Designing for the Unreached:

Estimating the Cost of Reaching Zero-Dose Children Through Human-Centered Solutions in Urban India

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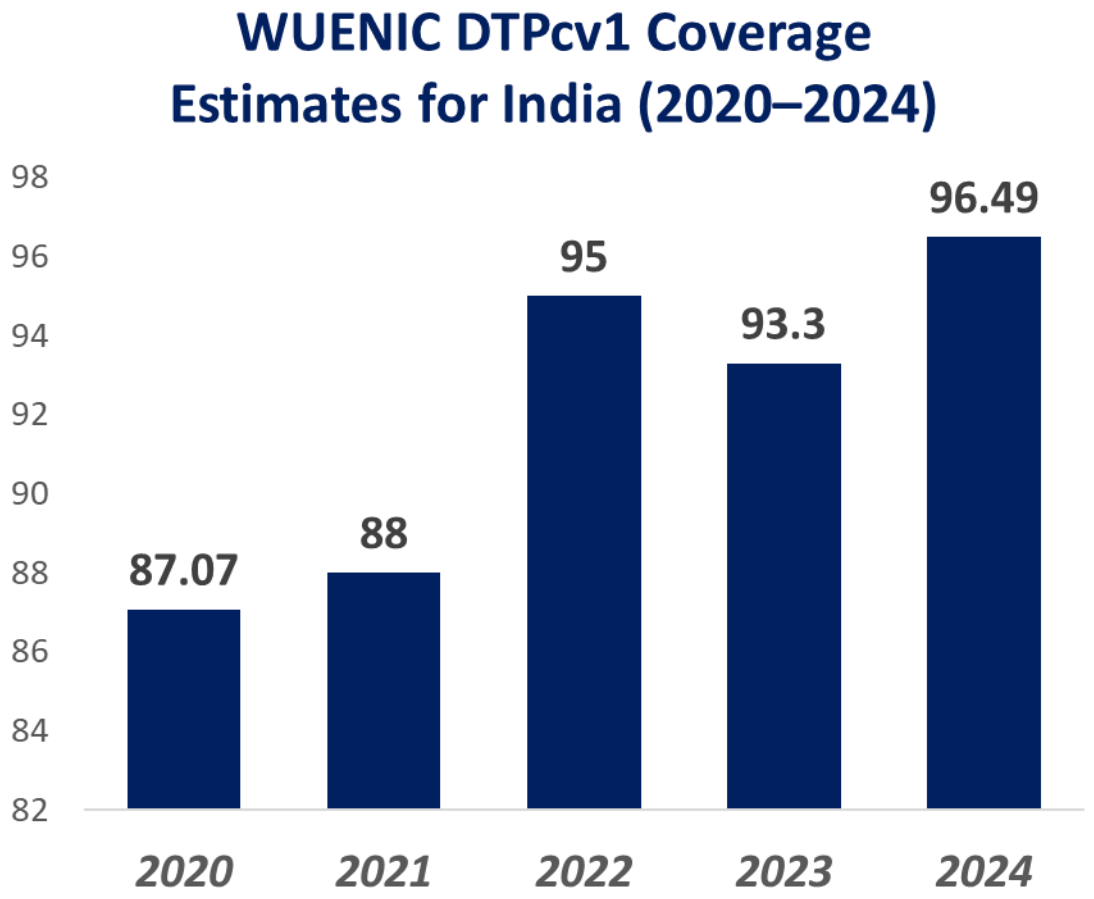
Indian Context

- Remarkable gains in the past with WUENIC estimates suggesting DTPcv1 coverage over 95%.

- However, the absolute number of ZD children still remains high (909K children – 2nd highest globally) – *WUENIC 2024*

Literature suggests national-level gains mask large sub-national variations (urban slums, remote rural)



WUENIC DTP vaccination coverage – JRF (2024)

What do we know?

- Routine immunization delivery costs vary widely in India—from $1.38 (Bihar), $1.5 (UP) to $2.93 (Kerala) per dose(Chatterjee et al., 2018).

