Zero-Dose LEARNING HUB

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

May 2024

Gavi The Vaccine Alliance

JSI

IIHMR DELHI

The Geneva Learning Foundation

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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ACRONYMS

BeSD	behavioral and social drivers
CLH	Country Learning Hub
CSO	civil society organization
DHIS	District Health Information System
DTP	diphtheria, tetanus, pertussis [vaccine]
EAF	Equity Acceleration Fund
eJRF	electronic Joint Reporting Form
EPI	Expanded Program on Immunization
FPP	Full Portfolio Planning
IHME	Institute for Health Metrics and Evaluation
icddr,b	International Center for Diarrhoeal Disease Research, Bangladesh
IIHMR	International Institute of Health Management Research
IR	implementation research
IRMMA	Identify, Reach, Monitor, Measure, and Advocate
JSI	JSI Research & Training Institute, Inc.
KT	knowledge translation
LGA	local government administration
n/a	not applicable
PIRI	periodic intensification of routine immunization
RI SMS	routine immunization short message service
UI	under-immunized
WHO	World Health Organization
WUENIC	WHO/UNICEF Estimates of National Immunization Coverage
ZD	zero-dose
ZDLH	Zero-Dose Learning Hub
ZDLH-X	ZDLH Inter-Country Peer Learning Exchange

ZERO-DOSE LEARNING HUB

PERIOD OF REPORTING: JULY–DECEMBER 2023

The Zero-Dose Learning Hub (ZDLH) established by Gavi, the Vaccine Alliance (Gavi), is focused on the outcome of timely, increased, and sustainable use of evidence to improve global, regional, and country immunization programs and policies in alignment with the Gavi 5.0 Strategy and Identify, Reach, Monitor, Measure, and Advocate (IRMMA) Framework. The Learning Hubs in Bangladesh, Mali, Nigeria, and Uganda are actively engaging with stakeholders, refining their learning agendas, assessing data systems, and designing and documenting implementation research (IR) studies. As they progress with their research and programming activities (learn more Gavi's Zero-Dose Learning Hub IRMMA Aligned Interventions: Semiannual Update [October 2023]), the Learning Hubs are generating and sharing insights on a variety of research methods, behavioral and social drivers (BeSD) tools, the costs of programs targeting zero-dose (ZD) children, and strategies for improving data systems for effective monitoring and measurement. They are addressing learning priorities aligned with the IRMMA framework through tailored collaborative capacity strengthening and systematic, robust monitoring and learning. As each Learning Hub continues their IR, they will provide timely monitoring on key indicators and translate their research findings for key stakeholders.

This semiannual update for the Gavi Board and other stakeholders highlights the ZDLH consortium's efforts to leverage evidence for a deeper understanding of the factors that affect the implementation and performance of strategies to identify and reach ZD and under-immunized (UI) children and missed communities. A critical aspect of the Learning Hubs' approach is the engagement of a wide range of stakeholders, from local communities to government entities and international partners. This engagement is essential for mobilizing resources, shaping policy, and securing community support. Engagement efforts are tailored to the unique contexts of each country, emphasizing the importance of political leadership and targeted advocacy for advancing immunization equity.

BACKGROUND

COUNTRY LEARNING HUBS

The ZDLH helps generate, synthesize, and share ZD data and evidence at both the global and country levels. The structure is a hub-and-spoke model: JSI, the global learning partner manages learning and evidence at the global level, and four country learning hubs (CLHs) in Bangladesh, Mali, Nigeria, and Uganda, comprised of local partners/consortiums, capture and use country-level programmatic data and evidence to provide insights on how the ZD strategy is being translated at the subnational level through improved monitoring and evidence generation.

The four CLHs include:

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

The CLH countries were selected to ensure variation by region and context, including rural, urban, conflict, or refugees, and based on a relatively high number and proportion of ZD children. Other considerations included feasibility and risk mitigation.

ZDLH GLOBAL CONSORTIUM

In addition to the four CLHs, the ZDLH mechanism includes a global consortium led by JSI Research & Training Institute, Inc. (JSI), in partnership with the International Institute of Health Management Research, New Delhi (IIHMR) and The Geneva Learning Foundation (TGLF). The global consortium provides technical and operational support to the CLHs and disseminates learnings at the community, regional, national, and global levels.

Tailored and Collaborative Capacity Strengthening

Technical Assistance

As the global learning partner, ZDLH supports the country learning hubs to implement their IRMMA-aligned learning agenda by providing tailored and collaborative capacity strengthening, technical assistance, and mentorship, including assisting the learning hubs to identify and resolve implementation challenges in immunization programming. In the original program design, technical support to CLHs was intended to be driven by standardized guidance and respond to needs obtained through a standard capacity assessment tool. A more effective capacity support model has emerged in which technical expertise is matched to learning hub needs identified during collaborative design and methods development working meetings, responding to the specific technical need and current work plan activity. To date, ZDLH's demand-driven approach to capacity building for the Learning Hubs and development of tailored technical assistance (TA) content and resources has covered qualitative methods and data analysis, outcome mapping, knowledge translation, and targeted surveys,

in particular monitoring immunization coverage using Lot Quality Assurance Sampling (LQAS). ZDLH also developed a common protocol for conducting a political economy analysis (PEA) for ZD children in CLH countries.

Contributing Evidence and Capturing, Synthesizing, and Disseminating the Breadth of Learning

Measuring Zero-Dose Children

During 2023, the ZDLH initiative aligned on a recommendation to use an expanded age range of 18 weeks to 23 months for targeted surveys, with enough power in the sample size to enable disaggregation of key results across two different cohorts in the sample, namely children aged 18 weeks to 11 months and 12–23 months. Even though the global operational definition of ZD children for surveys is the lack of DTP1 among children aged 12–23 months, there are many reasons why the expanded age range should be included in targeted local surveys in the CLH countries. The inclusion of the first year of life cohort can generate useful insights on immunization timeliness, minimize recall bias among survey respondents, and may potentially enable the reduction in sample size and time needed to detect impact, when this is a critical research question. It may significantly improve the utility of evidence for decision-making, as insights will be generated for the population currently targeted by the program. The inclusion of older age cohorts in the survey will generate insights and inform catch-up activities for older groups, but may increase recall bias. The inclusion of multiple age cohorts in the same survey may enable comparison of results across different age cohort years and support better identification of systematically missed communities, supporting the validation of set programmatic priorities. It may also generate insights on changes in enablers and barriers to immunization under dynamic contexts such as the introduction of a new ZD intervention or when recovering from the impact of health system shocks. Including multiple age cohorts may require larger sample sizes if results need to be disaggregated by cohort years, but may enable a potential reduction in the need for household visits to find eligible children. **Learn more**: Measuring Zero-Dose Children: Reflections on Age Cohort Flexibilities for Targeted Immunization Surveys at the Local Level.

Zero-Dose Landscapes

As the four CLHs began their work in early 2023, the ZDLH carried out a landscape scan in each country to better understand the immunization context. Through literature reviews and secondary data analysis, the ZDLH identified critical gaps, challenges, and opportunities to improve the identification, reach, monitoring, management and advocacy for ZD and UI children. The resulting landscape analyses identified factors affecting the immunization system within the four CLH countries, including immunization coverage equity, human resources, immunization policies and financing, environmental context, and community health structures. Developing a deeper understanding of these factors and regional contexts can be used to create more targeted, contextually-appropriate immunization programming. The findings from the landscape analyses provide opportunities for others working to reach ZD and UI children to apply lessons learned and strengthen their own data collection and implementation approaches. Review the landscape analyses and *Vaccines Work* blog: Zeroing in on zero-dose.

Facilitating Learning and Sharing

Zero-Dose Resource Library

The ZDLH resource library features a curated repository of evidence-based measurement, monitoring, and learning resources; tools; guidance; and approaches, as well as existing evidence from each country and resources generated by the ZDLH. It includes a curated collection of ZD immunization case studies highlighting approaches to identify and reach ZD and UI children and missed communities. Visit the ZDLH website to access more resources.

Knowledge Translation

In September 2023, ZDLH held its second inter-country peer learning exchange, ZDLH-X2, focused on ZD and UI children and missed-community challenges in Nigeria and Uganda. The session provided an opportunity for national and sub-national practitioners to share their experiences and learn from each other and to strengthen networking within and across countries. Insights and learning exchanges from the ZDLH-X2 session focused on microplanning, community engagement, designing services for busy caregivers, addressing gender-related barriers, and integrating immunization and other services to reduce missed opportunities for vaccination. In addition to this peer exchange, ZDLH developed a forthcoming knowledge translation toolkit to support the four CLHs in their efforts to effectively translate their ZD immunization research findings into action. Learn more about ZDLH-X.

