



AN INVESTMENT CASE FOR SIERRA LEONE'S COMMUNITY HEALTH WORKER POLICY

An integrated approach from child health and
community health systems



MOMENTUM works alongside governments, local and international private and civil society organizations, and other stakeholders to accelerate improvements in maternal, newborn, and child health services. Building on existing evidence and experience implementing global health programs and interventions, we help foster new ideas, partnerships, and approaches and strengthen the resiliency of health systems.

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Cover photo: Community health worker, Martin Kpange, tests Admasay Thullah's three-year-old child, who has fallen ill, before diagnosing and treating her, in Maconteh, Moyamba District, Sierra Leone.

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	5
ABBREVIATIONS.....	6
EXECUTIVE SUMMARY.....	7
Background.....	7
Methods.....	8
Findings.....	8
Funding Gap Analysis.....	9
Conclusions and Recommendations.....	9
INTRODUCTION.....	11
Background and Context.....	11
The Current CHW Policy.....	12
Justification.....	13
Objectives of the Study.....	13
Country Context and Situational Analysis.....	13
The State of the CHW Program in Sierra Leone.....	16
METHODOLOGY.....	19
Introduction.....	19
Data Collection Approach.....	19
Description of Tools.....	20
Estimating the Cost of the CHW Program.....	21
Calculating Health Benefits.....	22
Estimating Economic and other Benefits.....	22
Estimating the Return on Investment of the CHW Program.....	23
RESULTS OF COSTING AND INVESTMENT OF THE CHW PROGRAM.....	24
Cost of Implementation.....	24
Benefits of the CHW Program.....	33
Return on Investment.....	34
CURRENT FINANCING AND FUNDING GAPS.....	37
Assumed Financing of the CHW Program.....	37
Gap Analysis.....	38
CONCLUSIONS AND RECOMMENDATIONS.....	40
Summary of Conclusions.....	40
Recommendations.....	42
Limitations.....	43
APPENDIX A. Comparative summary of Tools.....	44
APPENDIX B. Key Assumptions.....	45
APPENDIX C. Tables of Cost by Input and Intervention, and cost of Medicine by intervention.....	47
APPENDIX D. Analysis of CHW Services and Costs by CHW Cadre.....	49
APPENDIX E. c3 Tool Questions for Discussion with CHWs.....	51
REFERENCES.....	55

LIST OF FIGURES

Figure A. CHW Program Cost Breakdown..... 8

Figure 1. The Pillars of the Global Investment Case for CHWs 11

Figure 2: Share of Total Health Expenditure Per Capita 15

Figure 3: Number of Community Health Services Provided per Year by Type Service 24

Figure 4: Total Number of Services by Category 25

Figure 5: Number of CHWs 26

Figure 6: Cost of CHW Program per CHW Cadre..... 28

Figure 7: Estimated Cost of the CHW Program by Cost Inputs 28

Figure 8: Cost Drivers for Medicines, Averaged Over the Period 2021–2026 29

Figure 9: Cost of Program by Intervention/Service 30

Figure 10: Time Utilization of CHWs in HtR Areas 31

Figure 11: Time Utilization of CHWs in EtR Areas 31

Figure 12: Theoretically Ideal Number of CHWs Needed 32

Figure 13: Assumed Funding Analysis 37

Figure 14: Assumed Available Funding versus Gap in Funding 2021–2026..... 38

Figure 15: Assumed Versus Future Earmarked Funding 2021–2026 39

Figure 16: Assumed Versus Earmarked Funding Sources 2021–2026 39

Figure 17: Number of Community Health Services by CHW Cadre 49

Figure 18: Total Number of Services by Category and by CHW Cadre..... 49

Figure 19: Estimated Cost of the CHW Program by Cost Inputs and Type of CHW..... 50

Figure 20: Cost of Program by Intervention/Service 50

LIST OF TABLES

Table A: Benefits, Costs, and ROI 2021–2026, 2021–2031, in US\$ 9

Table 1: Selected Health Indicators in Sierra Leone 14

Table 2: Quick Facts about the CHW Program in Sierra Leone^{10,25}..... 17

Table 3: Differences between the Types of CHWs 26

Table 4: Components of the CHW Program included in the Costing 27

Table 5. Time Spent In Hours Per Month, Per Task by CHW type 31

Table 6a: Total Lives Saved by CHW Interventions 33

Table 6b: Total Lives Saved by EtR CHWs Intervention 33

Table 6c: Total Lives Saved by HtR CHWs Intervention 34

Table 7: Economic Gains on CHW Program Investments 35

Table 8: Comparative Analysis of Incentive Payment for CHWs ^{2,33}, 41

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ABBREVIATIONS

C3	Community Health Worker Coverage and Capacity Tool
CHPCT	Community Health Planning and Costing Tool
CHW	community health worker
DHMT	district health management teams
EtR	easy-to-reach
GDP	gross domestic product
HtR	hard-to-reach
iCCM	integrated community case management
LiST	Lives Saved Tool
MNH	maternal and newborn health
MoH	Ministry of Health
NGO	nongovernmental organization
OOP	out-of-pocket
PHC	primary health care
PHU	periphery health units
RMNCH	reproductive, maternal, newborn, and child health
ROI	return on investment
THE	total health expenditure
UHC	universal health coverage
USAID	United States Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

Global evidence has shown that investments in national community health worker (CHW) programs generate substantial positive returns on investment, in both health outcomes and broader economic benefits. This investment case uses country-specific analysis for Sierra Leone, making the case that such community health investments merit increased prioritization in health financing in regular government budgetary processes and in donor-financed programming. These results can be used as an advocacy tool to increase awareness about the importance of and sustainable financing for community health systems.

With an increasing population and growing health care needs, coupled with low public financing of health care, Sierra Leone seeks to expand health financing and delivery models that will generate the best health outcomes using available resources. For effective implementation of the CHW policy, which was revised in 2021, the following specific objectives of this assignment are highlighted below:

- Provide an accurate and realistic estimate of the total cost of the CHW program for successful implementation through 2031.
- Identify the funding needs and gaps.
- Use these to develop an effective and efficient investment case for CHW program implementation in Sierra Leone.

Our projections and analysis show that the CHW program in Sierra Leone:

1. Will require substantial additional time and resources to effectively meet the objectives laid out in the national CHW policy
2. Has projected funding requirements that are in line with the experiences of other countries in the region that have institutionalized CHW programs as pillar of the public health system
3. Will result in a positive return on investment, including prevention of nearly 14,000 child and maternal deaths through 2031

Box 1. CHWs by the Numbers

7,909 CHWs

- 4,745 in easy-to-reach areas
- 3,164 in hard-to-reach areas

791 peer supervisors

20 working hours per week

Background

Community health workers in Sierra Leone are essential frontline human resources for health who are critical to the country's vision of a resilient national health system and prosperous socioeconomic development. Sierra Leone faces a complex challenge for maternal and child health, which requires active community participation to reach diverse populations with essential lifesaving interventions. By bringing basic health services to their communities, CHWs play a critical role in bridging the gap between communities and the broader health and social services systems.

Based upon the recently revised CHW policy, there is a projected need for nearly 8,000 CHWs, and nearly 800 CHW peer supervisors, based on 2021 population estimates.^a CHWs' geographic coverage is divided into two categories: easy-to-reach (EtR) areas, CHWs cover a 3–5 km radius from a health facility (EtR CHWs); and hard-to-reach (HtR) areas, CHWs work at a distance of over 5 km radius from the nearest peripheral health unit or within

^a The analysis for this Investment Case was completed in 2022. The five-year timeframe was set to an initial year of 2021. Based on estimated population increase in 2022, the number of required CHWs is 8,154. The 2021 cadres were also reconstituted in 2022 with new requirements for education levels, etc. The Investment Case results by year remain accurate, though the costs included for 2021 may not still be relevant.

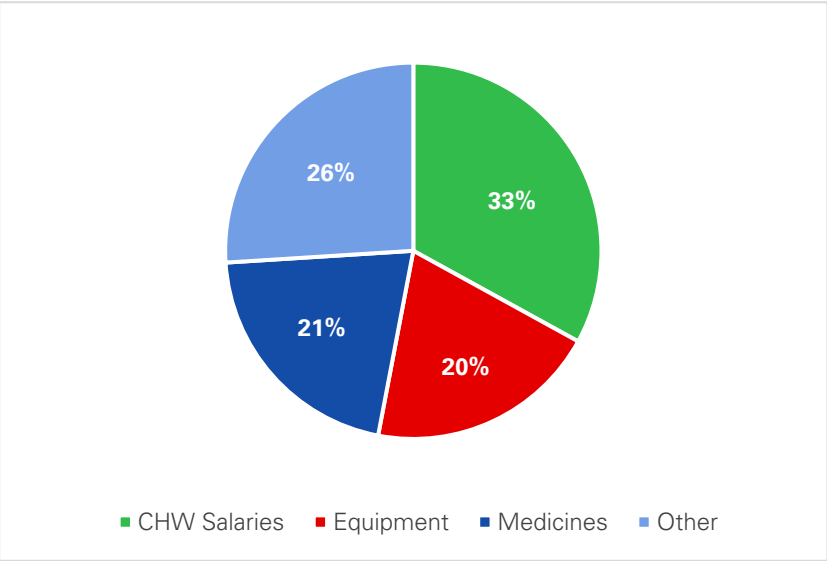
3–5 km in difficult terrains (HtR CHWs). EtR and HtR CHWs cover the same basic reproductive, maternal, newborn, child and adolescent health and nutrition, HIV and TB services. However, HtR CHWs also provide integrated community case management (iCCM) treatment interventions for malaria, pneumonia, diarrhea, and screening children under 5 years for acute malnutrition.

Methods

This investment case used three tools; the [Community Health Planning and Costing Tool](#) (CHPCT), the [Community Health Worker Coverage and Capacity](#) (C3) Tool, and the [Lives Saved Tool](#) (LiST). Together, these tools provided the analysis of costs and benefits of the CHW program from 2021–2031.^b We estimated the return on investment (ROI) for two projection periods; for 2021–2026 and then we extrapolated it to 2031 wherein we assumed the annual cost in real terms to be the same over the projection period.^c

Findings

Figure A. CHW Program Cost Breakdown



Cost: The total cost of the CHW program from 2021–2026 is projected to be US\$53.7 million. The largest cost drivers over this period are CHW salaries (33%), equipment (20%), and medicines (21%). “Other” costs include transport, supervision visits (salaries, equipment, transport, etc.), training (initial and recurrent), and management costs.

At the point the program^d is fully operational in 2026, the cost per capita, for the total population is estimated to be \$2.23 and the cost per CHW is \$1,340. This is somewhat lower than regional averages; currently estimated to be \$2.62 per capita and \$3,584 per CHW.¹

Benefits: Investments made in the CHW program are projected to return both short- and long-term health and economic benefits. Implementation of LiST estimated 4,801 lives saved from 2021–2026 and 13,706 lives saved from 2021–2031. Other benefits were monetized using standard methodologies then compared with costs to calculate returns on investment, as shown in Table A. With a ROI of \$4 for every dollar of investment through 2026, the ROI increases to nearly \$6 when considered over the longer timeframe through 2031.

^b The baseline year was 2021 and a full income approach was used to compute the long-term economic benefits.

^c The return on investment was calculated as the total benefits divided by the total costs.

^d This includes the full CHW program costs, including the full range of reproductive, maternal, newborn, child and community health services provided by CHWs.

Table A: Benefits, Costs, and ROI 2021–2026, 2021–2031, in US\$

Variable	2021–2026	2021–2031
Productivity benefit	54.95 million	427.1 million
Insurance against health crisis benefit	123.03 million	225.56 million
Employment benefit	37.66 million	89.74 million
Total benefits	215.64 million	742.40 million
Total costs	53.7 million	128.2 million
Return on investment	4.02	5.80

From this analysis, it is clear that the CHW program in both the short and long run shows positive returns on investment and that these grow over time.

Funding Gap Analysis

The CHW program in Sierra Leone has been in existence for about a decade, funded by various traditional donors. We assessed current and estimated funds earmarked against projected funding needs for the CHW program’s optimal operation. Current estimates for funding over the 2021–2026 period cover about 43% of the total cost of the program, meaning the CHW program faces a 57% funding gap, or about \$30 million.

Conclusions and Recommendations

This analysis shows that investments in Sierra Leone’s CHW program can yield significant benefits, especially in the health and economic sectors, when the program is supported to its full extent. Donor and government support are crucial to sustain the gains made by the program. The investment case makes the following key conclusions:

- **Due to the scope of work and type of terrain covered, the CHW program needs more CHWs in hard-to-reach areas.** The current policy calls for 1.5 times as many CHWs serving “easy-to-reach” populations as CHWs serving “hard-to-reach” populations. We recommend a re-evaluation of this allocation based on the target populations for each CHW category, differences in time allocations, and inclusion of time in transit.
- The minimum time required to carry out the tasks is 4 hours per day. Adding time for transit, special campaigns, and other supportive activities, **it is not feasible for CHWs to complete these tasks at half-time** (20 hours per week), as specified in the CHW policy. We recommend supporting CHWs in full or three-quarter time to provide appropriate time for the tasks assigned.
- **CHWs in Sierra Leone receive one of the lowest stipends among the region.** To ensure maximum impact of the program and optimal service is performed, we recommend increasing the incentives for CHWs to match the average of half the median for the sub-region, or \$32 per month, which is approximately the minimum wage in Sierra Leone.
- The CHW program in Sierra Leone has made great progress in recent years to integrate the CHW program into the broader health system. Nevertheless, a few specific areas of improvement remain. CHWs should be better integrated in the overall national health system planning; enrolled as salaried employees on the national payroll, which includes full benefits and pension; and ensured proper supervision, access to mobile technology, and performance monitoring. It is worth noting that, currently, much of the formally-employed public sector health workforce is not paid (“on pin code”) and roughly 50% work on a voluntary basis.