- Whereas, *Clarke-Deelder et al (2024)* reports the incremental cost per ZD child reached during PIRI** is $63.10 (exclusive of vaccine costs)

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*FIC- Fully Immunized Child (8 antigens)
**PIRI – Periodic Intensification of Routine Immunization (Intensified Mission Indradhanush(IMI) in India)

Going Beyond the 'What' to the 'Why' – Zero Dose Learning Agenda

Surface-level data tells us where zero-dose children are—but not why they remain Zero Dose.

Leading Barriers

- Vaccine & VPD awareness
- Low value of vaccines
- Fear of minor Adverse events
- Gendered barriers – limited women autonomy

Approach

DEFINE → DESIGN → DELIVER

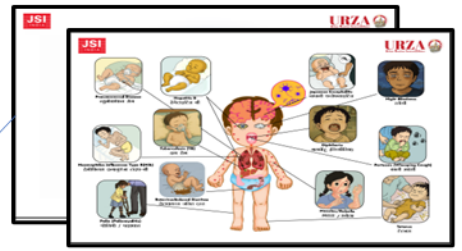
SPRINT REVIEWS

CO-CREATION & TESTING

Study on drivers

Context-specific interventions

ZDLA Solution



The goal is not just to fix symptoms but to shift systems—with interventions that are **context-relevant, effective, and sustainable**.

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Costing Objectives and Methodology

	Objectives	Methods	Respondents	Proxy indicator
1.	To estimate health system and workforce investments required for delivering immunization to ZD children in urban India.	Baseline-Endline Assessment (Pre-post analysis)	Facility-based staff involved in Immunization activities	Number of Penta 1/DPT 1 vaccines administered to ZD children at baseline vs endline (1 month)
2.	To estimate intervention-specific lifecycle (design to delivery) costs of ZDLA interventions for planning, scale-up, and resource allocation of ZD strategies in urban India.	Retrospective Activity-based time-use matrix	JSI TA (Technical Staff, Design Researchers, Implementing Staff), Government staff, Finance officers	Overall Unique Number of Penta 1/DPT 1 vaccines administered to ZD children

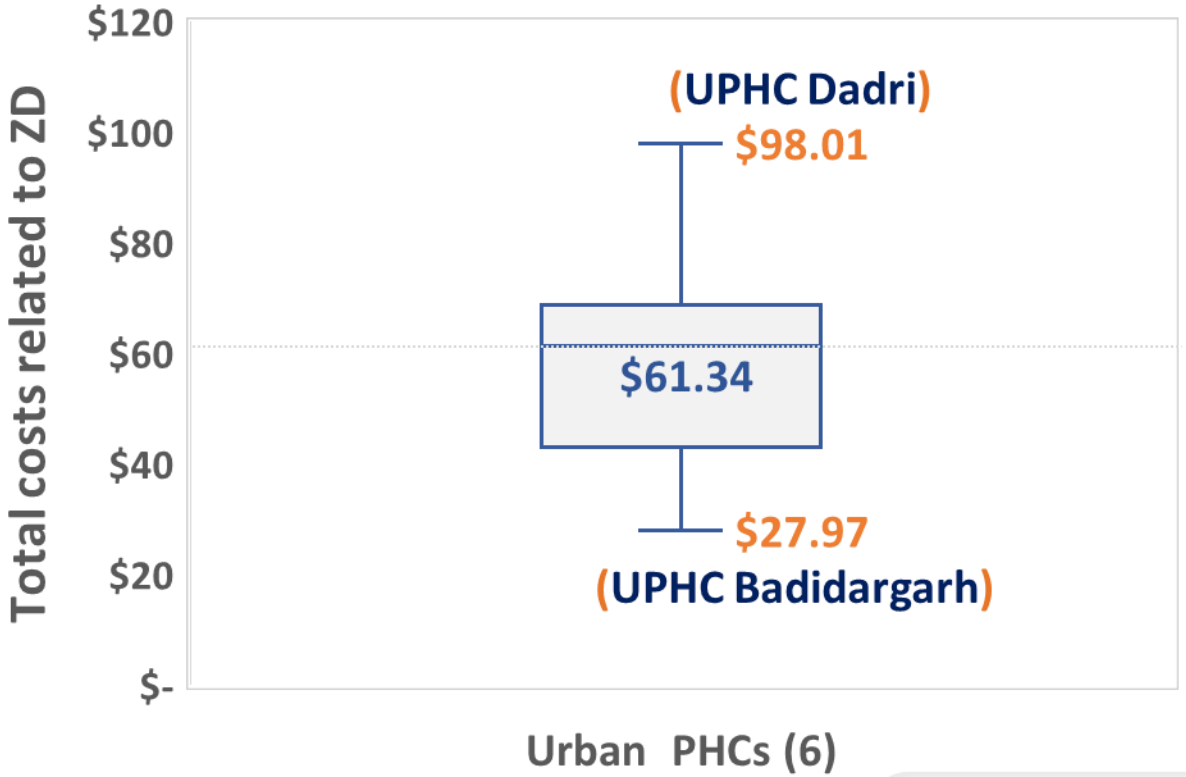
Objective 1. What are the Monthly routine baseline costs now?

