Methods for Evaluating Costs of Activities to Support Routinizing Catch-up Immunization in Kenya, 2023-2024

Gavi Zero-Dose Costing Meeting
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Disclaimer: The views in this presentation are those of the co-authors and do not necessarily represent the official position of the organizations of any of the co-authors.

Background

Catch-up vaccination

- **Definition**
  - Vaccinating an individual who is missing doses for which they are eligible per the national immunization schedule

- **Importance**
  - To close immunity gaps to increase individual and community protection against disease
  - Especially important following extended interruption of routine services (e.g., COVID-19 pandemic)

- **Barriers**
  - Non-existent or unclear policies on catch up vaccination
  - Perception that catch-up campaigns are sufficient
  - Concerns about impact on immunization program budget

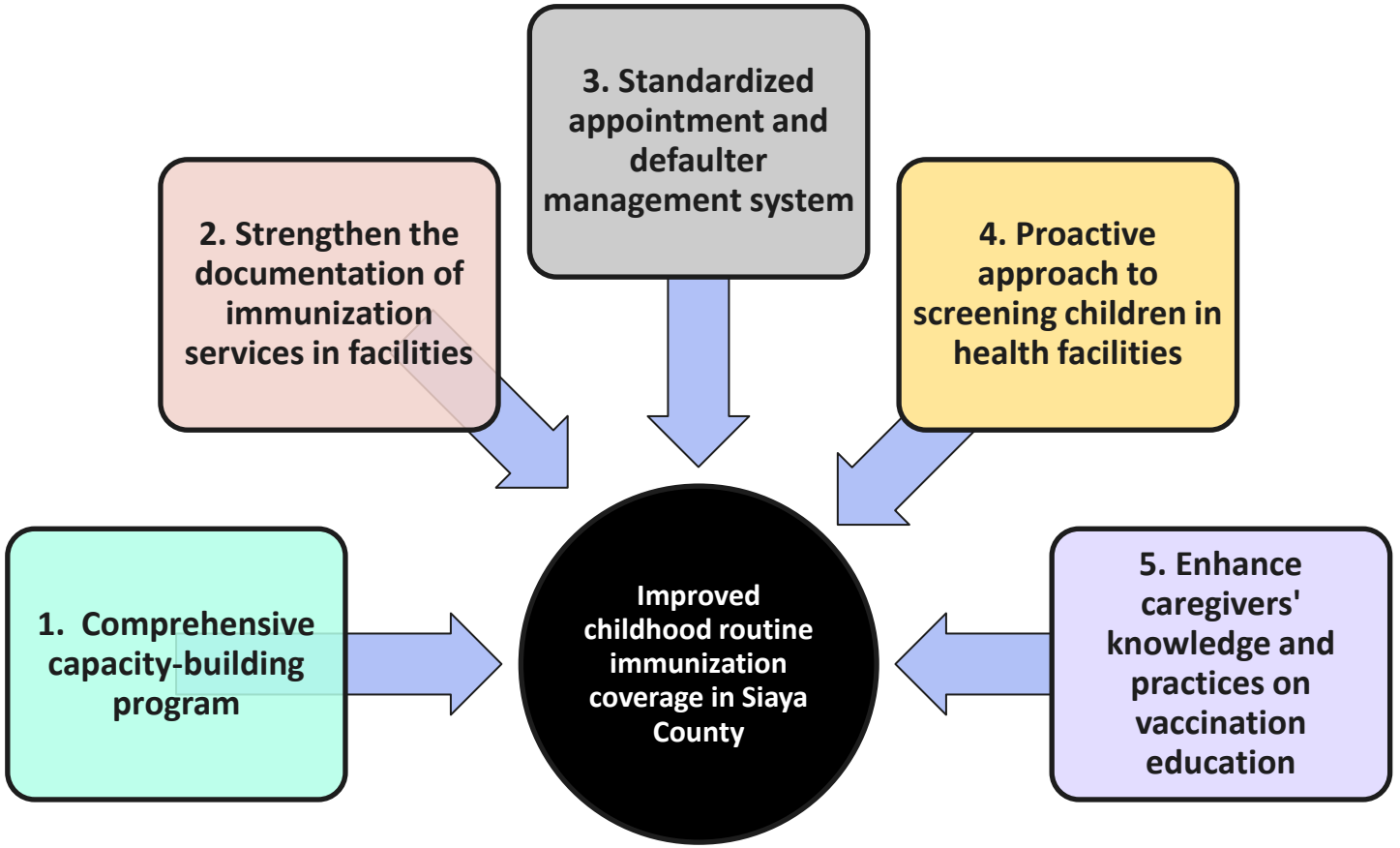
Study Area: Siaya County, Kenya

- **Siaya County**
  - Population
    - Total: 993,183
    - Under 5 children: 148,254 (KNBS, 2019)
  - Vaccination coverage (2022 KDHS)
    - 0.7% of children in 12–23 month cohort had not received any vaccinations
    - 69.9% of children aged 12–23 months in Siaya were fully vaccinated as per the national immunization schedule*
  - Selected for the evaluation based on identified coverage gaps and preexisting partnerships
    - Implementing partner (IP): CIHEB-Kenya
    - Funder: US Centers for Disease Control and Prevention (CDC)
    - Collaborators: Siaya County Health Department, National EPI

