Unveiling the Cost of Designing and Implementing Zero-Dose (ZD) Interventions in Kano State, Nigeria

Insights and preliminary findings from Kano Zero-Dose costing study*

July 2025

IHEA INTERNATIONAL HEALTH ECONOMICS ASSOCIATION

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*(*this also include comparison of TA vs. Government-led ZD reduction strategies)*

Authors & Affiliations

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Executive Summary

Background

- Nigeria has the highest number of zero-dose children globally, a challenge worsened by COVID-19.
- Achieving the global goal to reduce zero-dose children by 50% requires more investment, but data on the associated costs and budget implications is limited
- This study aims to understand the cost address that gap in Kano State, Nigeria

Methodology

- This presentation focuses on the costs of reaching zero-dose children (those without any vaccinations) in Kano, Nigeria through four new interventions: Immunization Advocacy Network, AEFI Response, Training of Trainers, Reach Every Child
- Costs were evaluated through two perspectives: cost of interventions and household costs

Preliminary result

- The design phase of the interventions were highly capital intensive due to level of efforts required for the co-creation of solution.
- However, implementation of the interventions are not as expensive highlighting feasibility for sustainability and government-led scale-up
- Caregivers may incur losses of up to 21% of their monthly income on transportation expenses, wait time, and post-vaccination care-related costs

Preliminary conclusion

- The preliminary findings from this study provides actionable cost data to improve planning, budgeting, and prioritization of immunization activities in Kano State.
- The findings support greater accountability and sustainability, helping government and partners more effectively reach zero-dose children and improve routine immunization performance.

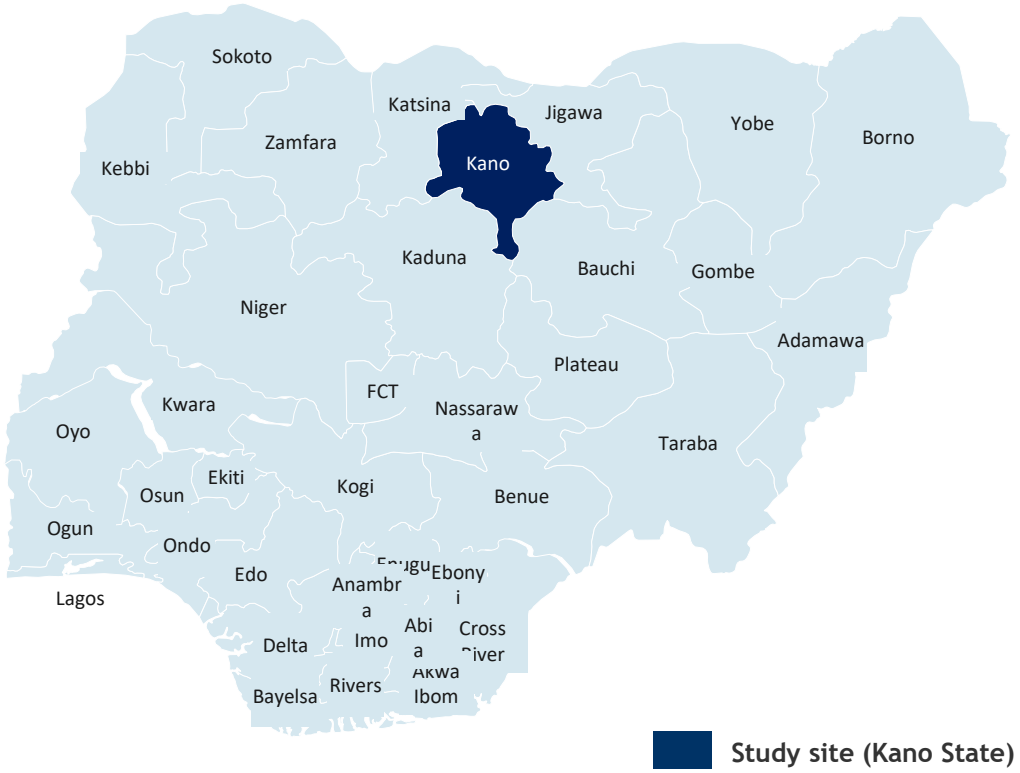
Nigeria currently holds the highest global burden of zero-dose, with an estimated 2.1 million children

Country Description:

- Nigeria is **a Federation comprising 36 states and the Federal Capital Territory (FCT)**, which is home to the capital city, Abuja.
- These **states are further divided into 774 Local Government Areas (districts),** serving as the third tier of administrative governance.
- Estimated population is over 200 Million people

Key Health Indicators	
Birth Cohort[1]	7,916,178
Infant Mortality Rate[2]	63 deaths per 1,000 live births
U-5 Mortality Rate[2]	110 deaths per 1,000 live births
Penta 3 Coverage[2]	53%
World Bank Index, IDA	3,41
GNI (per capita US$)	2,360

Map of Nigeria



Sources: *1.* Estimated population from 2006 National Census, NPopC, 2. Nigeria Demographic and Health Survey 2023/24

Amidst ongoing interventions to address the zero-dose burden, this costing study is guided by four key objectives anchored on clearly defined research questions

The study aims to estimate the incremental costs of vaccinating zero-dose (ZD) children, identify key cost drivers, and assess the financial barriers faced by caregivers in accessing immunization services in 15 zero-dose Local Government Areas (LGAs) in Kano State.