Range and Distribution of ZD Costs – Across Sites (n=6)

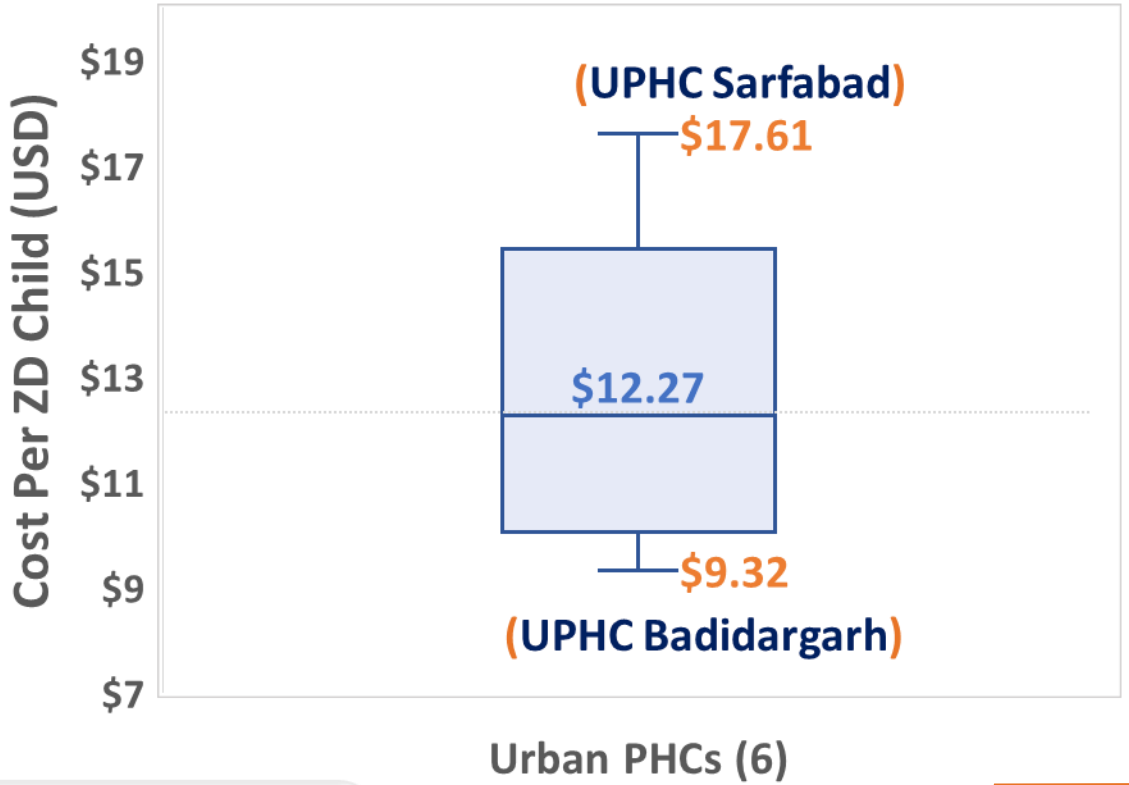
The Total cost related to ZD children ranges from $27.97 to $98.01 across UPHCs, with a **median of $61.34**.

