Estimating the cost of identifying and vaccinating zero-dose children in urban and rural geographies in Pakistan

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Study overview

Background and objective

- In Pakistan, almost **400,000 children were zero-dose** in 2023. To reduce this prevalence, the government have implemented zero-dose initiatives, but their comparative cost and effectiveness was unknown.

Study 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

- To select the interventions, we identified all past/present zero-dose interventions, and through comprehensive stakeholder engagement, **scored identified interventions based on their suitability.** Highest scoring interventions were selected.

Strategies at a glance

Routine strategies

Fixed site

- Routine vaccination services provided at designated permanent health facilities.
- Generally daily (1-2 sessions per day).

Regular Outreach

- Health workers deliver vaccination at nearby communities on a routine schedule,
- Generally daily (1-2 sessions per day).

Selected dedicated zero-dose strategies

Integrated outreach

- Outreach campaign systematically planned, where a vaccinator is accompanied by a social mobilizer in low-performing areas.
- **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 only to underserved urban areas to deliver vaccines, family planning, ultrasounds , nutrition, ANCs and 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 where polio workers deliver oral polio vaccines to households. Leveraged to identify zero-dose children, data shared with EPI to reach within six weeks.
- Every month/every few months.

ZD identification

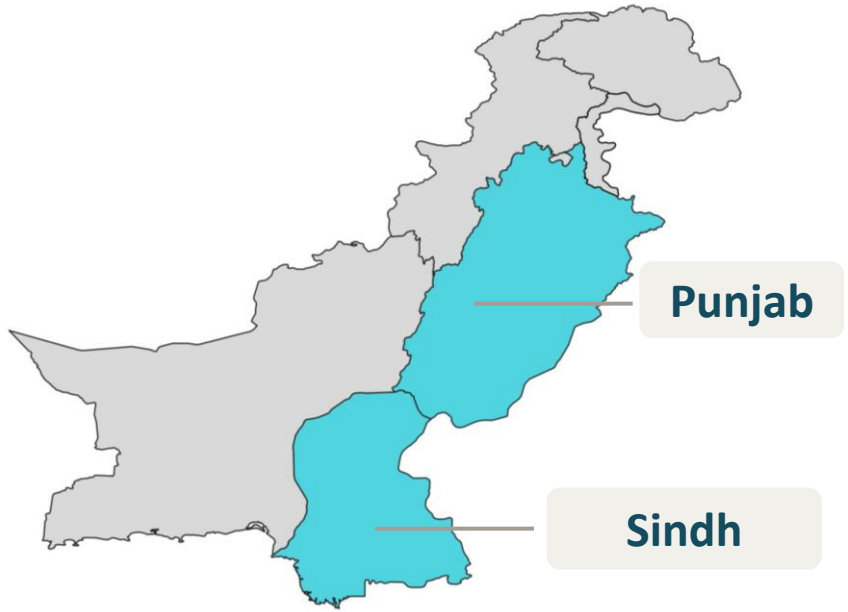
Methods

1. Bottom-up retrospective costing

- **Sample:**
  - 42 health centers and 2 mobile clinics in 26 Union Councils, 7 districts and 2 provinces (Punjab and Sindh)
  - Mix of Gavi priority status, population size, coverage, number of ZD kids, rural/urban
- **Period:** most recent campaigns & a usual month of routine activity
- **Payer perspective:** health provider incl. admin levels (district, provincial & WHO offices)
- **Volume weighted average** cost in 2024 USD
- **Zero-dose child***:* >18 weeks and not yet reached with Penta1 (EPI) or any injectable vaccines (polio*)
- **Full cost:** fixed site, regular outreach, integrated outreach
- **Incremental cost:** Clinic on Wheels, Polio h2h campaigns