1

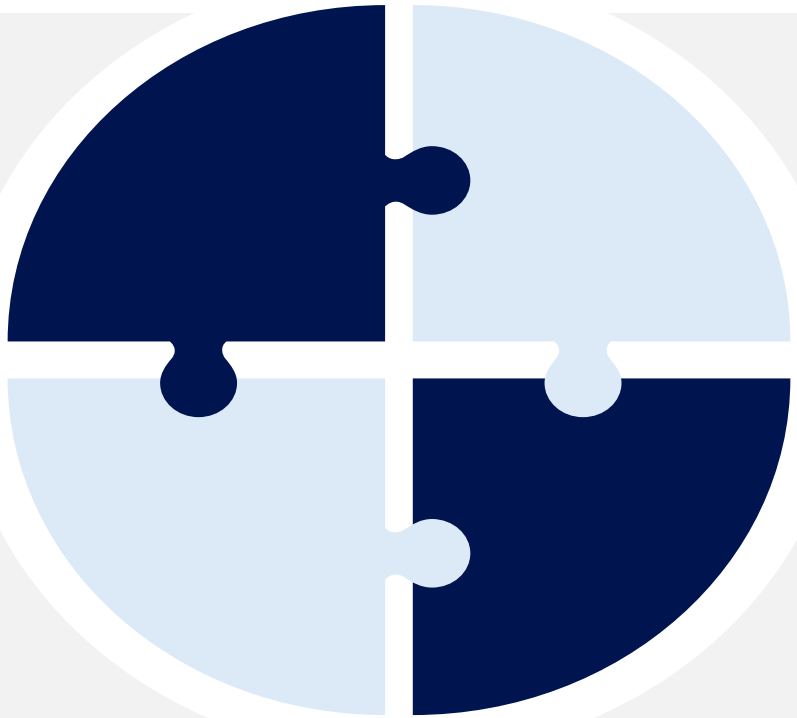
Determine the cost of vaccinating ZD children from the public health and caregiver perspectives

- *What is the incremental cost per ZD child compared to routine immunization?*

Compare the cost of routine immunization with ZD-specific interventions

- *What are the main cost drivers of ZD interventions?*

2



3

Describe supply-side cost drivers including HRH, last-mile delivery (LMD), and demand generation

- *What is the funding gap between current RI funding and the cost of reaching ZD children?*

Quantify out-of-pocket (OOP) expenses by caregivers in ZD communities

- *What costs do caregivers incur in vaccinating their children?*

4

This ongoing study presents preliminary financial cost estimates of interventions targeting zero-dose (ZD) children in Kano, offering early insights into the resources required for these dedicated strategies

Source: Costing study protocol

We adopted a descriptive research design for the study

Study Design and Scope

- The study employed **a comparative costing approach using both baseline and endline surveys to assess changes over time**
- Data collection was conducted across four system levels: **community/facility, LGA, zonal, and state, using structured costing questionnaires and specific tools**
- The study cover **15 ZD LGAs**

Data Analysis

- **Caregivers:** Focuses on out-of-pocket costs incurred by caregiver
- **Health facilities:** Assesses costs related to staff time, service delivery, logistics, training, outreach, and per diems.
- **LGA, zonal, and State officials:** Evaluates administrative, supervision, vaccine distribution, planning, and support costs
- **Data was analyzed using Excel-based tools**, applying descriptive statistics and detailed cost breakdowns.

Sampling

- Purposive sampling technique based on probability, proportional to the number of health facilities per LGA

Inclusion Criteria

- The study will only target healthcare providers involved in routine immunization.
- Caregivers of children aged 0–23 months visiting facilities for vaccination
- Facilities located in zero-dose LGAs.

