Immunization Economics Pre-Congress Meeting

Bali, July 19-20th, 2025

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The cost of Zero-Dose focused delivery strategies in urban settings

Bali, July 19, 2025

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Cost of reaching zero-dose children through selected interventions compared with routine delivery in Punjab and Sindh

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Overview

Objective

Evaluate the cost and output of three key interventions targeting zero-dose children in urban and rural areas in Punjab and Sindh, as well as routine strategies

Routine strategies

Fixed site

- Routine vaccination services provided at designated permanent health facilities across rural and urban settings
- Generally daily

Regular Outreach

- Health workers deliver vaccination at nearby communities on a routine schedule across rural and urban settings
- Generally daily (1-2 sessions per day)

Selected dedicated zero-dose strategies

Integrated outreach activity

- Outreach campaign systematically planned, where a vaccinator is accompanied by a social mobilizer in low-performing areas rural & urban
- **Not** integrated health services
- Occurs 2-3 times a year until recent big catch-up campaign (12-22 days long)

ZD reach

Clinic on Wheels

- Mobile healthcare initiative in Punjab to underserved **urban areas only** to deliver vaccines, family planning, ultrasounds , nutrition, ANCs, maternal care, and OPD prescriptions.
- Established in May 2024 by IRMNCH & Nutrition dept.
- Occurs daily.

ZD reach

Polio house-to-house (H2H) campaigns

- National/subnational campaigns in both rural and urban settings
- Leveraged to identify zero-dose children, data shared with EPI to reach within six weeks
- Every month/every few months.

ZD identification

Brief study overview

Data collected from **42 primary health facilities** & **2 mobile clinics** located within 26 Union Councils of 7 districts from 2 provinces. Three districts were urban & 4 were rural.

Zero-dose child*:* >18 weeks and not yet reached with Penta1 (EPI) or any injectable vaccines (polio)*

Obtained **financial & economic cost** data, along with perspectives from healthcare providers.

Full cost: Routine delivery and integrated outreach activity
Incremental cost: Clinic on Wheels and polio h2h

For each intervention, we collected data from the **most recent campaign** and **usual month** of routine activity.

**For polio h2h, 4 months used as proxy in Sindh as they recorded the age of children in months, not weeks*

Identifying and reaching zero-dose children: *Preliminary findings*

On average integrated outreach reached more ZD children per day, but not substantially more than routine outreach

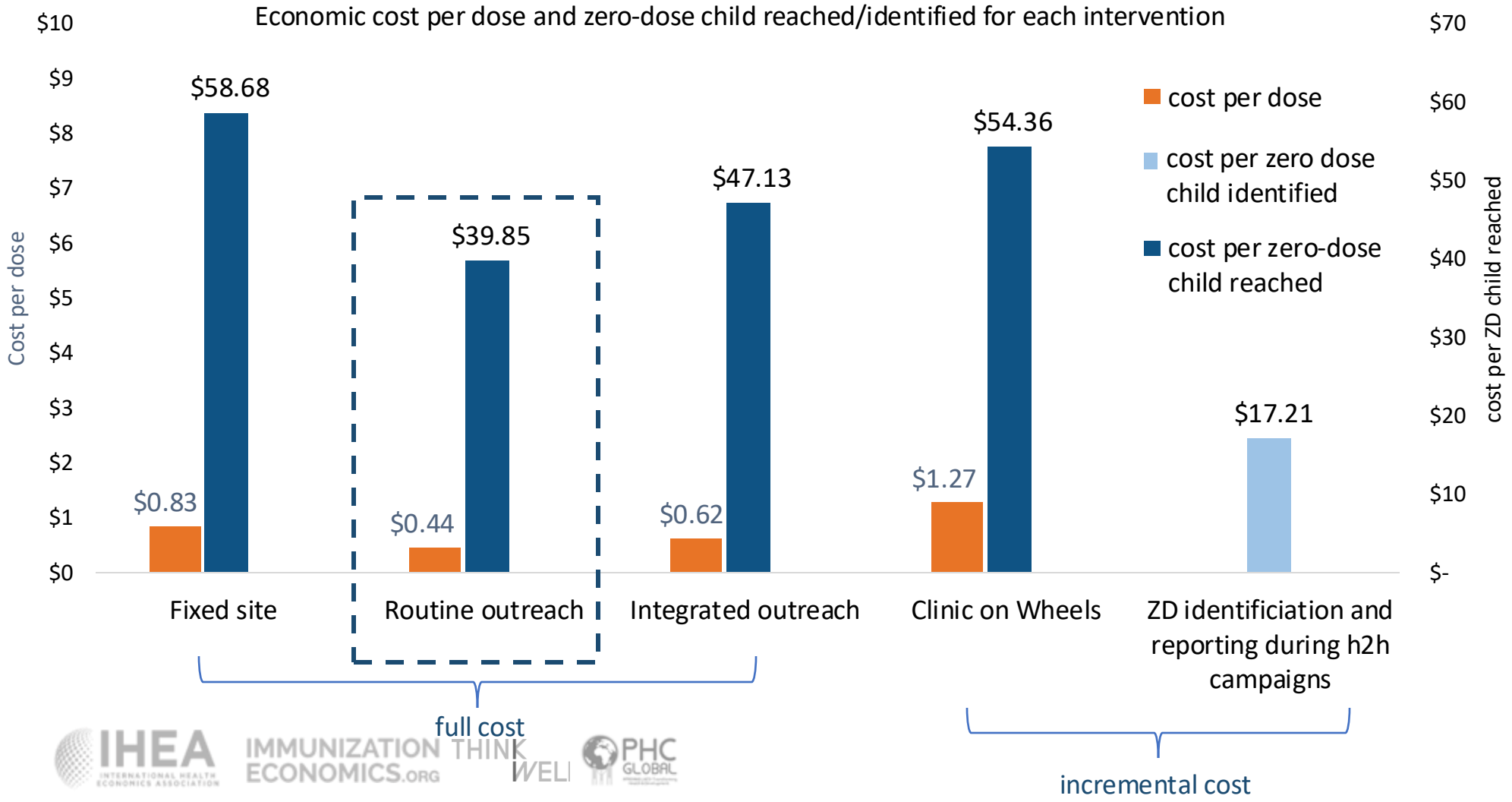
Intervention	Average doses delivered by Union Council per day	Average ZD children reached by Union Council per day
Fixed site delivery	34	0.3
Routine outreach	70	0.7
Integrated outreach activity	97	1.3
Clinic on Wheels *Punjab only*	33 *(382 services including ultrasounds, ANCs, OPD services, family planning)*	0.7

Polio house-to-house campaigns were effective at identifying zero-dose children though they are not always reached

Intervention	Average doses delivered by Union Council per day	Average ZD children reached by Union Council per day
Fixed site delivery	34	0.3
Routine outreach	70	0.7
Integrated outreach activity	97	1.3
Clinic on Wheels *Punjab only*	33 *(382 services including ultrasounds, ANCs, OPD services, family planning)*	0.7
Intervention	**Average doses delivered by Union Council per day**	**Average ZD children identified by Union Council per day**
Polio H2H campaigns	3,444 *Based on two districts in Punjab*	2.32

Not all identified ZD children from polio h2h campaigns are then reached by EPI. For the October 2024 campaign, in Punjab 90% ZD children identified by EPI were reached within six weeks, but in Sindh this was 43%

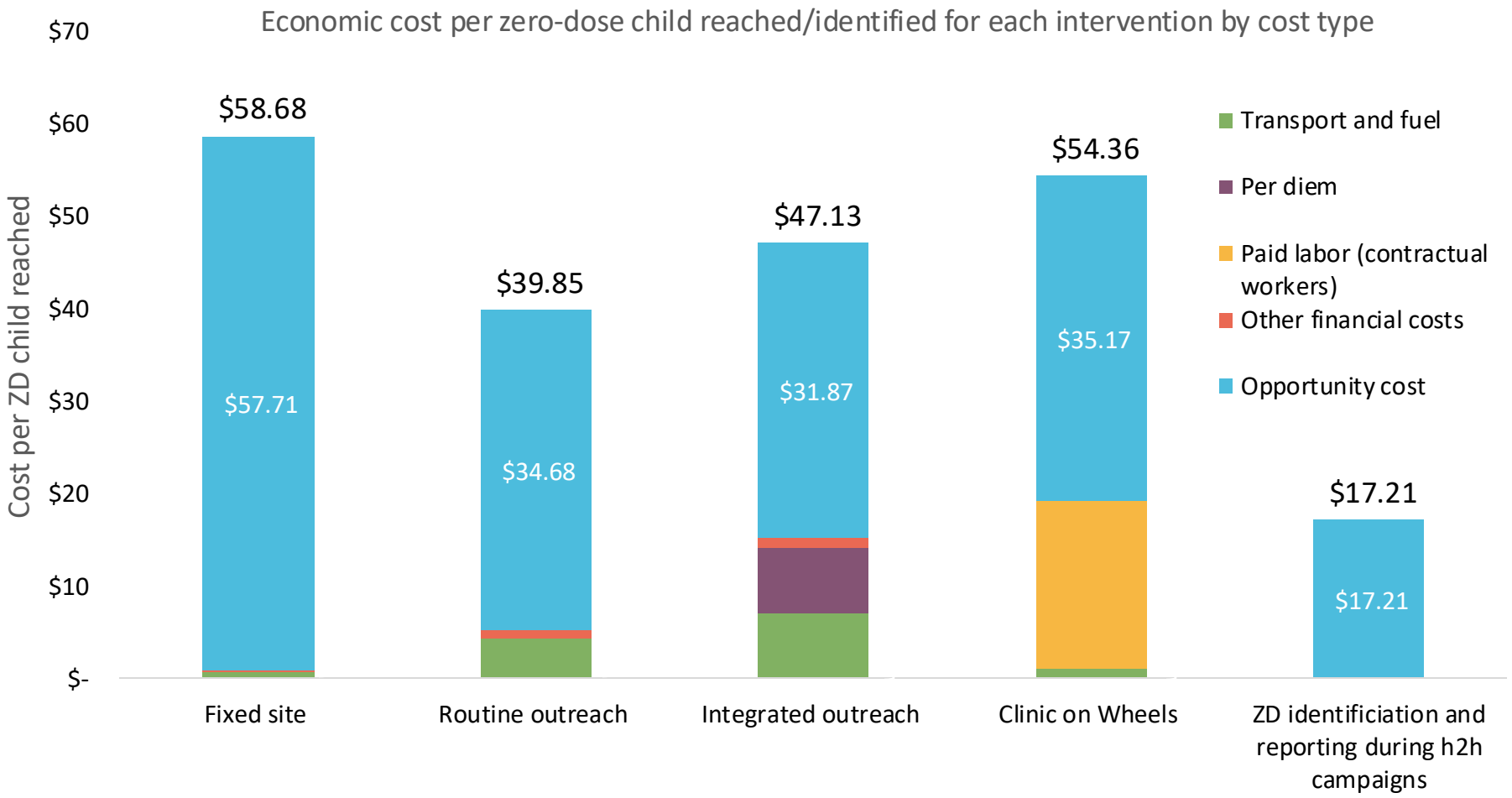
Overall, routine outreach incurred the lowest economic cost per dose and cost per zero dose child reached



Routine outreach has fewer staff and less financial support than most other strategies

Clinic of Wheels had a relatively higher cost owed to being **better resourced** than other delivery strategies.

Integrated outreach & Clinic on Wheels incur much higher financial cost per ZD child reached than routine activities



Financial cost for integrated outreach driven by per diem and travel allowances, for Clinic on Wheels driven by temporary workers.