In addition to these policy considerations, the following recommendations to the government for carrying forward this investment case recognize the absolutely crucial importance of the government's support.

- **Develop a strong lobbying team to mobilize political will and commitment from the government and donors.** Mobilizing political will is a prerequisite for moving forward with stronger financing for CHW programs; champions are needed to create political will. A strong lobbying team comprising the Ministry of Health and Sanitation (MoHS), international nongovernmental organizations, and implementing partners should campaign for financial support for the program by the Government of Sierra Leone and funding partners.
- **Disseminate the findings from the investment case to key stakeholders of the program.** With clear evidence of the ROI and potential savings, the results of this analysis should be shared broadly, including within the Government of Sierra Leone, Ministry of Finance and Health and Sanitation, to mobilize and prioritize the financing of the CHW program by allocating more funds to it. In addition, the Ministry of Finance should set aside some funding for the program while the MoHS should internally allocate more funds to the CHW program, given the documented returns on investment.
- **Utilize the results for external donors and funding opportunities.** The analysis within this report can be used to support future funding opportunities to ensure the sustainability of the program, such as in the upcoming Global Fund grant application process or private sector support.
- **Organize regular annual planning sessions to develop an action plan for the CHW program.** These meetings should be data-driven planning and monitoring sessions with stakeholders, especially development partners, to develop a joint annual action plan to channel resources towards addressing needs-based analysis, effectiveness of the program and efficiency in the CHW program resource allocation and use.

INTRODUCTION

Background and Context

There is strong global evidence that investments in community health worker (CHW) programs can generate positive returns on investment.² Without evidence specific to Sierra Leone, community health systems have not attracted adequate attention and prioritization in health financing especially on government budgetary processes. Owing to its growing importance, there is a need to develop a Sierra Leone-specific investment case for community health and to use the investment case as an advocacy tool to increase awareness of the importance of and sustainable financing for community health. At the global level, investments in the CHW program can give rise to significant gains in terms of not only health, but also economic and societal gains. Figure 1 lists the four pillars of the global investment case for CHW programs.

Figure 1. The Pillars of the Global Investment Case for CHWs

1. Community health workers are a necessity if sub-Saharan Africa is to achieve critical global health objectives.
2. Community health workers offer significant long-term return on investment (ROI).
3. Community health offers near-term and longer term cost savings to the health system, which can be redirected to finance system scale-up.
4. Community health has far-reaching benefits for society.

Source: Dahn B., et. Al. 2015

The global health community is guided by the Sustainable Development Goals of achieving universal health coverage (UHC) and ending preventable child and maternal deaths, for which 2030 targets were established.³ Achieving these goals will require strengthened primary health care (PHC), which, in turn, will require a well-supported CHW program. The World Health Organization (WHO) and the World Health Assembly in 2016 called for renewed efforts to realize the potential contribution of CHWs as members of multi-professional PHC teams.⁴

Universal health coverage ensures that all people have access to the health services they need, when and where they need them, without financial hardship. It includes the full range of essential health services, including health promotion and prevention, treatment, rehabilitation, and palliative care. The target of achieving UHC can be attained when the requisite and trained staff are available together with functioning facilities, access to medicines, etc. However, often, this is not the case for low- and lower-middle-income-countries that are grappling with the serious shortage of health workers, hence posing a critical challenge to the performance of these countries health systems. Some of the challenges faced by these countries include the challenge to train, retain, and distribute health workers, hence threatening their individual and community health outcomes.⁵

Task shifting has emerged as a possible solution to some of the problems highlighted above. It enables clinical staff to focus on their areas of expertise while the other staff carry out the daily routine task; this is where the CHW program can play a critical role.⁶

A CHW is a frontline worker dedicated to providing quality health care to their local community. Their close relationship with those they serve fosters a trust that gives their health recommendations, diagnoses, and referrals added authority.⁷ As a link to available health facilities, clinics, and other resources, the CHW's objective is to improve the quality and availability of health care for underserved communities.

Over the past several decades, CHWs have played important roles in vertically delivered disease control programs. Most vulnerable populations are unable to access health services where they live—and when they can, the quality of care is usually low. CHWs can offer essential care to the communities where they live. According to the WHO, “the increased coverage of essential health services and improved equity in coverage envisioned by well-functioning community health worker programs will result in fewer deaths and illnesses and lower disease burdens.”⁸ Increasingly, CHWs are taking on broader roles in more integrated PHC services. In 2019, the World Health Assembly urged Member States to integrate CHWs within their health systems and provide them the necessary support to deliver safe and high-quality care, drawing on insights from the new WHO guideline.⁹

Community health worker policies have been successively developed in Sierra Leone since 2012, each building on the successes of and lessons learned from those preceding. The current National Community Health Worker Policy 2021 is designed to improve efficiency, effectiveness, and sustainability towards strengthening the linkage between CHWs and the periphery health units (PHUs). CHWs in Sierra Leone are selected by their community and end up being predominantly male (currently 68% male and 32% female). The current CHW policy focuses on increasing CHW deployment to hard-to-reach communities, increasing the female CHW proportion to 60%, integrating vertical programs (HIV, TB, malaria prevention in pregnancy) into the national CHW program, and enhancing the CHW governance through the involvement of local councils.

The CHW policy has been approved by the MoHS and signed off by the Minister of Health and Sanitation for the Government of Sierra Leone. However, implementation requires adequate funding that is based on costing specific activities and determining how to finance the activities.

The Current CHW Policy

Community health workers provide a critical link between their communities and the health and social services systems.¹⁰ Sierra Leone faces some of the most challenging maternal and child health indicators in the world, hence reaching children and women with essential lifesaving interventions is crucial and requires active community participation.⁹ This is where CHWs are a critical component as they bridge the gap between the health facilities and the communities by bringing the clinic to their communities.

The objectives of the current national CHW policy includes the following:

1. Providing policy guidance and a framework for the selection, recruitment, training, scope of work, and deployment of CHWs in Sierra Leone
2. Strengthening the management and supervision of community structures, systems and processes, and ensuring that sustainable remuneration, supply of essential commodities, and performance management systems are in place for CHWs
3. Promoting the alignment and integration of CHWs program into the national health systems of health care service delivery, health workforce, and community governance
4. Building and advocating partnerships for the provision of community health
5. Strengthening social accountability and transparency through a community approach
6. Developing and implementing a mechanism for social mobilization for health security and emergencies
7. Strengthen the linkages between CHWs and PHUs
8. Increasing the share of females in the community health workforce
9. To prioritize reaching out to the hard-to-reach communities
10. The inclusion of local councils in the governance of CHWs

The current national CHW policy aims at contributing to the attainment of the goals of the National Health Policy (2021–2025), the Medium-Term National Development Plan (2019–2023), the UHC Roadmap (2021–2030), and other health and nutrition related targets in the Sustainable Development Goals by ensuring increased and equitable access to quality and affordable health care services and health security for all in Sierra Leone.

The CHW program is led by the Directorate of Primary Health Care within the Ministry of Health and Sanitation (MoHS) and guided by the following principles:

1. Is cost-effective, people-centered, and integrated care with a high-impact and demand-driven approach based on the needs of the populations
2. Ensures that community-based services are equitably offered and accessed across Sierra Leone
3. Saves lives especially those of pregnant and postnatal women, newborns, and children under 5 years
4. Encourages community participation and ownership
5. Creates a synergy of coordination and mutual respect among stakeholders
6. Ensures complementarity of services and efforts at community, district, and national levels

Justification

A well-trained, supervised, motivated, equitably distributed, and sustainable CHW workforce is the foundation of PHC in low- and lower-middle-income-countries, like Sierra Leone, considering the current inadequacies and poor distribution of the health workforce.¹⁰ Given the integrated nature of the CHW program and its workforce's contribution across multiple program areas within and beyond health sectors, including HIV/AIDS, TB, malaria, immunization, reproductive and child health, nutrition, noncommunicable diseases, and many more, there is a potential opportunity to mobilize resources from various donors and through multisectoral channels, if a strong investment case is presented.

This study was conducted by the United States Agency for International Development (USAID)-funded MOMENTUM Country and Global Leadership project and the Government of Sierra Leone, with technical support from UNICEF, Last Mile Health, and the President's Malaria Initiative to provide estimates of the future costs of and the investment case for the CHW program in Sierra Leone. This report is intended for the Government of Sierra Leone through the MoHS, donors, and implementing nongovernmental organizations (NGOs), to help them with advocacy, planning, and financing.

Objectives of the Study

The objectives of this work are highlighted below:

- Provide an accurate and realistic estimate of the total cost of the CHW program for successful implementation through 2031
- Identify the funding needs and gaps
- Use the estimated costs and funding needs and gaps to develop an effective and efficient investment case for CHW program implementation in Sierra Leone

Country Context and Situational Analysis

The State of Health Care in Sierra Leone

The responsiveness and resilience of the Sierra Leone health system have been repeatedly tested over the years—cholera outbreak in 2012, Ebola outbreak in 2014–2016, flooding and mudslides in August 2017, and the COVID-19 pandemic in 2020.¹¹ Total health expenditure per capita continues to be among the highest in West Africa. However, despite these efforts, Sierra Leone continues to have some of the worst health indicators in the world (see Table 1).

Table 1: Selected Health Indicators in Sierra Leone^e

Population (2021)^f	8.42 million
Gross domestic product (GDP) per capita (2021)	US\$520.5
Life expectancy (2021)	55.18 Years
Infant mortality rate (2019)	80 deaths per 1,000
Maternal mortality ratio (2019)	717/100,000 live births
Under-5 mortality rate (2019)	108/1,000 live births
Population below poverty line (2018)	56.8%
Burden of diseases (2015)	Communicable – 70% Noncommunicable – 22% Injuries – 8%
Fertility rate (2019)	4.0
Malaria prevalence	22% ^g
Total Health Expenditure (THE) per capita (2019)	US\$46.2
THE as a Share (%) of GDP (2019)	8.75
Without government health expenditure	1.23

Sierra Leone’s decentralized health system comprises the MoHS at the national level, 16 district health management teams (DHMTs), and 22 local councils. The MoHS provides strategic policy and direction, technical support, guarantee standards, and quality control for health services and health products. The DHMTs and local councils are responsible for managing the delivery of promotive, preventive, curative, and rehabilitative health services and other essential services in both the secondary and peripheral health care.^h However, despite local councils being technically responsible for managing these services at the PHUs, these tasks are still performed by the MoHS through the DHMTs.

Sierra Leone has a pluralistic health care system. The publicly owned entities—provided services—are tiered into three levels: (1) PHC, which includes PHUs and CHWs; (2) secondary health care, which includes district hospitals; and (3) tertiary health care, which includes regional/national referral hospitals. There are different financing mechanisms for health care in Sierra Leone depending on the level of health care.

^e Statistics Sierra Leone, <https://data.worldbank.org/country/sierra-leone?view=chart>, <https://www.who.int/countries/sle>

^f Projected population from Statistics Sierra Leone

^g Malaria Indicator Survey (MIS) 2021. Malaria prevalence is the percentage of children 6 to 59 months of age who tested positive for malaria according to microscopy results.

^h Local councils refer to local governance system provided for by the Local Government Act 2004, represented by councilors and headed by Mayors, Mayoresses and Chairmen/Chair Lady

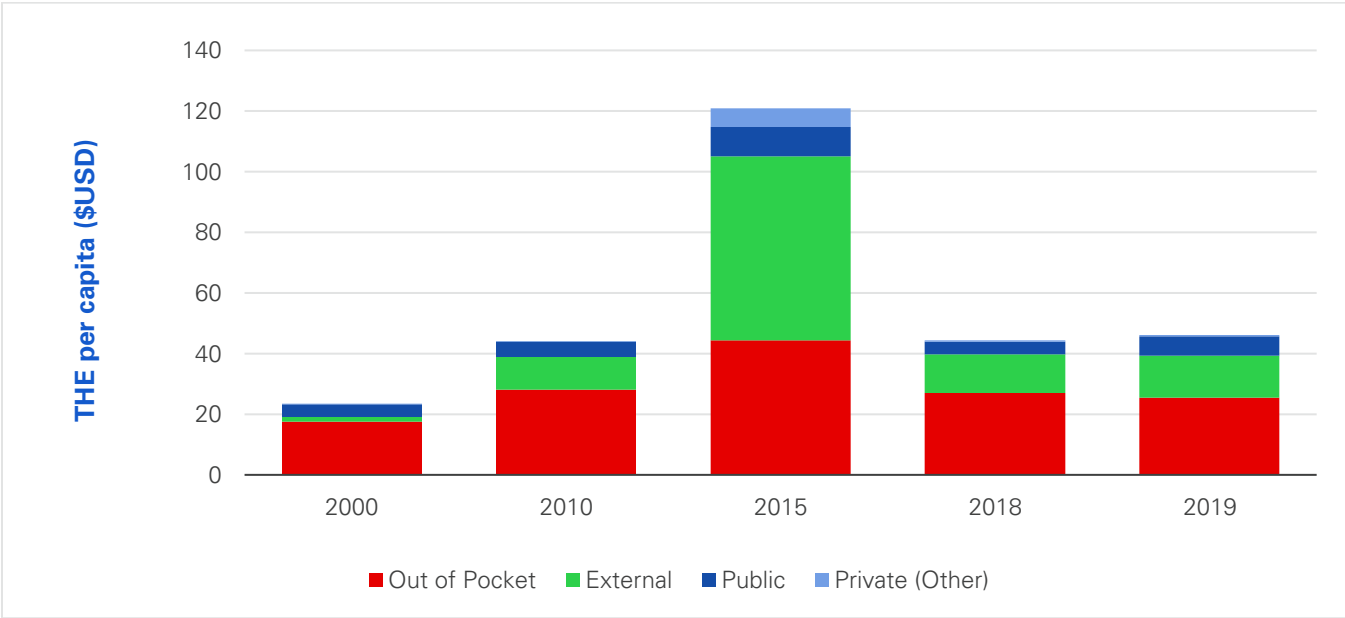
Sierra Leone has critical weaknesses in health financing. A significant share of total health expenditure (THE) per capita is borne by private citizens through out-of-pocket (OOP) payments made. The implication is that for every \$100, Sierra Leoneans spend about \$33 for their health out of their pocket.^{i, 12,13,14}

Sierra Leone’s health financing structure is not sustainable due to the following:

1. High OOP health expenditure, thus many people do not access care at the time of need
2. Limited government contribution into the health sector
3. It is a conduit for majority of the poverty cases (medical poverty) as most households spend a high proportion of their income on health
4. High burden on the population, financing is mainly through borrowing, support from relatives, or selling of prized assets
5. System is heavily reliant on external financing
6. Weak health financing arrangements (i.e., the country lacks risk pooling, it provides little financial protection for patients, and there is little or no strategic purchasing)

This is further explained in Figure 2, for the past two decades the health sector has been reliant on external funding and high OOP health expenditures.

