Cost of Maternal Immunization Delivery

Findings from five low-and middle-income countries

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Acknowledgments

Ministries of Health in study countries (Bangladesh, Kenya, Ghana, Mozambique, and Nepal)

Partner organizations and collaborators including KEMRI (Kenya) and BPKIHS (Nepal)

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Agenda

Introduction

Study methods and approach

Results

Summary

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Rationale for maternal immunization (MI) cost of delivery (COD) studies

- COD is a critical consideration in vaccine introduction decisions as it can be a significant cost borne by countries and a potential barrier to equitable access.
- COD estimates for vaccines given to pregnant women in LMICs are nearly non-existent and delivery strategies and costs may differ from pediatric vaccines.
- PATH conducted studies in **Bangladesh, Ghana, Kenya, Mozambique, and Nepal** in collaboration with local partners.
- The COD estimates generated from this study enhance understanding of the economic feasibility of implementing maternal immunizations.

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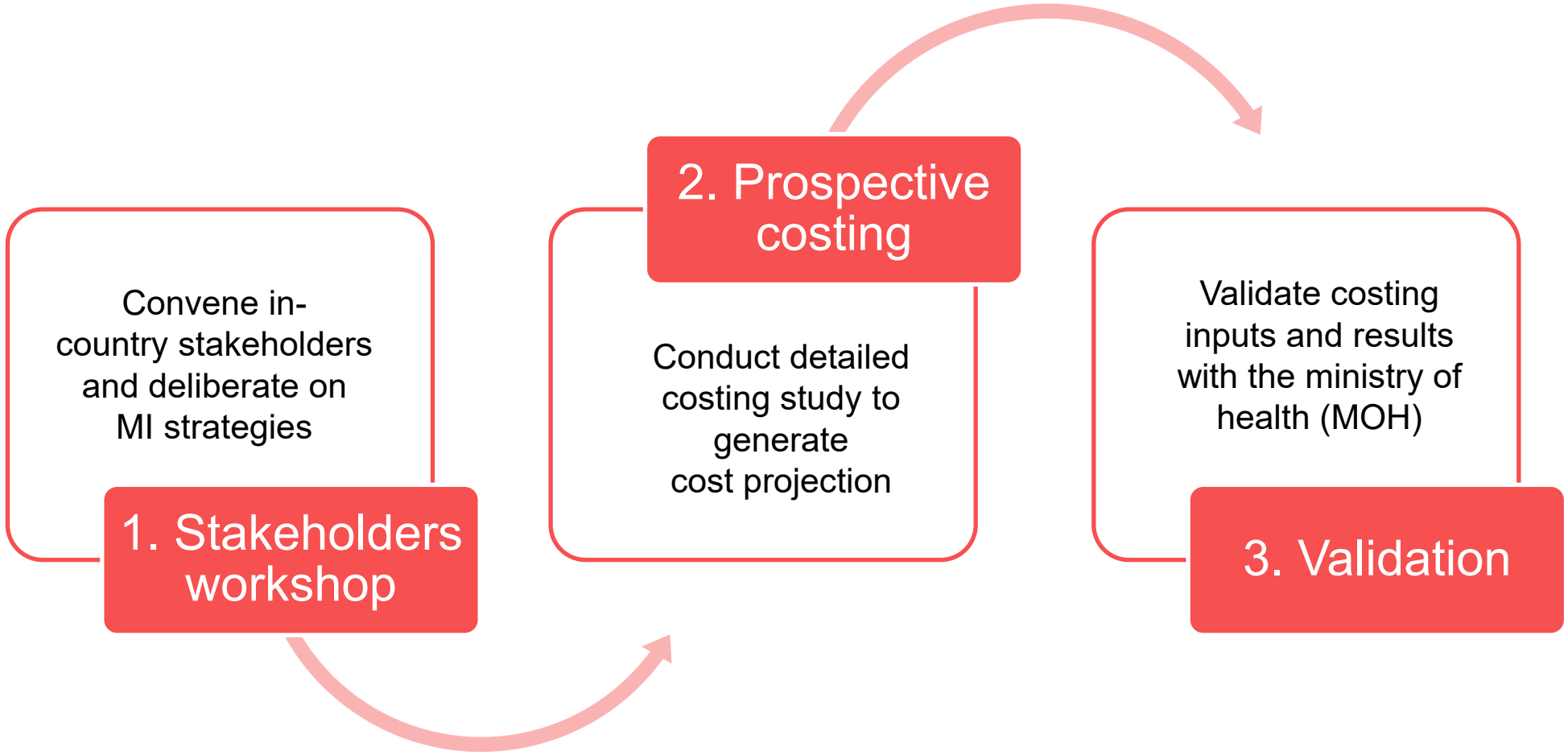
Costing methods summary