Opportunity costs are primarily driven by labor for all strategies

No additional financial cost for identifying ZD kids in polio campaigns, just opportunity cost of additional staff time for ZD identification and reporting, estimated at **82 additional minutes** per HRH per day

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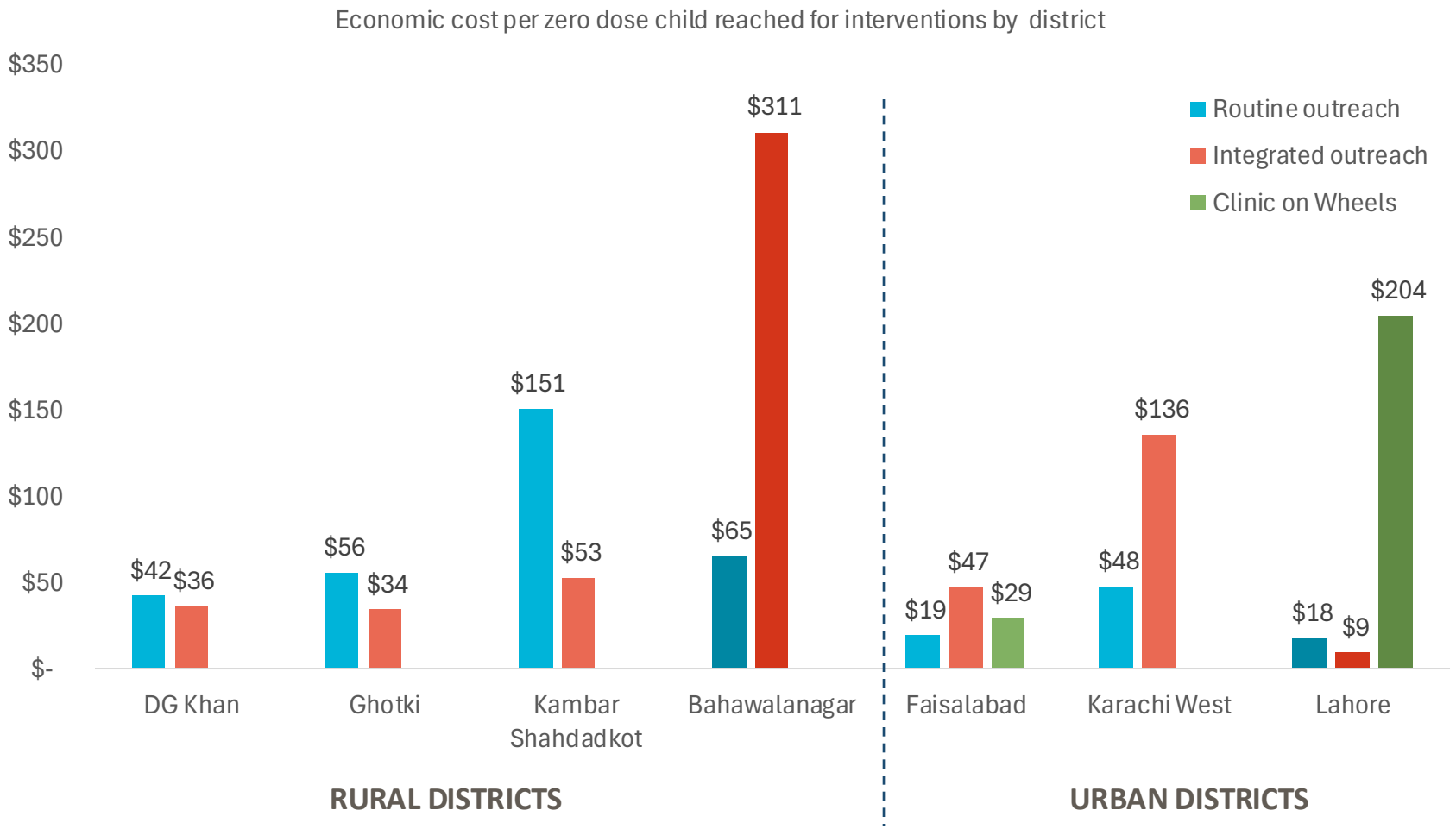
In most urban districts, routine outreach was the more cost-efficient strategy than integrated outreach



Integrated outreach activity effectiveness was more limited in urban districts where public resistance to immunization is a significant barrier & routine outreach was better resourced (2.2 IOA vs 1.8 RO per day). *Exception was Lahore* where IOA was particularly well-staffed & made more gains.

In rural districts, integrated outreach activity fills critical infrastructure gaps resulting in substantially more ZD kids reached than routine outreach (1.4 vs 0.6 per day). *Exception was Bahawalnagar,* with significant weather-related access barriers during the activity.

Clinic on Wheels was more effective at reaching zero-dose children than routine delivery in settings where **ZD children are concentrated in informal settlements**

Key Takeaways

Key Takeaways

To be effective, the intervention must match the specific zero-dose barrier in a certain context, whether that be addressing community resistance, routine infrastructure gaps, poverty, accessibility.

Immunization outreach campaigns such as integrated outreach activity, should be strategically deployed only where routine infrastructure gaps exist, not as a blanket intensification across provinces. IOA shows limited returns in more adequately-resourced urban areas such as Karachi West.

Clinic on Wheels is a highly targeted intervention, and more effective where ZD are concentrated in informal settlements. However, it is relatively high-cost intervention compared to outreach

ZD integration is a relatively efficient add on to the polio h2h campaign as incurs no additional financial cost, though the ability to reach ZD children hinges on the strength of the EPI. While a vital microplanning tool for EPI, polio h2h campaigns are costly and donor-reliant, and the country needs to strengthen EPI microplanning to prepare for a future polio transition.

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Incremental Costs and Impact of Weekend Vaccination Sessions: Lessons Learnt from Implementing the Zero-dose Reduction Operational Plan in Lagos state (Nigeria)

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Contributing Authors: *Zainab Yusuf, Tijjani Hussaini, Adebisi Adeyoyin, Salisu Sulaiman, Olufunke Fasawe, Emmanuel Okpanachi, Abiodun Giwa, Prince Friday, Akinpelu Adetola Mathew, Sulaiman Etamesor*

Gavi The Vaccine Alliance

World Health Organization

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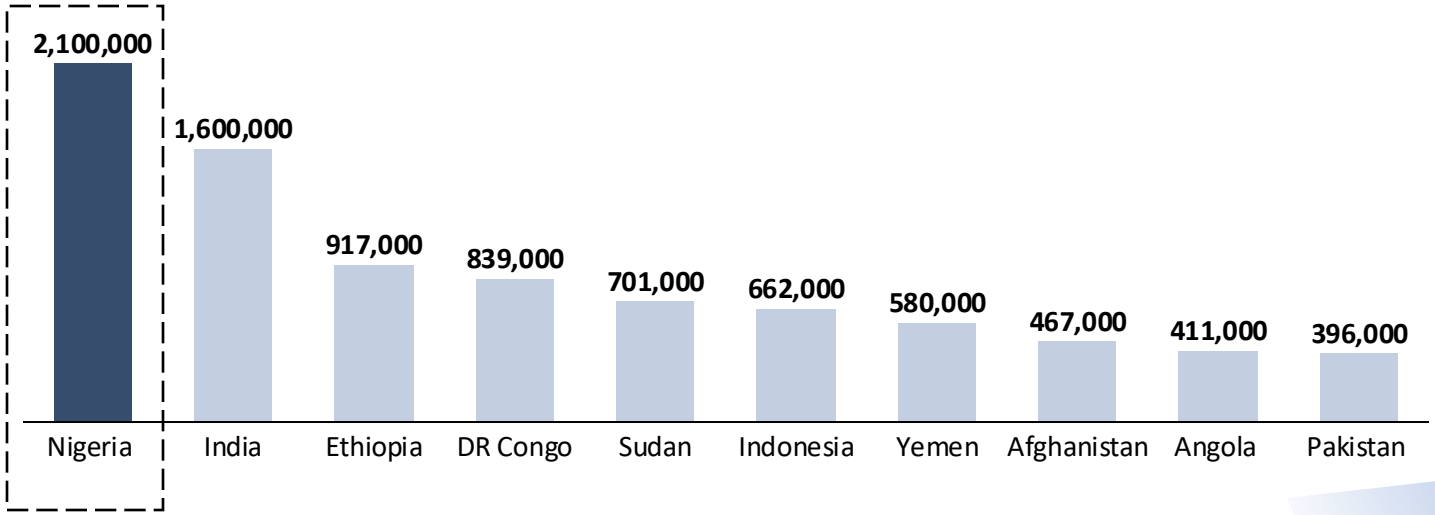
Outline

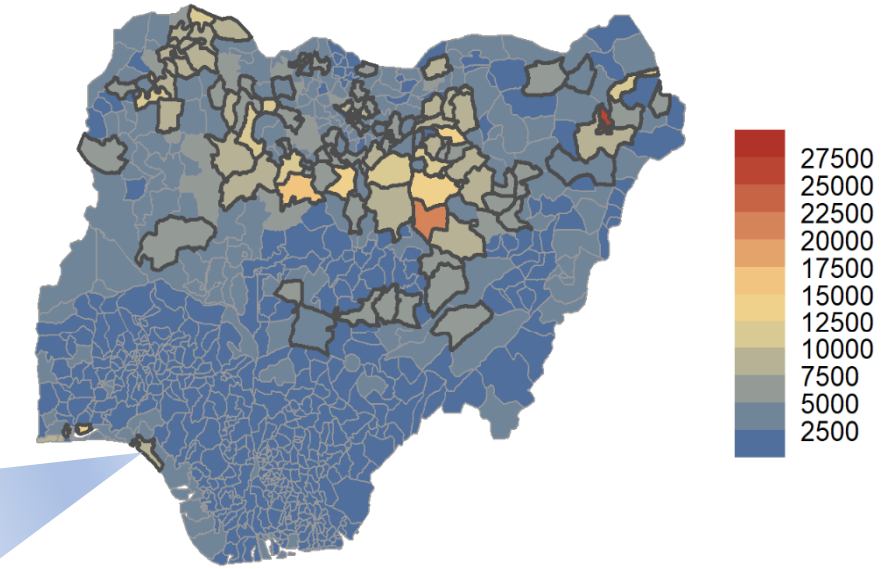
Background (1/3)

Despite progress made on RI, Nigeria has the highest number of zero-dose children with more than 2.1m unimmunized children

100/774 LGAs have the highest concentration of ZD children & are prioritized for ZD interventions

Zero-dose (ZD) children *are children who have not received the first dose of penta*





2 LGAs (Alimosho and Ikorodu) in Lagos are amongst the 100 zero-dose LGAs

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Sources: Zero-dose prioritization data, WHO & UNICEF Estimates of National Immunization Coverage (WUENIC Estimates), MICS/NICS 2021, Combined NPSIA DATA

Background (2/3)

Zero Dose Reduction Operational Plan (ZDROP)

One of the three interventions implemented along with gender mainstreaming and the zero-dose learning hub to reduce the burden of zero-dose in Nigeria.

Activities are implemented since August 2024 at multiple levels including the facility, ward and LGA levels across the spheres of **leadership and governance, service delivery, demand generation, supply chain, data management and M&E**

Funding for the implementation of ZDROP is provided by the **Global Vaccine Alliance (GAVi)** through the WHO to NPHCDA and state governments to support and strengthen immunization delivery.

	Total Population	Total U1 Population	Total ZD Population	# of RI HF	Service delivery approaches
1 Alimosho	2,252,518	90,101	180,201	169	**Fixed** – weekday and weekend **Outreach** – community and Market storms
2 Ikorodu	944,258	57,770	70,000	60	

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Source: NPoPc population projections, state records

Background (3/3)

Alimosho & Ikorodu are densely populated cosmopolitan LGAs, with increasing migrant population. 3 out of 5 women are working class and bear most childcare responsibilities.

"I went to a health facility for supervision and a mother came rushing into the health facility, begging me to ask the Nurse attend to her baby so that she can rush to work"

A LGA Immunization Officer

Lagos State government introduced the **weekend vaccination** to reach these working-class women.