Figure 2: Share of Total Health Expenditure Per Capita



As shown in Figure 2, currently, there are four major sources of health financing in Sierra Leone: (1) OOP household expenditure (domestic private health expenditure), (2) external support from bilateral and development partners including international NGOs (external health expenditure), (3) public government expenditure (domestic general government health expenditure), and (4) other private sources including for-profit and health insurance schemes. The 2015 increase in funding across the board was due to the emergency response to the 2014–2016 Ebola outbreak in West Africa.

With an increasing population and growing health care needs, coupled with a very low public financing of health care, there is a need to explore health financing and delivery models that will generate the best health outcomes using available resources.

ⁱ <https://www.afro.who.int/sites/default/files/2017-05/hrhprofile16.pdf> and accessed on 1st November 2022

The State of the CHW Program in Sierra Leone

Countries committed to achieving UHC as part of the Sustainable Development Goals set in 2015 and reaffirmed that commitment at the United Nations General Assembly High Level Meeting on UHC in 2019.¹⁵ Achieving UHC and ensuring effective pandemic preparedness and response will require strengthening health systems by investing in PHC, particularly frontline health workers at the PHC level and in communities.^{16,17,18,19,20}

In Sierra Leone, CHWs are essential frontline human resources for health, critical to the country's vision of a resilient national health system and prosperous socioeconomic development.^{21,22,23} Under the leadership of the MoHS, there was a large scale-up of CHWs employed by NGOs between 2000 and 2016, including during the Ebola crisis.²⁴ As of 2020, there were approximately 15,000 CHWs deployed in Sierra Leone.²⁴ An assessment of the national CHW program in 2019 incorporated findings from earlier iterations of previous studies and informed the MoHS National Community Health Worker Policy 2021.²⁴ The new policy included three key policy shifts: harmonization and integration of all CHW cadres into the national CHW program, rightsizing the scale of the CHW network, and retargeting CHW deployment to areas of greatest need.¹⁰

Sierra Leone established its first national CHW program in 2012, aiming to standardize roles, training, supervision, and monitoring of CHWs.²⁵ The first policy broadly defines the cadre and describes their general tasks, such as community mobilization, health promotion, and basic interventions in line with the country's essential health package.

Community health workers worked at the frontlines to mobilize and sensitize communities during the Ebola virus disease outbreak in 2014–2015 to safeguard against the virus, and conduct community-based surveillance to help curb the epidemic.²⁵ The effectiveness of their role and actions emphasized their importance in reaching underserved populations. It was against this backdrop that the MoHS recognized the importance of CHWs to effectively implement routine health interventions and to reach the overall objectives of achieving UHC in 2030.

The CHW program was updated in 2016 to address three primary areas:

- Reproductive, maternal, newborn, and child health (RMNCH)
- Integrated community case management (iCCM) for childhood illness
- Community-based surveillance

In February 2017, the revised national CHW policy 2016 was launched to better integrate and support CHWs in their role within the health system, including management and supervision, incentive structures, and training.

Table 2: Quick Facts about the CHW Program in Sierra Leone^{10,25}

Main CHW Program Policies/ Strategies	Free Health Care for Pregnant and Lactating Women and Children Under 5 Years	Health Sector Recovery Plan 2015–2020	Sierra Leone Basic Package of Essential Health Services 2010–2015	National Community Health Worker Policy 2016–2020	National Community Health Worker Policy 2021
Last Updated	2009	2015	2015	2016	2020
Number of community health providers	1 main cadre: CHWs			4 main cadres: <ul style="list-style-type: none"> • National CHW • Tuberculosis CHW • HIV/AIDS CHW • Malaria prevention (pregnant women, infants), traditional birth attendants 	3 main cadres: <ul style="list-style-type: none"> • CHWs serving easy-to-reach (EtR) population areas • CHWs serving hard-to-reach (HtR) population areas • Peer supervisors
Number of CHW providers	15,000 CHWs (including peer supervisors, at 1 peer supervisor to 10 CHWs)			7,909 CHWs, (including peer supervisors, at 1 per 10 CHWs)	
Recommended ratio of CHWs to beneficiaries	1 CHW: 250 people (areas 3 or more kilometers of a health facility) 1 CHW: 1,000 people (areas within 3 kilometers of a health facility)			1 HtR CHW: 300–350 people* 1 EtR CHW: 500–1,000 people#	
Community level data collection	Yes				
Level of management of CHW program	National, Regional, District, Chiefdom and Community (MoHS/Directorate of Primary Health Care-CHW Hub, regional coordinators; DHMT/CHW focal person, chiefdom supervisor, in-charge of each PHU, respectively)				
*HtR CHWs cover a distance of over 5km radius from the nearest PHU or within 3–5 km with difficult terrain #EtR CHWs cover within a 3–5 km radius of the nearest PHU					

The CHW program in Sierra Leone has been built on years of experience of using different types of CHWs, including traditional birth attendants, community drug distributors, and vertical disease program CHWs. The vertical disease CHWs have been supported by different MoHS programs and international NGO partners, leading to fragmentation and lack of coordination, emphasizing the importance of an integrated approach to financing the CHW program. The current CHW program has gone through phases in its development process (Table 2). Each of these policies has laid emphasis on specific improvements that, together, have culminated in the current strategy. The CHW Hub sits under the Directorate of Primary Health Care and coordinates CHW activities at national level, providing technical and operational guidance to DHMTs’ CHW focal persons, while each DHMT with its CHW focal person is responsible for district-level planning, implementation, and monitoring of the national CHW program in line with the national CHW policy. At national level, the CHW steering committee gives strategic and policy guidance and oversight to ensure that the CHW program is being implemented in complementarity of the other health sector programs and attaining its goals. The national technical working group provides technical oversight of CHW program implementation and supports the development of policies, strategies, curricula, job aids, mobilizes resources, and foster collaboration and coordination among partners.

The current CHW program has two cadres of workers—those serving easy-to-reach (EtR) and hard-to-reach (HtR) populations, as defined in the national CHW policy. The CHWs in EtR areas (EtR CHWs) serve populations within 3–5 km from a health facility and cover a catchment population of between 500–1,000 people. CHWs in HtR areas (HtR CHWs) works in communities more than 5 km from a health facility (or within 3–5 km with difficult terrain) and cover a catchment population of about 300–350 people.¹⁰

METHODOLOGY

Introduction

The costing of the CHW strategy utilized a four-pronged approach:

1. Data to be applied to the modeling tools were collected from diverse sources, including desk reviews, meetings and consultations, and facility data
2. A cost analysis was carried out in line with the policy strategy
3. A benefits calculation in terms of lives saved as a result of the CHW program intervention was done calculating the monetary benefits, including productivity, employment, and health in the form of insurance against an epidemic or pandemic
4. An investment case was presented taking into consideration return on investment (ROI)

Data Collection Approach

A majority of the data collected was secondary through desk review and analysis. Consultative meetings and discussions were held with key stakeholders to get first-hand information on required secondary data. Primary data were collected from a purposively selected number of health facilities and CHWs to help get a better idea on the reality of program implementation and ascertain whether some cost assumptions should be revised. Specifically, data related to time allocations and activities of CHWs, supervisors, and managers were obtained and validated through a sample of meetings and discussions. Two main methods were used to collect data—a desk review and meetings.

Desk Review

A thorough review of secondary literature was conducted. Based on this review, detailed data needed as part of the revised CHW policy document was collected for use in the costing analysis. Documents reviewed included the CHW policy 2021–2025, other CHW policy design documents, excerpts of interviews and/or other relevant documents used in the development of the policy, reports both national and international, other project documents relating to the CHW policy strategy. The document review process helped to:

- Gather background information—reviewing existing documents helped us understand the history, philosophy, and operation of the CHW program
- Identify knowledge, processes, and gaps and to formulate focused questions on the CHW program and its processes
- Carry out a stakeholder analysis of CHW in Sierra Leone
- Collect secondary data

This process helped develop a thorough understanding of the CHW program and policy document and in making meaningful contributions to the costing and investment case processes. It was also useful in the collection of secondary data.

Meetings and Discussions:^j

To get the requisite data needed, meetings were held with key stakeholders, especially the National Steering Committee^k, key experts, CHWs and their supervisors, including district focal, chiefdom in both Falaba and Tonkolili districts. These meetings were useful for specific data requirements, reaching consensus, and obtaining both detailed and summary information. Meetings were also held with key health facility staff to collect and ascertain the secondary data. Discussions were held with strategic partners especially the MoHS, UNICEF, and other stakeholders obtained from the stakeholder analysis.

Unit cost and expenditure data from the 2020/21 calendar year were collected from interviews with CHWs and staff at PHUs, community health centers, DHMTs, district planning officers from local councils, etc. The data collected were used to analyze and identify key cost inputs and drivers. The questions in the discussions and meetings mirror CHW costing in similar countries and programs and captures key thematic areas.

Field Data Collection

As part of the task to get accurate data, the team collected data from the field specifically for the use of the C3 tool. Two districts were chosen for the data collection exercise, Tonkolili and Falaba. The choice of the districts hinged on the Tonkolili being one of the best managed CHW program in the country comparatively and densely populated, while Falaba was chosen because it is one of the two newest districts, remote, sparsely populated, and has very rough terrain.

Data were collected from 30 participants through meetings and discussions from both districts, comprising 13 from Tonkolili and 17 from Falaba districts. From both districts participants included five CHWs who were EtR, 18 HtR, five peer supervisors, and two chiefdom supervisors.

Description of Tools

The investment case process involved costing of the program and estimating total benefits and finally the ROI analysis. Different tools were employed for this work. The costing exercise involved both the [Community Health Planning and Costing Tool](#) (CHPCT), the [Community Health Worker Coverage and Capacity](#) (C3) tool, and the [Lives Saved Tool](#) (LiST). The CHPCT tool uses an ingredients-based approach to calculate the costs and depends on data from two costs—actual and normative.²⁶

- Actual cost: This data mirrors real-time data from the community health program. It is collated from expenditure reports, service registers, or interviews with staff.²⁶ The data were collected at both national and sub-national levels and in a sample of health facilities and CHWs involved in the community health program.
- Normative cost: These data mirror the cost of providing high-quality services according to norms and standards, typically detailed in a community health strategy.²⁶ This includes information on the interventions provided by CHWs; estimated total cost of personnel supporting the program, such as CHWs and their managers; costs of training and supervision; and more.

The Community Health Planning and Costing Tool

This tool is used to cost packages of community health services and produce results to enable planners and policy-makers assess the performance, plan future services, and make investment cases as to why the CHW program should be prioritized.²⁶

This tool classifies community health service program costs into key buckets, namely: CHW related costs, supervision costs (salaries and meeting costs), management costs (salaries and meeting costs), training costs,

^j The field guide used for the meetings with the CHW and their supervisors are included in the appendix.

^k The National Steering Committee consisted of members from UNICEF, the Directorate of PHC, among others.

equipment costs, medicines and supplies, capital costs, and recurrent costs. The CHPCT is an input-based model, thus customizable and includes a comprehensive coverage of cost items.²⁶

CHPCT's key advantages are that it is specific for community health, it is customizable as it is an input-based model tool, and it is widely used and broadly endorsed by organizations and countries especially in sub-Saharan Africa. The CHPCT tool does suffer from the following disadvantages: its usefulness depends heavily on the availability of data and does not have an inbuilt function for calculating benefits and ROI.

CHW Coverage and Capacity Tool

The C3 tool is applied to support discussion and scenario-based analysis with CHW policy-makers and program managers regarding CHW time allocation, workload, and population coverage assumptions. The C3 tool helps planners to understand the number of CHWs needed to carry out evidence-informed policies and make national decisions with respect to workload, hence it helps planners with priority setting and rationalization.

The key advantages of the C3 tool are that it is used to give the efficient number of CHWs needed to carry out specified health interventions; it is used to optimize CHW time allocation; and it is used to define, rationalize, and optimize the effective level of coverage for and mix of activities/interventions that a predetermined number of CHWs undertake for a given population.²⁷ Despite these advantages, the tool suffers from not being able to measure the cost of the CHW program.

Lives Saved Tool

The Lives Saved Tool estimates the impact of service provision (health and nutrition), mainly for interventions to improve maternal, child, and newborn health, and how they change projected mortality and morbidity.^{28,29} LiST is a deterministic mathematical model that compares the effect of various interventions on population-level risk factors and stillbirths and maternal, newborn, and child deaths.^{30,31}

Although LiST can be used in wider applications and can compute benefits/value beyond just community health, in this particular analysis, LiST was used to project lives saved through scale up of lifesaving interventions at community between 2021–2026 and extended to 2031. Specifically, it was used to compute benefits/value of community health in terms of lives to be saved if population coverage of specific interventions were achieved.³² Some of the key benefits of using LiST include its utility in calculating the benefits of CHW programs in term of lives saved; allows the use to customize intervention coverage; estimates the relative effectiveness of CHW program options; and influences policy in low- and lower-middle-income countries. It is the only tool among the three that calculates both costs and benefits.³³ However, it suffers from some shortcomings, namely its usefulness depends on the availability of data to support the expected increase in coverage of specific interventions over the projection period, and it does not compute benefits resulting from increased employment and insurance against future health crises.³³ A comparative summary of the three tools used is shown in Appendix A.

