. One factor contributing to these unreliable trend estimates is the underestimation of the number of surviving children under one year old (i.e., the denominator). This figure has been calculated by extrapolating Mali's outdated (2009) census results and applying annual population growth rates each year.

- **Geographic distribution:** Nearly three-quarters of ZD children lived in districts affected by conflict or in rural regions.

- **Coverage and quality of vaccination services:** The assessment found that vaccination services were hindered by insufficient personnel, inadequate coverage of planned vaccination strategies, and frequent stockouts. In 2023, 67 percent of health facilities experienced vaccine shortages due to delayed funding, and only 57 percent of facilities had reliable cold chain systems.

- **Gender-related barriers:** In many communities, women had limited authority in making health-related decisions for their families, which can affect the prioritization of vaccination for children and access to health services. Women often bear a significant burden in managing household responsibilities, which also can limit their ability to seek vaccination services for their children. This burden includes time constraints and additional responsibilities that may impact their ability to travel to health facilities. Women's access to vaccination services was further constrained by a lack of transportation, which is essential for reaching health centers, particularly in rural and conflict-affected areas.

- **Preference for traditional medicine:** In some communities, people preferred traditional medicine over formal vaccination services. This preference is often influenced by cultural beliefs and practices, which can affect the acceptance and uptake of vaccination.

STAKEHOLDER FEEDBACK

The CLH organized a stakeholder discussion panel, moderated by representatives from the CNI, Centres de Promotion Sociale (CPS), World Health Organization (WHO), and United Nations Children's Fund (UNICEF), to discuss the root causes of the notable increase in IHME estimates of ZD children in 2022 and recommendations for addressing them. The panel identified a number of key factors contributing to this rise:

Health System Challenges

- **Clinic schedule:** Limited vaccination days.

- **Supply challenges:** Seasonal inaccessibility, insecurity, and geographical barriers.

- **Human resources:** Inadequate training of health personnel to support vaccination efforts.

Socioeconomic and Cultural Barriers

- **Demand and social factors:** Economic pressures, vaccine skepticism, mobility of populations, and low prioritization of immunization in urban and peri-urban areas. Additional challenges include the domestic and economic burdens that impact women's ability to access vaccinations for their children.

- **Civil society organization (CSO) involvement:** Community Health Associations' limited engagement in vaccination activities

Governance and Funding

- **Political factors:** Vaccine shortages caused by an embargo during a political crisis.

- **Funding issues:** Lack of continued funding after the end of Routine Systems Strengthening initiative in June 2022.

- **Reach Every Child implementation:** Lack of effective monitoring for the Reach Every Child (known in French as *Atteindre Chaque Enfant* [ACE]) strategy.

Data and Accountability

- **Insufficient tracking and accountability:** Inadequate systems for identifying missed children and tracking of vaccination efforts and no accountability framework for unmet targets.

The panel identified the following targeted recommendations to address these challenges:

- **Extend clinic hours:** Expand vaccination days and hours to accommodate varying schedules, especially in rural and hard-to-reach areas.

- **Enhance supply chain management:** Improve procurement and distribution processes to ensure a consistent and reliable supply of vaccines and equipment, including refrigerators and motorcycles, including in geographically challenging or conflict-affected zones.

- **Implement community engagement initiatives:** Increase awareness campaigns that involve local leaders and influencers to combat vaccine skepticism and cultural barriers.

- **Identify sustainable funding models:** Seek partnerships with international donors and in the private sector to establish long-term funding beyond temporary programs.

- **Establish robust data systems:** Improve the use of birth records and vaccination data to track coverage accurately and identify gaps in service delivery.

- **Establish accountability frameworks:** Establish clear accountability mechanisms within health programs to ensure responsibilities are met at every level from local health workers to national health authorities.

