What Does It Cost to Reach a Zero-Dose Child?

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Cost ≠ Expenditure ≠ Budget

Budget = Plan for spending on a particular service

Expenditure = Financial transaction related to a particular service

Cost = Value of all inputs used to deliver or obtain a service

- Opportunity costs of time
- Donated inputs
- Shared resources

Cost of Increasing Coverage: adjacent evidence

- 2 recent systematic reviews on cost of increasing coverage
  - **Ozawa, et al (2018):** meta- analysis/modeling study of 56 interventions from 42 studies (1977 – 2016, 2016$) including high income countries
    - The intervention costs per dose per percent increase in absolute immunization coverage for the 56 interventions ranged widely from $0.01 to $38.16, with a **mean cost per dose per percent coverage change of $3.13** (standard deviation (SD) $7.02).
    - Interventions to improve coverage are more expensive for higher levels of baseline coverage, suggesting the diminishing returns associated with reaching harder-to-reach and smaller target populations.
    - Higher non-vaccine intervention costs per dose per percent coverage change in relatively high-income country settings, and the lowest costs in relatively low-income countries
  - **Munk, et al (2019):**
    - 14 cost and cost-effectiveness studies from low- and middle-income countries
    - Calculated incremental coverage and incremental intervention cost
    - Most studies reported increases in coverage post intervention (avg 23 percentage points)
    - **Incremental cost-effectiveness ranged from $0.66 - $161.95 per child vaccinated** (2017$)
    - Lots of differences in how costs were estimated; incompleteness of reporting
    - Missed opportunity to pair costing with interventions focusing on increasing coverage

Linking the Cost of Scaling Up Coverage to the Cost/ZD Child

Coverage Percent	Mean Cost	Range
10	$0.21	$0.04 - $0.68
20	$0.33	$0.09 - $0.89
30	$0.53	$0.18 - $1.20
40	$0.86	$0.34 - $1.77
50	$1.42	$0.63 - $2.71
60	$2.37	$1.08 - $4.62
70	$4.04	$1.62 - $8.21
80	$6.99	$2.37 - $16.19
90	$12.30	$3.23 - $32.87

- Based on analysis by Munk, et al (2019).
- Fitted regression model.
- Predicted mean cost is equivalent to a cost per dose for a single vaccine.
- The costs of reaching a zero-dose child would be scaled by the number of vaccine doses in the vaccine program ≃ $160 for a program requiring 13 doses.

Source: Portnoy, A. Potential short-term proxy estimates for costs of delivering vaccines to zero-dose children. Boston University. Presented at the ZD Costing Meeting, April 2024.

Cost of Reaching a ZD Child

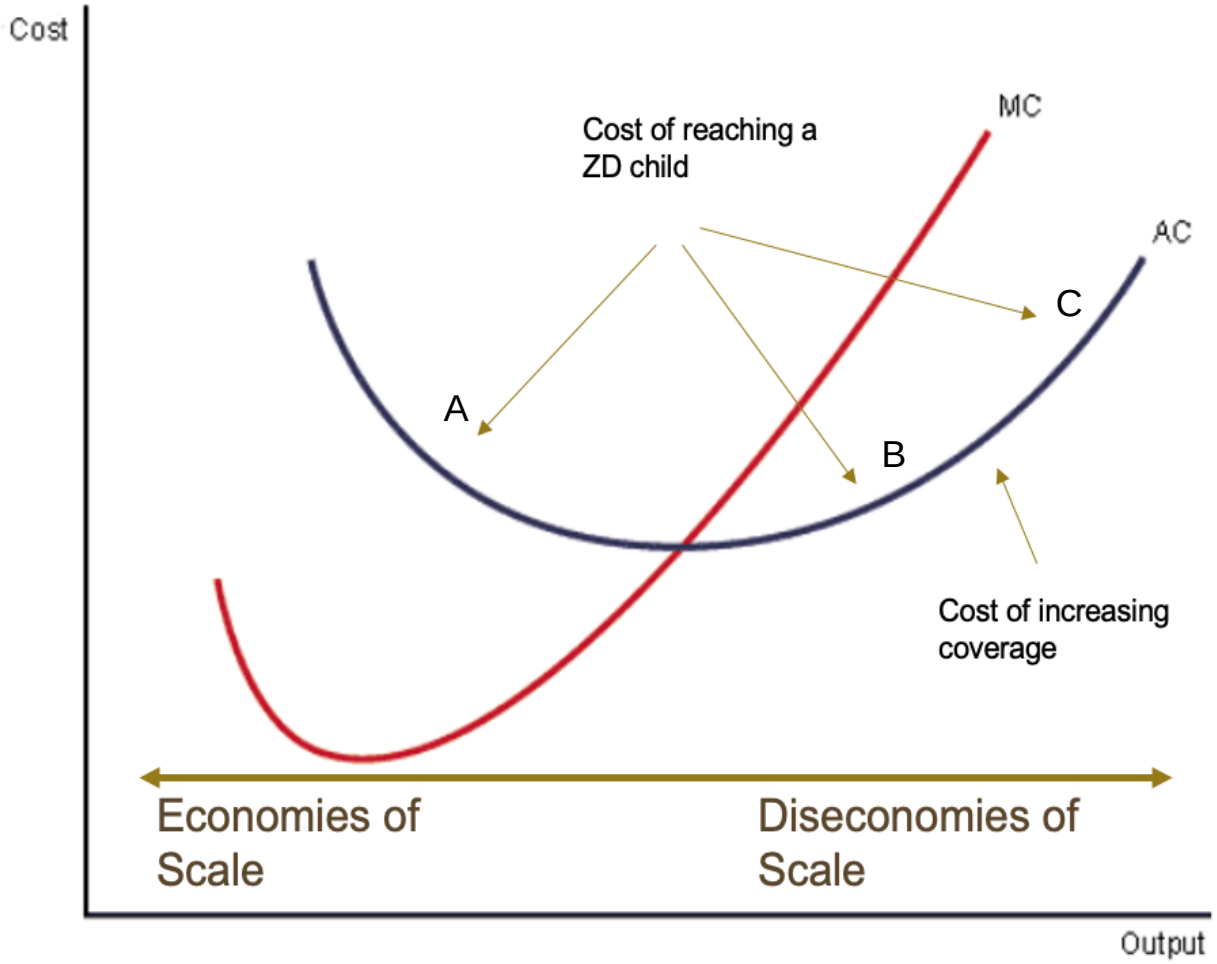
- Clarke-Deelder E, et al (2024): Health impact and cost-effectiveness of expanding routine immunization coverage in India through Intensified Mission Indradhanush, *Health Policy and Planning*, 2024; https://doi.org/10.1093/heapol/czae024
  - The study was conducted in a sample of 40 districts in Assam, Bihar, Maharashtra, Rajasthan, and Uttar Pradesh – home to a large number of zero dose children.
  - Evaluated the health impacts and incremental cost-effectiveness of the Intensified Mission Indradhanush (IMI) in India.
  - The **incremental cost per zero-dose child was $83, ranging from $22 (Bihar) to $193 (UP).**
  - Incremental cost per dose was **$6** ($3 in Rajastan - $28 in UP).
    - Compared to $1.30 (Bihar) -1.40 (UP)/dose obtained from a large costing study of routine services in similar areas of India (Chatterjee S, et al 2018).
  - Related study (Clarke-Deelder E, et al 2021) found that the IMI generated the largest effects for DTP1 vaccine: IMI reached approximately one-third of children who would otherwise not have received these vaccines.