Estimating the Cost of the CHW Program

In estimating the cost of the CHW program, several assumptions were made, in collaboration with the Government of Sierra Leone, with regard to the cost of the program (see Appendix B for the list of assumptions).

A health system perspective was adopted to estimate the standard cost of running a CHW program. Both the bottom-up and top-down approaches were used to capture the cost of the program. A bottom-up, activity-based costing was used for estimating cost at the service delivery level in which unit costs per service are built up by the type of resource (e.g., medicines) and multiplied by the total estimated number of services. A top-down approach was used to allocate the cross-cutting costs incurred at different levels of the program management (national, regional, district, chiefdom, PHUs, and CHW level) and include administration cost, staff and CHW training cost, and shared costs such as the cost of integrated supervision.

The cost of the CHW program was based on many factors, namely the number of services carried out by both CHWs (EtR and HtR), average number of people in a community to cover (750 for EtR and 325 for HtR), total number of CHWs at baseline, working hours a day, annual CHW financial incentive, cost of equipment used by CHWs supervisors and management, cost of training, management costs, other recurrent and start-up costs, preloaded medicines and their costs, and standard treatment protocol, which includes time taken to carry out a task. The costing module takes into consideration the number of health facilities, within the health system, at each level implementing the CHW program.

The outcome of modeling using these costs is the number of CHWs for each projection year, the total number of services carried out by the CHWs, and the total cost of the program for the baseline year to the cost for the final year of the projection period.

Calculating Health Benefits

The Lives Saved Tool was used to assess the benefits of the CHW program in Sierra Leone. LiST was used to project lives saved as a result of the national scale-up between 2021–2026 and extended to 2031.

The tool was used to project the number of deaths averted in the long run through the intervention of CHWs. In the short run, the tool was used to compute the expected reduction in the number of illnesses due to early access to health care services (curative) and health promotion and disease prevention. These health benefits were translated into monetary terms to estimate the value of the contribution to overall benefits.

Estimating Economic and other Benefits

Estimating total benefits includes estimating benefits in terms of productivity, avoiding the high costs of global health crises, and increased employment. The economic benefits of investing in the CHW program in Sierra Leone hinges on three broader criteria—increased productivity from a healthier population, insurance against future health crises, and increased employment.²

The primary driver of economic returns of the CHW program is increased productivity from mortality averted, or lives saved.² To classify the effect of the productivity benefit, we utilized a methodology being used before by estimating the economic value of lives saved to be equal to the number of lives saved multiplied by the expected future economic output of each life save.^{2,34} The expected future economic output per life saved was estimated by taking into consideration the gross domestic product (GDP) per capita for the projection years, GDP growth per year, life expectancy, and using a discount rate of 5% to calculate the net present value of the future cash flows from these projected life term earnings.^{2,35}

In terms of avoiding the high cost of a global health crisis, the World Bank estimated the cost to the global economy for a severe pandemic flu to be about \$3 trillion, and projected the inevitability of a human pandemic in the future.³⁶ Even though CHWs cannot prevent such epidemics or pandemics, they can be useful in containing these health threats by participating in early prevention and treatment efforts at critical inflection points. Taking into consideration the contributions by the CHWs in rapidly containing these fatal health crises, the economic losses that could be avoided through CHW scale-up is estimated as the contribution of the local CHWs to the global health workforce multiplied by the cost of a global pandemic.

In terms of increased employment, we see that the employment of CHWs, especially women, carries with it both an increase in economic activity and meaningful improvements in social indicators, including reduction in crime and expansion of education.² The value associated with increased employment is estimated by taking into consideration the multiplier effect of increased government spending resulting in increased formal employment and economic activity multiplied by the total cost of the CHW program.

The sum of these three benefits gives us the total benefits from the scale-up of the CHW program.

Estimating the Return on Investment of the CHW Program

The ROI was estimated using a conservative approach by dividing the total benefits by the total program costs for each scenario. The ROI calculates the total benefits derived from each dollar invested in the program. Both the benefits and costs are expressed in US\$ terms. While the ROI analysis is not frequently performed in CHW interventions, it has the potential to justify their value to a variety of stakeholders.³⁷ An ROI greater than \$1.00 generally indicates a successful program from the perspective of the ROI analysis.

RESULTS OF COSTING AND INVESTMENT OF THE CHW PROGRAM

Cost of Implementation

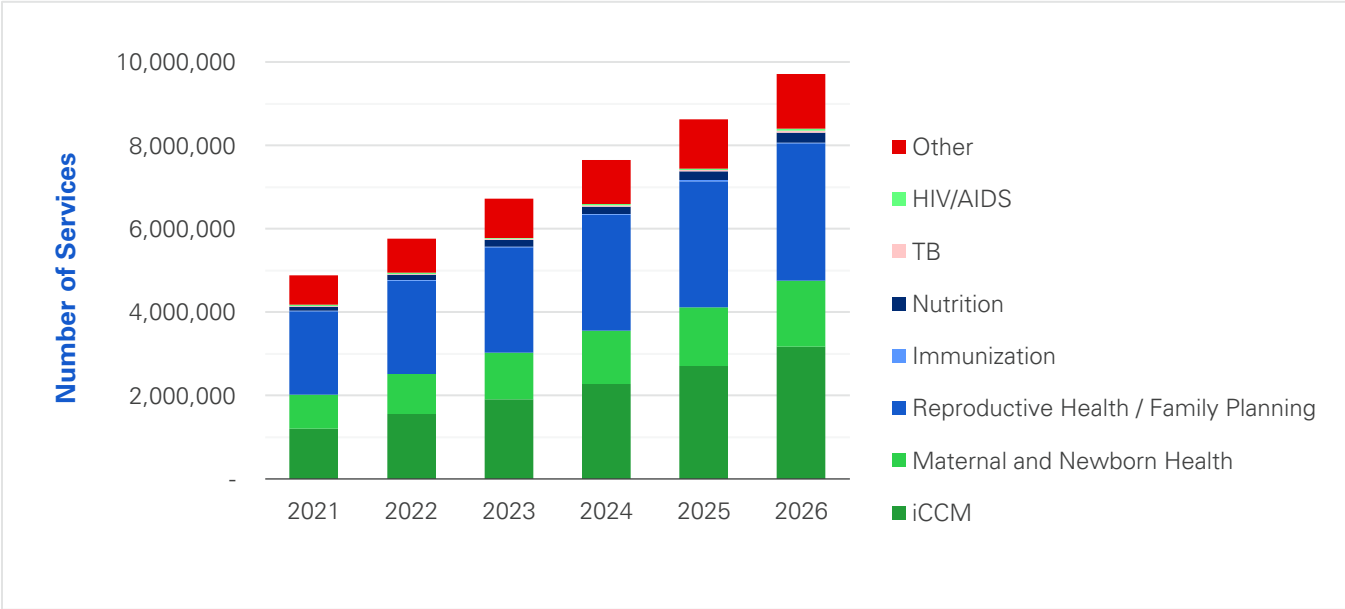
The projection period for this study is from 2021–2026; an additional projection was made to 2031. The determination of the investment analysis hinges on the cost of the program and its benefits thereof. Understanding the cost of the CHW program heavily relies on the number of health services provided by the CHWs. Unless otherwise stated, this work uses a moderate coverage scenario wherein it is assumed the program provides about 85% coverage of both services and population by end of 2026. (See Appendix C for tables of cost by input and intervention and cost of medicine by intervention.)

Number of Services Provided

The CHW program provided about 4.56 million services during the base year in 2021. By the end of the projection period (2026), the services will increase to about 7.87 million, accounting for an increase of 73% over the period. It is important to note that the unit of services provided are different; for example, child related health services represent encounters with individual children whereas promotional services represent encounters with members in a community.

Over 80% of services provided by CHWs falls within the iCCM, maternal and neonatal health, and reproductive health/family planning services (Figure 3). Over the period under review, reproductive health services accounted for the highest percentage at 38% of services provided by CHWs, followed by iCCM at 26%, and maternal and newborn health with an average of about 18%. (See Appendix D for a graphical representation of these services by cadre of CHW). Note that services related to the treatment component of iCCM are only delivered by CHWs serving in HtR areas.

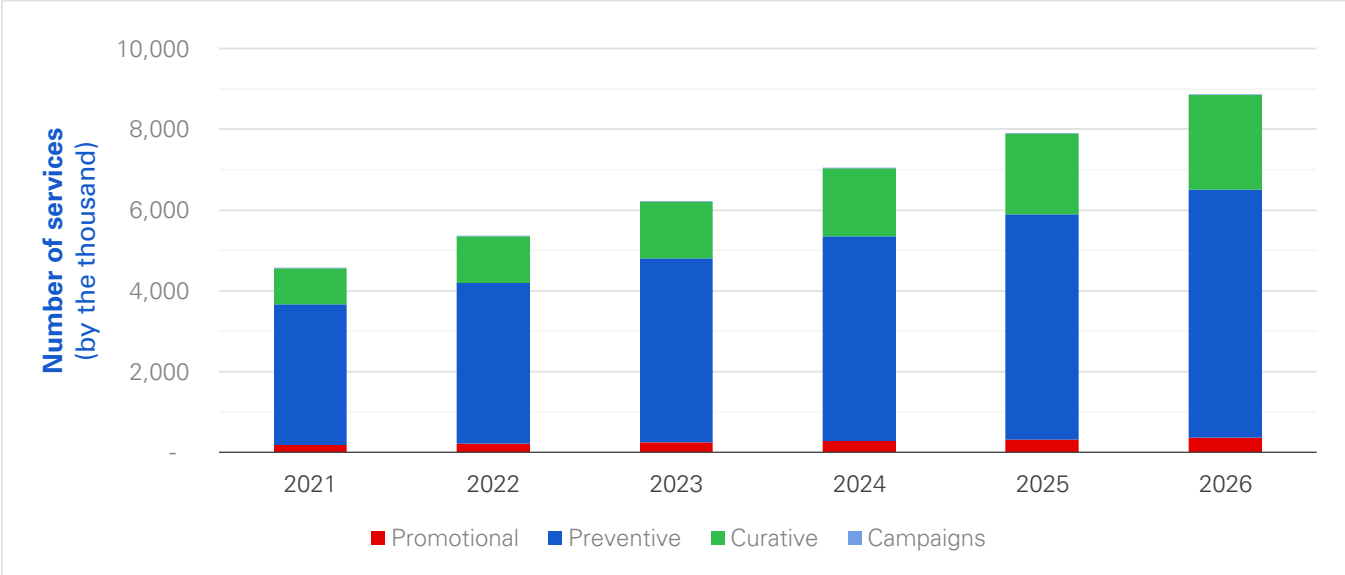
Figure 3: Number of Community Health Services Provided per Year by Type Service



We also looked at the number of community health services by category—promotional, preventive, curative, and campaigns. Health promotion programs focus on keeping people healthy through engaging and empowering individuals and communities to choose healthy behaviors and make changes that reduce the risk of developing chronic diseases and other morbidities. Preventive health programs focus on specific efforts aimed at reducing the development and severity of chronic diseases and other morbidities. They include all maternal and newborn health (MNH), reproductive health/family planning, condom distribution, nutrition (administering vitamin A), screening and referral for malnutrition cases, and HIV counselling and testing services. Curative health programs refer to health care practices that treat patients with the intent of curing them, not just reducing their pain or stress and they include all iCCM cases.

Preventive health captures the majority of services provided by CHWs over the projection period (Figure 4). About 72% of the total number of services over the projection period were preventive health followed by curative health with an average of about 23% of the total health services. These two cover almost all the health services, consistent with CHW programs wherein their focus is on preventive health.

Figure 4: Total Number of Services by Category



Number of CHWs

The number of CHWs determine to a greater extent the number of services and the cost of the CHW program. In Sierra Leone there are two categories of CHWs, EtR and HtR areas. According to the CHW policy 2021, each CHW will serve a given catchment population that will be determined by distance (plus access challenges) to a community, as outlined in Table 3 below.