Weekend vaccination sessions are provided as fixed sessions in PHC facilities **on Saturdays only**. There are two categories of health facilities providing weekend vaccinations based on the number of operating hours

Type	Implementation Approach	Cost Elements*
Selected hours	Vaccination is provided **for 6 to 8 hours** during fixed sessions and requires ○ 1 – 2 vaccinators ○ 1 recorder ○ 1 community mobilizer	Stipend & meals for vaccinator Stipend for recorder Stipend for comm. mobilizer
24-hour providing services	Services are provided **throughout the day** during fixed sessions and requires ○ Changing staff rotations	None

*These sessions also incur running cost including facility operational cost, cost of vaccinators and demand generators, cost of vaccines, logistics cost, cost of syringes. These cost elements are not included.

Methodology

Objectives

1. To estimate the quantified effectiveness of ZDROP in reaching zero dose and increasing access to immunization
2. To determine whether weekend vaccination are cost-effective in reaching more children
3. To gain insights into the experiences, best practices, and challenges associated with implementing extended immunization sessions

A mix-method approach was employed including

Desk review & Facility data collection

- **Administrative facility data** from July 2024 to February 2025 was collected from NHMIS immunization registers and tally sheets from 4 health facilities
- Cost data was collected from ZDROP budget costing and utilization data templates
- To compute the number of zero-dose children reached during the extended sessions. **Incremental cost (financial cost only) per dose of vaccine delivered** was calculated using (adjusted and non-adjusted):-

$$\frac{\text{Additional cost incurred per extended session}}{\text{Average of the number of vaccines delivered per session}}$$

Stakeholder interviews

- Interviews were conducted with the following using a structured guide.
  - ✓ **Local Government Immunization Officers (2)**
  - ✓ **Facility in-charges (2)**
  - ✓ **Immunization Providers across the two LGAs (4)**

✓ Thematic content analysis was used to synthesize the findings

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Results (1/4)

$154,738

Total cost of the ZDROP intervention in Lagos State

1,662

Total # of zero-dose children who received DPT1

$93.10

Incremental cost of per zero-dose child reached.

$34.26

Incremental cost of per dose delivered (adjusted for all antigens)

Comparison with other findings

Ozawa, et al (2018) found that intervention costs per dose for the 56 interventions ranged widely from **$0.01 to $38.16**

The incremental cost per zero-dose child lies within the range found in a study conducted in India (Clarke-Deelder E, et al (2024)), which ranged from **$22 to $193**

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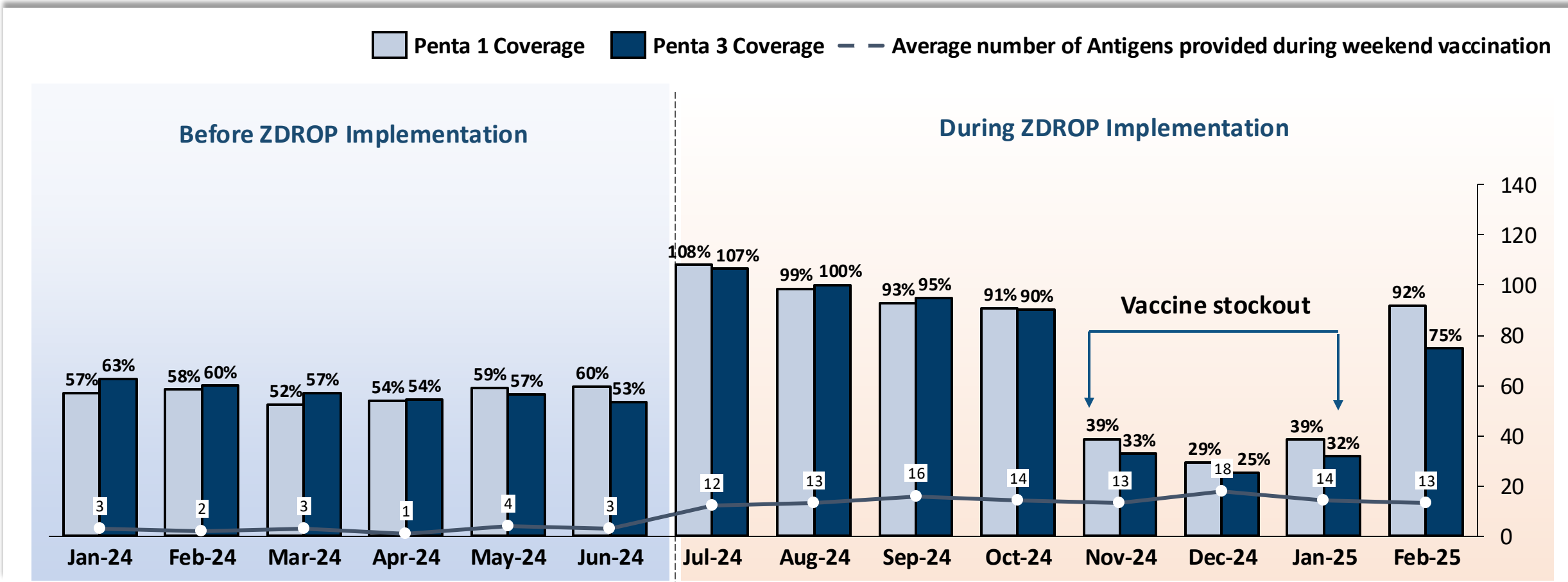
Ozawa S. Tatenda T. Yemeke, Kimberly M. Thompson, Systematic review of the incremental costs of interventions that increase immunization coverage, Vaccine, Volume 36, Issue 25, 2018, Pages 3641-3649; Clarke-Deelder E, Christian Suharlim, Susmita Chatterjee, Allison Portnoy, Logan Brenzel, Arindam Ray, Jessica Cohen, Nicolas A Menzies, Stephen C Resch, Health impact and cost-effectiveness of expanding routine immunization coverage in India through Intensified Mission Indradhanush, Health Policy and Planning, 2024; https://doi.org/10.1093/heapol/czae024

Results (2/4)

There was a significant increase in **penta 1 and penta 3 coverages** across the ZDROP implementing sites.



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Results (3/4)

Facilities providing weekend sessions for 6 to 8 hours

Key findings

- **$1.36/dose** *(adjusted for all antigens)* was spent to conduct the extended session*

Other findings

- **$6/dose** (Clarke-Deelder, *et al.,* 2024)
- **$2.70/dose** (Uddin *et al.,* 2012)

Although, there are methodological differences in estimating cost per dose delivered, the incremental cost of conducting weekend vaccination was **seen to be lower** than other additional interventions conducted to reach zero dose children.

* Incremental cost of **$4.23** per zero dose child reached was obtained i.e. only including zero dose children reached with penta-1 only

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Sources: CHAI Team Analysis of cost per dose data; Clarke-Deelder E, Christian Suharlim, Susmita Chatterjee, Allison Portnoy, Logan Brenzel, Arindam Ray, Jessica Cohen, Nicolas A Menzies, Stephen C Resch, Health impact and cost-effectiveness of expanding routine immunization coverage in India through Intensified Mission Indradhanush, Health Policy and Planning, 2024;https://doi.org/10.1093/heapol/czae024. Chatterjee S, Das P, Nigam A. et al. 2018. Variation in cost and performance of routine immunisation service delivery in India. BMJ Global Health 3: e000794.doi: 10.1136/bmjgh-2018-000794..

Results (4/4)

Stakeholders shared that

Best Practices & Lessons learnt

Weekend vaccination is complimentary & equitable
Ensuring equity for vaccination for children necessitates varied strategies, with weekend sessions particularly beneficial for reaching working-class women — **8/8**

Vaccines and supplies were accessible
Provision of weekend vaccination was not impeded by inaccessibility to vaccines. There were not instances when vaccines couldn't be accessed — **8/8**

Wastage rate management led to reschedule
Health care workers had to rescheduling of vaccination to workdays to avoid wastage of vaccines — **3/8**

Health talks was used in increasing awareness
Caregivers receive information on the availability of weekend vaccination sessions during immunization health talk which was subsequently cascaded to other caregivers — **8/8**

Challenges

Human Resource Gaps
Shortage of health care workers affected the availability of weekend sessions and led to increase workload amongst health care workers — **8/8**

Delayed funds release
This affected the ability of facilities to engage community mobilizers and hence affected client turnout — **4/8**

Demand Generation was not sufficient
There is need to engage additional community mobilizers to reach additional households with information on vaccination. — **4/8**

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Source: CHAI Team analysis of Stakeholder Interviews

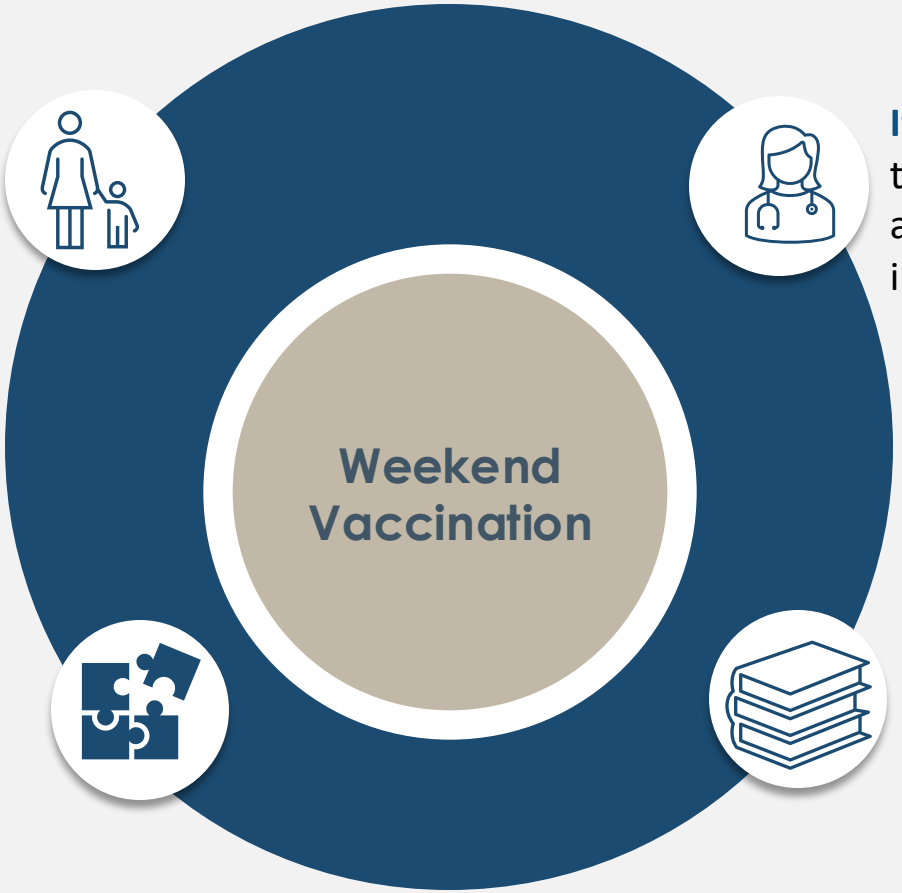
Limitations

1. **Reporting weekend vaccinations as weekday services** hinders data collection and prevents the generation of weighted vaccination estimates.

2. A lack of **robust, country-specific costing data** poses challenges for meaningful comparison and benchmarking

Conclusion

Weekend vaccinations are cost effective in reaching working class mothers and can be further optimized by implementing strategic demand generation efforts



It is imperative to address HR shortages to reduce burnout, improve HCW welfare and support facilities to provide immunization sessions effectively

Weekend vaccination complements other immunization service delivery approaches including fixed sessions, community outreach and market storms

Weekend vaccination should be integrated into immunization policies and plans, as part of gender and equity consideration to enhance immunization uptake

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Call to Action

1 Development & IPs

- Support National and state governments to implement weekend sessions to reach working class women, as part of efforts to advance equity in vaccination

2 Health Managers and Implementers

- Integrate weekend sessions into the service delivery models, health development plans and data reporting tools
- Investment in HRH and innovative financing mechanisms

3 Policy Markers

- Create comprehensive guidance materials and normative documents to facilitate the efficient and effective implementation of weekend vaccination programs.