Additional Evidence Related to Reaching ZD Children

Scope of the Study	Location	Result	Source
Cost of reaching a ZD child with polio vaccine in a timely way	Moradabad District, India	The estimated cost of vaccinating **one newborn** within 72 hours of birth was **Rs 133 (US$ 3).** This is significantly higher than the cost to vaccinate one newborn during an SIA at approximately Rs 13 (US$ 0.31).	Rainey JJ, Bhatnagar P, Estivariz CF, Durrani S, Galway M, Sandhu H, Bahl S, Jafari H, Wenger J. Providing monovalent oral polio vaccine type 1 to newborns: findings from a pilot birth-dose project in Moradabad district, India. Bull World Health Organ. 2009 Dec;87(12):955-9.
Cost of reaching un- and under-vaccinated children in hard to reach areas	Bangladesh	Modified EPI schedule, community support groups, provider training, and removing geographical boundary barrier policies for children in hard to reach areas = **$2.70/dose (2016$)**	Uddin MJ, Saha NC, Islam Z, Khan IA, Shamsuzzaman, Quaiyum MA, et al. Improving low coverage of child immunization in rural hard-to-reach areas of Bangladesh: Findings from a project using multiple interventions. Vaccine. 2012;30:168–79.
Cost of reaching unvaccinated children with polio vaccine in a conflict area	North east zone of Somalia	**$6.20/OPV dose or $20 per ZD child reached with polio vaccine (2014$).**	Kamadjeu R, Mulugeta A, Gupta D, Abshir Hirsi A, Belayneh A, Clark-Hattingh M, et al. Immunizing nomadic children and livestock--Experience in North East Zone of Somalia. Human vaccines & immunotherapeutics. 2015;11:2637–9.

Reaching ZD children vs reaching universal coverage

- The incremental cost of reaching a ZD child may vary depending upon the point in time that an evaluation is done.
- In settings where there are lots of ZD children, the additional cost of reaching an additional ZD child may be low (Point A).
- In settings with fewer ZD children, the cost of reaching an additional ZD child may be rising (Point C).
- In areas with large pockets of ZD children (clusters), the cost of reaching ZD children may be starting to rise, but not by much. There may be additional costs to identify and travel, but once there, costs will be spread over a large number of children (Point B)



Zero Dose Costing Evidence Needed	Who is Working on This Now
How much it will cost to reach ZD children *in addition to* the ongoing costs of routine programs for a range of interventions and contexts?	UNICEF, BMGF, universities, NGOs but need more assessments of different interventions and contexts
Which ZD interventions represent a better value for money than others?	??
What are the cost implications of ZD interventions for households? Do they save household costs or are they cost prohibitive?	BMGF, others??
How much more resources are needed globally to reach ZD children to achieve the objective of reducing ZD children by 50%?	??
How can countries integrate, sustain, and finance efforts to reach ZD children?	??
What is the envelope of funding that Gavi and other partners need to provide?	??

Key Messages

- There is not very much evidence right now on the cost of reaching ZD children
  - Existing evidence is adjacent to what we need to be measuring
- The cost of scaling up coverage has a larger evidence base
  - Higher incremental unit costs than routine services
  - Contexts with higher initial coverage have much greater incremental costs
- Several studies are underway but there are gaps in our understanding
- We need to be costing effective approaches, but we are in the early phases of implementation and effective approaches are still to be determined.
- Guidance on costing is available and more to come.
  - Research principles for ZD Costing (https://immunizationeconomics.org/wp-content/uploads/2024/09/Research-principles-ZD-costing-2-Sept-2024.pdf)
  - Immunization Delivery Cost Catalogue (https://immunizationeconomics.org/thinkwell-idcc/)
  - How to Cost Immunization Programs (https://immunizationeconomics.org/recent-activity/2020/12/23/how-to-cost-guide/)

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THANK YOU