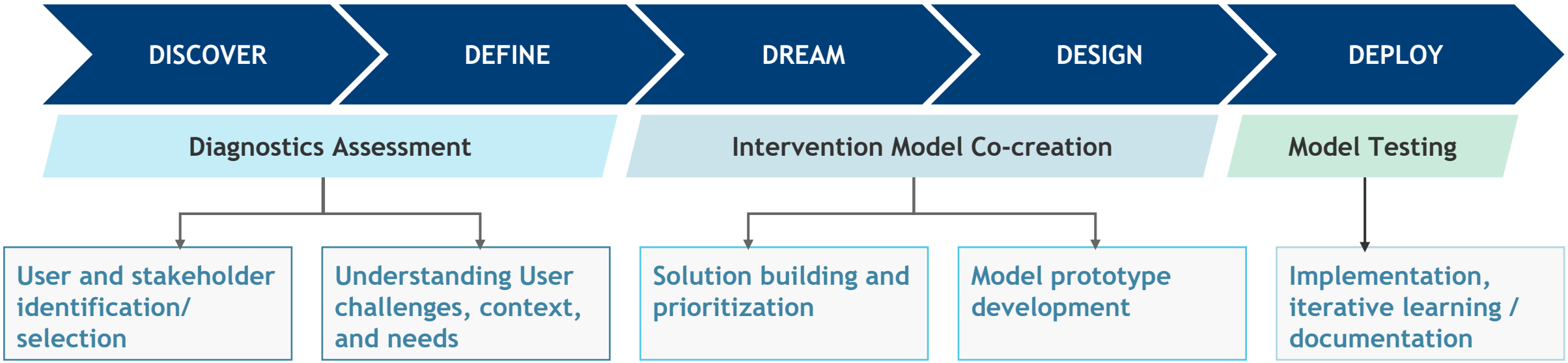
Exclusion Criteria

- Caregiver resident in non-zero dose LGAs.
- Facilities in Non-Zero Dose LGAs.
- Security compromised LGAs/ Facilities

Source: Costing study protocol

We followed a structured HCD process to understand the key drivers of zero-dose and to co-create tailored solutions to address them

The 5D HCD Program Approach



Summary of prioritized zero-dose specific interventions co-created and currently piloted in 3 sentinel LGAs in the state

Intent solution Readiness solution Access solution

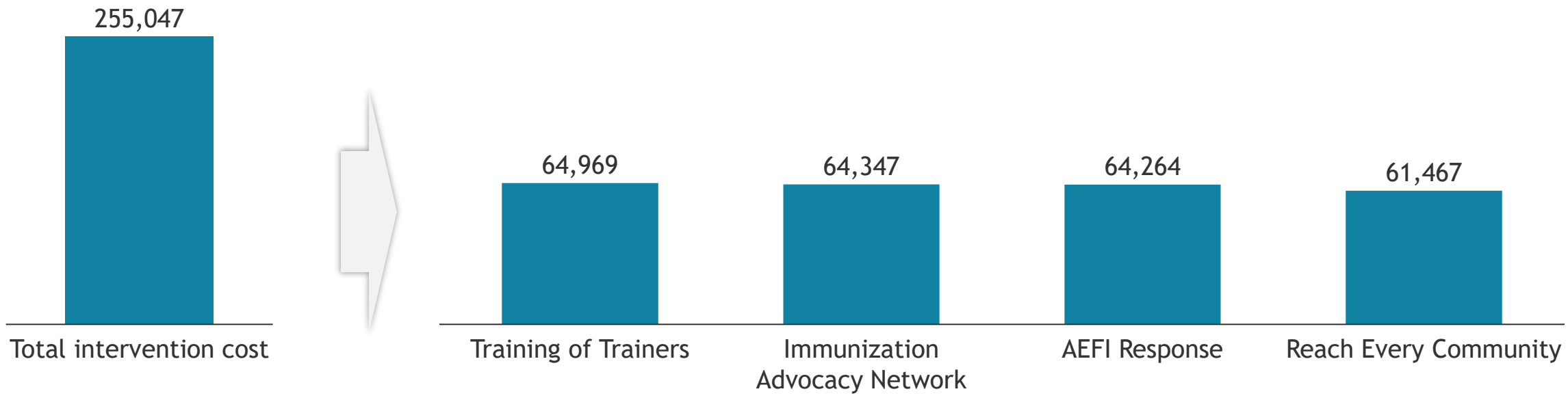
ZD Interventions

- Out of 8 zero-dose interventions co-created by stakeholders, 4 are currently piloted in 3 LGAs in state.
- The prioritization approach was designed to ensure coverage across each of the thematic areas contributing to zero-dose barriers
  - Intent: Barriers around demand generation
  - Readiness: Health systems ability to serve clients
  - Access: Ease of access to vaccination services

Intervention	Concept Summary	LGA	Design Period	Implementation Period
Immunization Advocacy Network (IAN)	**Male caregivers** conducting community sensitization on the importance of childhood vaccination among other men through the Friday Mosque	Gaya	March-October 2024	October 2024 – till date
AEFI Response Board (ARB)	**Female volunteers** carry out house-to-house visits to engage with households identified as hesitant toward vaccination due to concerns about adverse events following immunization (AEFI).	Gaya		
Training of Trainers (ToT)	**Service Providers** conduct in-facility training sessions on interpersonal communication (IPC) and routine immunization (RI) skills to enhance the overall client experience at the facility.	Nassarawa		
Reach Every Child (REC)	**Health Officers** and stakeholders review and update microplans to ensure accurate population estimates, boundary definitions, and settlement listings for effective routine immunization planning and outreach activities.	Gabasawa		