EMERGING LESSONS: IDENTIFY

In addition to the increase in the number of ZD children from 2019 to 2022, IHME 2022 data validated the prioritization of 44 districts where a total of 79 interventions will be implemented with Full Portfolio Planning (FPP) funding. These interventions will address supply- and demand-side barriers, including gender-related barriers, as well as data quality issues. Among Mali's 75 health districts, 37 are conflict-affected, 22 are rural or remote, 10 have special populations, and six are urban or peri-urban. The assessment reveals that nearly three out of four ZD children live in conflict or rural/remote areas, highlighting access constraints as a key determinant to reaching ZD children in Mali.

Emerging recommendations for improving quantification of the ZD burden in Mali include:

- **Leverage the new Mali census and Demographic and Health Survey (DHS) data** to improve ZD estimates. With the recent publication of Mali's 2022 census data, more accurate denominators are now available to replace the outdated figures currently used in DHIS2. Typically, the national level shares these updated denominator figures with subnational levels in December or January each year. It is unclear whether the 2022 census data will be used to replace the older estimates by the end of this year (2024), or if it will take another year to be communicated to subnational levels and integrated into DHIS2. Regardless, the new census data will undoubtedly lead to more accurate immunization coverage estimates across the country and will likely be incorporated into IHME's 2025 ZD estimates. These census and DHS data provide high-quality and reliable data sources that can be triangulated with administrative data, along with the periodic LQAS surveys planned by districts as part of monitoring efforts for Gavi 5.0.

- **Explore ways to strengthen routine health information systems** for the Expanded Programme on Immunization (EPI) with the EPI's Data Quality Group.

- **Develop micro-census strategies** with community health workers, traditional and religious leaders, and CSOs.

Data Collection Quality

Emerging recommendations to improve data collection quality include:

- Ensure the continuation of Data Quality Group meetings at the national and subnational levels. These meetings are funded by partner organizations and convened regularly when funding is

available. Due to funding shortages, the national-level EPI Data Quality Group, responsible for ensuring data integrity by addressing outliers, missing data, and duplicates, has not convened recently. The Equity Acceleration Fund is supporting the revitalization of the EPI Data Quality Group, with its first meeting since March 2022 scheduled for September 2024.

- Enhance self-assessment through DQA of health facilities to improve data quality and address reporting issues.

- Maximize complementary data collection systems (Coach2PEV, CAPEV Collaborative Intelligence Platform).

Vaccination Service Delivery

- Vaccination service delivery in Mali faces challenges due to shortages of skilled, trained, and motivated personnel, as well as gaps in the execution of planned vaccination strategies. In 2023, delays in vaccine procurement led to stockouts in 67 percent of health facilities in the six months preceding the rapid assessment. The Health Resources and Services Availability Monitoring System 2023 report found adequate availability of vaccines in only 57 percent of health facilities.

REACH

LEARNING HUB IMPLEMENTATION RESEARCH

The Mali CLH IR is a mixed methods pre-post study that will be carried out in eight selected health facility catchment areas in the four CLH study districts. The research questions focus on two interventions designed to tackle supply-side barriers to vaccination:

- **Coach2PEV** (C2P) is a digital supervision tool designed to enhance the skills and motivation of health personnel, thereby improving their ability to reach ZD children. Accessible via a mobile application and a central web platform, C2P offers a robust platform for performance coaching. The app is equipped with features for self-assessment, individualized coaching, and performance tracking. It also incorporates a performance e-dashboard and gamification elements to increase motivation and engagement among health workers. The e-dashboard, a key component of the tool, outlines a series of actionable steps in an improvement plan tailored to the performance results of health personnel. Coaches, or health staff, use the dashboard to execute these plans. The e-dashboard continuously monitors staff progress in implementing the improvement plans and sends automated rewards or alerts based on performance metrics. This systematic approach ensures that improvements in vaccine delivery are both recognized and encouraged, reinforcing positive outcomes in vaccination campaigns.