Prospective costing study	A cost projection for the anticipated delivery strategies stakeholders identified for future MI interventions.
Government's perspective	Assumes a government's perspective irrespective of external funding from donors that may be available during introduction.
Incremental costs only	Considers only the additional costs to the existing program in creating a conducive platform for MI interventions.
Activity-based costing	• Each activity associated with vaccine introduction and delivery are identified and costed individually. • Activities were regrouped into major cost categories (e.g., planning and coordination, communication, training, procurement, distribution, and service delivery).
Time horizon	Costs projections cover a 5-year period and assume national introduction across all districts.
Financial and economic costs	Evaluates both financial (direct financial outlays) and economic costs (including opportunity cost of existing resources and donated goods)

The COD study process



Stakeholder workshop

- **Stakeholder workshop:** In collaboration with the respective Ministry of Health (MOH), we hosted a one-day stakeholder workshop in each country in 2022 or 2023.
- **Purpose:** To discuss feasible delivery strategies for successfully implementing future MI programs within the respective health systems.
- **Participants:** Between 35 and 57 participants including national and select sub-national MOH representatives, academics, researchers, and representatives from various non-governmental organizations.

Kenya

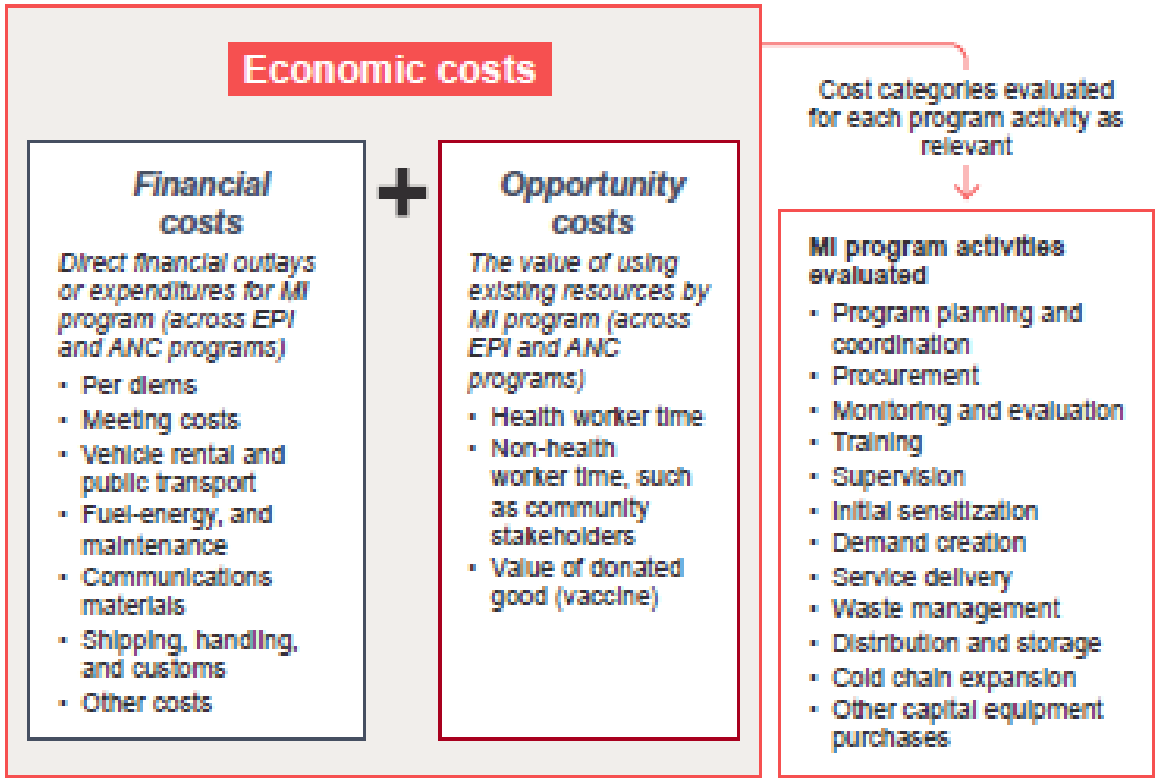
Ghana

Bangladesh

Data collection process

- A **detailed activity map** of implementation activities was developed via interviews with Expanded Program on Immunization (EPI) and maternal, newborn, child health (MNCH) program leads at National and sub-national levels in each country.
    - Included specific calls for any **system-wide changes and adaptations** of the existing health care delivery system needed to create conducive platforms for future MI interventions.
- Recent **experiences with new vaccine introductions and program expectations** informed activity mapping as well as detailed resource needs.
- **Primary data** from representative health administrative units, vaccine stores, and health facilities informed the potential recurring costs at regions/provinces, districts, and facility levels.
- Cost data were collected in local currency units (LCU) and presented in both LCU and USD 2023 units.

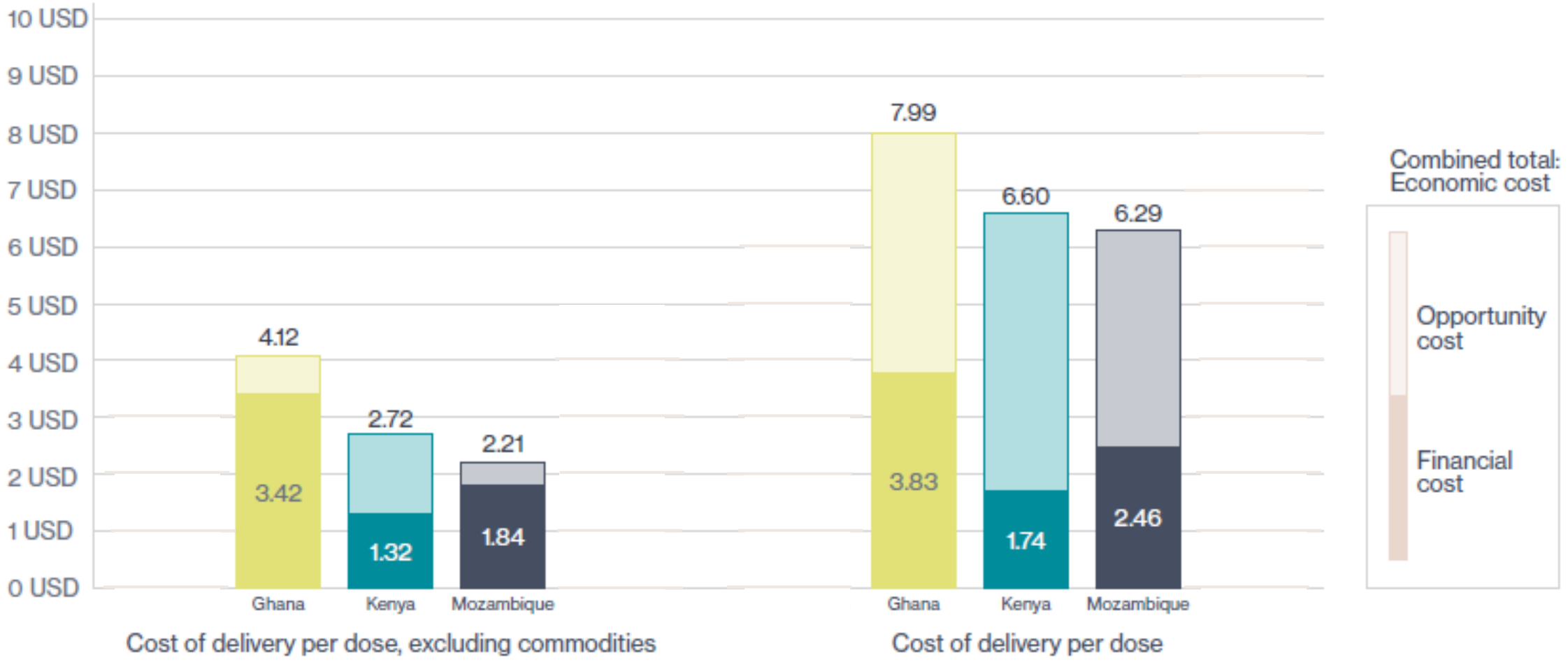
MI cost categories and program activities evaluated