Snapshot of Key Indicators from the Four CLH Countries

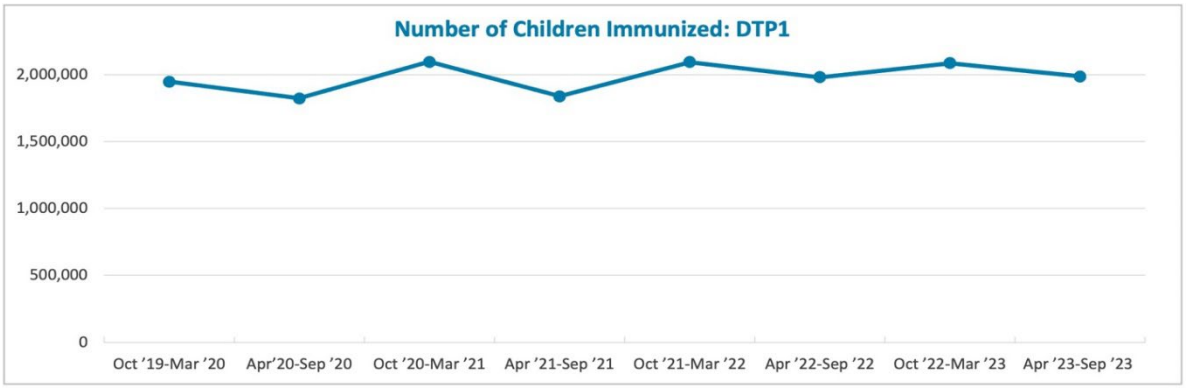
The following section presents data on key immunization indicators across the four CLH countries. ZDLH compiled data from global and country-level sources to create a dashboard of indicators for each country. An explanation of the data sources and interpretation of the figures is presented in the text that follows.

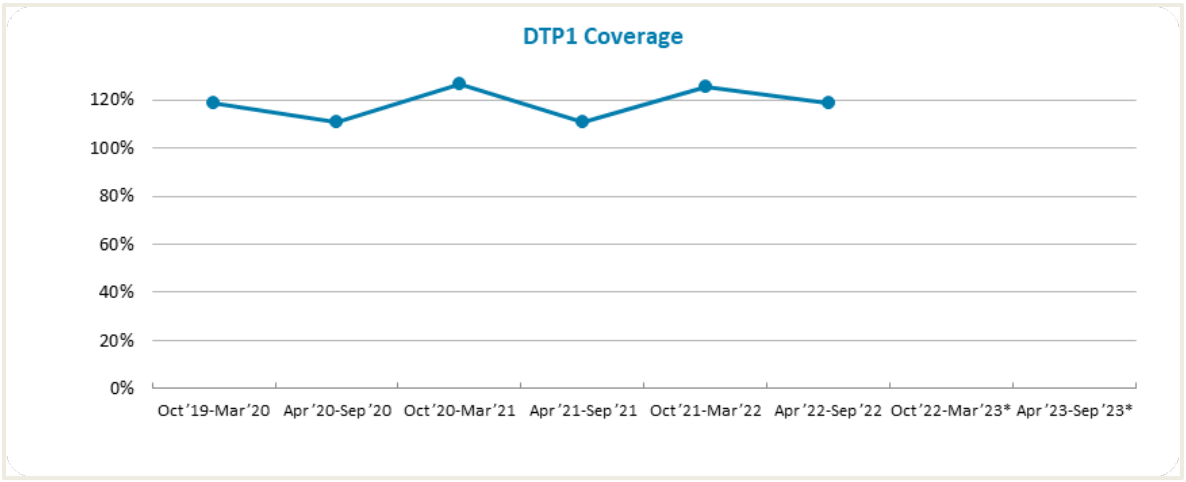
COUNTRY DATA DASHBOARDS

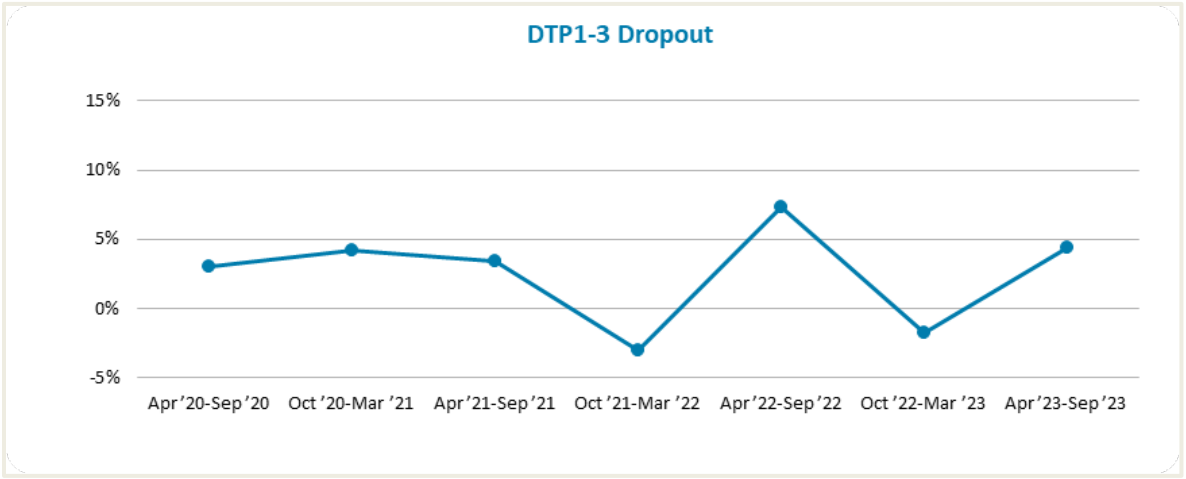
BANGLADESH

Figure 1. DTP1 Trends in Bangladesh, 2019–2023

(Source: WHO monthly immunization results database)







*All data for 2019–2022 were retrieved from the WHO monthly immunization results database. Only national level trends are shown here because Bangladesh does not report subnational data to WHO through the eJRF. For 2023, the denominators to calculate DTP1 coverage are not yet available through WHO. We will adjust these figures with updated data for 2023 in the next semiannual update.

Figure 2. CLH Study Sub-districts (upazilas) in Bangladesh: DTP1-3 Trends from April–June 2023 Compared to January–March 2023[1]

(Source: Bangladesh DHIS2 reported in Bangladesh CLH Quarterly Progress Report)

	Number of Children Immunized: DTP1[2]	DTP1 Coverage[3] (% Change from Baseline)	Percent Change in DTP1-3 Dropout[4]	Sub-District Typology
Sunamganj				
Jamalganj	**199** ↓	**95%** (-13%)	**175%** ↓	Wetlands
Dowara Bazar	**100** ↓	**102%** (-5%)	**162%** ↓	
Gaibandha				
Saghta	**33** ↑	**98%** (+2%)	**157%** ↓	Hard to reach, char area
Fulchhari	**14** ↓	**101%** (-1%)	**185%** ↓	
Noakhali				
Hatiya	**100** ↓	**104%** (-3%)	**59%** ↓	Hard to reach, coastal
Subarnachar	**41** ↑	**106%** (+1%)	**32%** ↓	
Rangamati				
Kawkhali	**6** ↓	**92%** (-2%)	**21%** ↑	Hard to reach, hilly
Rangamati Sadar	**25** ↓	**92%** (-14%)	**139%** ↓	
Sherpur				
Nalitabari	**39** ↓	**111%** (-2%)	**87%** ↓	Plainland
Sreebardi	**15** ↓	**106%** (-1%)	**46%** ↓	

1 Data from December 2022 are unavailable; therefore, this table includes comparisons between a three-month baseline period of January–March 2023 and a current period of April–June 2023. The baseline and current periods will be extended to six months in the next semiannual update.

2 Each number represents the difference in the number of children immunized with DTP1 between baseline (January–March 2023) and the current period (April–June 2023), with green arrows indicating an increase and red arrows indicating a decrease.

3 We calculate the percent change from baseline by subtracting the current DTP1 coverage rate from the baseline DTP1 coverage rate and dividing it by the baseline DTP1 coverage rate. In upazilas with coverage rates above 100 percent, the number of surviving infants vaccinated exceeded the total number of surviving infants in the upazila, indicating that there are issues with the quality of reported data.

4 Calculated by subtracting the current DTP1-3 dropout rate from the baseline DTP1-3 dropout rate and dividing by the baseline DTP1-3 dropout rate. Green arrows indicate a negative percent change in DTP1-3 dropout between baseline and the current period, and the red arrows indicate a positive percent change. For example, in Dowara Bazar, the DTP1-3 dropout rate was 10.6% in January–March 2023 and -6.5 in April–June 2023, resulting in a 162% percent change (decrease) in dropout rate.

Data Interpretation For the trends from national level, all data from 2019–2022 including denominators (i.e., the number of surviving children under one year of age) were retrieved from the WHO immunization database that houses data from the WHO/UNICEF electronic Joint Reporting Form (eJRF). For 2023, these denominators were provided by the CLH from the DHIS2 as denominator data is not yet available through eJRF. This means that the denominators for the last data points (2023) reflect data from two different sources. We will update the figures with the 2023 denominators from the WHO database once these are available.

The trends observed for the number of children immunized with DTP1 and DTP1 coverage mirror one another between October 2019 and September 2022, with two marked drops in April–September 2020 and April–September 2021, the first of which was presumably due to disruptions in service related to the start of the COVID-19 pandemic. It is important to note that coverage rates exceeded 100% across all of the reported periods, reaching a high of 127% in October 2020–March 2021, signifying issues with the quality of reported data.

The dropout rates from DTP1 to DTP3 started off at around 4% in April–September 2020 before dropping to a low of -3% in October 2021–March 2022 and increasing to a high of 7% in October 2021–March 22. The first dip in October 2021–March 2022 from 3% to -3% corresponds with an increase in DTP1 coverage from 111% to 126%, followed by a decrease to 118% that corresponds with an increase to 7% dropout April–September 2022.