The cost per ZD child ranges from $9.32 to $17.61 across UPHCs, with a **median of $12.27**.

*Distribution of **total cost related to ZD** across 6 UPHCs*



*Distribution of **Cost per ZD child** across 6 UPHCs*



Median monthly total cost - $61.34;
Median Cost per ZD child – $12.27

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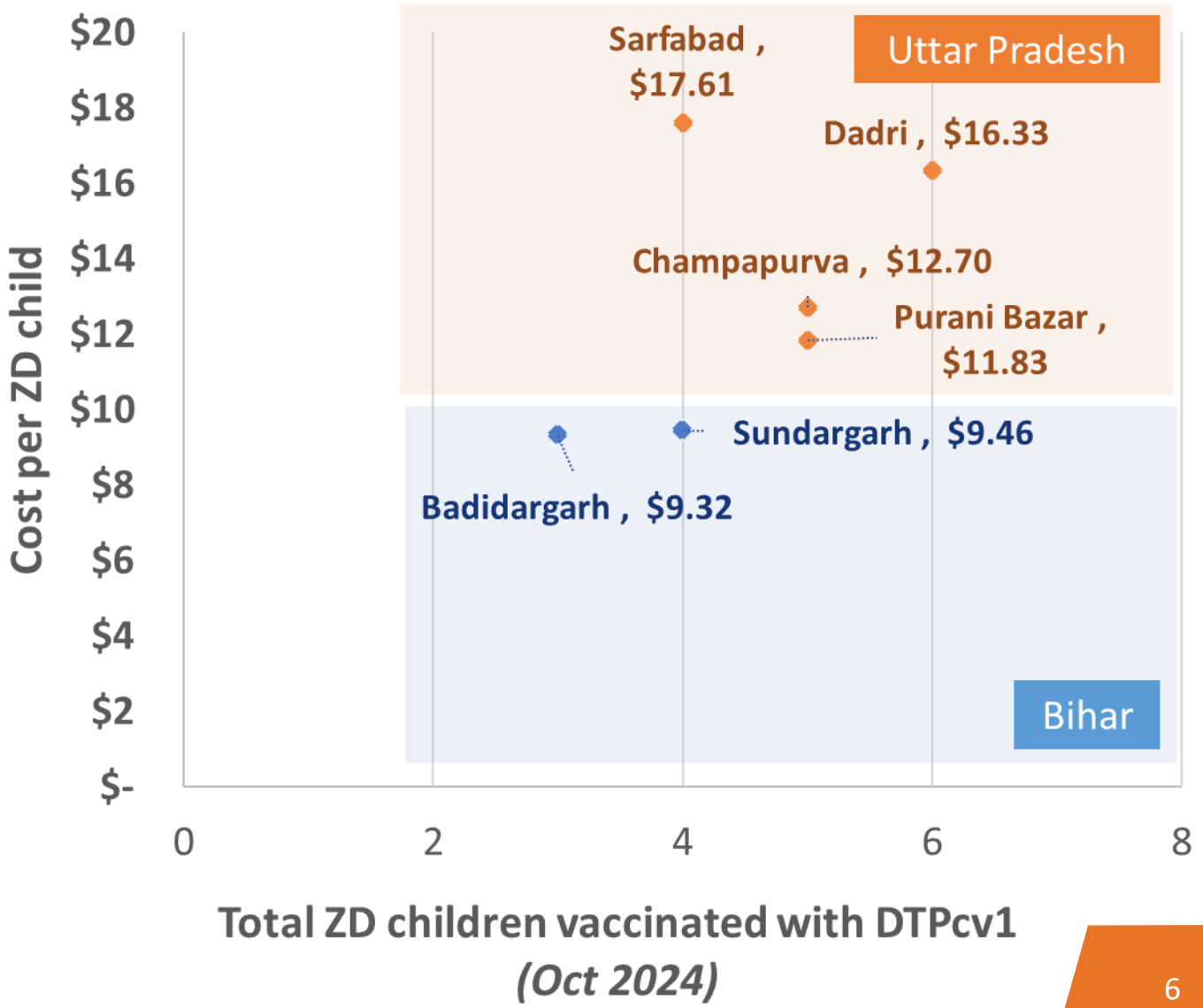
Cost Efficiency of Reaching ZD Children: Site-Wise Variation