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Thank you

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Costing study of interventions to optimize outreach Service to reach ZD children in Addis Ababa

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Health Financing

July 2025

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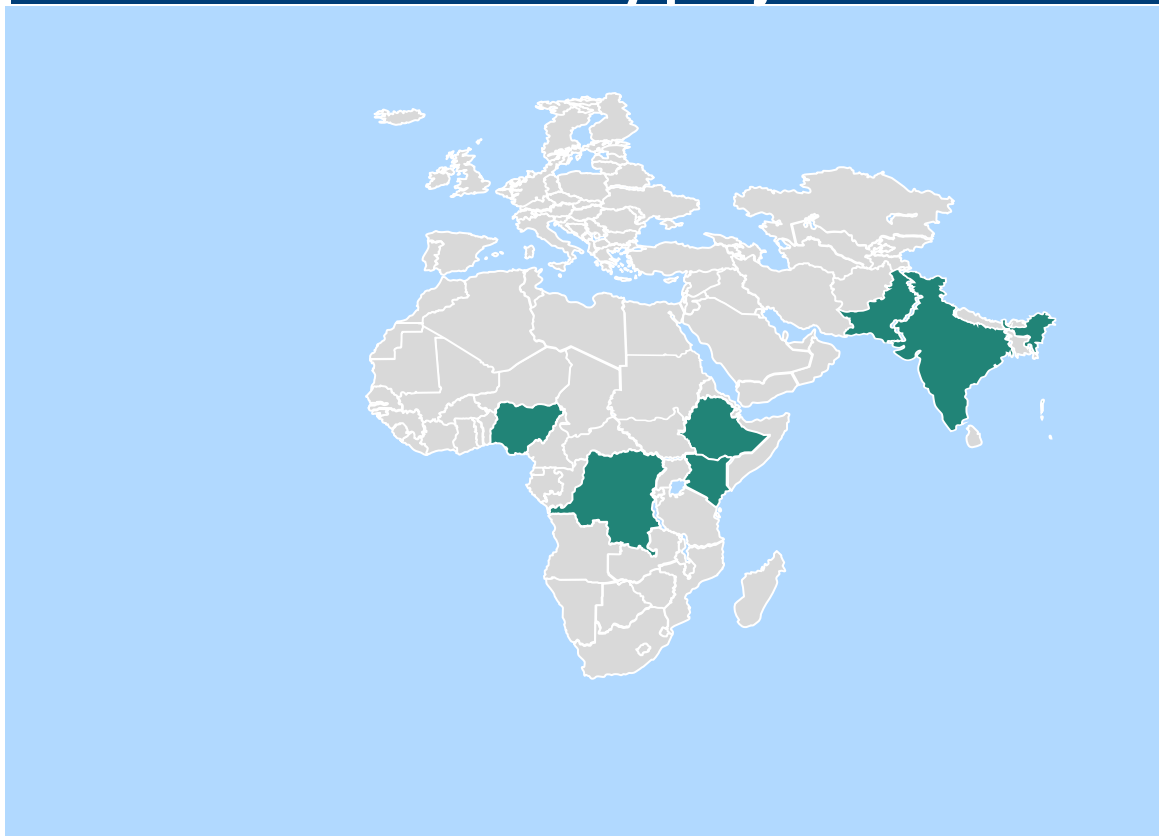
Background: ZDLA is a multi county project aimed at uncovering the root cause of ZD, co-creating, testing, and continuously improving solutions by engaging the community and stakeholders

ZDLA country projects



ZDLA Human Centred Design Approach

- Unpack the root causes of why children are not vaccinated

- Solutions with communities, health care workers, and government
- Continuously learn and improve
- Test and implement solutions

Government uptake & sustainability

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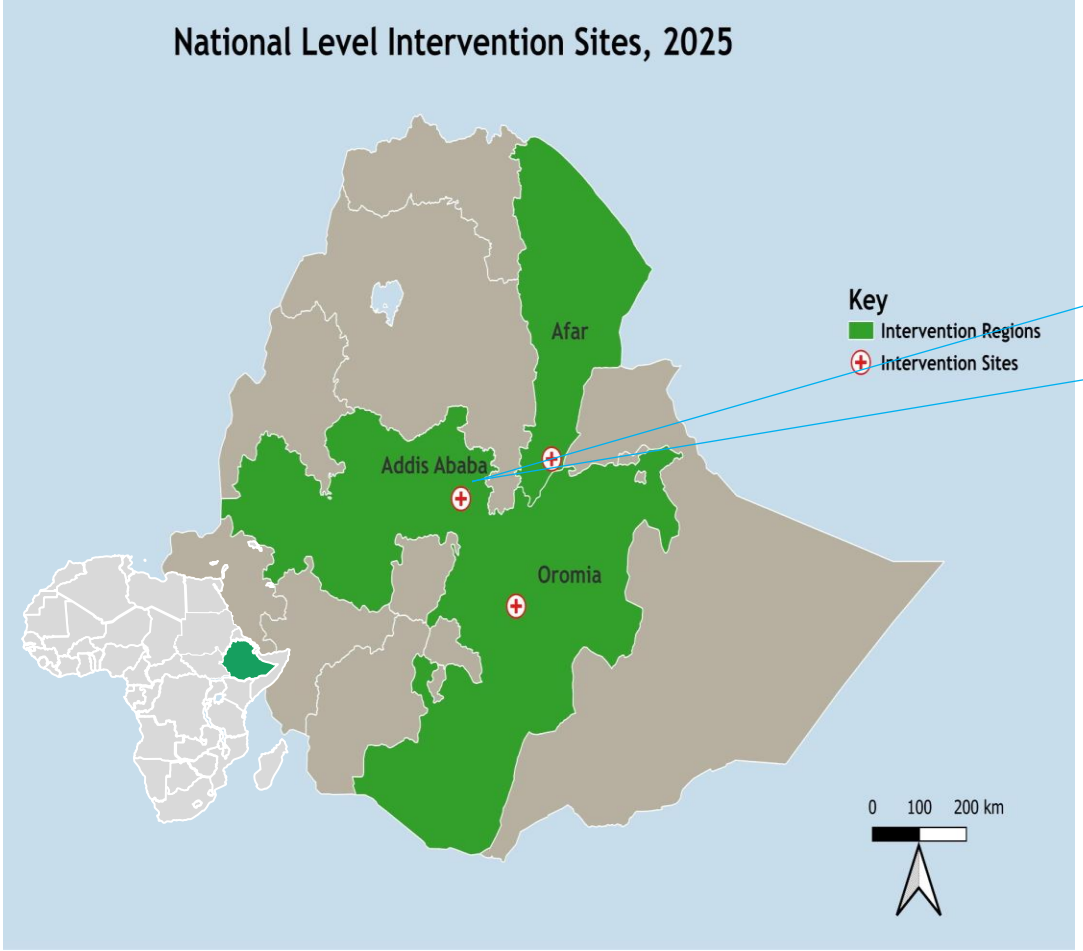
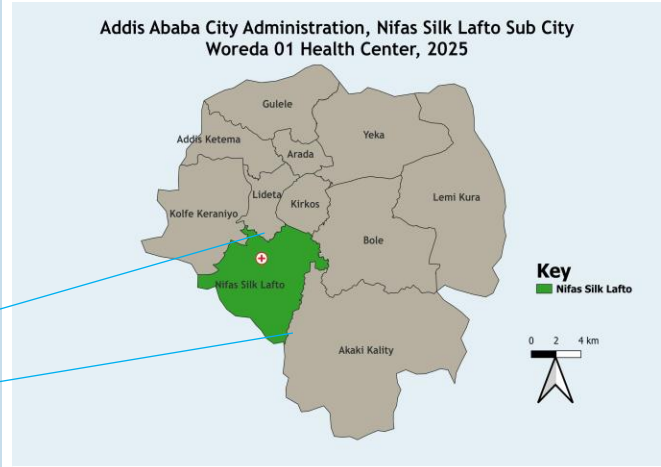
Background: CHIA implementing ZD and ZDLA projects in Ethiopia with the financial support of Gavi, BMGF and ELMA

- Ethiopia ranked 3rd* with 917k ZD children
- CHAI is implementing ZD project in 15 woredas of 5 regions
- Supported by Gavi, BMGF and ELMA.
- ZDLA interventions are in place across three sites
- Scope of this study is on **Addis Ababa**





NFL Woreda 1 HC

- Established in 2014
- Catchment: three districts (D1+D14+D15)
- Population :51,580
- ZD prevalence: 2.5%**

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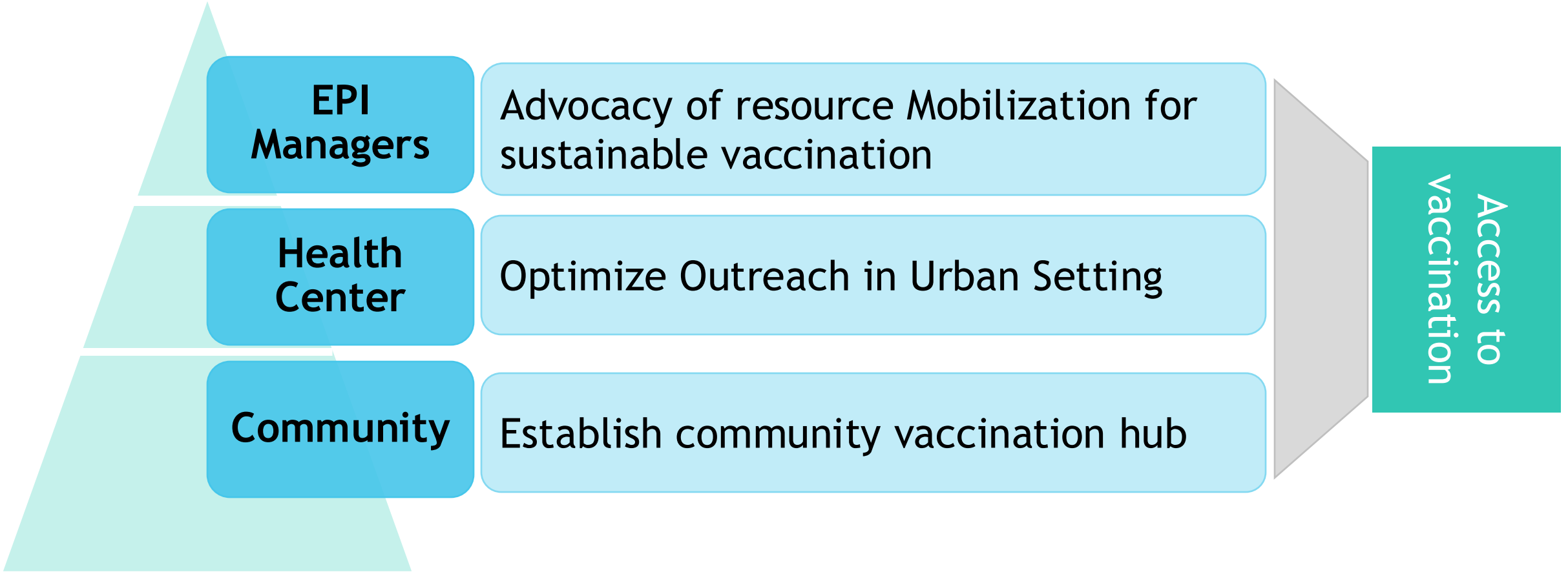
- Source: IA2030 GLOBAL PROGRESS REPORT 2024