The CLH retrieved the sub-district data included in Figure 2 were retrieved from the Bangladesh DHIS2. In four of the ten sub-districts, the dropout rate in the current period (April–June 2023) was in the negatives, indicating issues with the quality of the reported data. Additionally, wide fluctuations in dropout from baseline (January–March 2023) to the current period resulted in substantial percent changes in dropout in many of the sub-districts. For example, a shift from a dropout rate of 9% to -7% resulted in a 175% change in Jamalganj.

Figure 3. Comparison of Different Estimates of Numbers of ZD Children at the National Level in Bangladesh (2019–2022)*

(Source: Gavi Secretariat. 2022. "Bangladesh Zero Dose Analysis." Unpublished.)

	2019			2020			2021			2022		
	IHME	WUENIC	DHIS2	IHME	WUENIC	DHIS2	IHME	WUENIC	DHIS2	IHME	WUENIC	DHIS2
National level												
Estimated Number of ZD Children	Not included	Not included	Not included	174,698	Not included	Not included	14,789	29,577	Not included	13,164	29,405	Not included

*Data marked as "not included" were not available at the time of publication, but will be included in the next semiannual update.

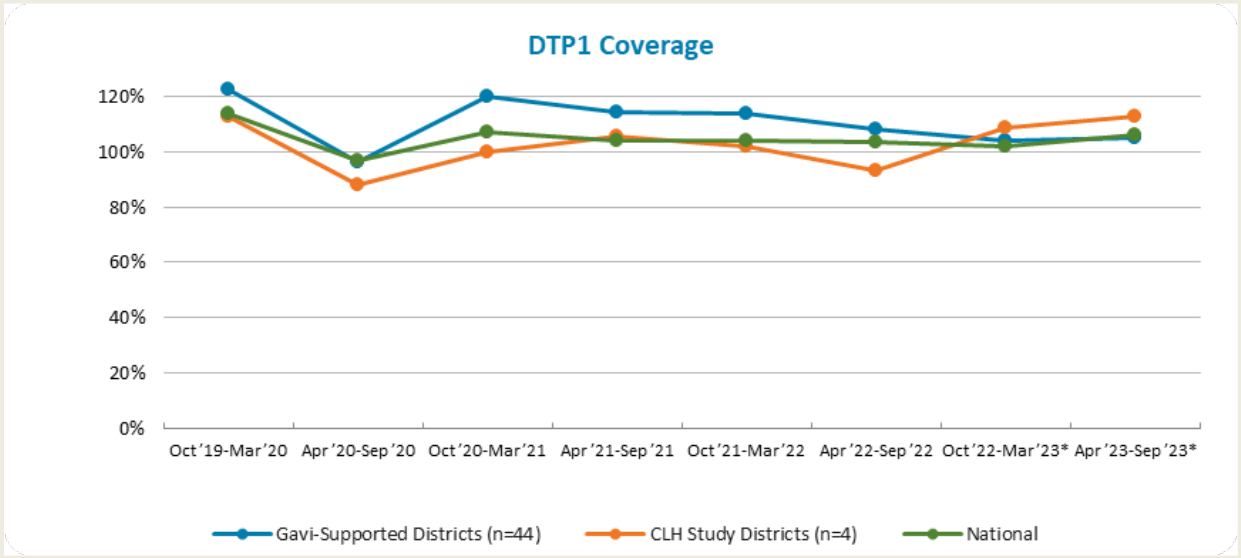
MALI

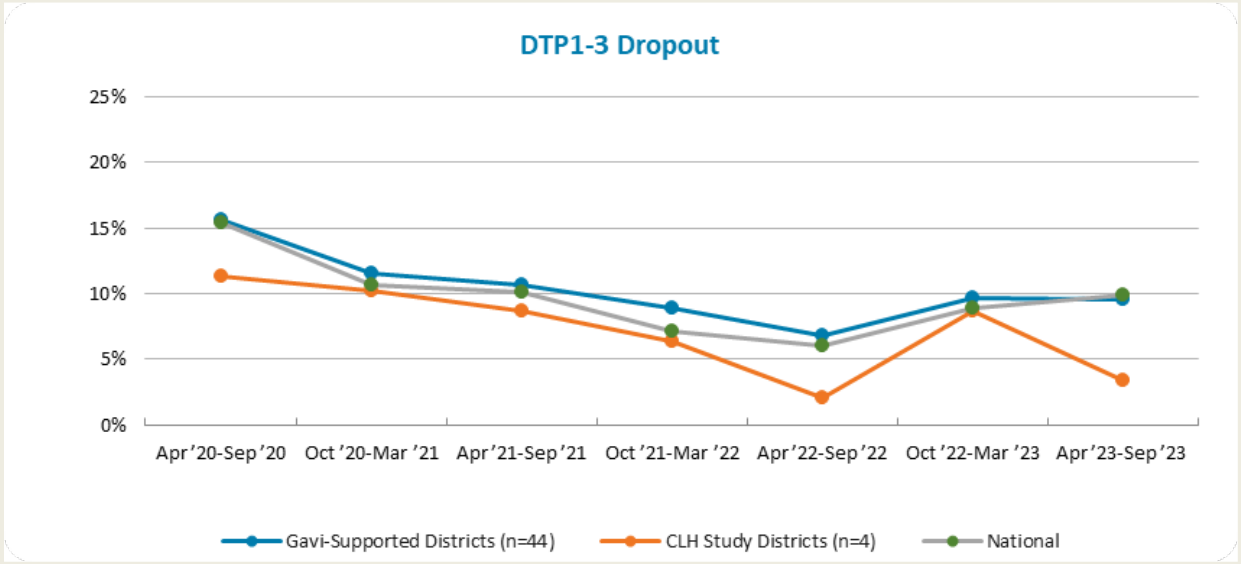
Figure 4. DTP1 Trends in Mali, 2019–2023

(Sources: WHO monthly immunization results database and Mali DHIS2)

Figure 5. DTP1 Coverage and DTP1-3 Dropout Rates in Mali, 2019–2023*

(Source: WHO monthly immunization results database & Mali DHIS2)





*For the national level, 44 Gavi-supported districts, and 4 CLH study districts, the denominators for 2019–2022 were retrieved from the WHO monthly immunization results database. For 2023, the CLH retrieved the respective denominators from the Mali DHIS2 as this data is not yet available through WHO. Data for the six-month period between Q4 2023 (October–December 2023) and Q1 2024 (January–March 2024) are not yet available and will be updated in the next semiannual update.

Figure 6. CLH Study sub-districts in Mali: DTP1-3 Trends from April–September 2023 compared to October 2022–March 2023

(Source: Mali DHIS2 reported in Mali CLH Quarterly Progress Report)

	Number of Children Immunized: DTP1[1]	DTP1 Coverage[2] (% Change from Baseline)	Percent Change in DTP1-3 Dropout[3]	Sub-District Typology
Commune VI				
Asaconia	**851** ↑	**137%** (+35%)	**319%** ↓	Urban/Peri-urban
Asacoyir	**163** ↑	**369%** (+1%)	**523%** ↓	
Niono				
N'Debougou	**63** ↑	**61%** (+11%)	**177%** ↓	Rural/Remote
M'Bewani	**90** ↑	**251%** (+53%)	**59%** ↓	
Bougouni				
Bougouni Ouest	**49** ↑	**212%** (+2%)	**78%** ↑	Special Communities/ Others
Niamala	**248** ↑	**99%** (+203%)	**31%** ↓	
Yorosso				
Karangana	**3** ↓	**82%** (-2%)	**992%** ↓	Conflict Zone
Gouélé	**77** ↑	**163%** (+13%)	**742%** ↓	

1 Each number represents the difference in the number of children immunized with DTP1 between baseline (October 2022–March 2023) and the current period (April–September 2023), with green arrows indicating an increase and red arrows indicating a decrease.

2 The percent change from baseline is calculated by subtracting the current DTP1 coverage rate from the baseline DTP1 coverage rate and dividing by the baseline DTP1 coverage rate. In sub-districts with coverage rates above 100%, the number of surviving infants vaccinated exceeded the total number of surviving infants in the sub-district, indicating that there are issues with the quality of reported data.

3 Calculated by subtracting the current DTP1-3 dropout rate from the baseline DTP1-3 dropout rate and dividing by the baseline DTP1-3 dropout rate. Green arrows indicate a negative percent change in DTP1-3 dropout between baseline and the current period, and the red arrows indicate a positive percent change. For example, in Asacoyir, the DTP1-3 dropout rate was 3.1% in October 2022–Mar 2023 and -12.9% in April 2023–September 2023, resulting in a 523% percent change (decrease) in dropout rate.

Data Sources

For the trends from national level and Gavi-supported districts, the denominators for 2019–2022 (i.e., the number of surviving children under one year of age) were retrieved from the monthly WHO immunization database that houses data from the WHO/UNICEF eJRF. Denominators are estimated by Mali's *Direction Nationale de la Population* based on the 2013 census with a growth rate of 2.8% per year and reported through the eJRF. For 2023, the CLH provided these denominators from the DHIS2 as denominator data is not yet available through eJRF. This means the numerators and denominators for the last data points (2023) reflect data from two different sources. We will update the figures with the 2023 denominators from the WHO database once these are available. For the CLH study sub-districts, all data were reported by the Mali CLH from the DHIS2 (Figure 6).