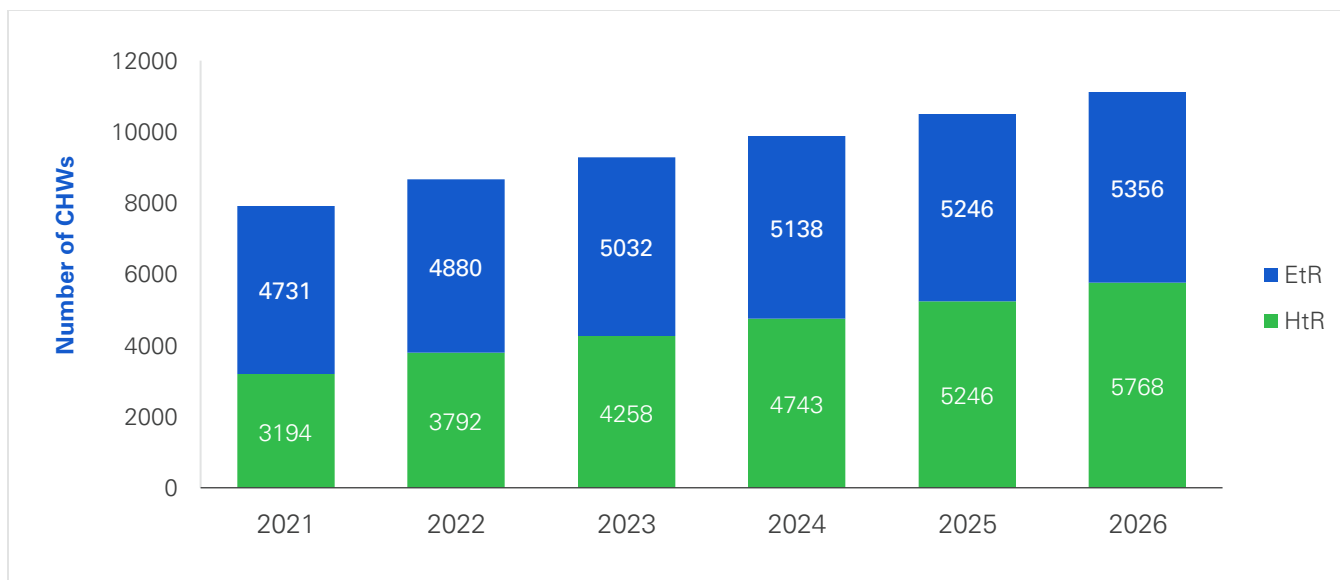
Table 3: Differences between the Types of CHWs

Descriptions	Easy to Reach	Hard to Reach
Distance (radius from the nearest PHU)	Between 3 km and 5 km	Over 5 km (or between 3 km and 5 km with difficult terrain)
Catchment population	500–1,000 (100–170 households)	300–350 (50–60 households)
Service package	Provide all services as per scope of work	Provide all services as per scope of work Provide iCCM Plus services
Scope of work	Provide all services with the exception of iCCM Plus (treatments); however, they will identify and refer sick persons to health facilities for treatment and provide TB and HIV services	Provide all the services in the CHW package, including iCCM Plus, TB, and HIV services

Source: MoHS (2021)

The total number of CHWs increased by 3,199 over the projection period (Figure 5). The proportion of CHWs is higher for EtR over the projection period. This is due to the design of the program wherein EtR CHWs accounted for about 60% of the total number of CHWs in 2021. However, by 2026 and based on the coverage needs, the number of HtR increased to about 52% while EtR dropped to 48%.

Figure 5: Number of CHWs



From the CHPCT calculation of the number of CHWs, we saw that EtR decreases over the projection period from 60% to 40% whereas HtR had the opposite. This is also in line with the results from the C3 wherein to get an optimal number of CHWs to carry out the respective tasks in the policy, the program needs more HtR CHWs.

Cost of CHW Program

To understand the total cost of the CHW program requires specification of the components of the program included in the costing exercise. Table 4 shows the components used to arrive at the total cost of the CHW program over the projected 2021–2026 period. Note that in these calculations, per the national policy, refresher trainings occur annually for supervisors and every other year for CHWs.

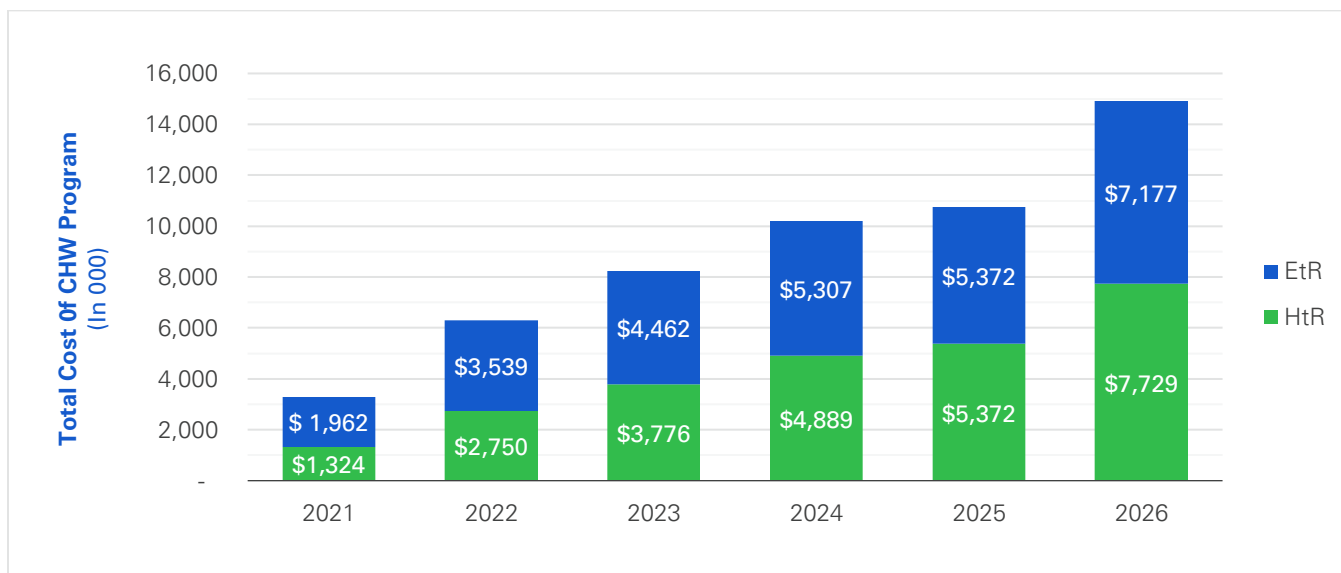
Table 4: Components of the CHW Program included in the Costing

Component	Description
Number of CHWs	7,909* EtR = 4,745 and covers between 500–1,000 people and are paid \$180 per year HtR = 3,164 and covers between 300–350 people and are paid \$300 per year
Number of Peer Supervisors	791
Number of Management Staff	<ul style="list-style-type: none"> • Director • Program management team • 5 regional coordinators • 16 district focal supervisors
Trainings Included**	<ul style="list-style-type: none"> • CHW trainings: baseline and refresher trainings including pre-service training • Peer supervisor trainings: baseline & refresher trainings including pre-service and master trainer training
Equipment Included	<ul style="list-style-type: none"> • CHW equipment • Peer supervisor equipment • Management equipment
Medicines included: iCCM (oral rehydration salts + zinc, amoxicillin DT, malaria rapid diagnostic test, artemether + lumefantrine), family planning (condoms, oral contraceptives), nutrition (vitamin A), maternal and infant health (sulfadoxine + pyrimethamine).	
Capital costs include: vehicles and software and other recurrent costs: office supplies, fuel for vehicles, vehicle maintenance, office communication (internet for CHW Hub office)	
*This is the total number of the CHWs presently in the country, which is different from the 7925 calculated by the CHPCT – ideal number that should be working taking into consideration the attrition and new entrants	
** Given the reconfiguration of the CHW workforce in 2022, the initial training did not apply to all CHWs, but approximately 25% of the CHW workforce. This was the same proportion applied in out-years, taking into account both turnover and increased numbers of the CHWs as the program evolved.	

Source: – MoHS 2021

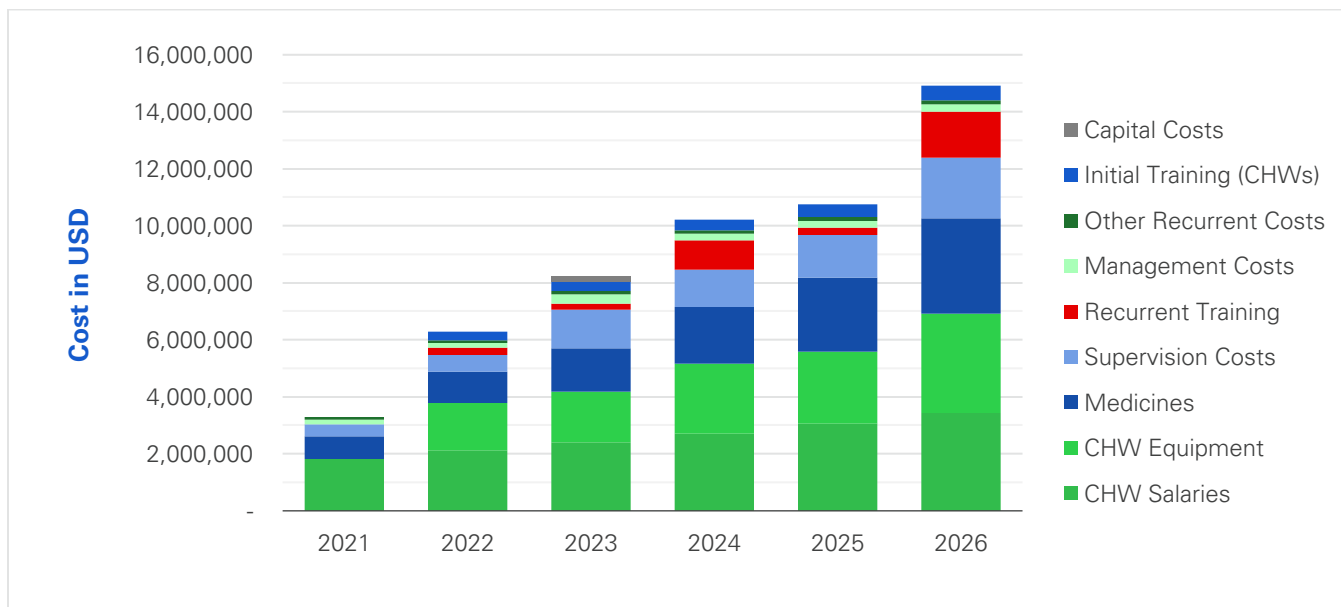
Based on current CHW structures and service delivery, the total cost required to deliver the CHW program in Sierra Leone over the projection period is \$53.8 million (Figure 6). All costs are expressed in US dollars and exclude inflation. A population growth rate of 2.1% per year and an average household size of 5.9 were assumed.

Figure 6: Cost of CHW Program per CHW Cadre



The cost increases steadily from about \$3.3 million in 2021 to approximately \$15 million in 2026, an increase of over 350%. The main cost drivers for the CHW program over the projection period are CHW salaries/incentives covering about 33%, medicines 21%, and CHW equipment 20%, all covering about three-fourths of the total cost (Figure 7). This shows that for every \$10 invested in the CHW program, about \$7 will be towards CHW incentives, medicines, and equipment over the projection period.

Figure 7: Estimated Cost of the CHW Program by Cost Inputs

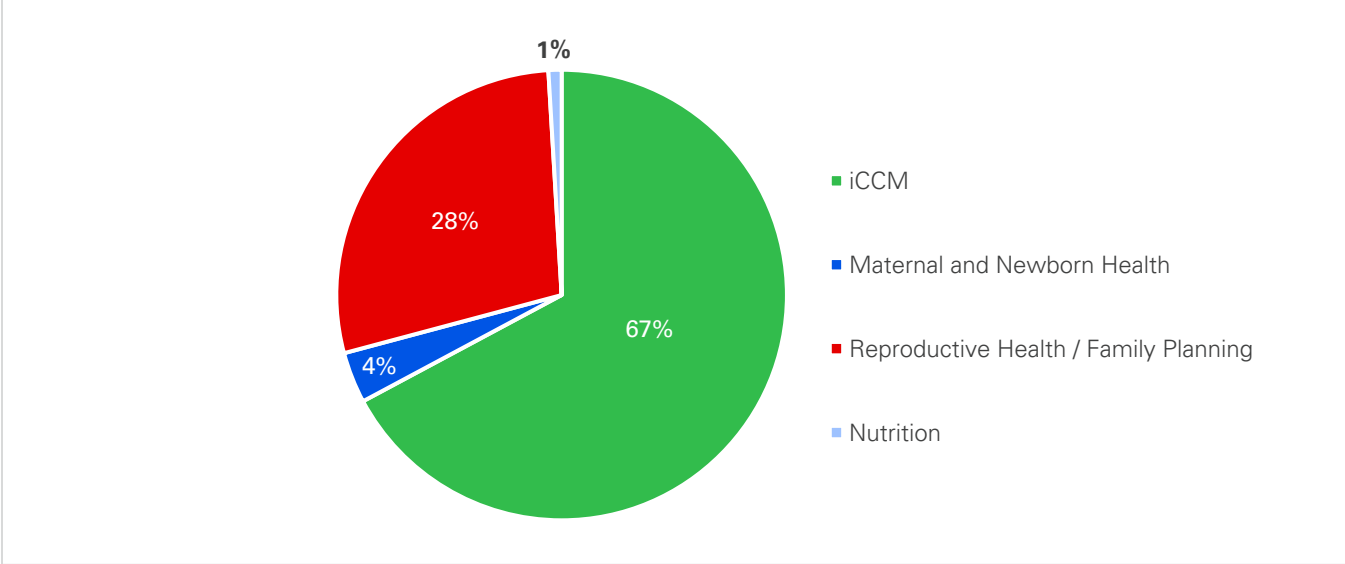


There is not much difference between 2024 and 2025 where the cost was flattened. This is attributed to recurrent trainings that will not take place in 2025 but will in 2024 and 2026 and with replacement of equipment, such as job aid during the same periods. The increases in salaries, number of CHWs, and medicines in 2025 over 2024 are offset by the cost of equipment and recurrent trainings in 2024. In addition, most of the other equipment purchased are to be replaced in 2026 like medicines box, android tablets for supervisors etc.

The cost of medicines delivered through the CHW program was \$800k in 2021. It increases as a result of concurrent increases in both the number of CHWs and services delivered to \$3.35 million in 2026. Inflation is also taken into account over time.

The majority of costs associated with medicines that CHWs provide are for iCCM and reproductive health (Figure 8). In 2026, nearly 70% of the total costs will be for iCCM drugs, of which 61% is for malaria commodities (primarily treatment but also rapid diagnostic tests), 33% for diarrhea treatment, and 5% for pneumonia treatment (see Table 4 for the medicines listed per category).