* BCG, three doses of DPT-HepB-Hib, four doses of OPV, one dose of IPV, three doses of pneumococcal vaccine, two doses of rotavirus vaccine, and one dose of MR

Catch-Up Vaccination Intervention Design for Siaya County, Kenya

- **Strengthening delivery of routine catch-up vaccines**
  - To enhance the frequency and scope of catch-up vaccination for children <5 years of age in public health care facilities and understand short-term outcomes in Siaya County, Kenya



- **Timeframe**

	2022					2023												2024											
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseline assessment																													
Designing Intervention Package																													
Implementing Intervention Package																													

Catch-Up Vaccination Intervention Components

26 activities

Activity	2023					2024								
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Operational Level Training for nurses			■											
Operational Level Training for health records and information officers			■											
Operational Level Training for community health assistants			■											
Operational Level Training for community health promoters			■											
Mentorship to community health workers				■	■	■	■	■	■	■	■	■	■	
Mentorship to health care workers				■	■	■	■	■	■	■	■	■	■	
Developing continued medical education modules			■											
Continued medical education				■	■	■	■	■	■	■	■	■	■	
Supportive Supervision at health facilities					■			■			■			■
Supportive Supervision at school					■			■			■			■
Developing and distributing monitoring and evaluation module	■	■												
Distributing MOH tools to health facility	■	■	■											
Data review meeting (County; Bi-monthly)				■		■		■		■		■		■
Data review meeting (subcounty; quarterly)					■			■			■			■
Data review meeting (health facility; monthly)				■	■	■	■	■	■	■	■	■	■	■
Programmatic M&E meeting	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Distributing appointment diaries to health facilities			■											
Sending reminder messages to caregiver			■	■	■	■	■	■	■	■	■	■	■	■
Defaulter tracing register			■											
Health talk at health facilities		■	■	■	■	■	■	■	■	■	■	■	■	
Updating, printing, and distributing IEC materials preparation			■	■	■									
Community level campaigns			■					■	■					
Workshop for early child development officers							■							
Client satisfaction survey				■	■				■				■	
Facility-based catch-up vaccination	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Defaulter tracing village visits	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Methods

Study Design

1. **Evaluation question**
   - What is the incremental cost of activities to support routinizing catch-up vaccination

2. **Sampled facilities for intervention**
   - Randomly selected 55 facilities from the 154 government-owned facilities in Siaya Country* for the intervention

Sub-County	Health Facility Type			
	Level 2 (Health dispensaries)	Level 3 (Health centers)	Level 4 (County hospital)	Total
Alego-Usonga	10	3	2	15
Bondo	2	4	3	9
Gem	5	7	1	13
Rarieda	1	4	1	6
Ugenya	4	1	1	6
Unguja	3	1	2	6
Total	25	20	10	55

* At the time of sampling, there were 154 facilities, but the number had been reduced to 150 as of April 29, 2024.

Study Design

3. Scope of cost analysis

	(1) Financial costs	(2) Opportunity costs (Health care worker time only)
Types of costs	Financial	Economic
Number of facilities	55 supported facilities	30 (out of 55) supported facilities + 30 non-supported facilities
Time frame and analytic horizon	Aug 2023 – Sep 2024	Aug 2023 – Sep 2024
Data collection date	Jun 2024 – Oct 2024	July 2024
Data collection tool	Excel	Paper form + Open Data Kit
Cost data	IP's financial records	Direct observation (DO; Time-motion)
Vaccine dose data	• The number of vaccine doses delivered to children identified as missing doses of routinely recommended vaccines • Data source 1. Health facility record 2. Individual children's MCH booklets	

Financial Cost Evaluation

- **Cross-sectional retrospective program cost analysis**
- **Ingredients-based costing approach**
- **Dimensions of cost categorization:**

1	PROGRAM ACTIVITY	2	RESOURCE INPUT	3	ADMINISTRATIVE LEVEL
▪ Planning ▪ Workforce capacity building ▪ Social mobilization ▪ Monitoring and supervision ▪ Defaulter tracing		▪ Personnel ▪ Equipment ▪ Supplies ▪ Travel of persons ▪ Transport of goods ▪ Venue ▪ Utilities/Communications ▪ Contracted services ▪ Other		▪ IP Cross-cutting ▪ County ▪ Sub-county ▪ Health Facility ▪ Community	

Financial Cost Evaluation

- **Study perspective: external donor (i.e., the US CDC)**

Included costs	Excluded costs
• Incremental financial costs incurred by IP (CIHEB)	• Financial and other economic costs of the Kenyan government and other funding sources • Opportunity costs to use IP's existing resources • Costs borne by the caregiver and beneficiary costs • Costs of conducting the evaluation itself • Costs of CDC staff time providing technical assistance to the project