Key data inputs and assumptions

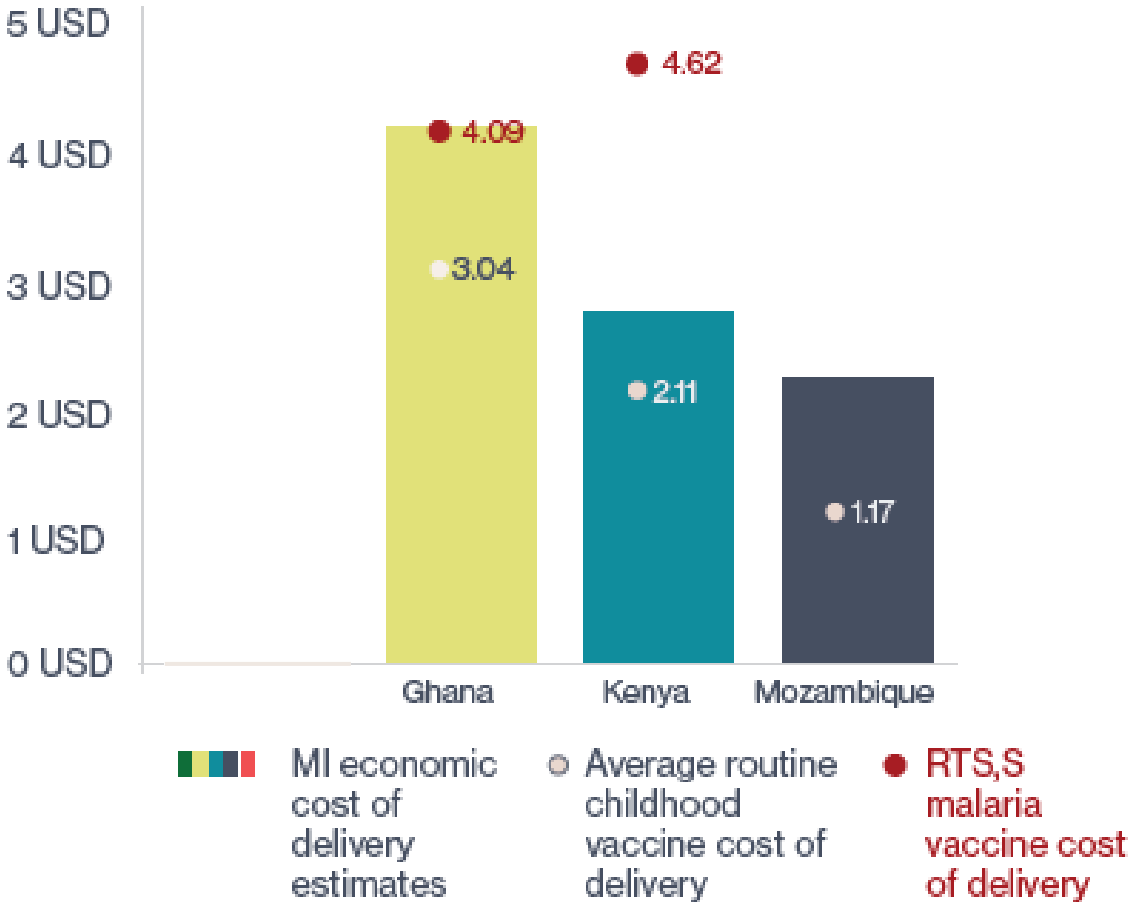
Inputs	Bangladesh	Ghana	Kenya	Mozambique	Nepal
Cost of vaccine per dose, (USD), assumed donated	**$3.00 ($1 and $5 for sensitivity analyses)**				
Syringes and safety boxes per dose	$0.12	$0.11	$0.26	$0.20	$0.11
Total procurement add-on charges as a % of product cost (freight, insurance, inspection, handling, taxes)	18%	11%	7.6%	12.9%	35%
Vaccination coverage	90%	88%	50%	50%	75%
Target population (pregnant women) for a given year	4,007,544	1,283,521	1,668,242	1,620,987	515,533