- **MEDEXIS** (electronic logistics management system) focuses on improving logistical management, including vaccine storage, distribution, and data analysis. It seeks to provide better oversight and integration of vaccine-related data through digital analytics and interoperability of systems, ultimately reducing stockouts and improving vaccine availability. The MEDEXIS application can do the following:

  - Monitor stock movements: Each entry and exit of products is recorded and traced, which makes it possible to know quantities available in each warehouse at any time.

  - Send out-of-stock or low-stock alerts: The app can be configured to send automatic notifications when a product's inventory reaches a critical threshold, helping anticipate shortages and trigger necessary restocks.

  - Optimize ordering: Consumption and forecast data helps generate automated orders, reducing stockouts and costs.

  - Create custom reports: MEDEXIS offers a variety of reports to analyze inventory data, identify trends, and improve commodity management.

The C2P and MEDEXIS interventions aim to enhance the quality of vaccination services, increase vaccine availability, and improve EPI indicators, which are expected to contribute to a decrease in ZD children in Mali. However, factors such as health professionals' resistance to change, insufficient training, and high turnover could impede successful implementation. Additionally, financial and material limitations, including a lack of resources, present significant challenges. Contextual issues such as security and governance, including political instability and sustainability concerns, may also affect the effectiveness

of these interventions. While improving the supply of vaccination services is vital for meeting demand, some barriers related to demand and gender might not be fully resolved through enhancements in supply alone.

The IR protocol is in draft and outlines a mixed-methods process to assess the acceptability, feasibility, and sustainability of the C2P and MEDIXIS initiatives in the eight health facility catchment areas. The research includes a quantitative baseline based on a cross-sectional household survey using LQAS in the same eight catchment areas. This survey aims to provide more accurate estimates of vaccination coverage and to better understand the demand-side challenges that may limit the effectiveness of planned interventions. These challenges will be evaluated using a series of indicators from the WHO Behavioral and Social Drivers of Vaccination framework. The household survey will not be repeated as a post-assessment because the delayed arrival of FPP funding has left too little time to implement the two study interventions.

The next steps involve finalizing the study protocol, conducting a validation workshop with national stakeholders, submitting the protocol to the ethics committee, and beginning data collection and analysis. Findings from the Mali IR research will be used to develop recommendations to improve the effectiveness and integration of these innovative approaches within the immunization program.

EMERGING LESSONS: REACH

The Mali CLH developed a theory of change for each of the proposed interventions—C2P and MEDEXIS—to address major obstacles identified through the rapid assessment, notably the lack of skilled and motivated human resources and vaccine stock-out. The CLH has purposefully selected eight health facilities across four districts with distinct typologies for ZD children—urban, rural/remote, special populations, and conflict affected areas—to observe differences in implementation and effects across these different environments. The rollout of the study interventions is scheduled for early 2025. Meanwhile, the CLH has had to adjust its choice of health facilities to ensure that both interventions will be implemented in the selected areas. IR findings will be shared in the future reporting.

MONITOR AND MEASURE

As discussed in the *Identify* section, the rapid assessment highlighted significant data quality issues within Mali's health information system, with marked differences between vaccination data recorded in tally sheets, facility reports, and DHIS2. Data is frequently missing or incorrect, with notable discrepancies across various administrative data sources such as surveillance, stock, and service delivery. Additionally, the system is fragmented: routine vaccination data is captured through the administrative system, whereas data from vaccination campaigns and district-level LQAS are recorded through separate, parallel systems. The rapid assessment underscored the importance of integrating immunization services and related data collection into the broader health system, especially in conflict areas, to ensure equitable health care access. Recommendations for improvement included mapping EPI technical and financial partners, engaging stakeholders in CLH activities, and facilitating knowledge sharing through the Collaborative Intelligence Platform (CIP).