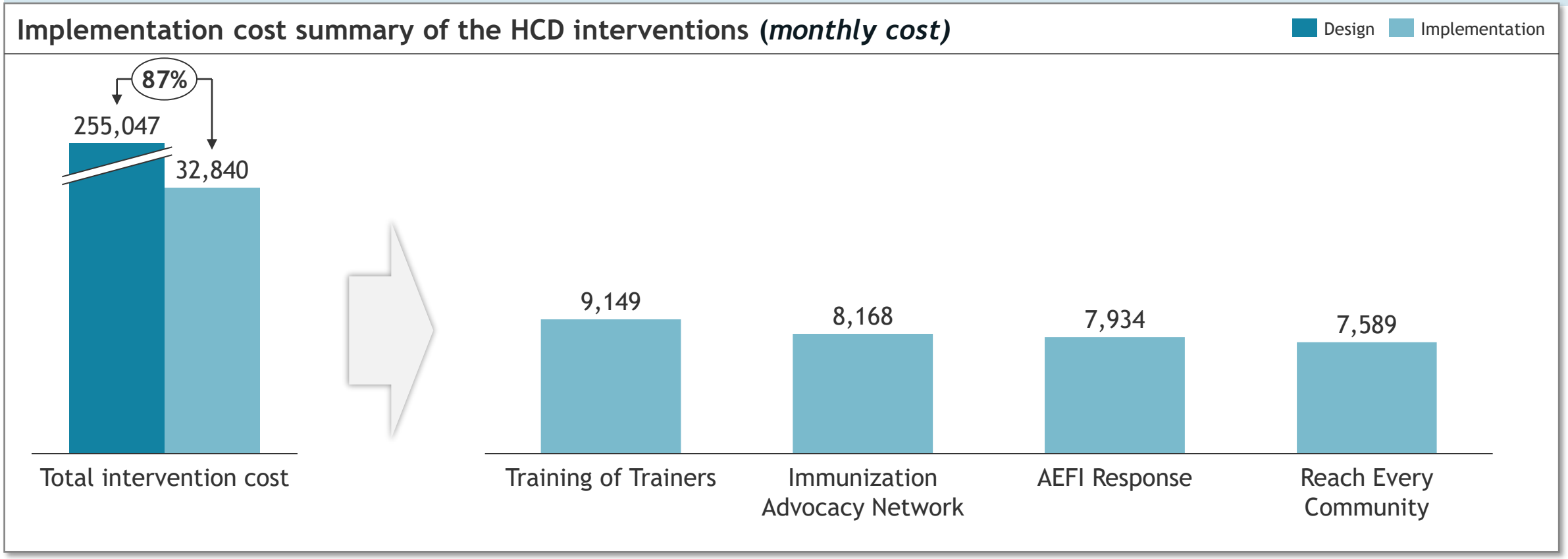
The design phase was more capital intensive compared to the implementation phase

Design cost summary of the HCD interventions *(USD)*



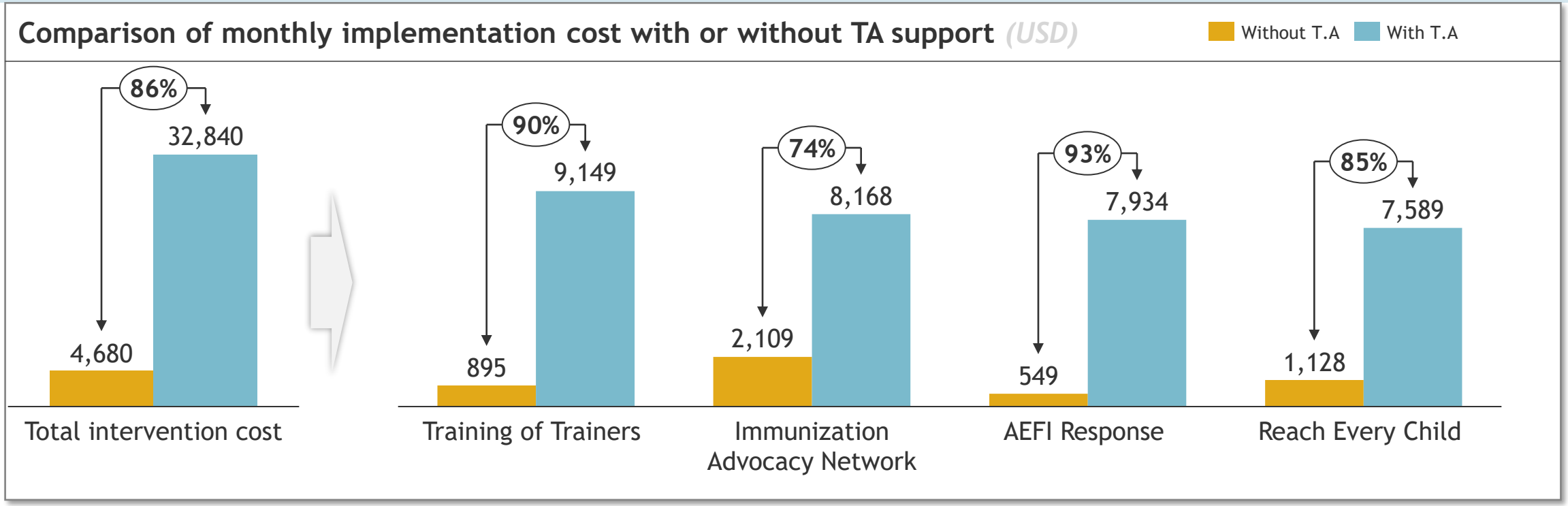
- The **design phase for the interventions was conducted concurrently over a period of eight months** and required significant technical support to effectively coordinate the co-creation process
- Associated costs included personnel expenses, such as salaries for technical assistance, and costs related to community and stakeholder mobilization, workshop costs, etc, with the salaries as the highest cost contributor
- Since the interventions were designed and conducted concurrently, personnel costs were distributed across the four interventions, as the same set of staff were involved in all