2. Qualitative interviews

Understand **enablers and challenges**, at all sites and levels



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

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

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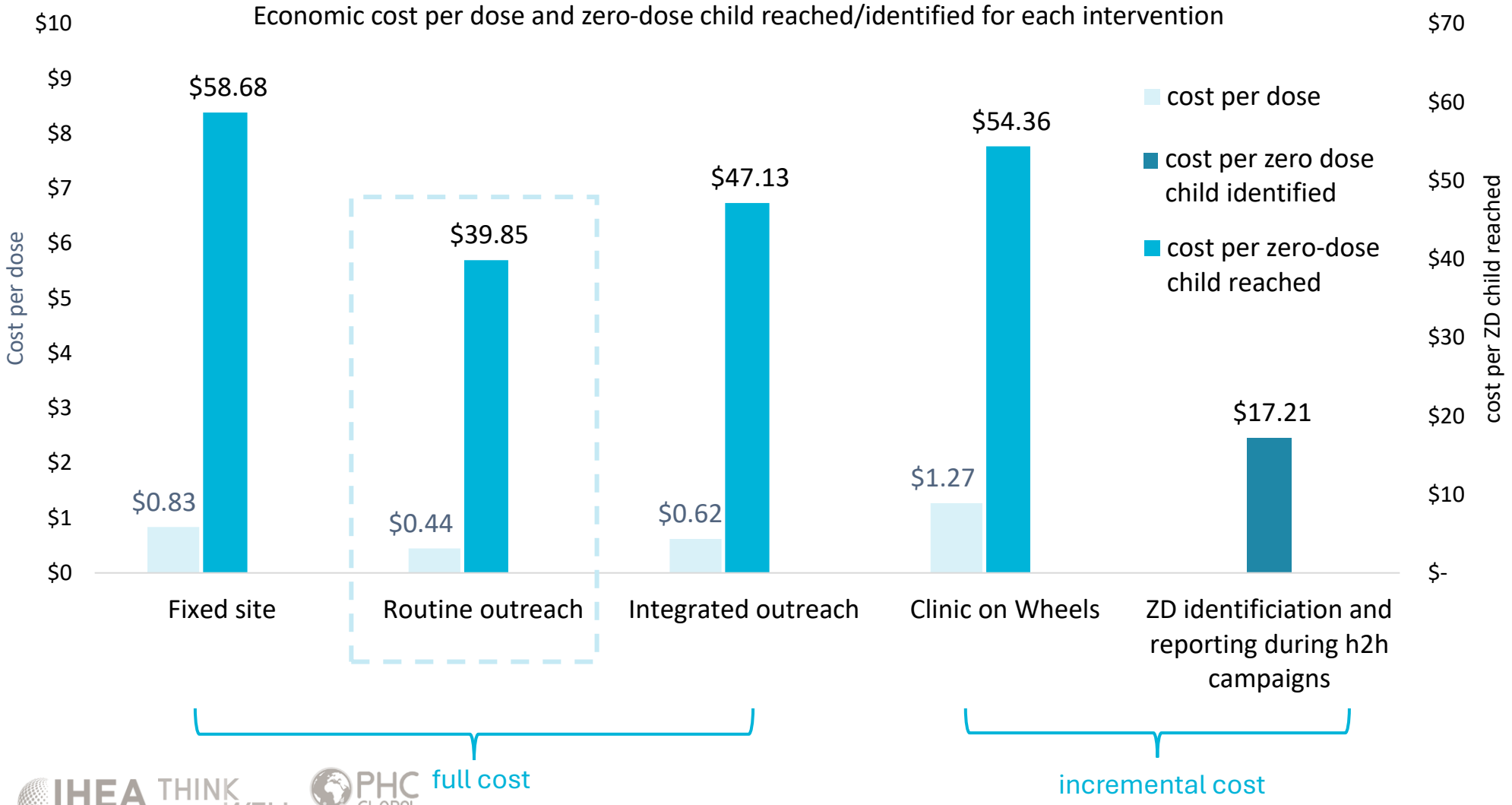
Polio H2H campaigns	**Average doses delivered by Union Council per day**	**Average ZD children identified by Union Council per day**
	3,444 *Based on two districts in Punjab*	2.32

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 were reached by EPI within six weeks, but in Sindh this was 43%