Financial, opportunity, and economic unit cost estimates for MI delivery



References:
Baral et al., 2024. Cost of delivering childhood RSV prevention interventions to the health system in Kenya: a prospective analysis. BMJ Open. https://pubmed.ncbi.nlm.nih.gov/39578037/
Baral et al., 2025. What will introducing and delivering new maternal vaccines cost in Ghana and Mozambique? A prospective analysis. Vaccine. https://pubmed.ncbi.nlm.nih.gov/39892111/

Comparison with other routine childhood and malaria immunization delivery costs



Note: Any direct comparisons of the cost estimates across studies should be made cautiously because the methods, delivery strategies, settings, and context are different.

This graph plots non-commodity economic cost estimates for MI together with other estimates available for study countries.[1,2]

Sources

[1]Baral et al. 2023 https://pubmed.ncbi.nlm.nih.gov/36710234/

[2]Portnoy et al. 2020 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7437655/

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Financial and economic cost drivers for new maternal vaccine delivery by cost share percentage

Percentage of total cost

	FINANCIAL					ECONOMIC				
	Bangladesh	Ghana	Kenya	Mozambique	Nepal	Bangladesh	Ghana	Kenya	Mozambique	Nepal
Procurement										
Program planning and coordination	16%	<1%	7%	11%	15%	68%	<1%	9%	11%	12%
Monitoring and evaluation	21%	1%	4%	1%	7%	10%	<1%	5%	1%	3%
Training	22%	35%	39%	30%	44%	8%	37%	32%	31%	44%
Supervision	1%	4%	9%	8%	3%	1%	4%	13%	9%	2%
Initial sensitization	1%	5%	5%	1%	1%	1%	4%	4%	1%	1%
Demand creation	27%	17%	6%	10%	14%	6%	16%	5%	9%	9%
Service delivery and waste management	<1%	1%	15%	3%	4%	4%	3%	19%	6%	9%
Distribution and storage	5%	17%	6%	27%	7%	1%	15%	8%	23%	17%
Cold chain and other capital purchases	6%	20%	10%	9%	6%	1%	19%	6%	9%	3%

NOTE: "Procurement" is the biggest overall cost driver across countries among the cost categories evaluated in this study, but it is not included in this table so that other key cost drivers can be seen more clearly.