- **Cost components include:** staff time**(identification, mobilization & vaccination)**, transport, and supplies—**excluding vaccine cost**.
- **Wide variation in cost per ZD child**: UP sites report higher cost per ZD child compared to Bihar sites.
  - ➢ This variation is primary driven by persistent vaccine hesitancy despite resource allocation.
- **Labour/time-use findings:** On average, just **5.5%** of CHWs' time is spent on ZD activities *(range: 3% in Badidargarh, Bihar to 9% UPHC Champapurva, UP)*



Objective 2

To estimate intervention-specific lifecycle (design to delivery) costs of ZDLA interventions for planning, scale-up, and resource allocation of ZD strategies in urban India.

Methods

Retrospective Activity-based time-use matrix

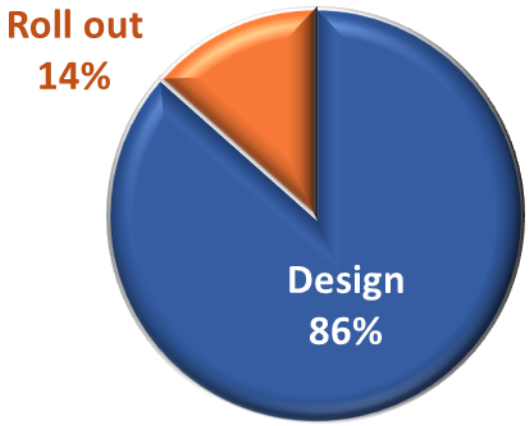
Objective 2: What did it cost?

Cost of reaching ZD child: Intervention-Specific Costs & Comparison

Major cost: design phase (86%), driven by HCD consultant inputs.

1. *Design phase spanned ~5 months (Aug - Dec 2024)*
2. *Rollout occurred over ~1 month*

Cost Distribution Between Design and Rollout Phases



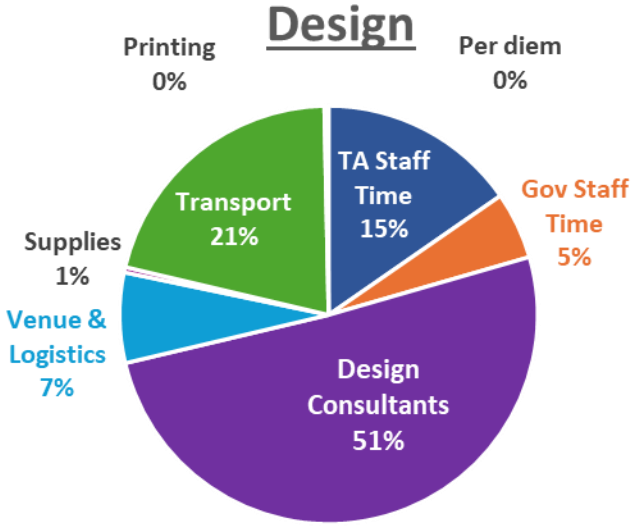
Cost Components	USD ($)
Total Design Costs	$45,147.1
Total Rollout Costs	$7,031.1
Total Costs	$52,178.3

Conversion (Feb – Jun 2025): Total ZD children vaccinated since intervention rollout - **382**

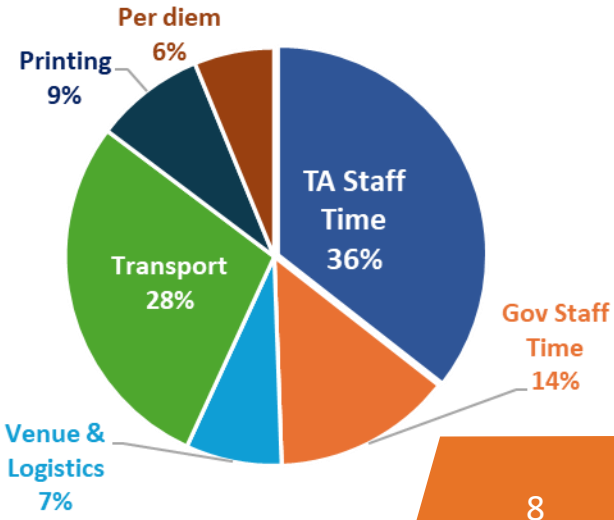
Cost per ZD Child (USD) (Flyer + CB)	
Total Roll out cost	$4,509.28
Cost/Child (without design)	$11.80
Cost/Child (with design)	$68.70