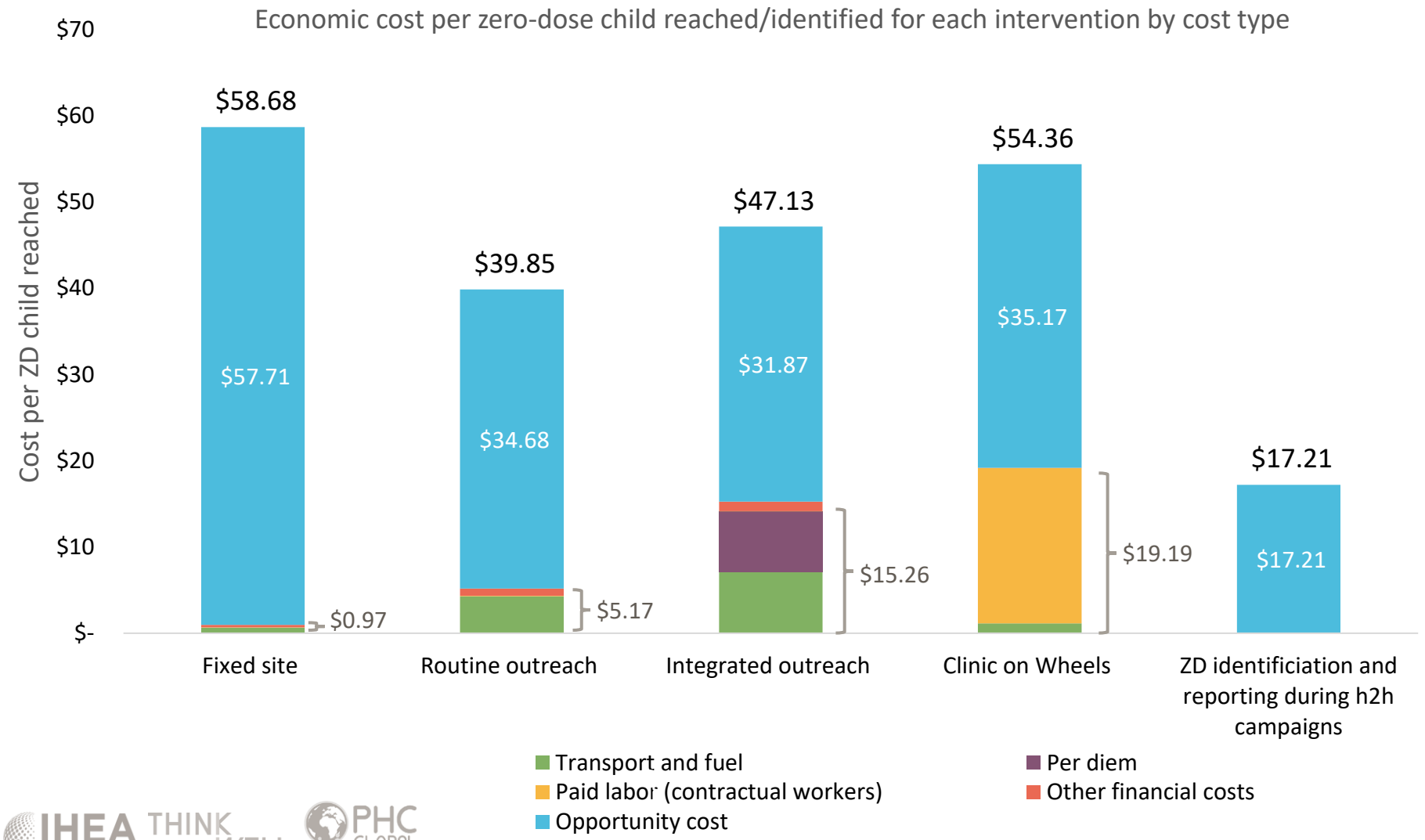
Overall, routine outreach incurred the lowest economic cost per dose and cost per zero dose child reached