** The ZD prevalences is only for the OR catchment areas such as Kerss Bela, Kersa Kontoma, Mango,and Harissa areas

Interventions: Three co-created interventions prioritized and rolled out to address structural barriers to vaccination access



Objective & Methodology: Estimate the cost of reaching ZD children using ingredient-based, payers' perspective, & retrospective approach

Key Objectives
Assess the incremental cost of reaching ZD children
Analyze the key cost drivers and implication

Data collection
Structured data collection instrument
Pretested and complemented by observation at OR site

Costing Study Methodology

- Ingredient-based costing
- Payers' perspective
- Retrospective

Cost of ZD Intervention

Financial Cost

- Per dime cost
- Renovation cos
- Transport cost

+

Opportunity Cost

- Capital investment
- Volunteers time
- Donations/ transfers
- TA time

Cost of vaccine and injection supplies are excluded

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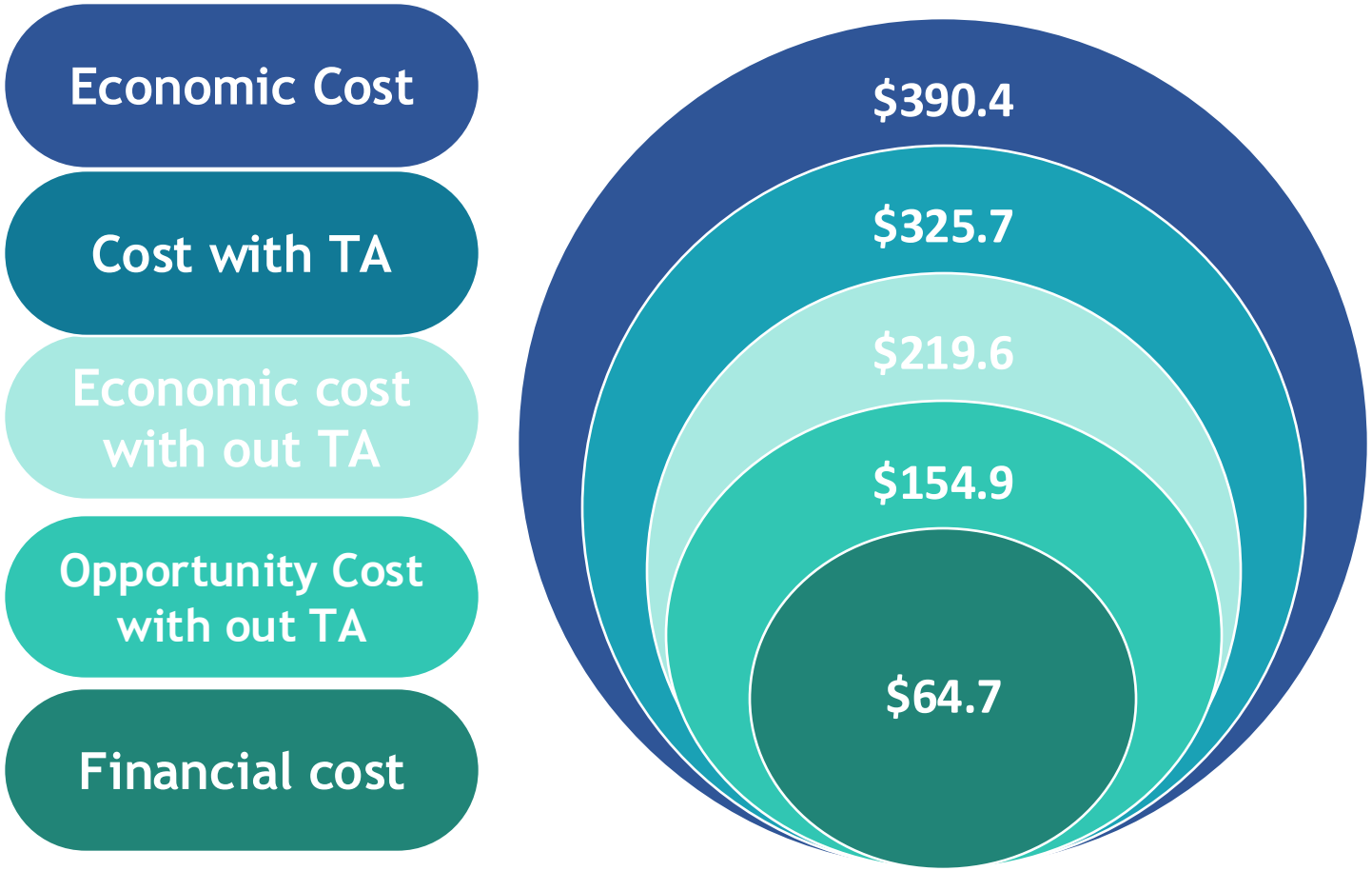
Results: The incremental financial and economic cost of implementing ZDLA interventions range from $65 to $390 per month



High economic vs financial cost due to:

- Heavy reliance on the existing HR & volunteers
- Investment in improving existing assets
- Leveraging transferred furniture

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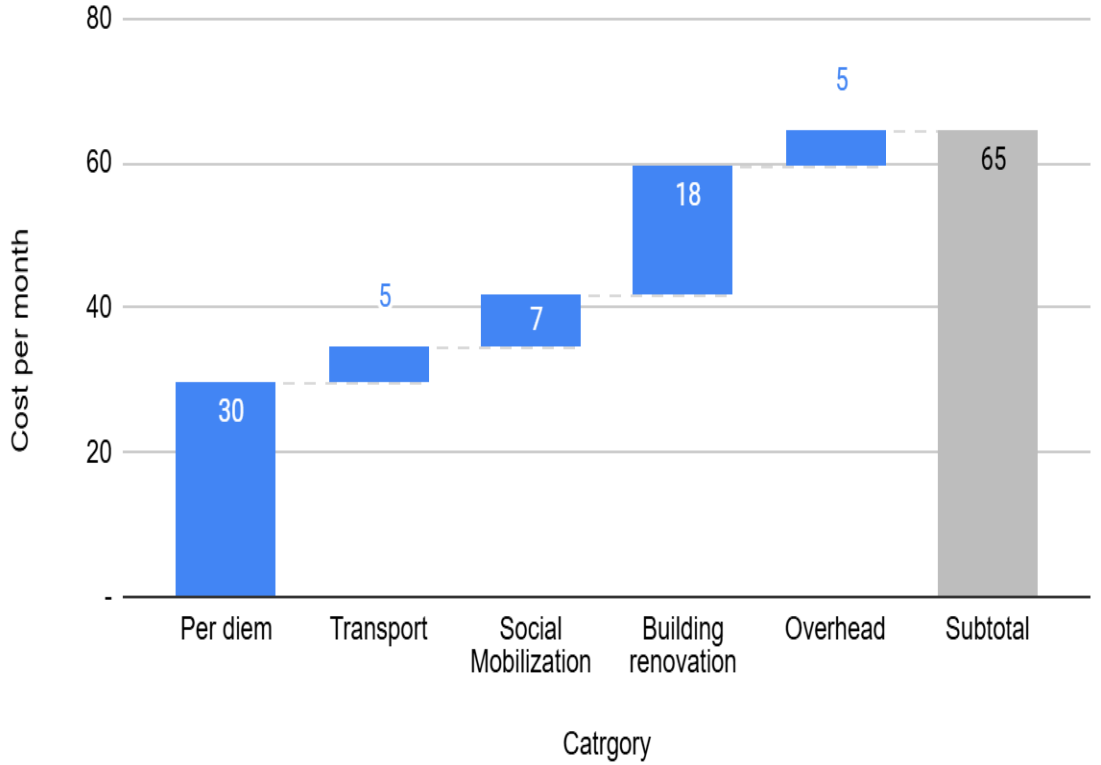
Result: Per diem accounts for significant part the of financial cost (46%) followed by renovation (28%), social mobilization(11%), & transport cost (7%)

Cost Category	Share of FC	Share of EC
HR Cost	0%	8%
Per diem	46%	8%
Volunteer HR	0%	9%
Transport	8%	11%
Furniture	0%	3%
Social Mob	11%	2%
Renovation	28%	13%
Overhead	7%	2%
TA time	0%	44%
Total	**100%**	**100%**

Financial Cost build-up per month (USD)



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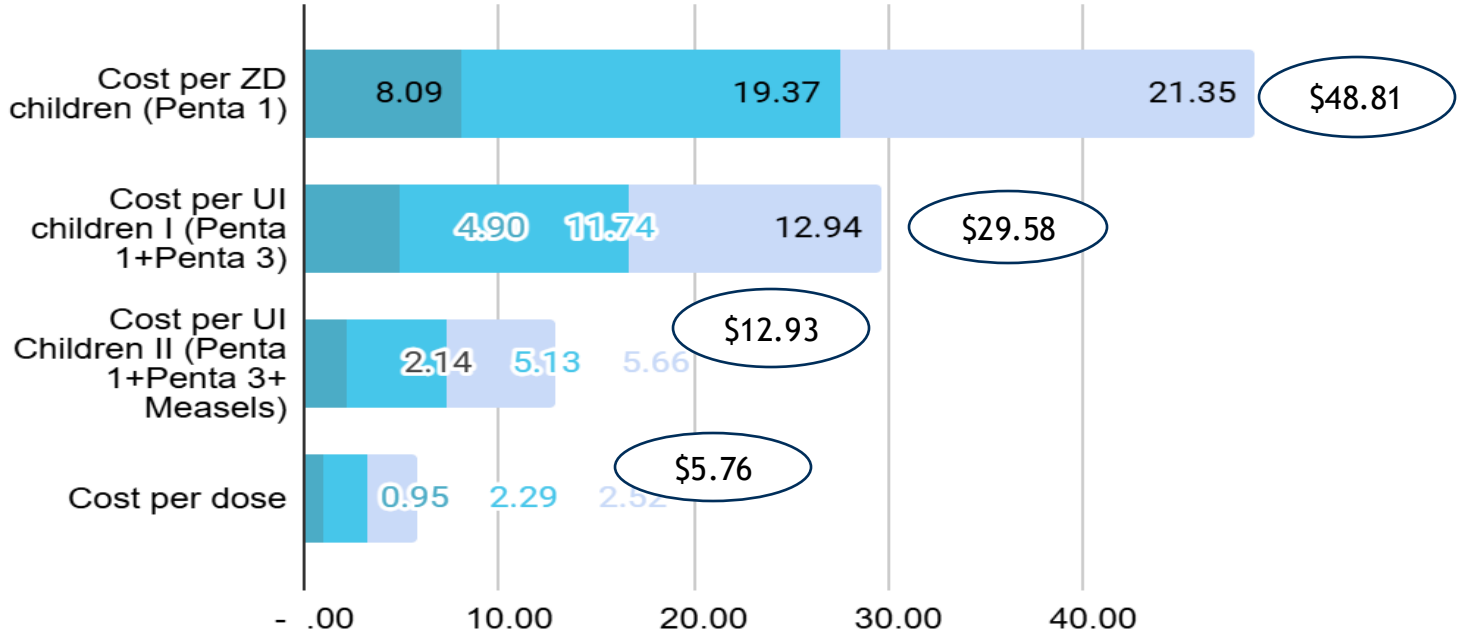
Result : The financial cost of vaccinating ZD children estimated at $8.1 while Economic cost range from $27.4 to $48.8 including TA time

Incremental Cost of Vaccination



Economic Cost = Financial Cost + Opportunity cost + TA cost

Key Takeaways

High increamental cost per ZD children and per doze compared to routine vaccine delivery ($ 1.57* and $1.37 for Ethiopia and LMICs, respectively

- Targeting marginal group in high vaccination coverage setting (87%)
- No economies of scale

Comparing with cost for reaching UI and ZD children in Uganda and India, it is low ($17.51* to $63.29*)

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- Source: ThinkWell. 2024. Immunization Delivery Cost Catalogue. Geneva:

Key Insights and implication

Cost Difference

- Significant differences in financial and economic costs arise from reliance on the existing workforce, volunteers, and other resources.