Cost per ZD Child (USD) (Full Bundle)	
Total Roll out cost	$7,031.14
Cost/Child (without design)	$18.41
Cost/Child (with design)	$136.59

Design



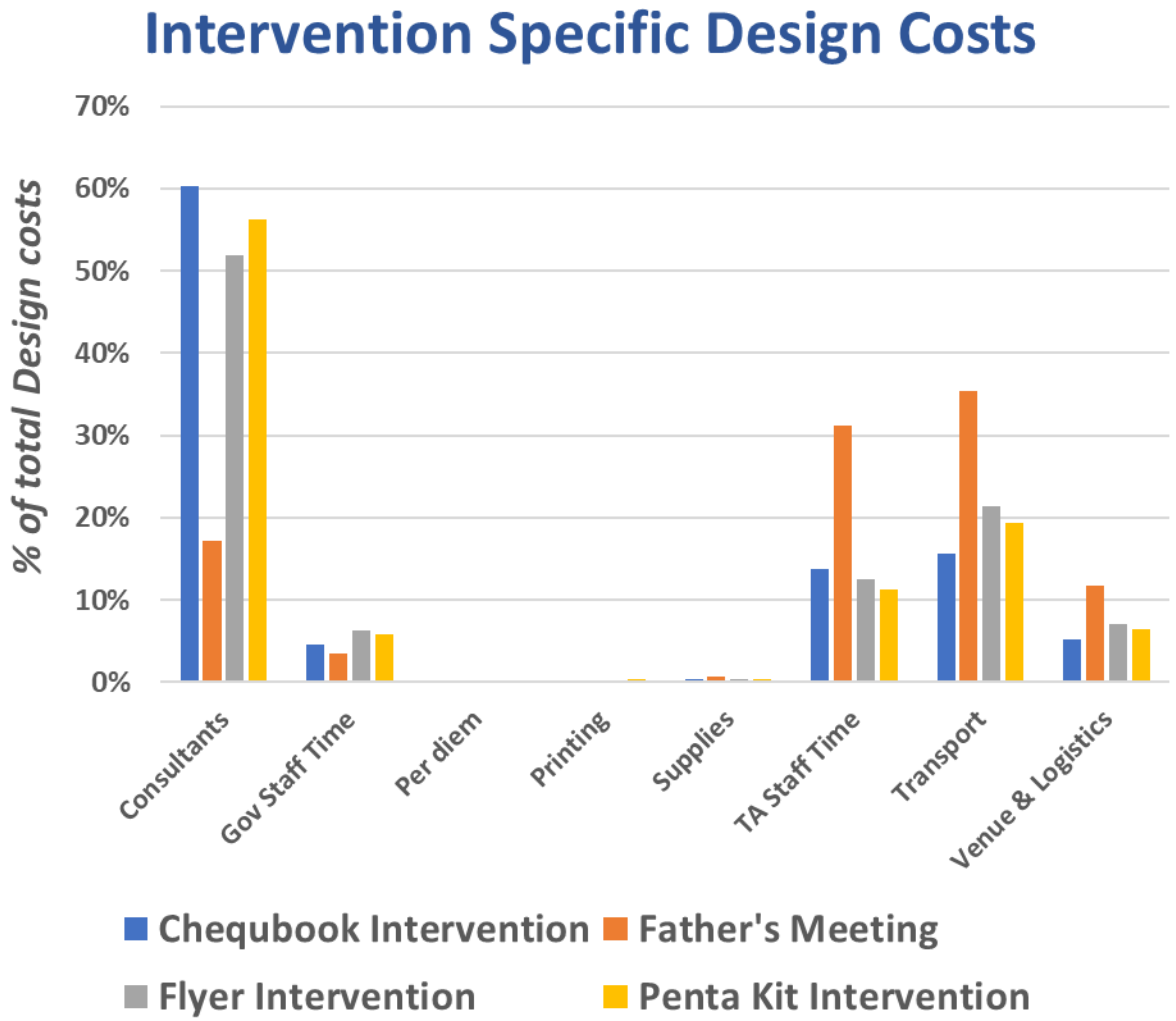
Roll out