Non-major cost drivers — Major cost drivers

Summary

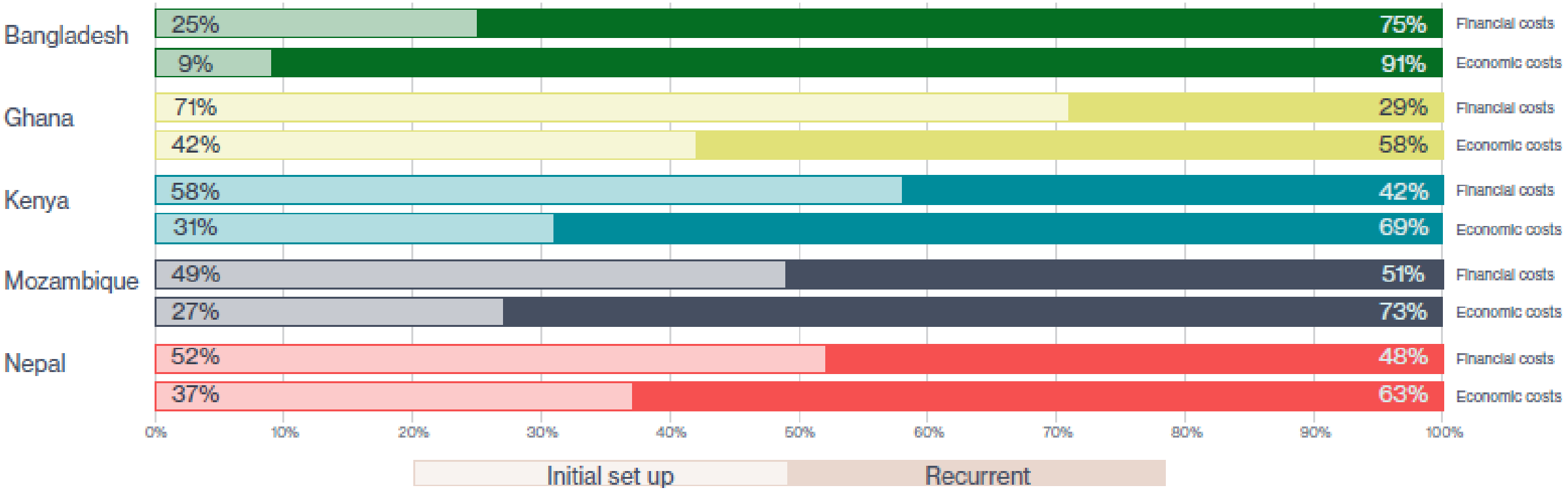
- The estimated incremental costs of MI delivery (excluding commodity cost) range between **$1.32 and $3.42 (financial) and $2.21 and $4.12 (economic)** across study countries.
- The economic cost of MI delivery estimates are within the range of routine vaccine delivery cost projections and other recently introduced vaccines.
- These estimates can help countries to evaluate resource needs and can inform other health economic analyses (e.g., cost effectiveness and budget impact).
- Cost data from this study would be strengthened by **validation via a retrospective cost analysis** in a few countries upon MI implementation.

Thank you

Extra slides

Introduction (initial setup) and recurrent cost as a percentage of total cost

- Recurrent cost constitute a large share of both total financial and total economic cost.
- Recurrent cost include the cost of commodity (economic cost), and procurement add-on cost on commodity (financial cost).
- Initial set-up costs constitute a relatively larger proportion of financial costs across countries.