Data Interpretation

The trends observed for the number of children immunized with DTP1 and for DTP1 coverage at the national level and in the 44 Gavi-supported districts mirror one another and stay relatively unchanged from 2019 through 2023, with the exception of a marked drop in the period April–September 2020. This is presumably due to disruptions in services related to the start of the COVID pandemic. The trends in the number of children immunized and the coverage rates in the four CLH study districts are largely similar to those at the national level and Gavi-supported districts during the same period, though there is a noticeable drop in DTP1 coverage observed only in the four CLH study districts April–September 2022, with trends normalizing by the following reporting period (Figure 2). Across all levels, the coverage rates hover around or above 100%, signifying issues with the quality of reported data. In Commune VI, rates are particularly high, exceeding 150% since the October 2020–March 2021 period and driving up the overall coverage rates for CLH study districts. Because there are only four CLH study districts, fluctuations in only one district can have a disproportionately large effect on the overall trends observed in the above figures.

While overall DTP1 coverage among Gavi-supported districts remained fairly stable between April 2021 and December 2023, several districts experienced substantial fluctuations in coverage during that time period. For example, coverage in Goundam district increased from 25% in October 2021–March 2022 to 65% in April–September 2022. Similarly substantial decreases, such as from 227% to 203% during that same period in Kalabancoro district, contributed to the appearance of overall stable coverage rates when all Gavi districts are combined as in Figure 6 above.

The dropout rates from DTP1 to DTP3 are similar when comparing national trends with Gavi-supported districts, starting off at over 15% in April–September 2020 and steadily declining to a low of around 5% in April–September 2022, before increasing again in the period October 2022–March 2023. The dropout rates in the CLH study districts show a similar pattern in fluctuations, which may appear more dramatic since 2022 because of the scale. For example, the first dip in April–September 2022 is from a 6% dropout to 2% dropout, which corresponds with a dip in DTP1 coverage from 114% to 108% in the same period. The second dip in April–September 2023 from 9% to 3% dropout rate corresponds with an 11% increase in DTP3 doses against only a 5% increase in DTP1 doses.

The CLH retrieved the sub-district data included in Figure 6 from the Mali DHIS2. In five of the eight sub-districts, the dropout rate in the current period (April–September 2023) fell into the negatives, indicating issues with the quality of the reported data. Additionally, wide fluctuations in dropout from baseline (October 2022–March 2023) to the current period resulted in substantial percent changes in dropout in many of the sub-districts. For example, a shift from a dropout rate of 2% to -15% resulted in a 992% change in Karangana. In smaller sub-districts, slight changes in the number of children immunized with DTP1 will have a greater effect on the percent change in the number of children immunized with DTP1 than in larger sub-districts. In Niamala, for example, the estimated population of surviving infants in the current period is 370 compared with Asacoyir, which has an estimated surviving infant population of 1,758. While 163 children resulted in just a 3% increase in the number of children immunized with DTP1, 248 children in Niamala resulted in a 207% increase.

Figure 7. Comparison of Different Estimates of Numbers of ZD Children in Mali (2019-2022)

(Source: Gavi Secretariat. 2022. "Mali Zero Dose Analysis." Unpublished.)

	2019			2020			2021			2022		
	IHME**	WUENIC	DHIS2	IHME	WUENIC	DHIS2	IHME	WUENIC	DHIS2	IHME	WUENIC	DHIS2
National												
Estimated Number of ZD Children	176,319	149,810	-87,598	210,319	212,865	-37,132	161,628	157,055	-91,529	227,189	160,626	-58,392
Gavi-Supported Districts (44 districts)												
Estimated Number of ZD Children	161,439	NA*	-70,325	142,026	NA*	-28,801	136 888	NA*	-70,361	203,520	NA*	-33,864
CLH Study Districts (Bougouni, Niono, Yorosso, Commune VI of Bamako)												
Estimated Number of ZD Children	15,190	NA*	-21,761	14,621	NA*	-16 627	14,532	NA*	-26,933	24,284	NA*	-23,554

*WUENIC data are national coverage estimates; these data are not available at district or sub-district levels in Mali.

**In 2019, Institute for Health Metrics and Evaluation (IHME) estimates did not include data from five Gavi-supported districts: Kalabancoro, Markala, Oussoubidiagna, Commune V, and Commune V.

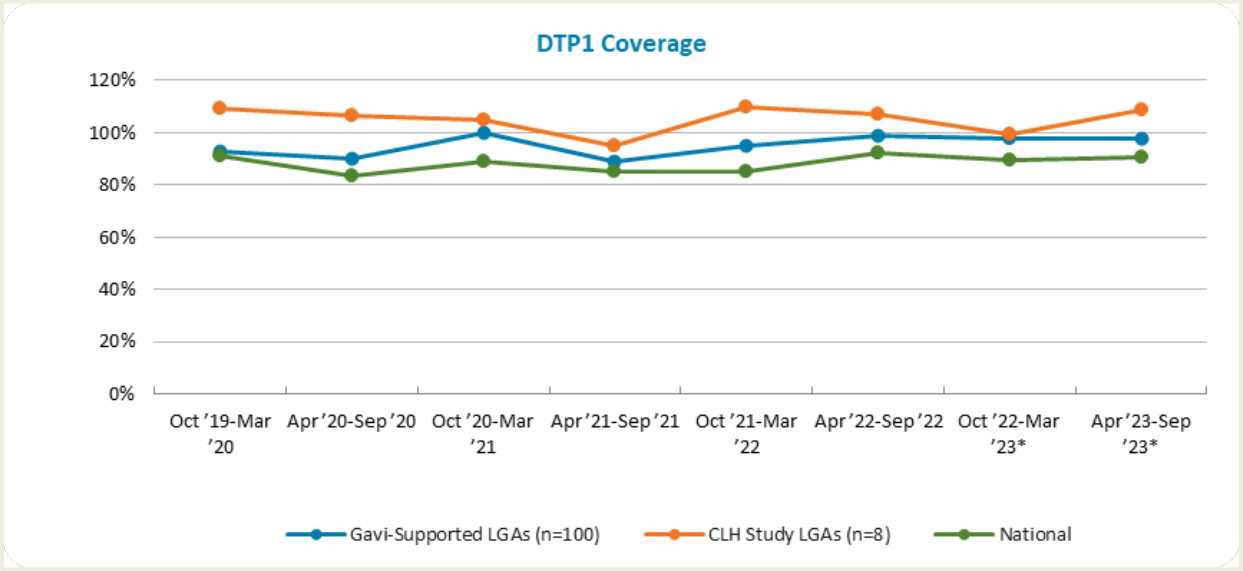
NIGERIA

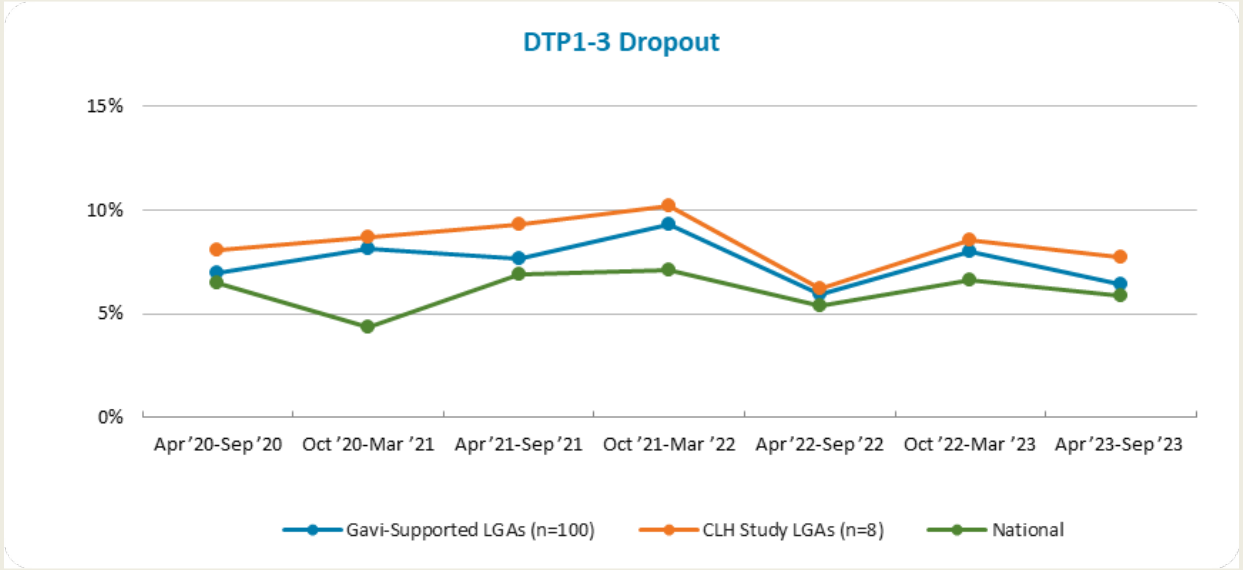
Figure 8. DTP1 trends in Nigeria, 2019–2023

(Source: WHO monthly immunization results database and Nigeria DHIS2)

Figure 9. DTP1 Coverage and DTP1-3 Dropout Rates in Nigeria, 2019–2023

(Source: WHO monthly immunization results database and Nigeria DHIS2)





*For the national level, Gavi-supported local government administration (LGAs), and CLH study LGAs, the denominators for 2019–2022 were retrieved from the WHO monthly immunization results database. For 2023, the respective denominators were retrieved from the Nigeria DHIS2 by the CLH as this data is not yet available through WHO. Data for the six-month period between Q4 2023 (October–December 2023) and Q1 2024 (January–March 2024) are not yet available and will be updated in the next semiannual update.