Cost Drivers

- Per diem, HR, renovation, and transport are major components of financial costs and economic costs.

Cost of reaching UI and ZD children

- Cost of reaching UI and ZD children in urban slum is more expensive compared to routine child vaccination.
- Incremental cost estimates to reach UI and ZD children are below that of Uganda and India but with different context

Intervention Effectivenss

- Further research and evidence needed to get insight on effectiveness and determine return on investment

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Thank you

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The cost of immunizing zero-dose children through additional outreach sessions in Lagos, Nigeria

Christina Banks
ThinkWell

Objective

This study estimated the cost and effectiveness of outreach strategies at reaching zero-dose and under-immunized children in Lagos

Methods cont'd

Sampling strategy	Sampling of the **two priority LGAs**, purposive sampling of local council development areas in collaboration with state MOH
Time horizon	Costs incurred during a typical month at point of data collection (February 2025)

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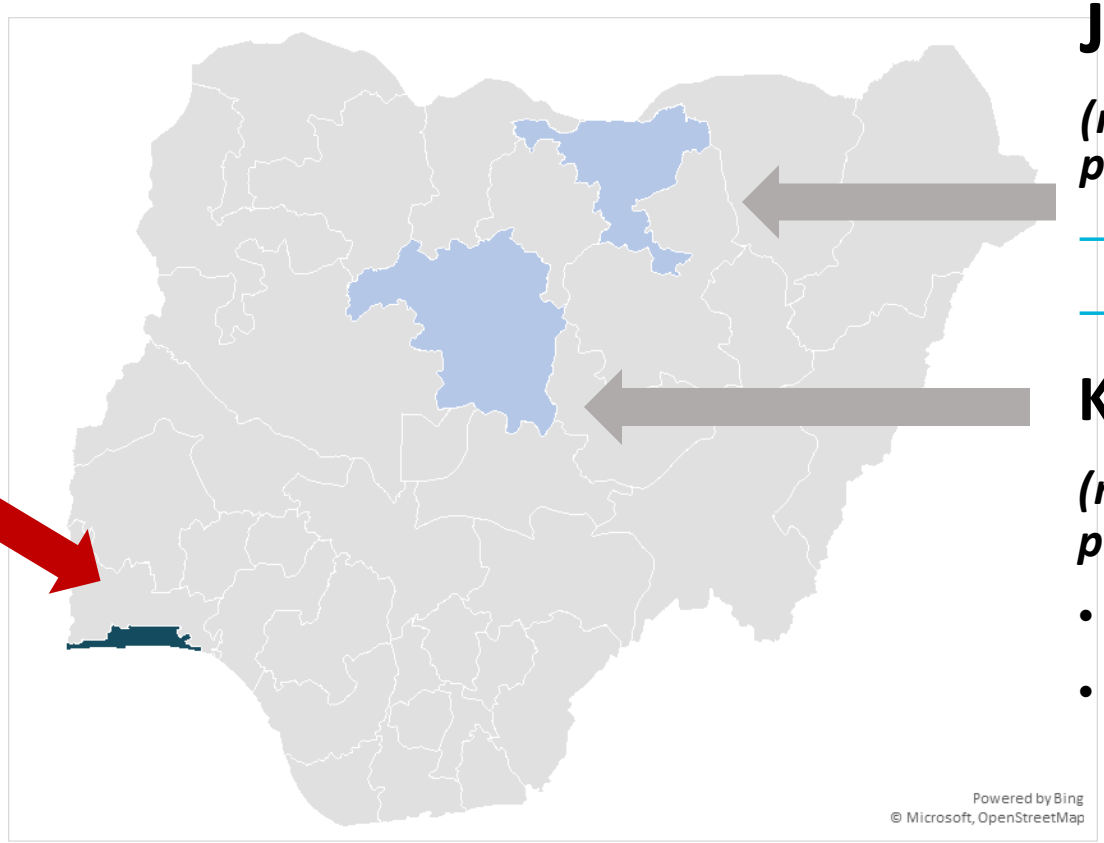
Our study included 15 facilities from 2 LGAs in Lagos

Lagos

- 2 LGAs
- 15 facilities
  - 9 part of ZDROP
  - 9 in urban areas



Jigawa

(not included in this presentation)

- 2 LGAs
- 13 facilities

Kaduna

(not included in this presentation)

- 4 LGAs
- 33 facilities

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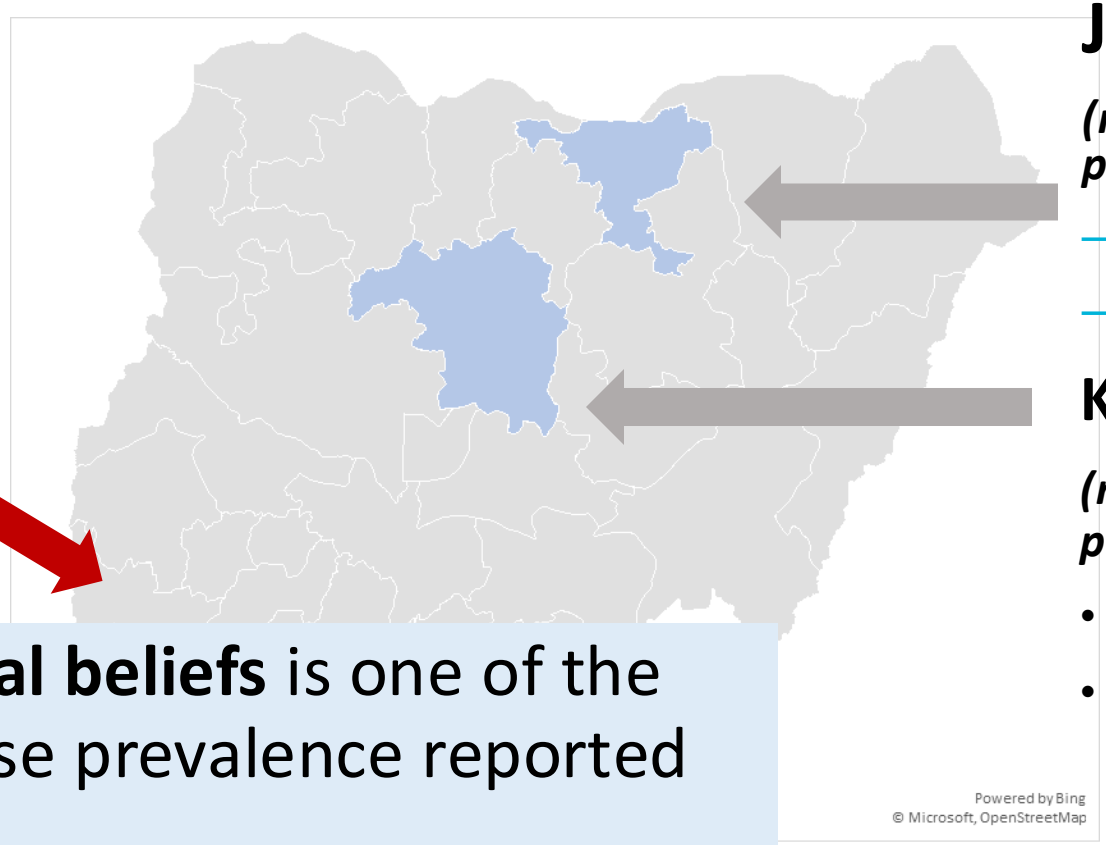
Our study included 15 facilities from 2 LGAs in Lagos

Lagos

- 2 LGAs
- 15 facilities
  - 9 part of ZDROP
  - 9 in urban areas



Jigawa

(not included in this presentation)

- 2 LGAs
- 13 facilities

Kaduna

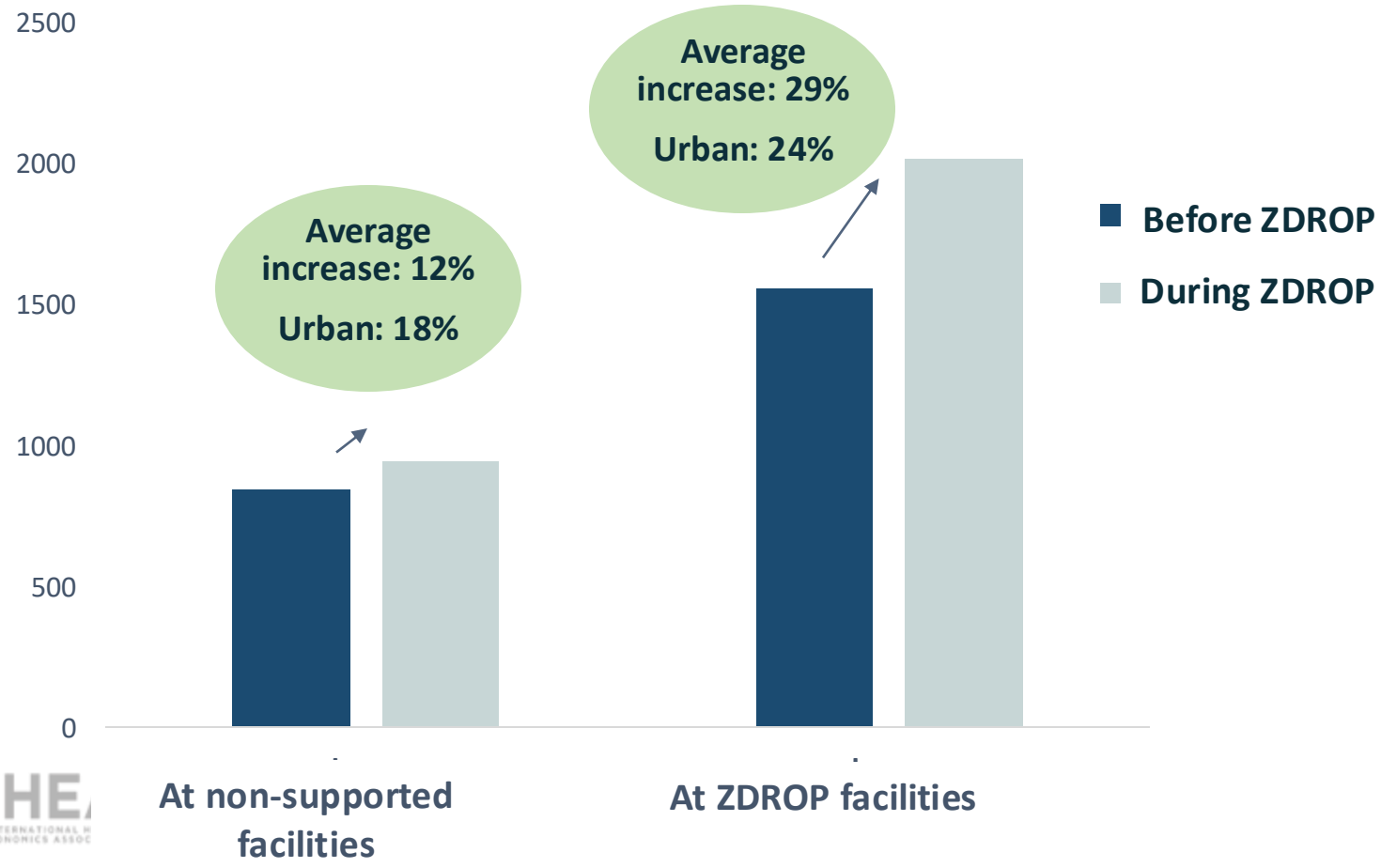
(not included in this presentation)

- 4 LGAs
- 33 facilities

Lack of awareness or cultural beliefs is one of the main root causes of zero-dose prevalence reported at all urban facilities