Figure 8: Cost Drivers for Medicines, Averaged Over the Period 2021–2026



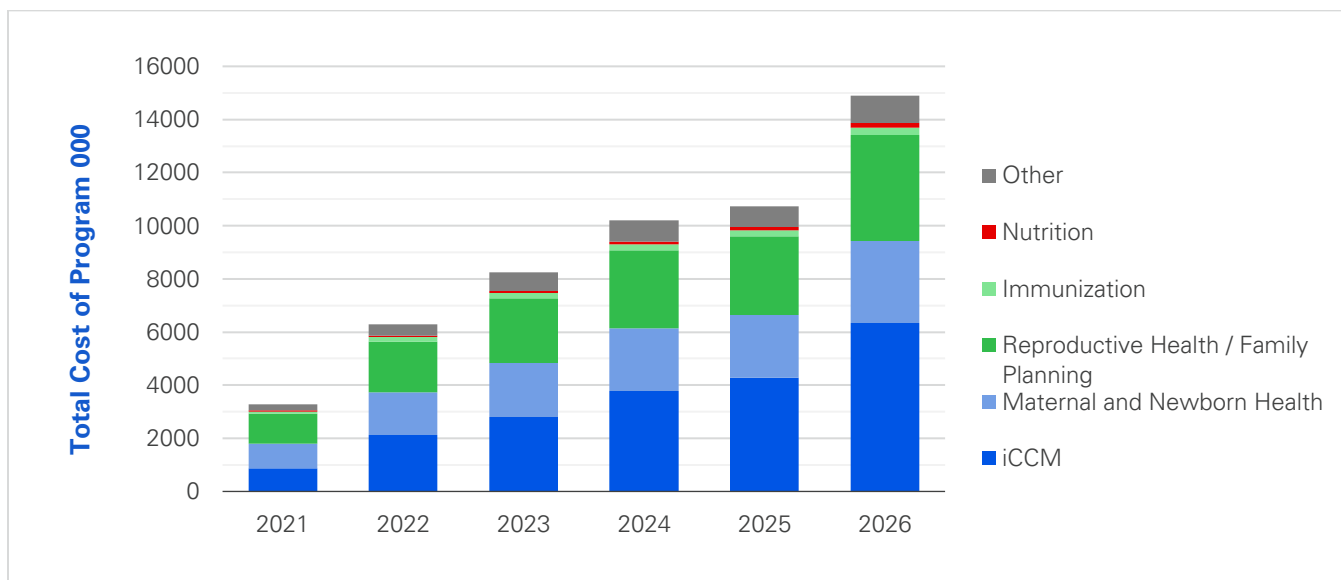
For the overall CHW program, the cost per capita (based on total population) is \$0.54 in 2021, rising to \$2.23 in 2026.¹ The cost per CHW (total cost of the program divided by the total number of CHWs) rises from \$415 in 2021 to a projected \$1,340 in 2026. The increase is triggered by the increase in the total cost of medicines by over 350% while the number of CHWs increases only 40% over the same period, reflecting a greater number of services delivered. In addition, the number of HtR CHWs, which have higher costs, increased by about 80% over the same period.

In sub-Saharan Africa, the annual cost for a phased rollout of community health interventions across rural low-income settings is estimated at between US\$2.62 and US\$6.56 per capita, with a total CHW program cost of \$3,584 per CHW. The estimates for Sierra Leone are just below these regional estimates because the compensation packages for CHWs in Sierra Leone, with current policy, are lower than typical in other countries in the region.

The cost of the CHW program was also looked at in terms of cost per intervention package. There are five main interventions provided by both cadres of the CHW program in Sierra Leone, save for the iCCM treatment component that is provided by HtR only. The other four interventions include MNH, reproductive health/family planning, immunization, and nutrition. Other services provided by both EtR and HtR CHWs include HIV/AIDS, TB, routine visits to households, community-based surveillance, etc.

¹ This is total cost divided by the total population. Based on the population to be covered by the CHW program, the per capita cost would be \$2.53. Note that the CHW program does not cover every Sierra Leonean.

Figure 9: Cost of Program by Intervention/Service



Over the projection period, services delivered by CHWs for iCCM, MNH, and reproductive health/family planning are responsible for about 90% of the total CHW program cost (Figure 9). However, if we look at the costs by CHW cadre (Appendix D), and noting that it is only the cadre serving HtR populations that deliver iCCM services, about \$5.4 out of every \$10 goes to iCCM interventions for HtR populations. On a per capita basis for the covered HtR populations, the delivery of iCCM services costs \$2.69. For EtR populations, for every \$10 spent, about \$4.6 and \$3.7 is spent on reproductive and maternal health respectively. Beyond MNH, and reproductive health/family planning, the other services provided by CHWs to both EtR and HtR populations include: national immunization campaign (counselling, defaulter tracing, referral, outreach); vitamin A; reporting of births and deaths; routine community meetings for promotion, education, and screening; routine visits to families without children under 5 for promotion, education, and screening; routine visits to families with infants and children under 5; TB contact tracing and referral; education on TB with high-risk groups; and education/counselling on HIV with high-risk groups.

CHWTime Utilization

The C3 tool was used to investigate two questions, 1) what was a realistic expectation of a CHW’s time and how could they best utilize that resource? (optimal time utilization), and 2) how many CHWs are realistically required for the tasks included in their scope of work, as prescribed by the national CHW policy (optimal resource mobilization) (Appendix E). Currently, CHWs in Sierra Leone work half time (4 hours a day). With the current distribution, there are more EtR than HtR CHWs; the current scenario is creating a limited return for health. To determine optimal time utilization, we estimated how CHWs spend their time, disaggregated by EtR and HtR CHWs in Figures 10 and 11.

Figure 10: Time Utilization of CHWs in HtR Areas^m

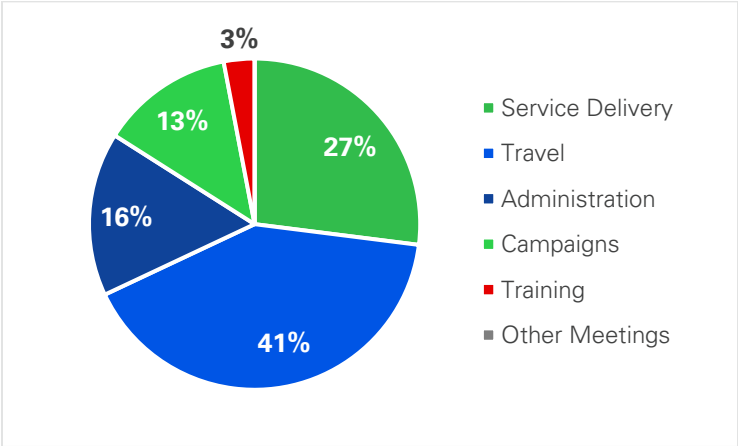
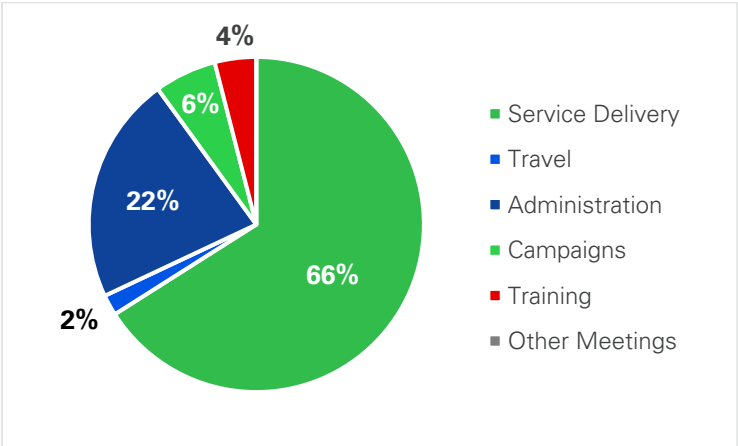


Figure 11: Time Utilization of CHWs in EtR Areas



Figures 10 and 11 above are based on theoretical time use where all implementation is completed as planned, without time constraint, and the chart does not take idle time into account. Due to differences in actual time spent on travel (much higher for CHWs serving HtR areas), the total amount of time spent by CHWs in HtR and EtR areas are not equal. Throughout the CHW allocation scenarios (half-, part-, or full-time) in the C3 tool, time spent on administration, campaigns and training is comparable for each cadre, r, as seen below in Table 5.

Table 5. Time Spent In Hours Per Month, Per Task by CHW type

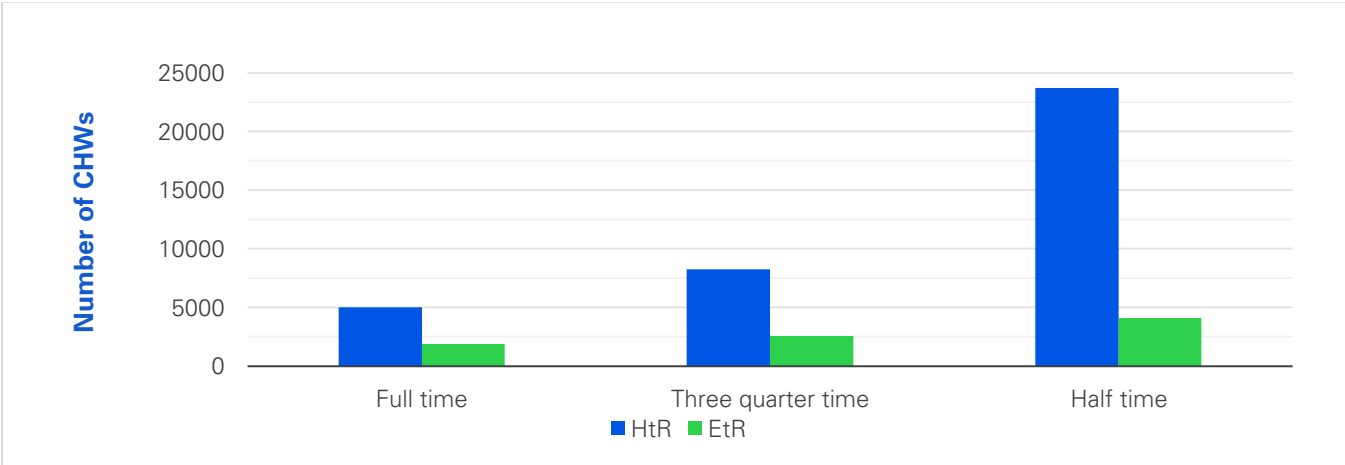
Average Time Spent	EtR	HtR
Training	0.5	0.6
Campaigns	2.6	2.7
Administration	10.8	13.6

^m Travel refers to the time taken to move from one community/village to another; administration involves, among other things, preparation of daily, weekly, and monthly reports; campaigns include support to national immunization days, HIV/AIDS campaigns, etc.; others include meetings with community and supervisors.

Considering the proportional analysis of time spent from figures 10 and 11 above, it is clear that CHWs in hard-to-reach areas spend the biggest proportion of their time on traveling from one community to the other; whereas for easy-to-reach areas, CHWs spend a majority of their time on service delivery.ⁿ Service delivery varies depending on actual services delivered. From our in-depth interviews and data collection, we found most CHWs especially the HtR areas trek on foot within their catchment population. Easy-to-reach CHWs are mostly deployed in urban and semi-urban areas, where the road network is comparatively better and geographic distances are close than the hard-to-reach areas.^o CHWs in HtR areas are only able to spend a little over one-fourth of their time on service delivery, which is one of the main responsibilities of their role. Considered in addition to the 13% of their time that CHWs in HtR areas spend on campaigns, these CHWs are able to spend about 40% of their time on their main health tasks. The experience is completely different for the easy-to-reach CHWs. About 66% of their time is utilized on service delivery, and 6% on campaigns, for a total of 70% of their time spent on main health tasks. This disparity in time use for both cadres of CHWs shows that in hard-to-reach areas, CHWs must spend much of their time travelling from one community to another, leaving less time to focus on service delivery. In easy-to-reach areas, however, CHWs spend less time on travelling and can better apportion their time in carrying out their tasks, especially service delivery.

For optimal resource allocation, we looked at the optimal number of CHWs required to realistically complete the tasks included in their scope of work, as prescribed by the national CHW policy. We theorized three scenarios; 1) CHWs work full time—8 hours a day; 2) they work three-quarters time—6 hours a day; or 3) they work half time—4 hours a day. Based on the number of CHWs required and what will be ideal for the scope of work and compared to the current policy, it was clear that CHWs working on half time—4 hours a day—will be proportionate to about 28,000 CHWs, which will be too much to manage and support. However, looking at the scope of work, the location and accessibility for both CHWs cadres, it is necessary to have more HtR CHWs than EtR, which can only be achieved using full or three-quarter time. From the results, full or three-quarter time could provide the sufficient number of CHWs needed; half-time is not feasible (Figure 12).

Figure 12: Theoretically Ideal Number of CHWs Needed



From the Figure 12, for full time work, the ideal number of CHWs needed is 6,886 (EtR = 1,878 and HtR = 5,008), for three-quarter time work, the ideal number of CHWs needed is 10,845 (EtR = 2,577 and HtR = 8,268), and for half-time work, the ideal number of CHWs needed is 27,802 (EtR = 4,104 and HtR = 23,698).

ⁿ Service delivery here refers to services dealing with the diagnosis and treatment of disease, or the prevention, promotion, maintenance and restoration of health. Hence, service delivery entails promotional, preventative and curative services as defined in the CHPCT.

^o Hard-to-reach areas are so named and defined by the rough terrains in the regions, including poor infrastructure, such as disrepair feeder roads and limited means of transportation.

Benefits of the CHW Program

This analysis presents the benefits derived from the CHW program. There are two sets of such benefits, namely, short- and long-term benefits.