Figure 10. CLH Study Wards in Nigeria: DTP1-3 Trends from April–September 2023 Compared to October 2022–March 2023

(Source: Nigeria DHIS2 reported in Nigeria CLH Quarterly Progress Report)

	Number of Children Immunized: DTP1[1]	DTP1 Coverage[2] (% Change from Baseline)	Percent Change in DTP1-3 Dropout[3]
Bauchi LGA *20 wards*	**3,826** ↑	**147%** (+11%)	**35%** ↓
Ganjuwa LGA *16 wards*	**2,011** ↑	**110%** (+17%)	**33%** ↓
Jere LGA *11 wards*	**688** ↑	**95%** (+46%)	**41%** ↓
Maiduguri LGA *14 wards*	**1,464** ↑	**107%** (+30%)	**20%** ↓
Kumbotso LGA *11 wards*	**1,705** ↑	**109%** (+6%)	**14%** ↑
Sumaila LGA *11 wards*	**499** ↑	**107%** (+25%)	**31%** ↑
Tambuwal LGA *11 wards*	**492** ↑	**111%** (+105%)	**710%** ↑
Wamako LGA *11 wards*	**971** ↑	**141%** (+140)	**47%** ↑

1 Each number represents the difference in the number of children immunized with DTP1 between baseline (October 2022–March 2023) and the current period (April–September 2023), with green arrows indicating an increase and red arrows indicating a decrease.

2 We calculate the percent change from baseline by subtracting the current DTP1 coverage rate from the baseline DTP1 coverage rate and dividing it by the baseline DTP1 coverage rate. In LGAs with coverage rates above 100 percent, the number of surviving infants vaccinated exceeded the total number of surviving infants in the LGA, indicating that there are issues with the quality of reported data.

3 Calculated by subtracting the current DTP1-3 dropout rate from the baseline DTP1 -3 dropout rate and dividing by the baseline DTP1-3 dropout rate. Green arrows indicate a negative percent change in DTP1-3 dropout between baseline and the current period, and the red arrows indicate a positive percent change. For example, in the 11 wards in Tambuwal, the DTP1-3 dropout rate was 2.3% in October 2022–March 2023 and 18.4% in April–September 2023, resulting in a 710% percent change (increase) in dropout rate.

Data Sources

For the trends from national level and Gavi-supported local government administration (LGAs), the denominators for 2019–2022 (i.e., the number of surviving children under one year of age) were retrieved from the monthly WHO immunization database that houses data from the WHO/UNICEF eJRF. Denominators are the annual subnational populations reported by Nigeria through the eJRF. For 2023, the CLH provided these denominators from the DHIS2 as denominator data is not yet available through eJRF. This means the numerators and denominators for the last data points (2023) reflect data from two different sources. We will update the figures with the 2023 denominators from the WHO database once these are available. For the CLH study wards, the CLH reported all data from the DHIS2 (Figure 10).

Data Interpretation

The trends observed for the number of children immunized with DTP1 and for DTP1 coverage at the national level and in Gavi-supported LGAs largely mirror one another between October 2019 and September 2023. Notably, many of the Gavi-supported LGAs with coverage rates exceeding 100% in earlier periods experienced a drop to more expected rates in April–September 2021 that were sustained through April–September 2022. Among the Gavi-supported LGAs, a typical example is Shagari (not individually represented in the DTP1 coverage graph), where coverage dropped from 121% in October 2020–March 2021 to 92% in April–September 2021. However, coverage rates among many other CLH study and Gavi-supported LGAs remained well over 100% across each of the reporting periods. For example, in Jere (a CLH study LGA and Gavi-supported LGA), coverage rates were as high as 294% in October 2019–March 2020 and did not drop below 127% in any of the periods, driving up the overall coverage rates for both CLH study LGAs and Gavi-supported LGAs.

The dropout rates from DTP1 to DTP3 are largely similar when comparing Gavi-supported LGAs with CLH study LGAs, starting at approximately 8% in April–September 2020 and steadily increasing before experiencing a drop to 6% April–September 2022, followed by an increase back up to 8% in October 2022–March 2023. The national level dropout rates follow a similar trend, but are lower than the rates among the Gavi-supported LGAs and CLH study LGAs. Additionally, there was a decrease in dropout rates at the national level in October 2020–March 2021 while the Gavi and CLH LGAs experienced a slight increase. The decrease in April–September 2022 corresponds with a 9% increase in the DTP3 doses against a 5% increase in DTP1 doses.

The CLH retrieved the ward data included in Figure 10 the Nigeria DHIS2. Given the high number of CLH study wards, the data in Figure 3 are presented by LGA. Wards in four of the eight LGAs experienced in a decline in dropout rates between baseline (October 2022–March 2023) and the current period (April–September 2023), with dropout rates hovering at or below 10% in the current period among wards in most of the LGAs. The exception is Tambuwal, where a shift from a dropout rate of 2% to 18% resulted in a 710% change.

Figure 11. Comparison of Different Estimates of Numbers of ZD Children in Nigeria (2019-2022)*

(Source: Gavi Secretariat. 2023. "Nigeria Zero Dose Analysis." Unpublished.)

	2019			2020			2021			2022		
	IHME	WUENIC	DHIS2	IHME	WUENIC	DHIS2	IHME	WUENIC	DHIS2	IHME	WUENIC	DHIS2
National												
Estimated Number of ZD Children	Not included	2,034,038	960,809	2,065,106	2,212,051	1,475,066	1,947,584	2,247,212	1,925,295	2,511,940	2,271,265	1,459,293
Gavi-Supported LGAs												
Estimated Number of ZD Children	Not included	NA	502,445	Not included	NA	513,345	832,111	NA	601,629	910,501	NA	502,909
CLH Study LGAs												
Estimated Number of ZD Children	NA	NA	34,206	NA	NA	38,925	NA	NA	42,469	NA	NA	34,197

*WUENIC data are national coverage estimates; these data are not available at the ward or LGA levels in Nigeria. IHME data may be available at the LGA level and will be provided by the Nigeria CLH as well as the remaining ZD estimates from DHIS2 for the 100 Gavi LGAs and 8 CLH LGAs.

UGANDA

Figure 12. DTP1 Trends in Uganda, 2019–2023

(Source: WHO monthly immunization results database & Uganda DHIS2)