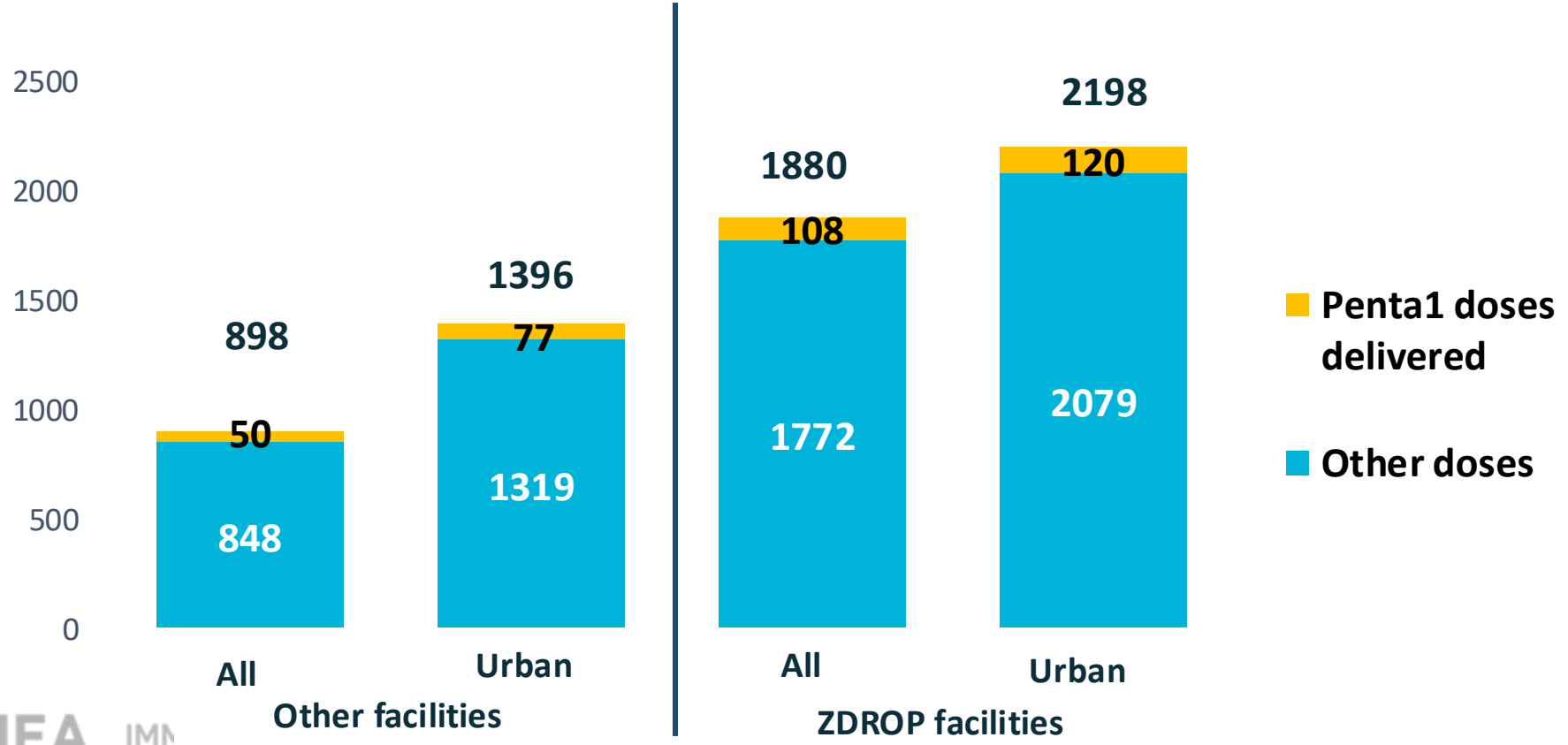
Transport issues reported by several rural facilities

When implementing ZDROP, facilities delivered **more vaccine doses**

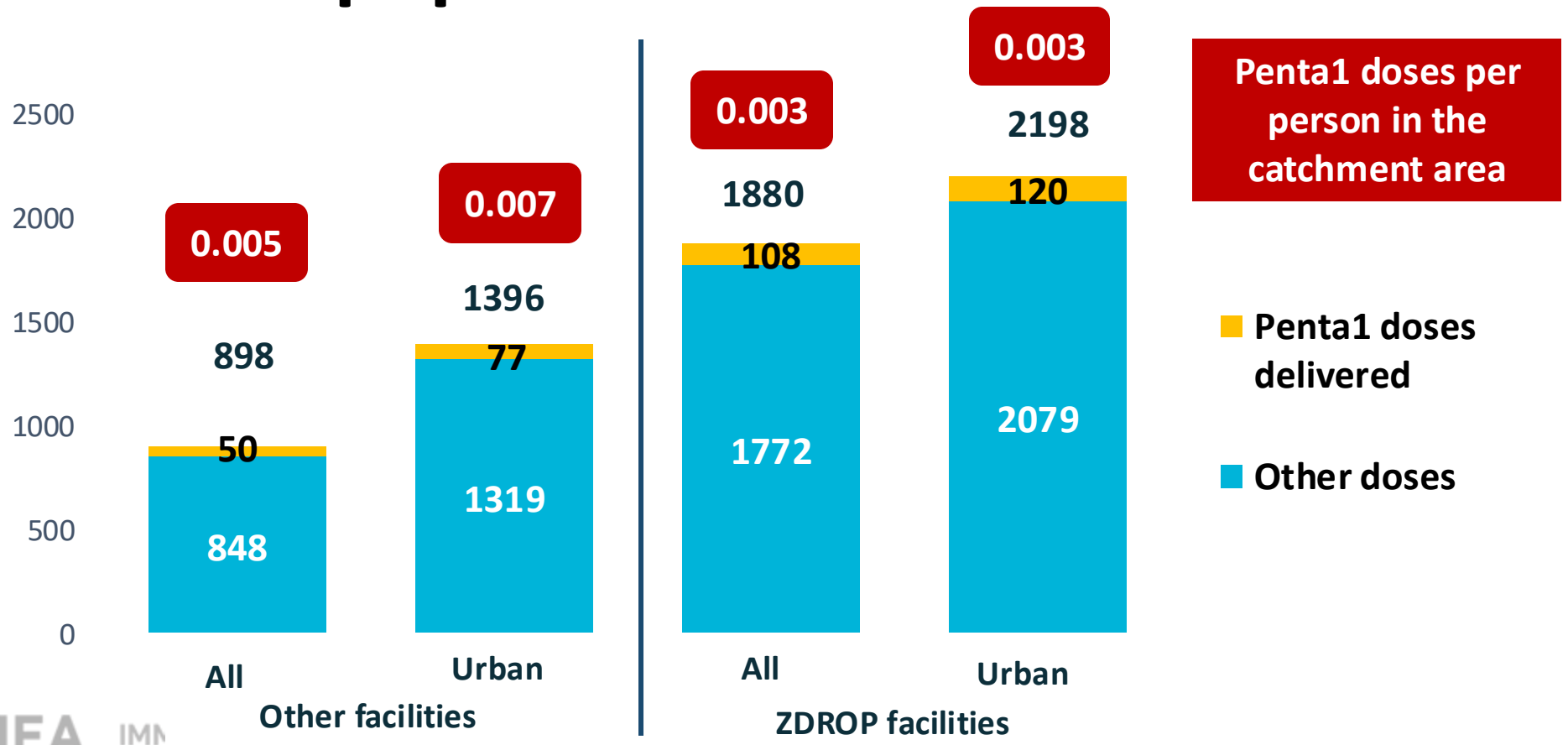


- ZDROP activities started in Q2 2024, and lasted for 8 months
- General increase in doses delivered was seen, with higher trend at ZDROP supported facilities

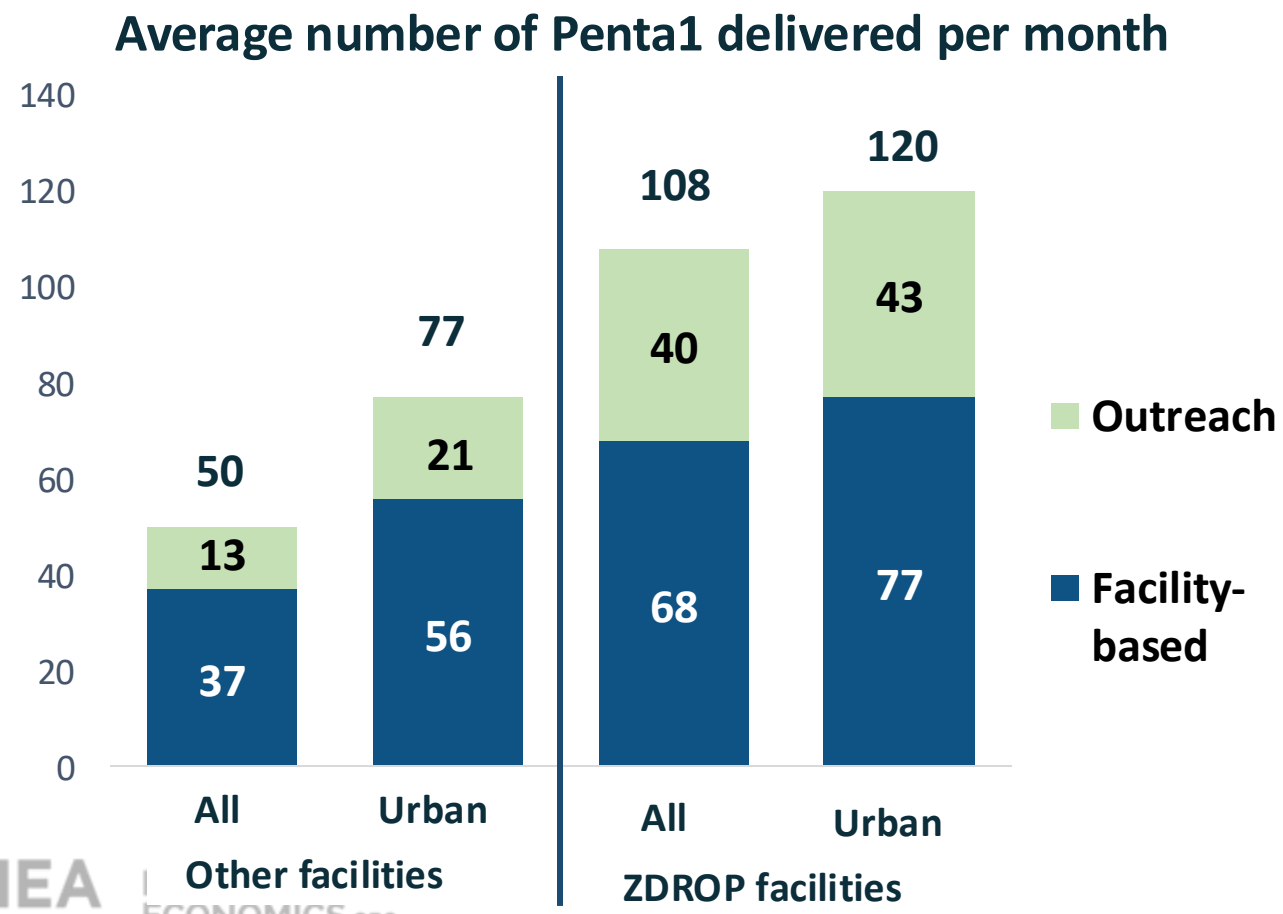
During ZDROP, facilities reached **more new children** than other facilities, though not relative to catchment population



During ZDROP, facilities reached more new children than other facilities, though **not relative to catchment population**