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

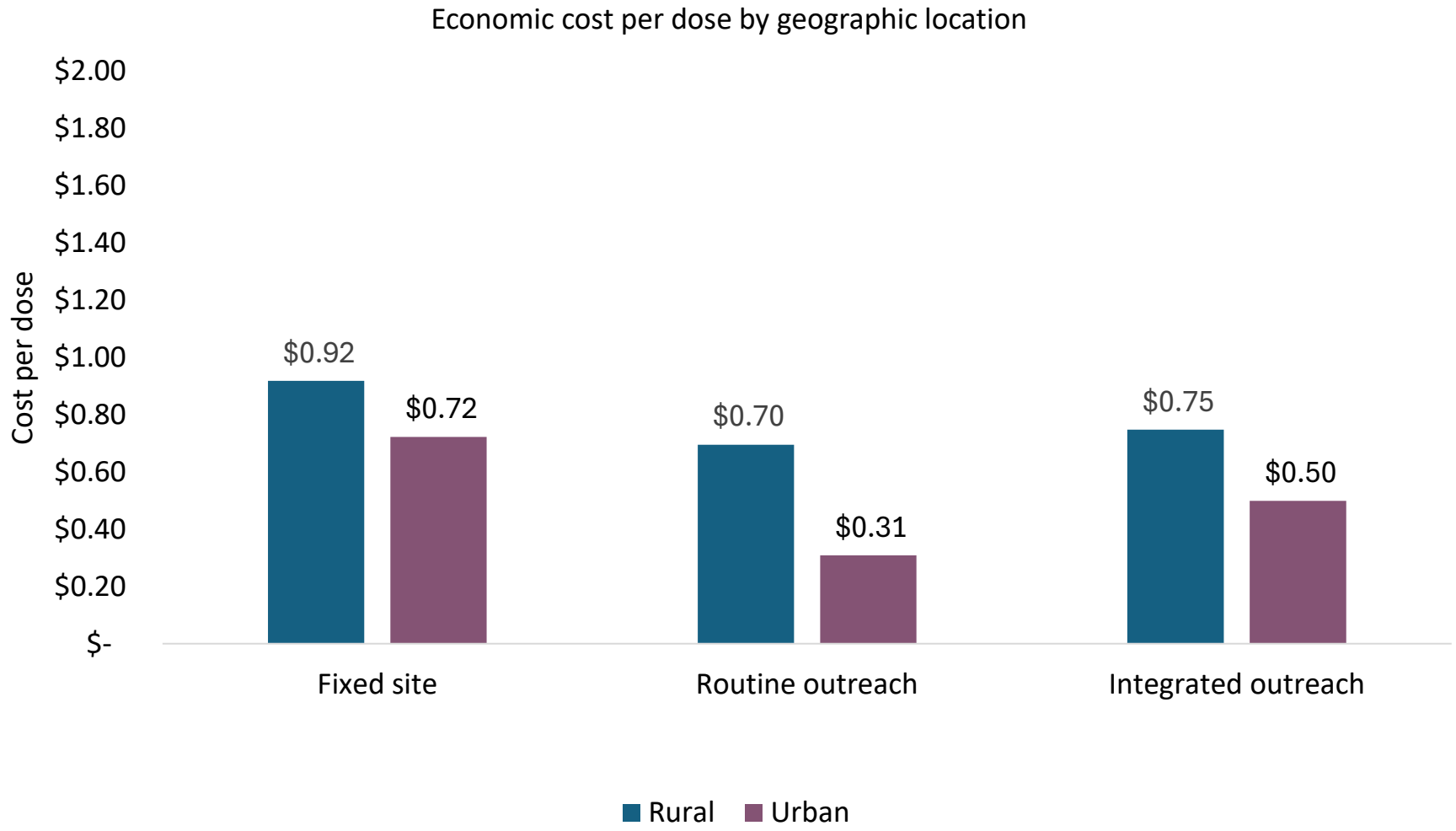


Financial cost for integrated outreach driven by per diem and travel allowances, for Clinic on Wheels driven by temporary workers.