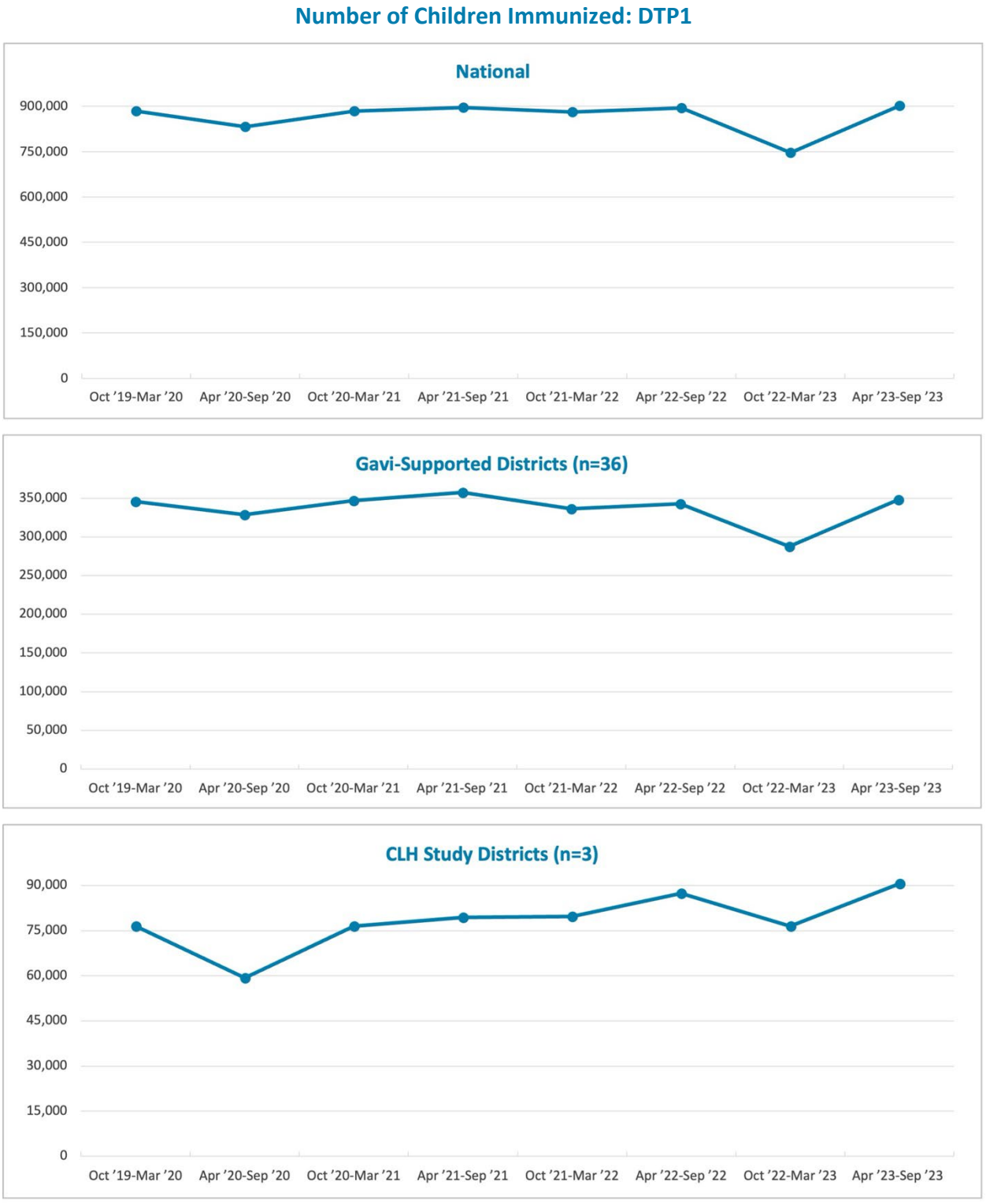
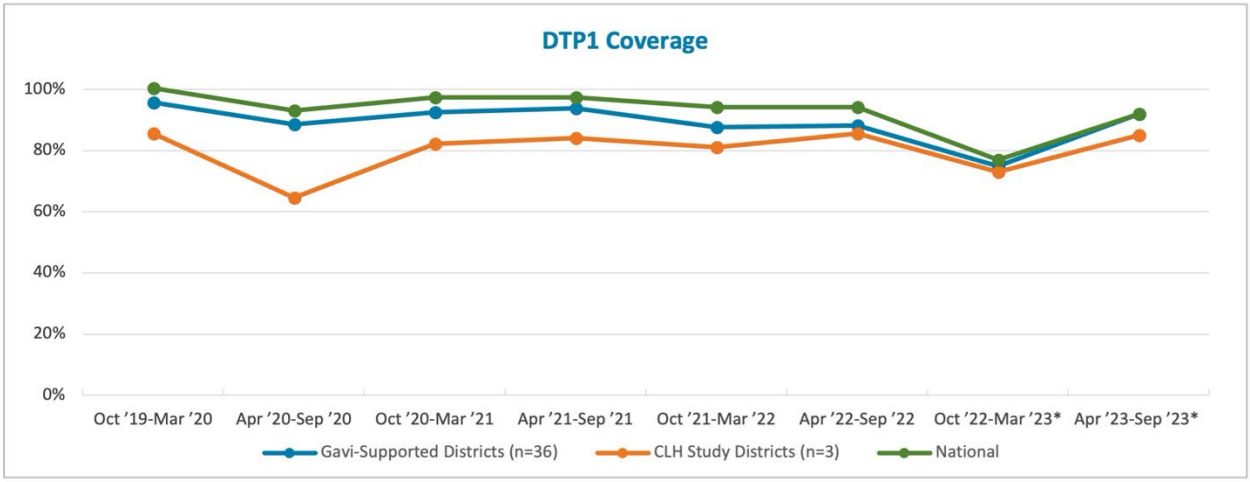
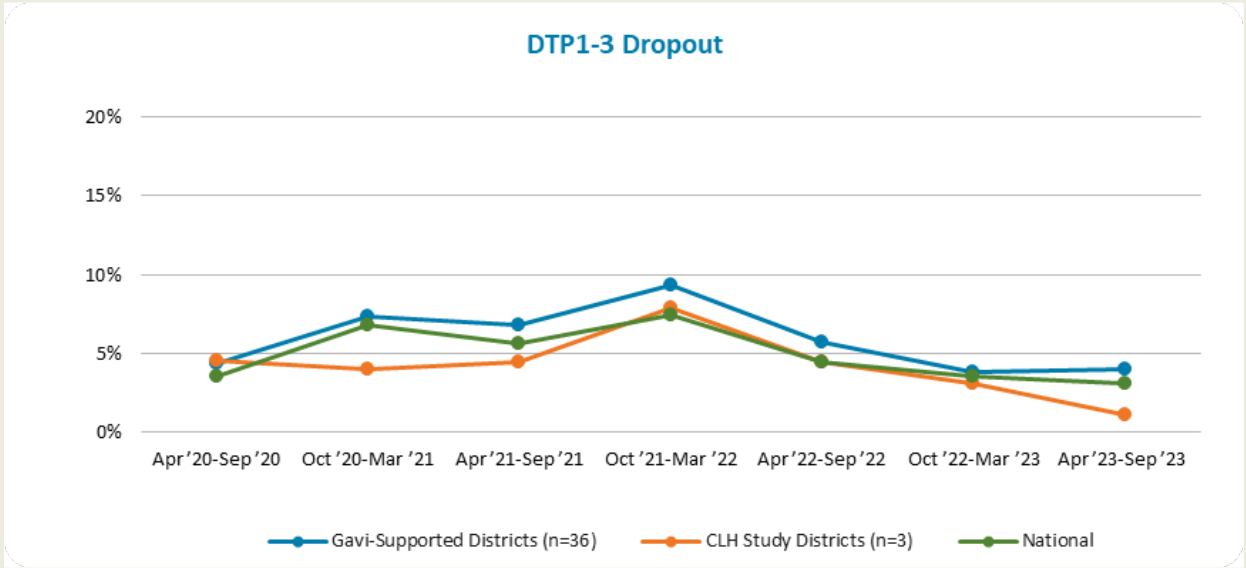


Figure 13. DTP1 Coverage and DTP1-3 Dropout Rates in Uganda, 2019–2023*

(Source: WHO monthly immunization results database & Uganda DHIS2)





*For the national level, Gavi-supported districts, and CLH study districts, we retrieved the denominators for 2019–2022 from the WHO monthly immunization results database. For 2023, the CLH retrieved the respective denominators from the Uganda DHIS2 as this data is not yet available through the WHO. Data for the six-month period between Q4 2023 (October–December 2023) and Q1 2024 (January–March 2024) are not yet available and we will include them in the next semiannual board report.

Figure 14. CLH Study Sub-districts in Uganda: DTP1-3 Trends from April–September 2023 Compared to October 2022–March 2023

(Source: Uganda DHIS2 reported in Uganda CLH Quarterly Progress Report)

	Number of Children Immunized: DTP1[1]	DTP1 Coverage[2] (% Change from Baseline)	Percent Change in DTP1-3 Dropout[3]	Sub-District Typology
Kasese				
Karambi	**42** ↑	**86%** (+7%)	**98%** ↓	Mountainous
Isango	**50** ↓	**45%** (-35%)	**427%** ↓	National border
Mubende				
Kiruuma	**33** ↓	**47%** (-12%)	**52%** ↓	Hilly, Mining, Underserved
Butoloogo	**86** ↓	**105%** (-11%)	**102%** ↓	Hilly, Hard-to-reach
Wakiso				
Bussi	**17** ↑	**45%** (+4%)	**20%** ↓	Island, Fishing
Namugongo	**101** ↑	**31%** (+3%)	**54%** ↓	Urban

1 Each number represents the difference in the number of children immunized with DTP1 between baseline (October 2022–March 2023) and the current period (April–September 2023), with green arrows indicating an increase and red arrows indicating a decrease.

2 We calculate the percent change from baseline by subtracting the current DTP1 coverage rate from the baseline DTP1 coverage rate and dividing it by the baseline DTP1 coverage rate. In sub-districts with coverage rates above 100%, the number of surviving infants vaccinated exceeded the total number of surviving infants in the sub-district, indicating that there are issues with the quality of reported data.

3 We calculate the percent change in dropout by subtracting the current DTP1-3 dropout rate from the baseline DTP1-3 dropout rate and dividing by the baseline DTP1-3 dropout rate. Green arrows indicate a negative percent change in DTP1-3 dropout between baseline and the current period, and the red arrows indicate a positive percent change. For example, in Isango, the DTP1-3 dropout rate was 4% in October 2022–March 2023 and 13% in April–September 2023, resulting in a 427% decrease in dropout rate.

Data Sources

For the trends from the national level and 36 Gavi-supported districts, we retrieved the denominators for 2019–2022 (i.e., the number of surviving children under one year of age) from the monthly WHO immunization database that houses data from the WHO/UNICEF eJRF. Denominators are the annual subnational populations reported by Uganda through the eJRF. For 2023, the CLH provided these denominators from the DHIS2 as denominator data is not yet available through eJRF. This means denominators for the last DTP1 coverage data points (2023) reflect data from two different sources. We will update the figure with the 2023 denominators from the WHO database once these are available. For the three CLH study sub-districts, Uganda CLH reported all data from the DHIS2.

Data Interpretation

The trends observed for the number of children immunized with DTP1 and DTP1 coverage at the national level and in the Gavi-supported districts mirror one another and stay relatively unchanged from 2019 through 2023, with the exception of a marked drop in October 2022–March 2023, with trends normalizing by the following reporting period. The trends in the number of children immunized and the coverage rates in the CLH study districts are largely similar to those at the national level and Gavi-supported districts during the same period. However, while both the national level and Gavi-supported districts experienced a drop in April–September 2020, presumably due to disruptions in service related to the start of the COVID-19 pandemic, the drop among the CLH study districts is

more dramatic. For example, the number of children immunized with DTP1 dropped approximately 6% at the national level and among Gavi-supported districts compared to 22% among CLH study districts. In the CLH study district of Wakiso, the number of children immunized in the April–September 2020 period dropped 30% from the previous period, contributing to the substantial decline. Additionally, Wakiso experienced a drop from 82% coverage in October 2019–March 2020 to 55% in April–September 2020. It is worth noting there are only three CLH study districts; therefore, fluctuations in only one district can have a disproportionately large effect on the overall trends observed in the above figures. Additionally, the surviving infant population of Wakiso more than doubles that of the other two CLH study districts, so the aggregate CLH study district figures primarily reflect Wakiso trends.