Following the design phase, implementation costs in the pilot sites were 87% lower, highlighting strong feasibility for sustainability and scale-up



- The cost efficiency is largely attributed to integration with existing systems, reliance on local staffing, and the use of volunteers
- Given that the design is a one-time activity, the low implementation costs highlight the strong feasibility of a government-led scale-up

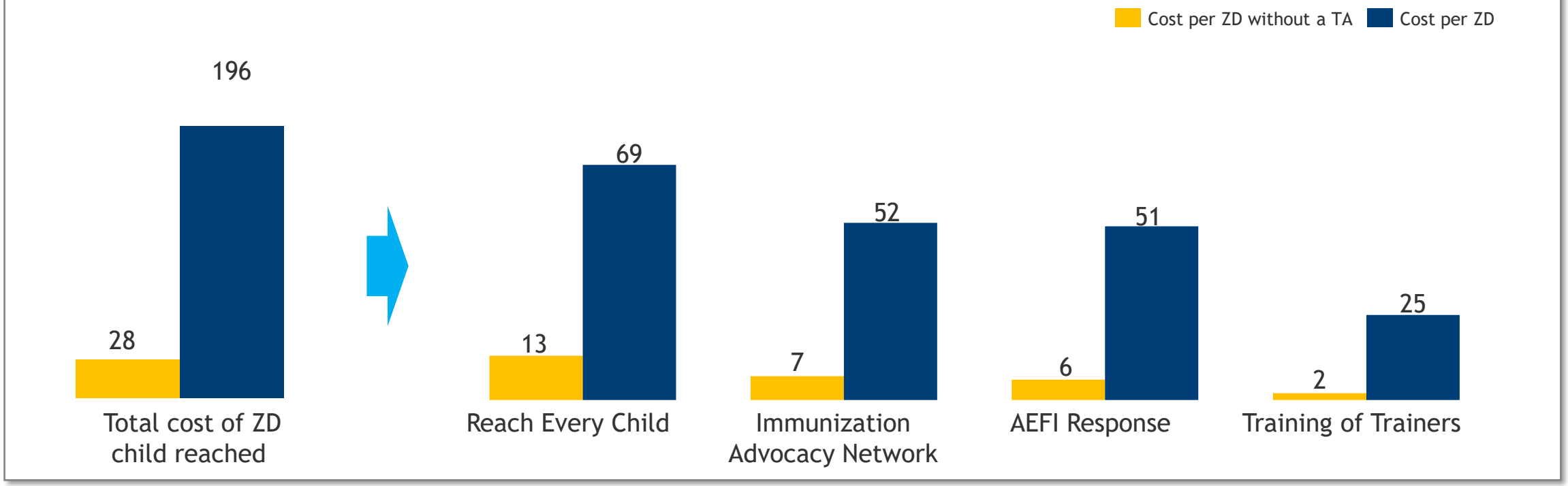
A deeper analysis showed that government-led implementation of zero-dose interventions could result in over 80% monthly cost savings



- Government-led ownership can reduce costs by over 80%, though technical support may still be required in countries with weaker health systems and limited technical capacity
- Addressing zero-dose (ZD) barriers requires sustained, multi-level engagement and adaptive strategies. Continued investment is necessary to build stability and gradually transition ownership to the state
- Economies of scale can be leveraged during scale-up, as design costs are largely fixed—reducing the marginal cost per additional site.

In line with the equity of leaving no child behind, we believe that investments in reaching ZD children are both equitable and cost-justified