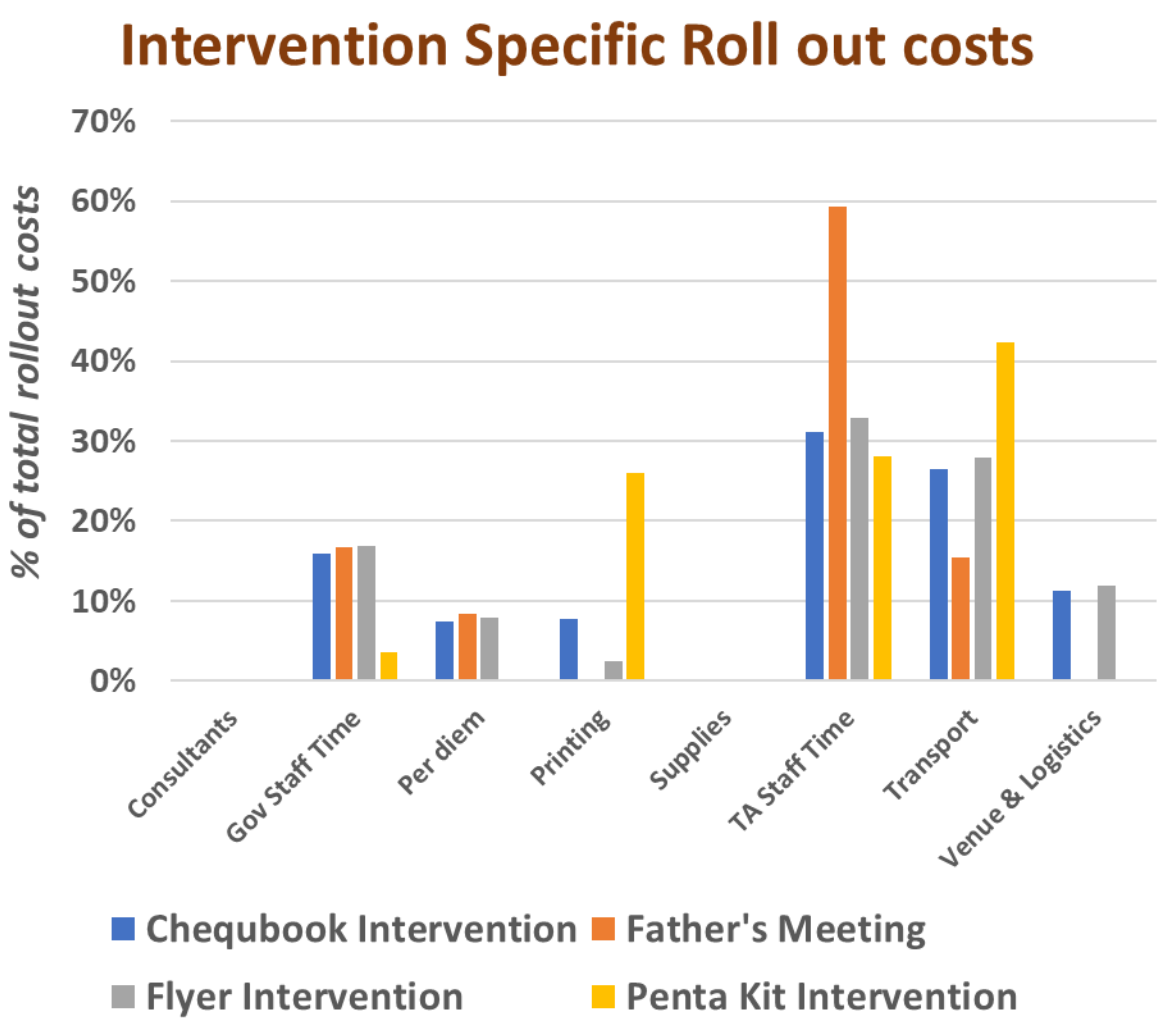


**Flyer and Chequebook were foundational mobilization tools, while fathers' meeting & Penta kit acted as reinforcement, with the kit in 1/6 UPHCs.*