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

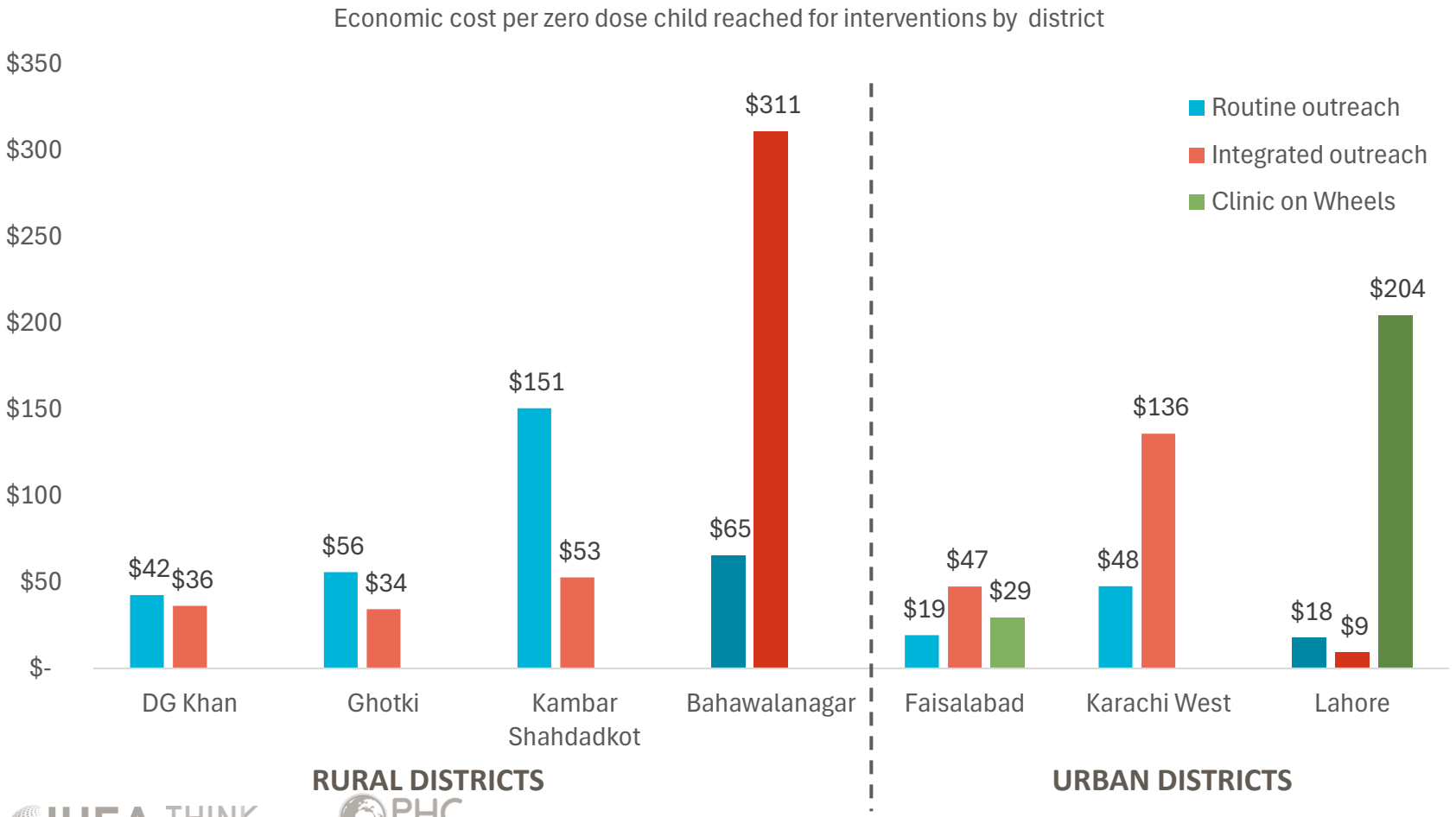
Higher cost per dose for the interventions in rural settings than urban settings



Vast territories, geographic isolation, and weather-related access barriers result in higher economic cost per dose for rural territories.

Urban areas benefit from **better basic infrastructure and communication systems** than rural areas, resulting in delivering higher volumes of doses at a lower cost.

In most rural districts, integrated outreach was a more cost-efficient strategy, while routine outreach was more cost-efficient for most urban districts



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.

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.

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

In summary…

- **Integrated outreach most cost efficient in rural, less adequately resourced areas**. Such campaigns should be strategically deployed only where routine infrastructure gaps exist, not as a blanket intensification across provinces

- **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 house-to-house 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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