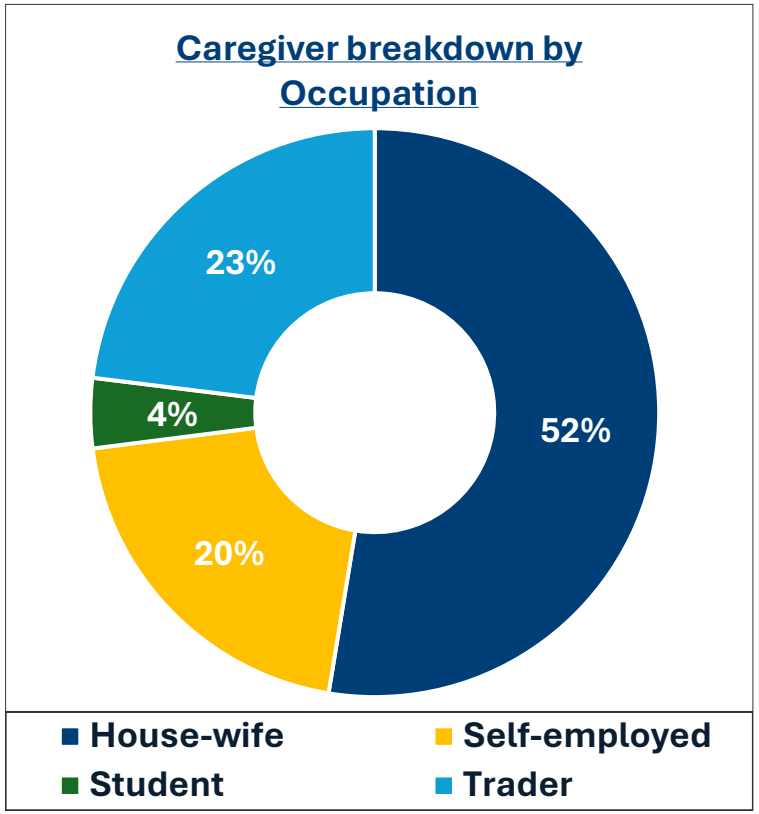
Comparison of cost per ZD child reached through ZD interventions, with and without TA

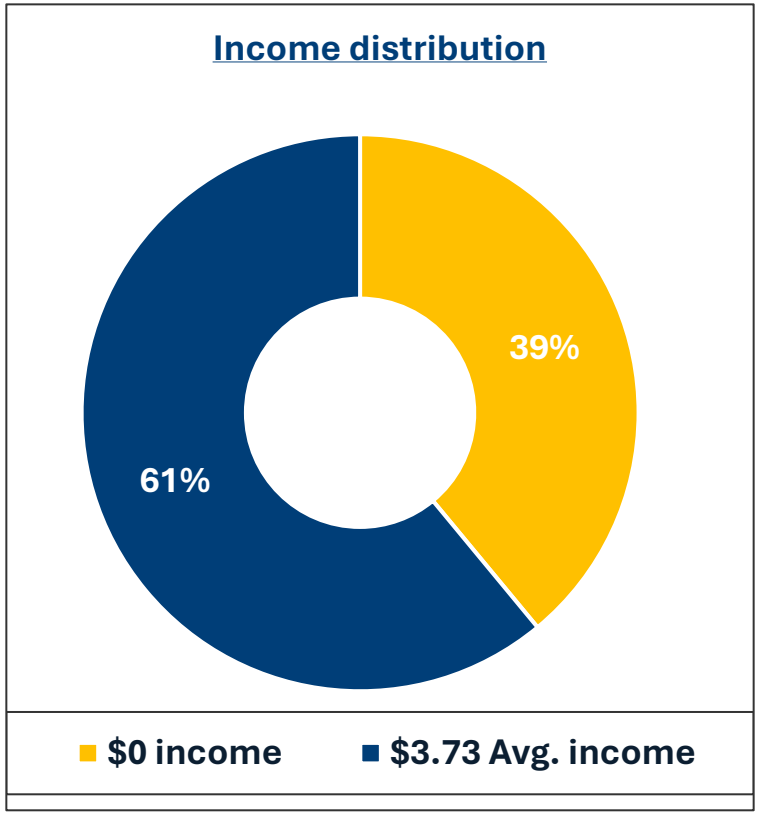


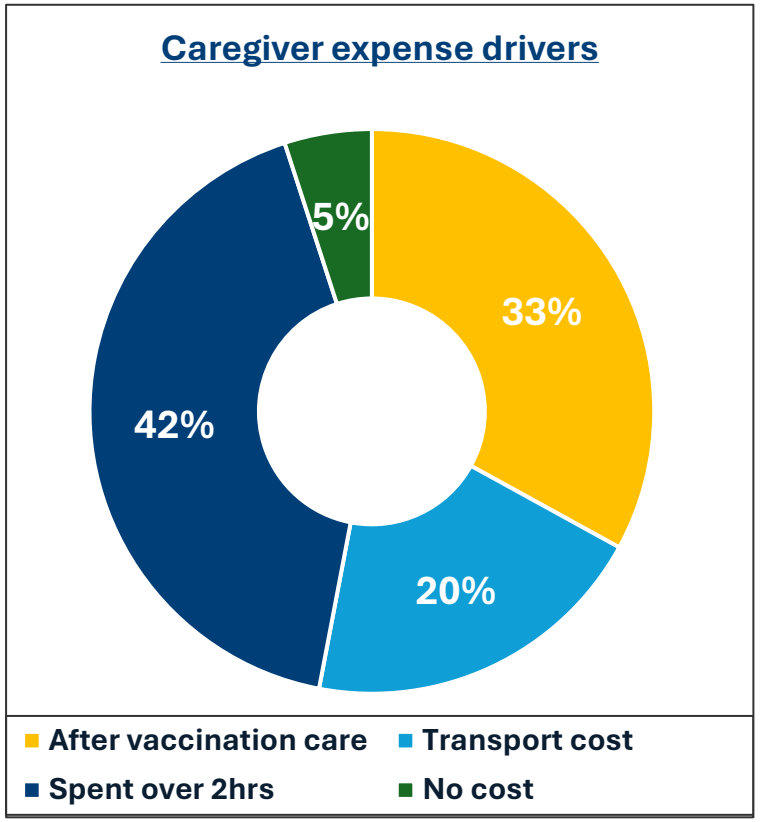
No cost is too much to reach a child with life savings vaccines as it justified by health and equity gains