Short-Term Benefits

The short-term benefits are those that are immediate once investment is made in the CHW program. Increasing investments in the CHW program is a driving force in improving health outcomes in both the short, medium, and long term. Some of the short-term gains from investing in the CHW program over the projection period included:

- Creating 3,199 new jobs
- Empowering women and youths through job creation
- Helping to improve health indicators
- Helping to increase knowledge and capacity at the community level
- Helping to increase referrals to the facility level
- Creating financial savings for the health system (e.g., reducing the number of patients who visit health facilities, task shifting and reducing the burden on health sector personnel and infrastructure needs, averting recurrent health care expenditure costs, etc.)
- Reducing unmet need, especially in rural populations

Long-Term Benefits

The long-term benefit of the CHW program is determined based on the calculation of the ROI. To estimate the potential long-term impact of expanding the coverage of the CHW program in Sierra Leone, we used LiST and other modules of the SPECTRUM software program.^p We ran two separate LiST projections for our data. First, we ran a baseline projection, which projected the number of child and maternal deaths each year from 2021–2031, beyond the projection end year of 2026, where we assumed no changes to the current coverage or any preloaded inputs. Next, we ran our second model wherein we projected child and maternal deaths over the same period and assumed increased coverage rates for interventions provided by CHWs for child and maternal health. The potential impact in terms of lives saved of these interventions is shown in Table 6A, B, and C.

Table 6a: Total Lives Saved by CHW Interventions

Lives Saved	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Maternal	0	13	24	37	45	55	57	58	59	59	60	467
Child	0	303	584	884	1246	1610	1648	1685	1723	1760	1796	13239
Grand Total	0	316	608	921	1291	1665	1705	1743	1782	1819	1856	13706

Table 6b: Total Lives Saved by EtR CHWs Intervention

Lives Saved	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Maternal – EtR	0	8	17	25	31	36	37	38	39	39	40	310
Child – EtR	0	29	65	96	129	163	166	171	174	178	182	1353
Total	0	37	82	121	160	199	203	209	213	217	222	1664

^p SPECTRUM Software program available at <https://www.avenirhealth.org/software-spectrum.php>

Table 6c: Total Lives Saved by HtR CHWs Intervention

Lives Saved	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Maternal – HtR	0	5	7	12	14	19	20	20	20	20	20	157
Child – HtR	0	274	519	788	1117	1447	1482	1514	1549	1582	1614	11886
Sub-Total	0	279	526	800	1131	1466	1502	1534	1569	1602	1634	12043

The total number of lives saved over the period is 13,706, including 467 maternal deaths and 13,239 child deaths averted. The lives saved under child interventions are 28 times higher than those in maternal interventions. The CHW program in Sierra Leone was specifically designed to focus on iCCM to improve child health. When the lives saved were compared based on the CHW program, we saw a greater impact in HtR areas than EtR; in fact, for every one life saved in the EtR program (1,663 total), seven lives were saved in the HtR program (12,043 total). More maternal lives were saved in EtR CHW programs (310) than their counterpart HtR CHW programs (157). More child lives were saved in the HtR CHW program (11,886) than in the EtR program (1,353); these results highlight the effectiveness of the scope of work of HtR CHWs, which includes iCCM treatment interventions.

Return on Investment

The monetary returns and benefits of investing in the CHW program in Sierra Leone are reported in this section. The CHW program is not only useful in achieving critical health objectives, but rather an investment in CHWs also yields meaningful economic benefits.² The ROI for the CHW program estimates the monetary value of an investment in the CHW program against its cost. An ROI analysis is a way to evaluate the efficiency of investments, taking into account all the resources invested and all the amounts gained through increased revenue, reduced costs, or both. To calculate ROI, the benefit (return) is divided by the cost, and the result is expressed as a percentage or a ratio.³⁴

$$ROI = \frac{\text{Total Benefits}}{\text{Total Costs}}$$

Our model borrows heavily from the works of Dahn et al. (2015), and the *Action and Investment to Defeat Malaria 2016–2020*.^{2,34} This work estimates three types of benefits (economic returns) from investing in the CHW program—productivity, insurance against future health crises, and increased economic activity arising from increased employment. The following assumptions were used in estimating returns on investment:

- GDP per capita is projected to increase by an average of 4.31% over the projection period
- Average life expectancy is 61.51 years over the projection period using the UN Population Statistics Division estimates
- A child will enter the workforce at age 18 and exit the workforce at age 60 (average retirement age for formal employment in Sierra Leone)

Productivity

The main driver of economic returns of CHW programs is increased productivity from lives saved. There is strong global evidence that investing in health as a whole increases productivity, which is a fundamental basis for economic growth and sustainable development.³⁸ The implication here is that investments in the CHW program will imply a healthier population in the next few years. It is, however, important to note that investments in health alone, through improved access to health services, without improvements in productivity and other economic activities, will not be sufficient to impact economic growth.³⁹ A healthier population emanating from investments in health care will imply increase productivity in terms of real growth of GDP for the employed.

The productivity benefit is estimated as the discounted economic value of each life saved multiplied by the number of lives saved. We estimate that each individual life saved would have contributed approximately \$31,164.74 in economic activity over their lifetime. Table 7 presents the estimation of the economic value of lives saved.

Table 7: Economic Gains on CHW Program Investments

Variables	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	TOTAL
GDP per capita	520.5	513.34	502.57	500.10	502.28	510.32	532.88	556.43	581.02	606.7	633.52	
GDP Growth	3.19	3.45	4.32	4.85	5.09	4.42	4.42	4.42	4.42	4.42	4.42	
Life Expectancy^a	60.06	60.41	60.79	61.26	61.45	61.64	61.83	62.01	62.20	62.38	62.55	
Number of CHWs^f	7925	8672	9290	9881	10,492	11,124	11,124	11,124	11,124	11,124	11,124	
Total Lives Saved	0	316	608	921	1291	1665	1705	1743	1782	1819	1856	13,706
Productive Economic Value of Lives Saved (in millions of US\$)	0	9.848	18.948	28.702	40.233	51.889	53.135	54.320	55.535	56.688	57.841	427,143

The estimate above is based on the following four key factors:

- The average GDP per capita for Sierra Leone over the projection period is \$541.79
- A projection of an average increase in GDP by 4.31% over the projection period
- A projected average life expectancy of 61.51 years using the estimated UN Population Statistics Division projection
- Assuming a discount rate of 5% to calculate the net present value of future projected lifetime earnings.

In estimating the discounted GDP per capita, we use the value of a statistical life. The literature about the value of a statistical life suggests that a value of 1.5–2.0 times the GDP per capita would be appropriate for the value of a life saved in a low-income country.^{2,34,40,41} For this study, we use 1.5 as the value of a statistical life.

From Table 7 and the key factors stated above, we can conclude that in Sierra Leone, saving 13,706 lives over the period at an estimated economic value of \$31,165 per life results in approximately \$427 million in productivity gained over the period.⁵

Insurance against future health crises

This section estimates, in monetary terms, the benefits of investments in CHWs in averting the burden of epidemics and pandemics. We use three key variables:

- The global cost of a pandemic-like COVID-19 loss to the world’s economy
- The global health workforce
- The total number of CHWs in Sierra Leone by the end of the projection period

^a Data sourced from UN Population Division. *World Population Prospects 2022: Online Edition*.

^f This represents the CHWs required after taken into consideration those lost to attrition and new entrants. After the end of the projection period 2026, the following years are assumed to have the same number of CHWs.

⁵ Estimated as \$31,164.74 multiplied by the total lives saved over the period.

For global cost, we used the International Monetary Fund's recent estimate of the global economic cost of COVID-19 to be \$12 trillion over the two years 2020–2021 as reported in the work of Ajmal M. M, Khan M, & Shad M K. (2021), implying a cost per year will be \$6 trillion.⁴²

To quantify the degree to which the CHWs in Sierra Leone may be able to reduce this impact, we estimated the fraction of the global health workforce accounted for by CHWs in Sierra Leone. The global health workforce as reported by WHO was 65.1 million in 2020.⁴³ The percentage increase of the CHWs in Sierra Leone to the global health workforce (the economic risk of health crisis is assumed to reduce in proportion to the size of the global health workforce) is 0.0171%.

The calculation of the insurance benefits is based on the estimated potential adverse economic impact of a global health crisis, estimated to occur once in 50 years, and the estimated potential benefit based on the increase in health workers in Sierra Leone. Based on these assumptions above, the global annual economic risk from a severe health crisis is \$120 billion, i.e., \$6 trillion divided by 50 years. Therefore, the annual insurance benefit against future health crisis due to the Sierra Leone investment in CHWs is estimated as the contribution of the CHWs to the global health workforce (0.0171%) multiplied by the annual average cost of a global pandemic (\$120 billion).

From this, the annual value of the CHWs contribution to reduction of health crisis economic risk in Sierra Leone is \$20.5 million,[†] which equals \$123 million of forgone growth avoided due to the CHWs for the period 2021–2026. When the projection is extended to 2031, the 11-year benefit of the CHW program in reducing health crises and their economic impact is estimated at \$226 million.[‡]

Increased economic activity arising from increased employment

To estimate the impact of the increased employment of CHWs and the subsequent increase in economic activity, we used the concept of economic multipliers. This concept implies that a government's spending has an additional impact on GDP since when one is employed, they are paid a salary which can be used to buy goods and services and so on. For simplicity, it was assumed that all inputs, not just salaries but also purchases, transportation, etc., contributed to this multiplier effect. The spending multiplier by governments in low-income as estimated by the World Bank is 0.7.⁴⁴ Using \$128.2[‡] million as the estimated total cost of the CHW program over the projection period 2021–2031 results in a further \$89.74 million in economic benefits as a result of employing 11,124 CHWs over the projection period.

The total 11-year benefit equals \$742.44 million, comprising \$427.14 million in productivity benefits, \$225.56 million in insurance against health crises benefits, and \$89.74 in employment benefits. The total cost for the program from 2021–2031 is \$128.20 million. The ROI therefore is 5.8, which implies that every \$1 invested in the CHW program will yield a return of \$5.8. However, if the projection was limited to the period 2021–2026, the total benefits would be equal to \$215.64, comprising \$54.95 million, \$37.66 million, and \$123.03 million for productivity, employment, and insurance benefits, respectively. The total cost for the same period is \$53.7 million, giving an ROI of 4.0.

[†] This is derived by the following: first we find the quotient by dividing the global cost of a health crisis (\$6 Tn) by the number of years for one such crisis to occur (50 years); second, the result is multiplied by 0.0171% (percentage increase of Sierra Leone CHWs to the global health workforce).

[‡] This is obtained by calculating the annual value of CHW contribution in reducing health crises by the number of years of projection.

[‡] We assumed the same cost of the CHW program after 2026, the actual year the costing projection should end.

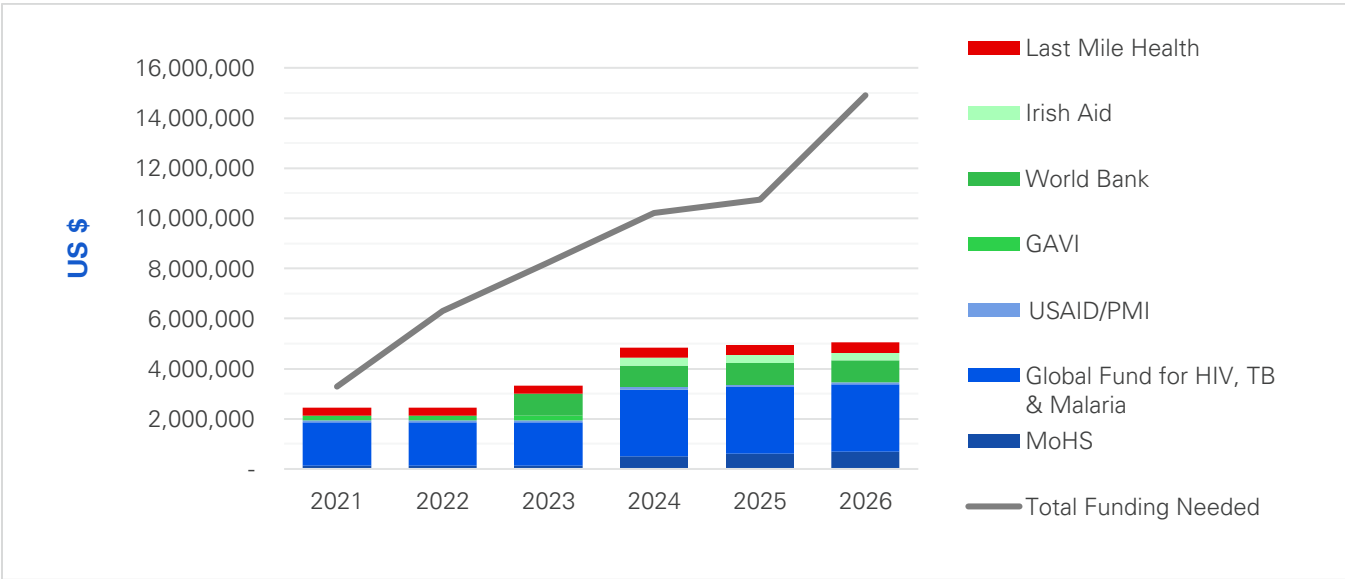
CURRENT FINANCING AND FUNDING GAPS

The CHW program has been in existence for about a decade now, funded by various traditional donors. This funding analysis provides a presumed estimation of the total assumed funding available^w, resulting gaps and future earmarked funding (it refers to funding which has not been committed by the partners, but the possibility is there to tap into it) to fill those gaps. This section therefore provides analysis on assumed available and future earmarked funding for the CHW program within the projection period 2021–2026. It is worth noting that due to the scarcity of information, much of the analysis on funding availability hinges heavily on assumptions.

Assumed Financing of the CHW Program

This section presents conventional funding organizations of the CHW program in the past and present. In this analysis, we assume that the current and past funder between 2018–2020 will continue in their financing of the program. We also base our analysis on the budget presented by some of the organizations. Figure 13 presents the assumed funding organizations between the projection period 2021–2026.