In many of the 36 Gavi-supported districts, coverage rates exceeded 100% across nearly all of the reported periods, signifying issues with the quality of reported data. In Nakaseke, for example, coverage rates did not dip below 119% between the October 2019–September 2022 period. However, some districts with coverage rates exceeding 100% in the earlier periods (Oct 2019–September 2020), dropped to more expected coverage rates in the later periods. For example, Sembabule had a 105% coverage rate in October 2019–March 2020 that then hovered between 89% and 95% in later periods.

The dropout rates from DTP1 to DTP3 are similar when comparing national trends with Gavi-supported districts, starting off at around 4% in April–September 2020 and increasing to a high of around 8% in October 2021–March 2022, before decreasing again in April–September 2023. The dropout rates in the CLH study districts show a similar pattern, but with a drop in October 2020–March 2021 while the other levels experienced an increase. This can be explained by the numbers of children immunized with DTP1 and DTP3 in Wakiso, which increased by approximately 49% and 85%, respectively, while remaining fairly stable in the other two CLH study districts.

The CLH retrieved the sub-district data included in Figure 14 from the Uganda DHIS2. In three of the six sub-districts, the dropout rate at baseline (October 2022–March 2023) was in the negatives, indicating issues with the quality of the reported data. Additionally, shifts from a negative dropout rate at baseline to a positive dropout rate in the current period (April–September 2023) resulted in substantial percent changes in dropout in many of the sub-districts. For example, a shift from a dropout rate of -7 to 0.1% resulted in a 102% change in Butoloogo.

Figure 15. Comparison of Different Estimates of Numbers of ZD Children in Uganda (2019-2022)*

(Source: Gavi Secretariat. 2022. "Uganda Zero Dose Analysis." Unpublished; IHME 2023.)

	2019			2020			2021			2022		
	IHME	WUENIC	DHIS2	IHME	WUENIC	DHIS2	IHME	WUENIC	DHIS2	IHME	WUENIC	DHIS2
National												
Estimated number of ZD children	38,381	62,816	Data not included	177,268**	96,513	77,992	140,849	49,266***	58,210	211,951	100,096	116,206
Gavi-Supported Districts												
Estimated number of ZD children	16,438	N/A	Data not included	76,722	N/A	36,295	60,124	N/A	52,952	90,031	N/A	85,924
CLH Study Districts												
Estimated number of ZD children	N/A	N/A	Data not included	N/A	N/A	28,753	N/A	N/A	30,340	N/A	N/A	28,605

***** WUENIC data are national coverage estimates; these data are not available at district or sub-district levels in Uganda. IHME data may be available at district level and will be provided by the Uganda CLH as well as the remaining ZD estimates from DHIS2 for the 36 Gavi districts and three CLH districts.

**The latest IHME data published in November 2023 includes WorldPop population estimates that have been adjusted to align with 2022 national United Nations Development Program population estimates. Consequently, the 2020 IHME ZD estimate included here is higher than the estimate included in Gavi's 2022 ZD analysis, which was calculated using 2020 IHME data.

***__Note__: It is not clear what is driving the contrast between WUENIC and IHME trends. However, given the limited survey data informing IHME (official JRF, covariate, and satellite data), WUENIC and DHIS2 estimates may provide a more accurate representation of ZD trends.

IRMMA FRAMEWORK: LEARNING HUB HIGHLIGHTS

The ZDLH semiannual update highlights the ZDLH consortium's efforts to leverage evidence for a deeper understanding of the factors that affect the implementation and performance of strategies to identify and reach ZD and UI children and missed communities. It synthesizes findings, challenges, and recommendations across the IRMMA framework emerging from the CLHs. Below are brief highlights of key lessons and recommendations. **See the linked country reports for a detailed summary of each country's priorities, activities, progress, and learnings to date.**

IRMMA HIGHLIGHTS: IDENTIFY

The CLHs are working to generate evidence and learnings on effective methods and approaches for identifying and reaching ZD children and missed communities. A recurrent challenge across the CLHs is the lack of accurate population estimates, which complicates the assessment of vaccination coverage and identification of ZD children. Innovations and improvements in this area are crucial for effective monitoring and the implementation of targeted ZD interventions. Each CLH is exploring solutions to improve the population estimates, thereby enhancing the accuracy of coverage data and ZD identification. Findings and emerging lessons during this reporting period include:

Bangladesh: The challenges related to defining ZD children in Bangladesh are multifaceted. The Gavi definition of ZD differs from that of the existing EPI definition, complicating the accurate identification and tracking of these children. To tackle these challenges, the CLH offered several recommendations. First, while DHIS2 data be a useful for the initial pinpointing of areas with high concentrations of ZD children, improving the identification of areas with ZD children requires better quality administrative data from DHIS2 and addressing issues related to the denominator of target children. Second, addressing problems with inaccurate and/or outdated denominator data is critical to achieving precise performance metrics. National surveys, such as the Coverage Evaluation Survey (CES) and the Demographic and Health Survey (DHS), are not currently designed to provide micro-level information, including sub-district or zone-level data, that could aid in identifying ZD children. Revising sampling could provide more detailed information at the micro-level, such as from upazila/zone-level or specific upazilas with high proportions of ZD children. Additionally, LQAS could be used for both the identification and verification of communities that health workers have missed, further streamlining the process of targeting interventions towards ZD children. Learn more: Semiannual Update-Bangladesh.

Mali: Initial results from the Mali rapid assessment revealed complex and varied barriers to reaching ZD and UI children. Addressing these challenges requires integrated strategies that combine security, cultural sensitivity, economic support, health system strengthening, and effective communication and education initiatives. Continuous updating of data, innovative outreach strategies, robust monitoring, and targeted advocacy are essential components for improving vaccination coverage through a multi-faceted approach that incorporates strong partnerships, community engagement, and data-driven decision-making to effectively reach ZD children in Mali. Emerging recommendations include data triangulation, exploring opportunities to strengthen the routine health information system for immunization programs, particularly focusing on data quality, and employing microplanning strategies through community health workers, traditional and religious leaders, and civil society organizations (CSOs) to identify ZD children more accurately within communities. Learn more: Semiannual Update-Mali.

Nigeria: Identifying ZD and UI children is impeded by a range of logistical, socio-economic, cultural, and health care system-related challenges in Nigeria. Immunization programs are hampered by challenges in existing reporting systems, including poor data quality and reporting delays. Strengthening these systems is critical for improving data-driven decision-making and immunization outcomes. Systems like DHIS2 and routine immunization short message service (RI SMS) reporting have limitations in measuring ZD children and reaching remote areas. The reliance on volunteers and challenges in staffing are notable barriers. Understaffing, inadequate infection control, and insufficient data management hinder the delivery of routine immunization and contribute to the prevalence of ZD children. Strengthening community engagement and improving service delivery are crucial steps forward. Learn more: Semiannual Update-Nigeria.

Uganda: The definition of ZD varies across stakeholders in Uganda, and this lack of standardization can lead to conflicting ZD data. The definition of ZD at the national and subnational level should be harmonized to allow uniform understanding and reporting. In addition, the burden of ZD children is fluid and requires continuous monitoring and assessment. Health interventions need to be adaptable and responsive to changing circumstances

and data to effectively reach ZD. Outreach efforts are an important component of service delivery in Uganda, but are also highly unstable and rely on mini-campaign style activities such as Child Health Days. Irregular outreach efforts are a key barrier to reaching ZD children. Outreach activities are dependent on the availability of funds, whether in routine immunizations, campaigns, or special outreach efforts. It is critical to strengthen and better resource routine immunization. Learn more: Semiannual Update-Uganda.

IRMMA HIGHLIGHTS: REACH

Reaching ZD children and missed communities requires addressing both supply- and demand-side barriers. CLH implementation research (IR) will examine implementation strategies and help to understand intervention effectiveness in specific ZD contexts as well as interactions within broader systems. IR studies are ongoing in each CLH country and findings will be detailed in future reports. Initial findings and emerging lessons from the CLHs during this reporting period include:

Bangladesh: The CLH selected areas for implementation and initiated IR in five districts (Sunamganj, Gaibandha, Noakhali, Sherpur, and Rangamati) and one city corporation (Dhaka North City Corporation [DNCC]). The CLH selected two upazilas in each district (one intervention and one comparison) for the IR. The variety of barriers uncovered during the rapid assessment highlights the importance of tailoring strategies to the specific contexts and needs of communities. Human-centered design can help identify interventions that respond to specific barriers. Emerging recommendations from the ongoing IR include the use of theories of change like those developed and tested by icddr,b to better understand program contributions and interactions and the greater system and context within which these programs exist. The number and type of interventions to reach ZD and UI children vary widely, and how they interact to drive change is unclear. Other recommendations include introducing electronic or mobile-based interventions for caregivers who lost their children's vaccination cards and arranging crash programs (community sensitization activities to motivate mothers to bring their children to EPI sessions) to boost EPI coverage in areas with low coverage. Learn more: Semiannual Update-Bangladesh.