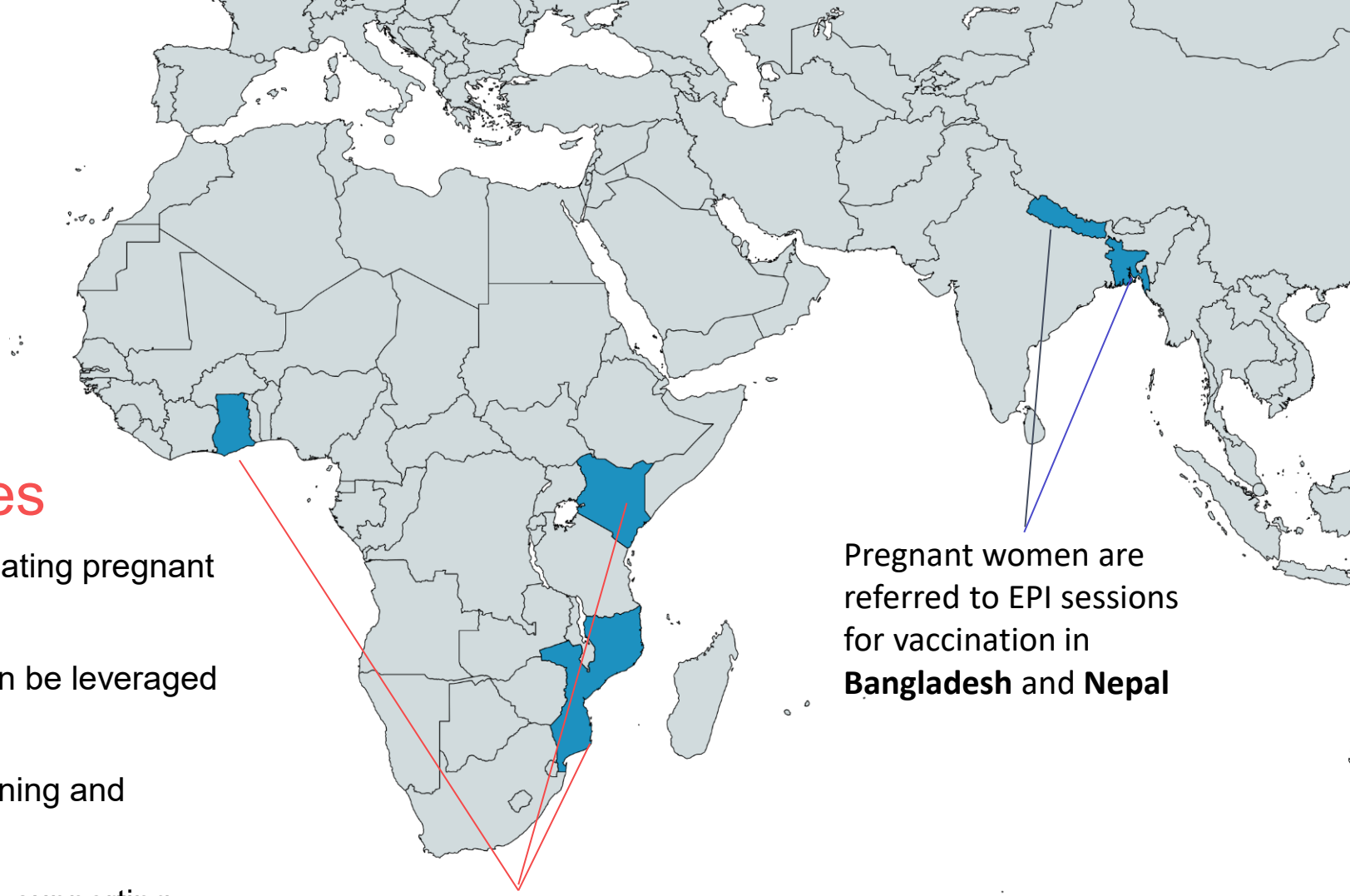


Key terms

Financial costs	• **Direct expenses** related to introducing and delivering new maternal vaccines (e.g., staff allowances for specific trainings).
Opportunity costs	• Entail the **value of existing resources** (e.g., health worker time) & value of donated goods.
Economic costs	• **Financial costs plus costs of existing resources** (e.g., health worker time and value of donated goods).
Activity-based costing	• **Identifies and costs each activity** associated with intervention introduction and delivery.
Incremental costs	• **Costs additional to existing program operations** that are necessary to implement new maternal vaccines (e.g., planning organizing meetings and training).
Commodity costs	• Vaccine and immunization **supplies / product costs**.
Cost per dose administered	• Cost associated with **vaccine, vaccine introduction, and recurring operational cost**.
Cost of delivery per dose	• Cost associated with vaccine introduction and recurring operational cost, **excluding vaccine and injection supplies cost**.

Key workshop learnings informing costing analyses

- All five countries have experience vaccinating pregnant populations.
- Existing service delivery mechanisms can be leveraged for any future MI platform.
- Health workforces have similar basic training and transferable skills.
- Most ANC visits occur later in pregnancy, supporting the chances of reaching pregnant populations during appropriate gestational age windows for vaccination.
- EPI and ANC roles and MI delivery models differ between countries and even within a country.



Pregnant women are referred to EPI sessions for vaccination in **Bangladesh** and **Nepal**

Pregnant women in **Kenya, Mozambique**, and **Ghana** receive vaccines through ANC

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