- Long-term savings from disease prevention
- Reduced burden on the health system
- Gains in health equity and social inclusion

Surveyed caregivers are predominantly housewives and petty traders who earn between $0-$3.73 monthly and still incur some vaccination costs







- Over half (52%) of the surveyed caregivers are housewives with no monthly income, increasing their dependence on their spouses. As primary caregivers, their limited economic autonomy contributes to challenges in obtaining permission for child immunization
- 61% of caregivers earn just about $3.73/month, placing them in extreme poverty (Global Poverty Index).
- A higher proportion of caregivers' expenses comes from post-vaccination care and time-related costs (travel and waiting).

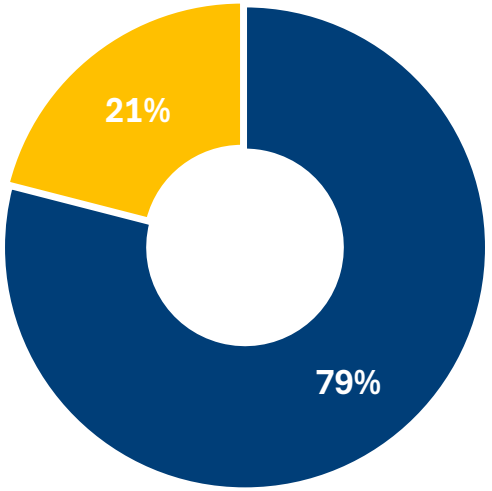
Caregivers may incur losses of up to 21% of their monthly income on transportation expenses, wait time, and post-vaccination care-related costs.

Caregiver Expense Distribution Overview (average)

Total= $0.78

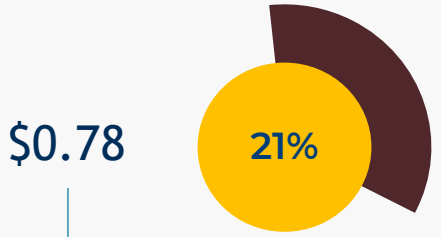
Average transport cost | Afer care cost | Opportunity cost

Possible income loss per caregiver per vaccination visit



Total Income | Possible income loss

Loss to caregivers could be further reduced through incentives/ improved access



Incentives

- A caregiver earning an average monthly income of $3.73 incurs approximately $0.31 in transport costs, $0.05 in opportunity cost due to time lost, and an additional $0.42 for post-vaccination care, resulting in a total expenditure of about **$0.78** per visit.
- This represents a potential loss of nearly **21%** of their monthly income for a single vaccination-related visit. This could be an even worse barrier for caregivers without any monthly earnings
- With cash incentives, the financial burden on caregivers could be driven down to 4.3% of monthly income per vaccination visit

Key Results

Themes	Key Findings
Intervention Costing	▪ Opportunities for cost savings exist if the design and implementation is government led ▪ We can benefit from economies to reach more children if successful interventions are scaled up
Cost-per zero-dose child reached	▪ Reaching children missed by routine immunization requires greater resource investment through ZD interventions ▪ Investments in reaching ZD children are both equitable and cost-justified
Caregivers Costing	▪ Funding constraints impacts on caregiver's decision to vaccinate ▪ Opportunities exist for reducing the financial burden on caregivers through incentives

Implications of the Study Findings

01

State AOP Development

- By quantifying the specific costs associated with key immunization activities (e.g., microplanning, transportation, demand generation), the study supports credible budget proposals in the AOP.
- This evidence enhances advocacy for increased domestic financing priority interventions aligned with cost-effectiveness and equity goals.

02

Donor-Partner Planning

- The costing study provides donors with granular, activity-based cost data that inform strategic investment decisions.
- The costing evidence enables donors to assess the cost-effectiveness and sustainability of funded interventions.
- It also supports performance monitoring by linking financial inputs to immunization outputs and outcomes, thereby enhancing accountability.

03

State/National-level (NPHCDA) Planning

- This enables the Kano State Primary Health Care Management Board (SPHCMB) and partners to prioritize high-impact, cost-efficient interventions in the AOP—such as outreach services, health worker incentives, and logistics—based on actual cost drivers and gaps identified.

Zero dose data reporting and documentation is a critical challenge impacting on the conduct of the study.