The Mali CLH developed the CIP with the primary goal of regularly engaging key immunization stakeholders—including CNI, WHO, UNICEF, academia, CSOs, non-governmental organization (NGOs), and the private sector—to collaboratively design, implement, and monitor ZD activities. The platform's first task is to track and present the implementation and progress of activities outlined in the FPP, including identifying any barriers or facilitators to progress. The Mali CLH has created standardized forms for partners to submit information about the status of their respective activities and is currently working on the best ways to synthesize and present this information to promote collaboration and coordination among all partners. This platform will act as a central repository, giving partners a comprehensive view of FPP-funded activities addressing ZD children in Mali.

In July 2024, the Mali CLH organized its first online training session on CIP for CNI and immunization partners, guiding them on how to use the platform, upload documents and data, and make the platform an easy tool for sharing and accessing information. Attendees were actively engaged and provided feedback on platform improvements, such as adding budgetary indicators for activities and considering the inclusion of non-FPP activities. Additionally, a suggestion was raised about using CIP to gather and triangulate various sources of immunization data, including the 2024 census, the 2023 immunization coverage survey, the periodic LQAS survey results from the 44 priority districts, and MUSO-Unité de Médecine Rurale et de Santé Social data[1] collected at the community level to support the EPI Data Quality Group, which analyzes DHIS2 data at the national level. The Mali CLH is currently exploring ways to make this integration possible. Recognizing that CIP may encounter challenges in addressing country-level data quality issues without direct access to a central dataset like DHIS2, the initial approach will likely involve using CIP to streamline the collection and uploading of recent data from various sources. This will make it easier for the Data Quality Group to conduct triangulation. Ongoing discussions with partners will be necessary to explore the potential for full data triangulation within CIP.

During this reporting period, the Mali CLH also accessed and aggregated immunization data for the eight catchment areas that will be the IR focus. The trends over time in the number of children immunized

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[1] MUSO is an NGO that operates at the community level through trained community health workers who provide a package of maternal and child health services. MUSO actively works to increase immunization coverage by conducting awareness campaigns, training health workers, and enhancing access to vaccines. The data collected from these activities is entered into DHIS2 using the DISC-Mali application.

with DPT1, DPT1 coverage, and dropout from DPT1 to DPT3 for the eight catchment areas are displayed in the CIP subnational dashboard. The Mali CLH plans to continuously monitor these indicators throughout the IR period. While they do not yet have specific insights into the observed fluctuations, they noted that regular quality review meetings at the community and district levels could provide further understanding.

EMERGING LESSONS: MONITOR AND MEASURE

The CIP offers a valuable opportunity to enhance visibility, coordination, and collaboration among immunization partners. There is considerable interest and numerous suggestions from stakeholders about potential additions to the platform, which is encouraging. However, the Mali CLH should prioritize one or two key areas and carefully manage stakeholders' expectations.

It is essential to secure stable funding to ensure regular quality review meetings at the community, district, and national levels, which the FPP funding is expected to support. These meetings are critical for analyzing immunization data trends and improving overall program performance.

ADVOCATE

STAKEHOLDER ENGAGEMENT METHODS

The Mali CLH actively engaged with national stakeholders, including representatives from CNI and CPS, to co-author abstracts for Gavi's Zero-Dose Learning Week, focusing on insights from the use of FPP funding and rapid assessment. The CLH scheduled a validation workshop for the IR protocol for later in 2024 with the EPI Director and national stakeholders to validate the protocol before its final submission.

EMERGING LESSONS: ADVOCATE

Engaging with women leaders, known as "Mama-Yeleen," in urban and peri-urban districts has emerged as a promising strategy to promote immunization and improve coverage in Mali. Initiated in 2017 by UNICEF in partnership with the Ministry of Communications and the Regional Departments of Social Development and Solidarity Economy, the "Mama-Yeleen" program leverages the influence of community women leaders. These leaders employ a variety of methods, including community engagement and positive deviance, to encourage and motivate communities to adopt essential family practices, including child immunization. Although the "Mama-Yeleen" approach shows promise in fostering positive behaviors, its impact has not been adequately documented. Further research is needed to study the effectiveness of the 'Mama-Yeleen' approach in improving immunization rates and sustaining long-term health outcomes.

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