Disaggregated Design v/s Rollout Costs

Relative cost shares for design and rollout phases, by intervention and input category





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**Consultants = HCD/Design experts; **TA Staff = Technical Assistance*

What scales, what doesn't?

Monthly Normalized Cost and Feasibility

Intervention	Monthly normalized costs (Design)	Monthly normalized costs (Rollout)	Design Complexity	Rollout Complexity & Community acceptability	Early Impact
Flyer	$3,270.7	$2,546.9	Moderate (low rework, quick turnaround)	Low - Moderate (training logistics)	**Number of ZD children contacted with flyer and Chequebook: 1058**
Chequebook	$4,499.2	$2,690.4	Moderate – High (required stakeholder iterations)	Low - Moderate (training logistics)	**Number of ZD vaccinated: 382***

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**Data collection period: Feb 2025 – June 2026*

What scales, what doesn't?

Monthly Normalized Cost and Feasibility

Intervention	Monthly normalized costs (Design)	Monthly normalized costs (Rollout)	Design Complexity	Rollout Complexity & Community acceptability	Early Impact
Father's Meeting	$1,363.1	$1,393.7	Low - Moderate (known strategy, contextually adaptations)	High (planning, coordination, mobilization and facilitation)	Number of ZD father attended: 148
Penta kit	$2,121.1	$1,093.8	High (Logistically-heavy, design iterations)	High (Logistics-heavy, customized items – supply chain concerns)	Interim analysis awaiting

What are we learning?

- ***Behavioral (demand-side) interventions are cost-intensive to design***, but much needed to overcome the deep-rooted hesitancy in urban slums.

- ***Resource intensity does not guarantee conversion***: Higher staff time and spending does not translate to greater uptake, due to persistent hesitancy – not access barriers.

- ***Labour time is highly localized*****:** While the average CHW spends just **5.5%** of total time on ZD, **ASHAs covering ZD clusters spend 20–30%** of their work time counseling these families, often with limited results due to rooted hesitancy.

  - **Example (Dadri UPHC):** Of 119 outreach sessions, only **32** included ZD clusters; only 6 of 14 ANMs and 24 out of 40 ASHAs + Link workers engaged with ZD families.

- **Cost efficiency is site-dependent:** Per-child costs are substantially higher where conversion is lowest, thus reinforcing the need for targeted behavioral demand generation interventions, not just more resources.

Policy Takeaways

- ***Higher Cost of Reaching Zero-Dose (ZD) Children***: Preliminary analysis suggests that cost per ZD child reached >> Cost of routine immunization service delivery.

- ***Need to address persistent hesitancy***: High effort does not equal high conversion in ZD communities – behavioral barriers remain the primary constraint, not lack of outreach.

- ***Interventions must be hyper-targeted***: General outreach efforts are not enough – resources and strategies should zero in on specific ZD clusters and the CHWs serving them.

- ***Concentrated Labour burdens***: Need to recognize and support ASHAs/Mobilizers in high-burden ZD clusters; blanket averages can mask local workload and resource needs.

What's next for us

1. *Endline Costing Assessment*

Final round of costing for Objective 1: capturing health system and workforce costs after full intervention rollout.

2. *Learning-by-Doing (LxD) Costing*

Estimating the cost of continuous learning and iterations based on sprint reviews, including:

- ***Monthly costs for User Advisory Group (UAG) meetings*** for field feedback and community acceptability.
- ***Staff time and operational expenses*** for rapid adaptation and course-correction based on community and stakeholder insights.

Thank you

For more details, reach out to:

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