Challenges/ Gaps	Context	Mitigation
▪ **Poor ZD data management**	▪ Across most facilities visited, number of zero-dose children vaccinated with Penta and other antigens are poorly documented.	▪ In-depth review of facility registers ▪ Estimation using ZD baseline data using Mindset data
▪ **Low Facility Attendance Among Zero-Dose Caregivers**	▪ During the exit interviews, most of the caregivers interviewed are non-zero-dose children-caregivers	▪ Review of child health cards duplicates at the facility to determine the age ▪ Community survey of ZD children/ caregivers
▪ **Sub-optimal reporting of vaccines supplies on VM1A and VM1B at the facility**	▪ While vaccine supplies are critical to the study, we observed poor documentation of vaccines supply data in most facilities.	▪ Engaged LGA and Zonal cold stores to collect retrospective data on vaccines and supplies.

As next steps, the team will be completing the analysis of other objectives of the study while planning for the conduct of the endline assessment

01

Compare the cost of routine immunization with ZD-specific interventions

02

Understand supply-side cost drivers including HRH, last-mile delivery (LMD), and demand generation

03

Quantify out-of-pocket (OOP) expenses by caregivers in ZD communities

04

Plan, conduct and analyze data of the endline assessment of the costing Study

Thank you

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Back-up

This implementation research conducted across HCD facilities in Kano will determine the direct and economic costs of reaching zero dose children.

Scope of Analysis

Design Phase

- Captures all costs from the design and co-creation phase using HCD methods.
- Includes expenses for technical support, workshops, consultations, prototyping, and materials

Implementation Phase

- Captures direct and indirect costs during intervention delivery.
- Includes costs for technical support, mobilization, training, supervision, materials, and monitoring

Intervention Summary

4	3	8	12
Total No. of HCD interventions implemented	LGAs Implementation geography	months Duration of design phase	months Duration of Implementation (Projected)

Methodology

Direct Costs

- Actual expenses tied to intervention activities, e.g., personnel (T.A.), mobilization, training, logistics, monitoring, and local engagements.

Economic cost

- Value of unpaid contributions (e.g., volunteer time), estimated using local wage rates of predominant occupation of volunteers

Costing Methods

- Ingredients-based for general inputs: quantity × unit price.
- Activity-based for intervention-specific outputs, linked to participant numbers.
- Shared costs (e.g., venue) split evenly—25% per intervention.

Data sources: Budgets, invoices, attendance logs, and time-use records

Total Cost = Design Cost + Implementation Cost + Opportunity Cost (volunteer time)

We adopted a descriptive research design to determine the costs drivers of reaching zero-dose children in Kano state

Study Design

- The study will employ **a comparative costing approach using both baseline and endline surveys to assess changes over time**

Study Scope

- Data collection will be conducted across four system levels: **community/facility, LGA, zonal, and state, using structured costing questionnaires and specific tools**
- The study will cover **15 ZD LGAs**

Sampling

- purposive sampling technique based on probability, proportional to the number of health facilities per LGA

Data Analysis

- **Data will be analyzed using Excel-based tools**, applying descriptive statistics and detailed cost breakdowns.
  - The analysis will aim to evaluate the incremental cost to vaccinate a ZD child and identify key cost drivers across all levels

Data collection tools

- **Caregivers:** Focuses on out-of-pocket costs incurred by caregiver
- **Health facilities:** Assesses costs related to staff time, service delivery, logistics, training, outreach, and per diems.
- **LGA, zonal, and State officials (Annexes 3-4):** Evaluates administrative, supervision, vaccine distribution, planning, and support costs

Data Collection Approach

- The study will engage various respondent groups, including
  - Caregivers of **children aged 0-23 months**
  - **HCWs** involved in RI and ZD activities
  - **Key program officers/stakeholders** from LGA, zonal and state levels.

Inclusion Criteria

- The study will only target healthcare providers involved in routine immunization, caregivers of children aged 0-23 months visiting facilities for vaccination, and facilities located in zero-dose LGAs.

Exclusion Criteria

- Caregiver resident in non-zero dose LGAs.
- Facilities in Non-Zero Dose LGAs.
- Security compromised LGAs/ Facilities

Source: Costing study protocol

The Costing study findings will allow the Ministry of Health to understand the additional resources required to reach zero-dose children barriers.

This study compares the costs and reach of targeted interventions for zero-dose children in Kano State with those of the routine immunization program

Research contributions

1. Support health managers and policy-makers optimize immunization strategies through evidence-based insights
2. Provide evidence for better immunization resource allocation and support advocacy for increased funding
3. Enable stakeholders to understand the financial challenges families face in accessing vaccination services

Components of the Costing

- Facility-level Incremental ZD Delivery Costing
- Cost of Zero-Dose specific interventions
- Combining Facility and Intervention Costs
- Learning by doing mainstreaming costs/expenditures

Source: Costing study protocol

Preliminary Learnings

Identifying Zero Dose Children	Exploring multiple sources of zero-dose data beyond the facility data ensured the most near-accurate estimation was achieved
Estimating Transport Cost	Estimating transport costs using multiple indices – fuel consumption, ant spent, distance travelled, etc was critical to determining cost
Government Involvement	Involving Government representatives from the state Primary health care Management board gave impetus to the study
Zero Dose-specific Expenditures	Exploring direct and indirect costs by the state and LGA contributed to a near accurate estimation of the zero-dose costs