- **Analysis plan**
  - Unit cost per catch-up vaccination dose = $\frac{\text{Aggregated financial costs incurred by IP}}{\text{Total number of additional catch−up vaccine doses administered}}$
  - The total and unit costs will be reported by activity category, resource input, and administrative level in 2023 US dollars and 2023 Kenyan Shillings
    - Inflation will be adjusted monthly using Kenya's consumer price index.
    - Official exchange rates will be used to convert between Kenyan Shillings and US dollars

Opportunity Cost Evaluation: Health Care Worker Time

Time-Motion Assessment

- **Objective**
  - **Measuring time** health care workers (HCWs) spend on catch-up vaccination tasks
- **How to collect data**
  - Data collectors will **work in pairs**, with one data collector serving as the timer and the other entering data in the program evaluation form
  - Data collectors will use **a paper-based observation record form** and **stopwatches** to respectively record HCW performance of catch-up vaccination tasks and the time required to perform each task.
  - Both time and task data collected on the paper-based forms will be **entered** by data collectors **into tablet-based ODK forms** afterward.
- **Sample Size**
  - 60 facilities (30 supported + 30 non-supported facilities)
    - Based on operational feasibility and the budget for conducting the evaluation
  - Approximately 600 catch-up vaccine cases expected
    - 60 facilities X 2 catch-up cases per facility per day X 5 days

Opportunity Cost Analysis

Analysis Plan

- **Unit cost per catch-up vaccination dose**

$$= \left(\frac{\text{Aggregated value of HCW time}}{\text{Total number of catch-up vaccine doses administered during DO}}\right)_{\text{Supported facilities}} - \left(\frac{\text{Aggregated value of HCW time}}{\text{Total number of catch-up vaccine doses administered during DO}}\right)_{\text{Non-supported facilities}}$$

  - **The value of the HCW's time** will be monetized using the average wage rate per cadre for the Siaya County / Kenya Ministry of Health salary scale for different types of health care workers

    - $\frac{\text{HCW's monthly salary}}{\text{Number of working days per month}} \text{ X } \frac{1}{\text{Total minutes HCW works per day}} \text{ X Total minutes HCW spends on catch-up}$

a. Daily salary

b. Salary per minute

c. The value of HCW's time on catch-up

Projected Intervention Costs in the Context of Siaya County Budget

Siaya County Budget 2022-23			
No.	**Item**	**Total[a]**	**Per capita[b]**
1)	Total budget for health services	$ 15,306,376	$15.40
2)	Budget for "Preventive, and promotion health service" category	$ 2,601,461	$ 2.60
3)	Budget for immunization-related activities under "Preventive, and promotion health service" category (includes: MCH, immunization, community responsiveness, disease surveillance, and administration and support)	$ 187,527[c]	$ 0.20

Projected Financial Cost of the Intervention at the Facility Level						
Total Intervention Package Implementation Budget Cost	**# Sampled HFs**	**Project Budget Cost Per HF**	**# Total Public HFs in Siaya County**	**Extrapolation of Project Budget to All Public HFs in Siaya County**	**Extrapolation of Project Budget as % of the Siaya County Budget**	
$ 382,595[d]	55	$ 6,956	154	$ 1,071,224	1) Total budget for health services	7%
					2) Preventive, and promotion health service	41%
					3) Immunization-related activities	571%

Projected Financial Cost of the Intervention at the Child Level				
Total Intervention Package Implementation Budget Cost	**# children <24 months in catchment areas of 55 HFs included in evaluation**	**Per child cost for vaccination**		
		(1) When all children <24 months are eligible for either DTP3 or MR1 catch-up ($382,595/20,673 children)	**(2) When 48% of children <24 months are eligible for either DTP3 or MR1 catch-up (CIHEB Data) ($382,595/13,460 children)**	**(3) When 6% of children <24 months are eligible for either DTP3 or MR1 catch-up (2022 DHS Data[f]) ($382,595/1,687 children)**
$ 382,595	20,673	$ 18.50	$ 28.40	$ 226.80

(a) The budget abstracted from the Siaya County government website. The exchange rate applied is KSH 146.25/USD.
(b) Siaya County population: 993,183.
(c) Excluding vaccine procurement costs because vaccines and vaccine supplies are procured at the national level in Kenya.
(d) Of the $ 420,000 total project budget from CDC/GID to CIHEB, dissemination activity cost ($16,008) and M&E staff ($21,397) are excluded.
(e) According to the household census by CIHEB.
(f) Based on a vaccination card or the mother's report. Since DHS data provides DTP3 and MR1 coverage rates for 12-24-month cohorts only, under two assumptions– the same vaccination coverage rate for both [0-12 months) and [12-24 months) groups, and The number of children born each day is uniformly distributed (i.e., the same number of children for 1 day old, 2 days old, and 3 days old.).

Next Steps

- **Financial cost data collection**
  - June – November 2024: Financial cost data collection using the expenditure template
- **Opportunity cost data collection**
  - July 2024: Direct observation
- **Programmatic evaluation data collection**
  - September 2024: Endline data collection
- **Analysis and preliminary results**
  - Q4 2024

Thank You

For more information on the cost evaluation, please contact Dave Noh (hnoh@cdc.gov).