Mali: Engaging communities, including traditional and religious leaders, and establishing strong partnerships with local CSOs and humanitarian agencies are essential for overcoming barriers to vaccination. These partnerships can enhance trust in vaccines, address sociocultural barriers, and support the logistical aspects of vaccine delivery, especially in hard-to-reach areas. Continuous data updating and the use of innovative outreach strategies based on accurate, localized data are also crucial. The rapid assessment in Mali highlighted the value of microplanning and the use of community health workers for identifying ZD/UI children, underscoring the importance of local-level, evidence-based planning and implementation. Findings from the Mali rapid assessment also noted that a majority of Centres de Sante Communautaire (CSComs) lack the cold chain equipment essential for vaccine storage. This situation has been exacerbated by the establishment of new health facilities and the introduction of new vaccines, including COVID-19 vaccines. As a result, Mali has requested support from the Cold Chain Equipment Optimization Platform (CCEOP) for the year 2024. Prolonged stock-outs discourage caregivers from bringing their children for vaccination, as repeated unsuccessful trips lead to frustration. Learn more: Semiannual Update-Mali.

Nigeria: Strategies that enhance community trust and outreach efficacy, especially in reaching underserved or hard-to-reach populations, are critical. Implementing broad vaccination strategies such as big catch-up rounds, ZD Reduction Operational Plans (Z-DROPs) in LGAs, and targeted campaigns like Periodic Intensification of Routine Immunization (PIRI) are essential. These approaches address both immediate gaps in immunization coverage and longer-term systemic challenges. Strengthening the capacity of frontline providers and ensuring the development and improvement of costed routine immunization workplans and microplans are vital. The CLH IR focuses on evaluating the barriers and facilitators, effectiveness, efficiency, and incremental cost and cost-effectiveness of three vaccination strategies in Nigeria: Optimised Integrated Routine Immunization Session (OIRIS), PIRI, and optimized outreach sessions (OOS). These strategies aim to improve immunization coverage and target ZD children in various contexts, including remote rural areas, fragile settings, border communities, and urban slums. Learn more: Semiannual Update-Nigeria.

Uganda: Critical geographies include communities in national and district borders, mining areas, underserved regions, and those with immigrant populations. The Uganda National Expanded Programme on Immunisation (UNEPI) does not currently document these groups, underscoring the need for expanded program outreach efforts. Learn more: Semiannual Update-Uganda.

IRMMA HIGHLIGHTS: MONITOR & MEASURE

To effectively gauge progress, practitioners must closely monitor interventions intended to identify and reach ZD children. This includes reviewing program data and adjusting strategies as needed. Current challenges include low-quality administrative data, lack of specific tracking mechanisms for ZD children, and predominantly aggregated data at higher administrative levels, which hinder effective monitoring at the local level. Findings and emerging lessons from the CLHs include:

Bangladesh: The findings from the CLH suggest that most of the data sources in Bangladesh currently lack specific tracking mechanisms for ZD and/or are low-quality (especially denominators), which makes it difficult for health workers to track ZD issues. Moreover, for most sources, the available data are aggregated primarily at the district level, hindering the ability to effectively track ZD children at lower administrative levels. These limitations underscore the need for targeted interventions and strengthened data systems to identify and address the immunization gaps among ZD populations. There are opportunities for identifying, measuring, and monitoring some of the underlying drivers of ZD, but these will require significantly more effort, especially in tracking demand-side issues. A comprehensive approach involving government and partners is essential for improving data quality, fostering knowledge sharing, and leveraging technological solutions to enhance immunization coverage and reduce ZD children. Learn more: Semiannual Update-Bangladesh.

Mali: There is a critical need in Mali to continually update its data sources and mechanisms, ensuring data triangulation and use to improve identification and targeting of ZD children. The CLH's efforts to examine and compare existing data sources highlight the importance of accurate and current data in strategizing and implementing interventions. Lessons learned underscore the importance of a comprehensive approach to data management, community engagement, gender considerations, and evidence-based decision-making in monitoring and measuring ZD children in Mali. Learn more: Semiannual Update-Mali.

Nigeria: The CLH evaluated routine immunization reporting systems, identifying strengths, challenges, and recommendations for five key systems in Nigeria. This evaluation underscores the importance of improving data quality, access, and system integration to enhance routine immunization reporting and target ZD children more effectively. Successful monitoring relies on the adaptability and integration of data systems. Systems like DHIS2 show the importance of open-source, customizable platforms with data visualization capabilities. However, the challenge remains in integrating these platforms (e.g., DHIS2 with the Surveillance Outbreak Response Management and Analysis System [SORMAS]) to ensure seamless data flow and comprehensive monitoring. Issues with data quality and timeliness are recurring challenges across different platforms. Ensuring accurate, real-time data reporting is critical for identifying and reaching ZD children effectively. The application of GIS technologies, as suggested for Programme Management and Action—Lot Quality Assurance Sampling (PAPA LQAS), highlights the potential for more precise targeting and estimation of ZD populations, underscoring the need for innovative technological solutions in monitoring efforts. Learn more: Semiannual Update-Nigeria.

Uganda: Improving data availability and analytics capabilities at the facility level can improve the likelihood that EPI and other engaged community entities, like village health teams, are using the most up-to-date information available to inform community mapping and microplanning efforts in priority ZD areas. Learn more: Semiannual Update-Uganda.

IRMMA HIGHLIGHTS: ADVOCATE

Strong political leadership is essential for advancing immunization equity and sustaining progress through domestic financing. Targeted advocacy efforts foster and maintain this political will. The CLHs are exploring ways to collaborate with national and sub-national stakeholders—including government officials, CSOs, traditional and religious leaders, and health sector networks—to co-create innovative platforms and integrate research findings into routine immunization practices. This includes leveraging partnerships and employing evidence-based advocacy to ensure that immunization programs are well-supported, sustainable, and capable of achieving broader health goals. Findings and emerging lessons from the CLHs during this reporting period include:

Bangladesh: Systemic issues in Bangladesh, such as health worker shortages, may require increased funding, innovative staffing solutions and benefits packages, and better support and training for existing health workers. Data quality issues are widespread and greatly impede the ability to identify ZD and UI children. EPI investment in ZD-specific data quality assessments, unique identifier-based tracking systems, and more detailed coverage surveys, among other interventions, could greatly benefit efforts to enumerate and reach ZD and UI children in the country. The CLH's efforts in partner engagement and advocacy include forming and active engaging in monitoring and implementation committees; facilitating workshops for co-creation and capacity strengthening; ongoing communication and information dissemination; and strategic planning for monitoring, learning, and risk management. Jhpiego facilitated a co-creation workshop to share data landscape report findings and co-create plans for embedding ZD issues into future routine immunization monitoring systems. This engagement is pivotal for developing action plans for improving ZD tracking and health information systems. In collaboration with Jhpiego, icddr,b is documenting progress and achievements through an activity tracker, tracking predefined monitoring and evaluation indicators (Bangladesh Dashboard), and engaging in global learning activities. Learn more: Semiannual Update-Bangladesh

Mali: Regular engagement with national stakeholders in Mali has included co-creation with the *Centre National d'Immunization* (CNI) and Mali EPI members on a new innovative and collaborative platform through workshops to share and validate the terms of reference for a collaborative intelligence group. In planning for the IR, the CLH employed a cooperative approach with the CNI to select learning questions from the Full Portfolio Planning to guide the IR and work together to refine the study methodology. The CLH is seeking to establish additional partnerships and coordinate with various stakeholders during the IR, including collaboration with the Health Resources and Services Availability Monitoring System (HeRAMs) to include their cold chain data into the IR study. The CLH also highlighted the importance of partnering with the *Cluster Santé*—a collaborative forum for various health sector stakeholders—as a strategic approach to leverage existing community health networks. Learn more: Semiannual Update-Mali.

Nigeria: The CLH is leveraging the expertise of the Africa Health Budget Network by using CSO networks to reach out to identified stakeholders at the national and sub-national levels and implementing a comprehensive stakeholder engagement and advocacy strategy targeting legislators, government officials, international partners, CSOs, traditional and religious leaders, and communities to improve routine immunization. Key methods include advocacy visits, workshops, and the dissemination of learning materials to address challenges such as siloed data and non-specific budget allocations for immunization. Nigeria's engagement with and support from the National Emergency Routine Immunization Coordination Center (NERICC), the State Emergency Routine Immunization Coordination Center (SERICC), and local government areas (LERICC) provide valuable opportunities to assess progress, address challenges, and refine strategies in real-time, ensuring that efforts to improve immunization coverage remain responsive to evolving needs. Through these efforts, the CLH has laid the groundwork for deeper impacts in its next phase, emphasizing the necessity of inclusive and participatory approaches in immunization programs for achieving sustainable health outcomes. Learn more: Semiannual Update-Nigeria.

Uganda: Strengthening the lines of communication and collaboration among all stakeholders is essential to ensure the effectiveness of the recovery and catch-up plans in Uganda. Recommendations include continuing to build and strengthen partnerships across sectors to leverage diverse resources, expertise, and networks for a unified approach towards increasing immunization coverage. Evidence from research and data analysis is critical for advocacy with policymakers and stakeholders to increase focus and resources on reaching ZD and UI children and to highlight the importance of immunization equity in achieving broader health goals. Learn more: Semiannual Update-Uganda.

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