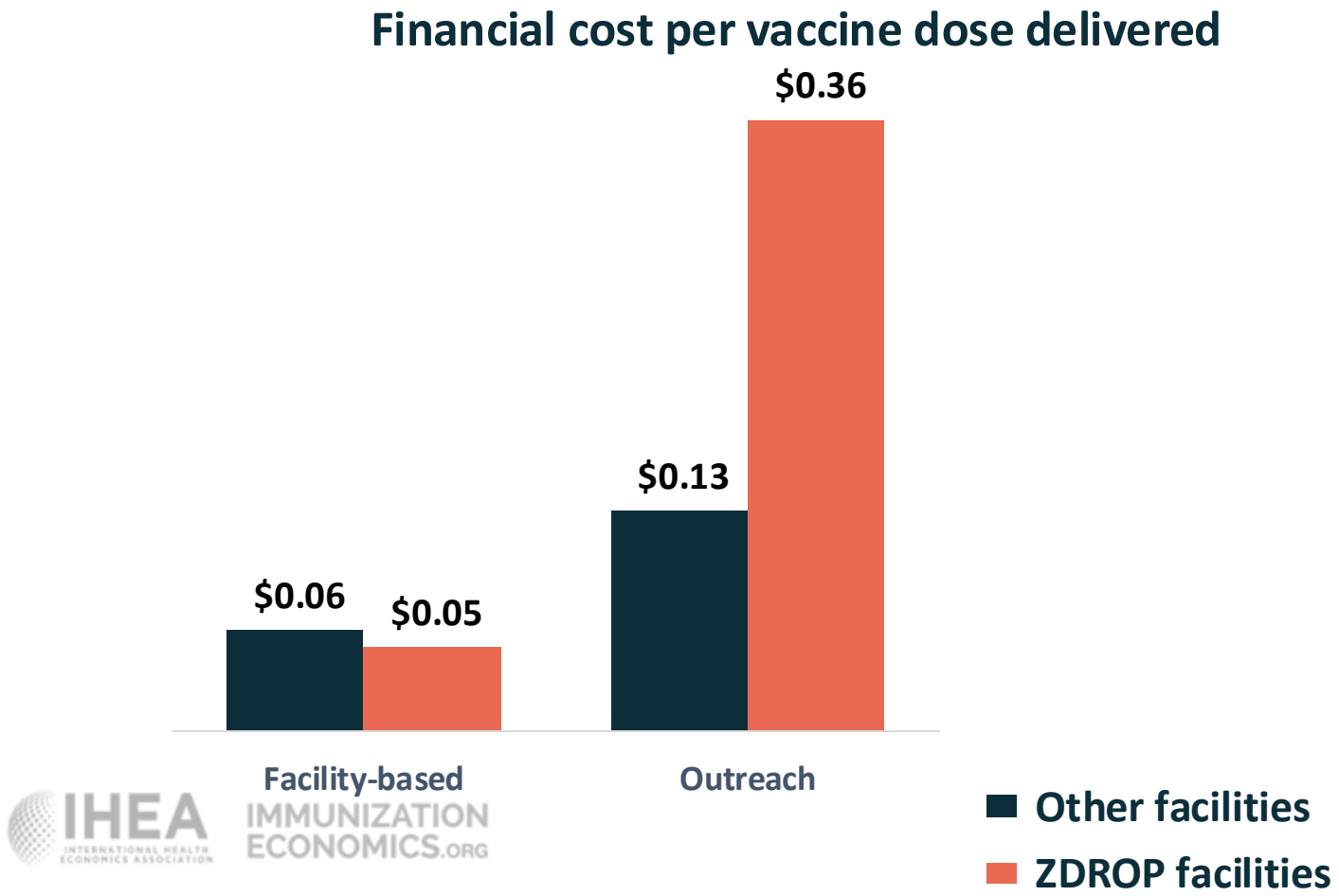


Most of the additional children reached by ZDROP facilities were **reached through outreach**



- ZDROP facilities reached **more new children** overall, and **more through each strategy**
- Urban facilities delivered a slightly lower proportion of Penta1 doses through outreach compared to rural

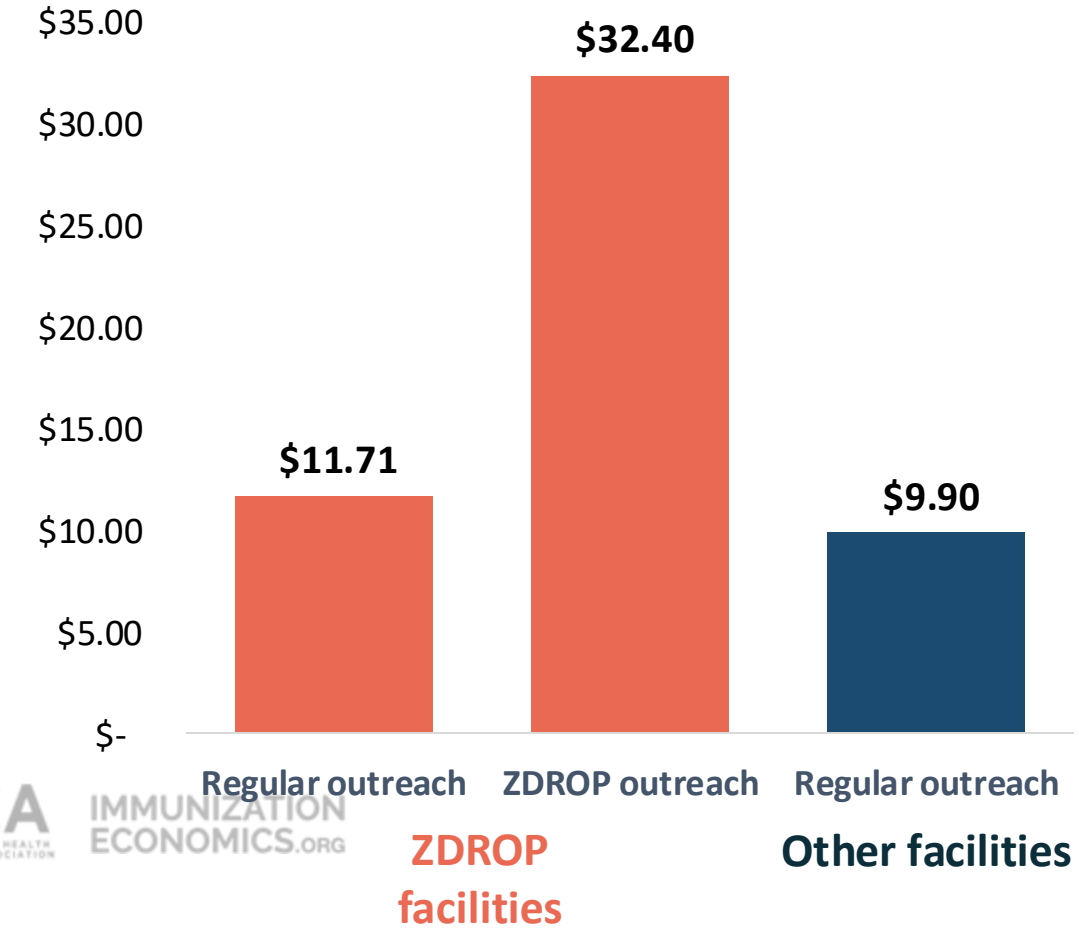
The cost of delivery was **higher for outreach** than for facility-based delivery



The higher cost of outreach is primarily driven by **incentives for staff**, and **transport costs**

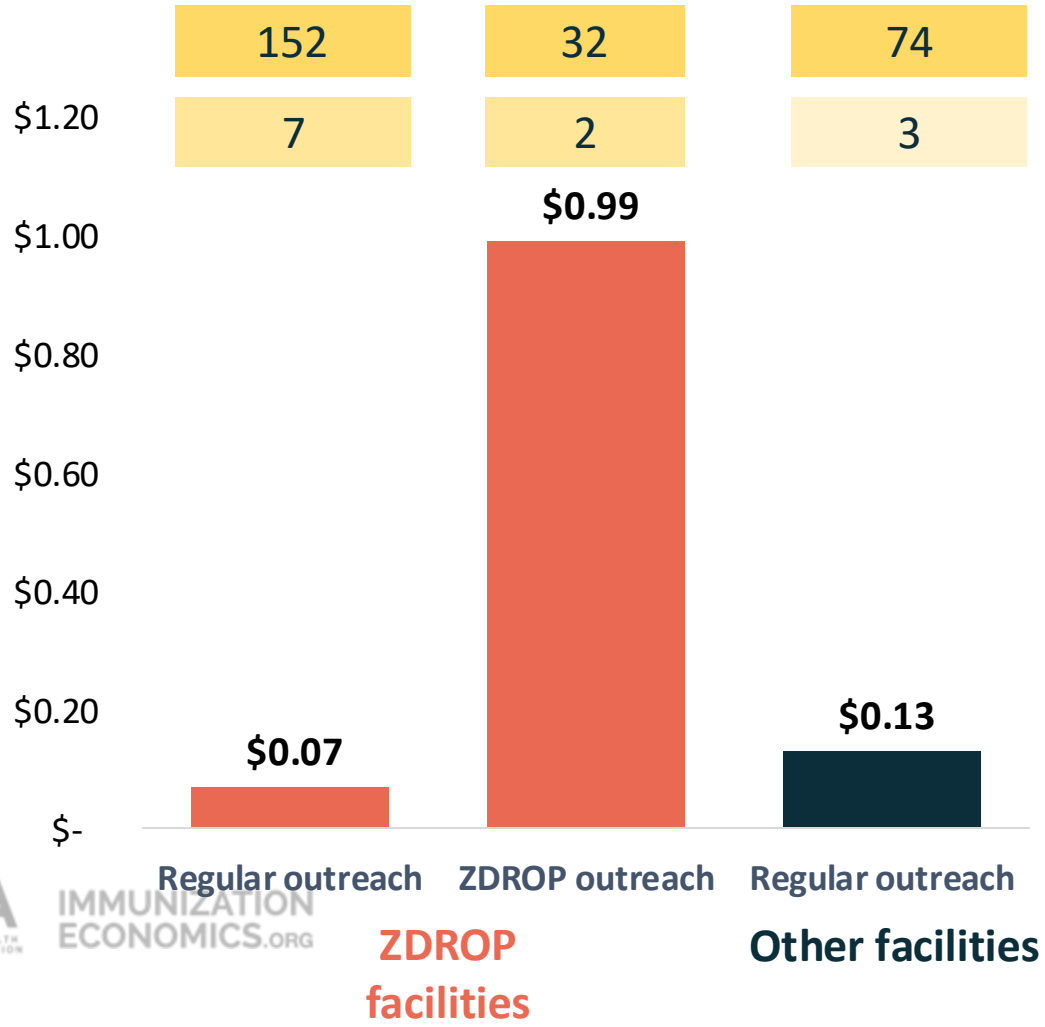
Outreach unit costs tended to be **lower at urban facilities** than overall

ZDROP sessions in Lagos cost **more than three times** that of regular outreach



- Facilities generally operated 1 regular outreach session and 2 additional ZDROP sessions per week, sometimes on weekend days
- Additional ZDROP sessions incurred higher costs driven by incentives
- ZDROP session costs and regular outreach at other facilities slightly lower in urban facilities

Due to lower delivery volumes at ZDROP sessions, they were **substantially more costly per-dose** delivered



- Higher costs were spread over a lower number of doses delivered
- Similar trend at urban only facilities

Key takeaways

- ZDROP support increased the number of vaccines doses delivered, as well as the number of **additional children reached with Penta1**
- Tripling the number of outreach sessions resulted in lower delivery volumes and led to led to a higher unit cost of delivery
- Dedicated ZDROP sessions in Lagos **reached very few children with Penta1** compared to regular outreach **but at a much higher cost** per dose, questioning the suitability of the intervention to address the root cause of zero dose prevalence in these areas, largely cultural beliefs

Thank you

Acknowledgements

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The cost of Zero-Dose focused delivery strategies in urban settings

Bali, July 19, 2025

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