Figure 13: Assumed Funding Analysis



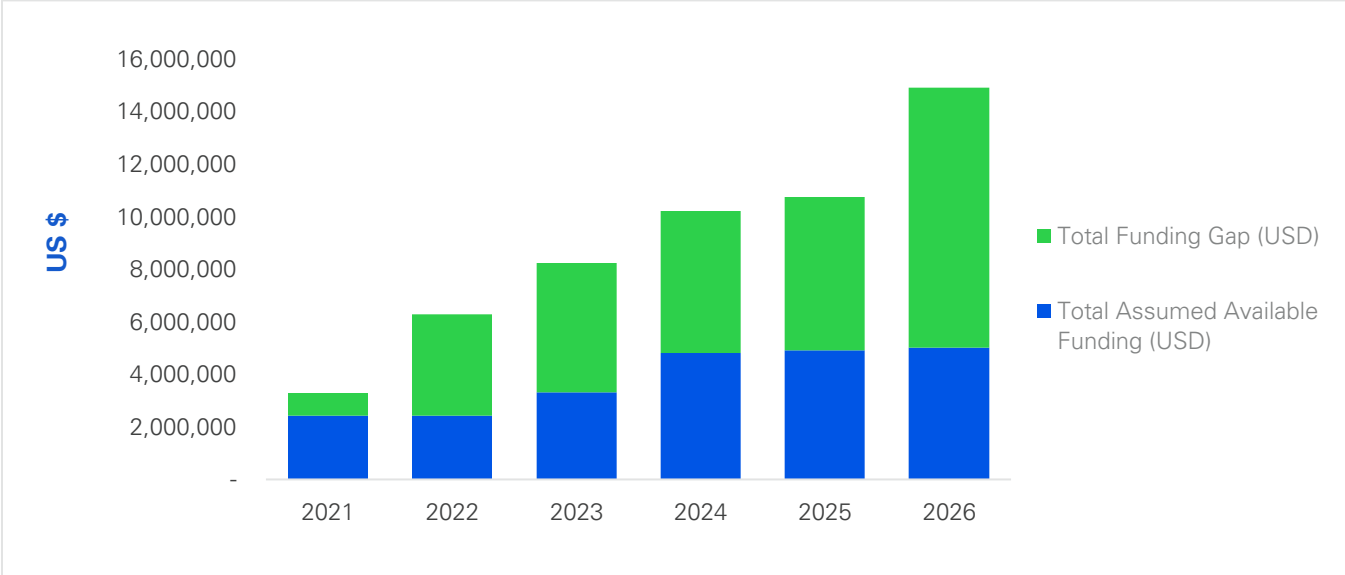
Source: CHPCT

The Global Fund is the main financier of the CHW program followed by the World Bank. The Global Fund alone covers one-fourth of the funding from 2021–2026 while the World Bank covers 6.5%; in total they both cover about 31% of the total available funds for the program.

^w Total assumed funding available refers to conventional funding organizations with their current and projected amount to be spent based on their budgets presented and funding history.

It is noteworthy to understand that the gap in financing the program is wide. The current assumed available funding covers about 43% of the total cost of the program. An analysis of the assumed available funding and the gap is shown in Figure 14.

Figure 14: Assumed Available Funding versus Gap in Funding 2021–2026



Source: CHPCT

Gap Analysis

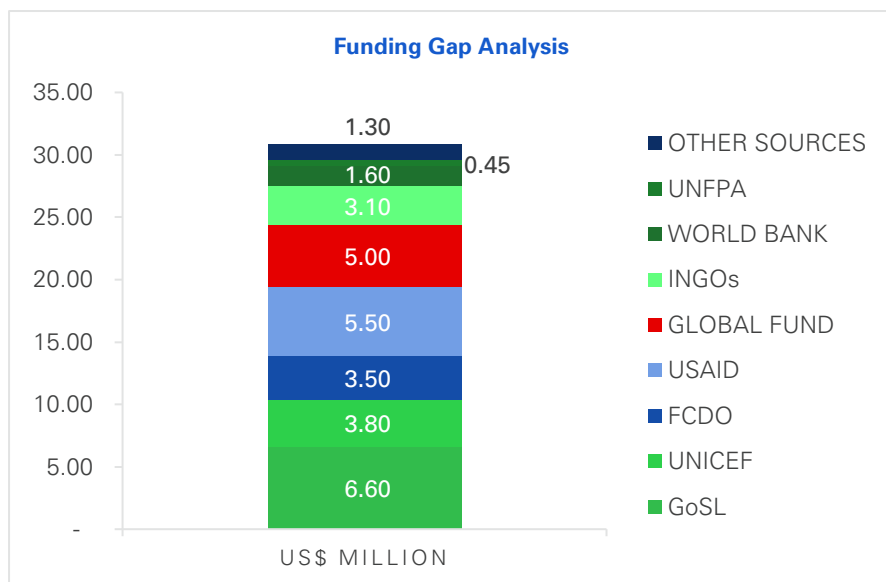
This section presents the difference between the cost of the program and the potential funding. To help in the gap analysis of the financing situation, we define future earmarked funding for the CHW program. For the purposes of establishing the overall program funding gap, we have made assumptions to help make projections for the CHW program for illustrative purposes only. These figures here do not imply commitment from partners, but that they can serve as a guide for proper donor mapping for the CHW program.

The gap of about US\$30 million is projected to be filled based on these key assumptions:

- The Government of Sierra Leone commits 0.225% of the total government budget to the CHW program per year from 2023
- Global Fund commits an additional US\$5 million outside the next funding round allocation to the health system strengthening program, effective 2023–2026
- The World Bank commits an additional US\$5 million from 2023–2026
- UNICEF, the U.K.’s Foreign, Commonwealth & Development Office; USAID; and international NGOs revive their support to the program.

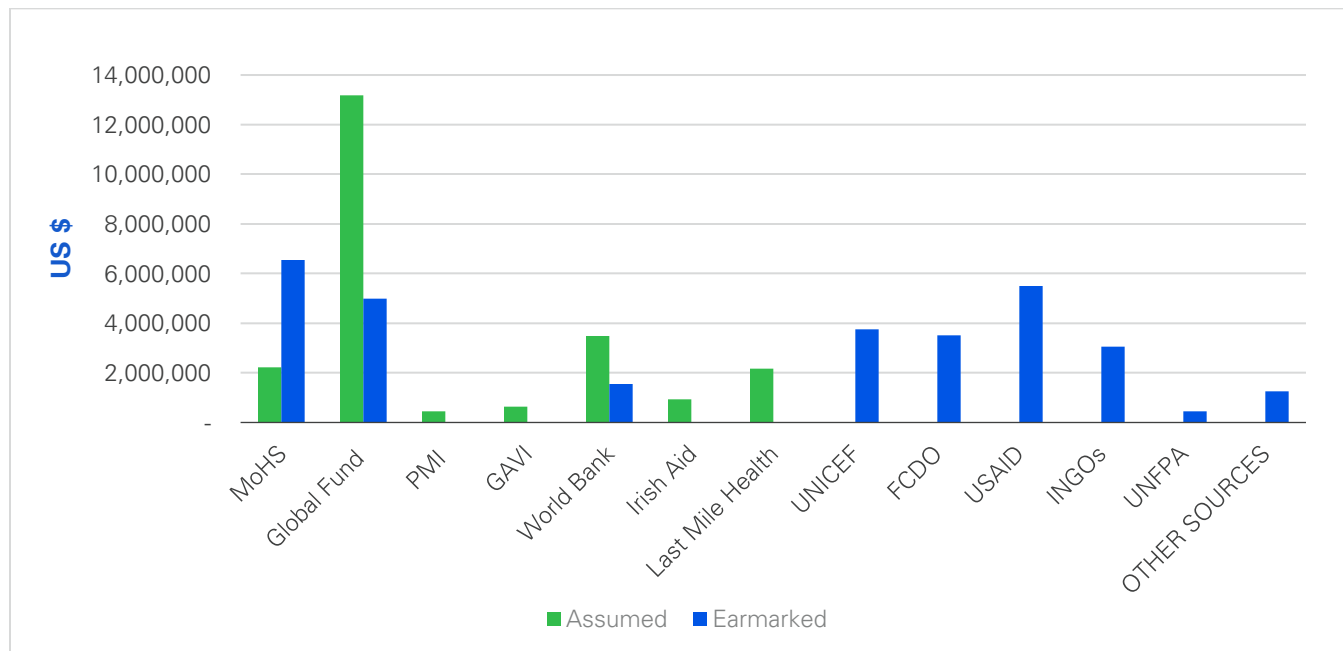
From the above assumptions, funding gap can be met provided there is enough commitment from these organizations (Figure 15).

Figure 15: Assumed Versus Future Earmarked Funding 2021–2026



From the funding analysis figure, we see that future earmarked funding is significantly higher, especially going forward from 2023. This refers to funding which has not been committed by the partners and doesn't have budgetary allocation to the CHW program, but the possibility is there to tap into them. For the CHW program to be successful, there has to be commitments from partners and the Government of Sierra Leone. The assumed available and future earmarked sources of funding are presented in Figure 16.

Figure 16: Assumed Versus Earmarked Funding Sources 2021–2026



Three of the financiers—Global Fund, Government of Sierra Leone through MoHS, and World Bank—are part of both funding streams, assumed and earmarked. All the others, save for GAVI, the President's Malaria Initiative, Irish Aid, and Last Mile Health are future earmarked financing organizations.

Going forward, it will be important for the MoHS to further refine all commitments to the CHW program to get a clearer picture of assumed and future earmarked funding. The ministry should also lobby its partners, listed in the funding analysis, to clarify their financial commitments and support for the program through current CHW donor and resource mapping exercises and monthly donor liaison meetings.

CONCLUSIONS AND RECOMMENDATIONS

Summary of Conclusions

This investment case has shown that investments in the CHW program in Sierra Leone are beneficial, taking into consideration the high returns on investment realized for both health, in terms of lives saved and health systems strengthening, and economic sectors, as shown for both projection periods. The ROI derived from the monetary values of the benefits of investing in the program and the cost of the program over the projection periods was positive. Three monetary benefits were calculated—productivity benefits as a result of lives saved, employment benefits resulting from the fiscal multiplier, and insurance benefits emanating from reduced risks of global health crises.

Further, the potential for increased impact and returns over the projection periods can only be realized when the funding mechanism is strengthened. The resources available to fund CHW programs especially in Africa depends on total government budgetary allocation to health care in general (and the CHW program in particular) and the availability of external funding, including from donors, low-cost loans, and human capital bonds repaid over an extended period based on future contingent savings.⁴⁵ From our study, there is need to sustain the funding aspect of the program, implying that the government should reconsider their financing of the health sector. The need for sustained domestic funding window(s) and increased efficiency in using the available resources cannot be overemphasized. It is clear from this study that there is a significant funding gap as only 45% of the total funds required to manage the CHW program are assumed to be secured.

This CHW program investment case serves as a reliable tool to mobilize stakeholders (national and international) involved in health financing in Sierra Leone to marshal resources to sustain the program. The program relies heavily on external funding for its sustainability. This is risky because in the long run, external sources of finance may not be reliable and may divert national resources away from health care, rather than supplementing it. The long-term optimal position would therefore be that the Government of Sierra Leone progressively increase its funding commitment to the CHW program, especially for the sustainability of the program in both the short and long run.

This analysis shows that investments in Sierra Leone's CHW program can yield significant benefits, especially in the health and economic sectors, when the program is supported to its full extent. Donor and government support to the program is crucial to sustain the gains made by the program. The investment case makes the following key conclusions:

1. Due to the scope of work and type of terrain covered, the CHW program needs more HtR CHWs.
2. It is not feasible for CHWs to complete these tasks at part time, as specified in the CHW policy.
3. CHWs in Sierra Leone receive one of the lowest stipends within the region.
4. The CHW program in Sierra Leone has made great progress in recent years to integrate the CHW program into the broader health system. Nevertheless, a few specific areas of improvement remain.

Each conclusion is explained in greater detail below.

Distribution of CHWS SERVING Easy-to-Reach VS. Hard-to-Reach POPULATIONS

The number of CHWs as designed by the program is such that there are currently more EtR CHWs as compared to HtR CHWs. In the current policy, EtR CHWs outnumber HtR CHWs 2:1. Using both the C3 and CHPCT tools, we see that by the end of the projection period, taking into consideration the scope of work and the ideal number of CHWs required to carry out the tasks, as prescribed in the scope of work, the number of HtR CHWs required should be more than the EtR CHWs. We recommend a re-evaluation of this allocation based on the target populations for each CHW category, differences in time allocations, and inclusion of time in transit.

Level of Effort

The minimum time required to carry out the tasks as specified in the CHW policy is 4 hours per day. Adding time for transit, special campaigns, and other supportive activities, it is not feasible for CHWs to complete these tasks at part time, as specified in the CHW policy. We recommend supporting CHWs in full- or three-quarter time to provide appropriate time to the tasks assigned. Hence, we recommend that the design of the CHW program and time allocated for work be revisited and increased from 4 hours to either 6 or 8 hours a day.

Reasonable Compensation

Community health workers in Sierra Leone receive one of the lowest stipends within the region (Table 8). To ensure maximum impact of the program and that optimal service is performed, we recommend increasing the incentives for CHWs to match the average of half the median for the sub-region, or \$32 per month, which is approximately the minimum wage in Sierra Leone. Following previous recommendation, increasing the working time for CHWs will require an increase in incentives/salary.

Table 8: Comparative Analysis of Incentive Payment for CHWs ^{2,33,46}

Country	CHW Monthly Incentive (US\$)	Type of Employment
Sierra Leone		
• Easy-to-Reach	15	Part Time
• Hard-to-Reach	25	Part Time
Ethiopia	85	Full Time
Kenya	40	Part Time
Liberia	70	Part Time
Malawi	63	Full Time
Mozambique	20	Part Time
India		
• Accredited Social Health Activist	49	Part Time
• Village Health Guide	24	Part Time

Health System Integration

The CHW program in Sierra Leone has made great progress in recent years to integrate the CHW program into the broader health system. Nevertheless, a few specific areas of improvement remain. CHWs can be better integrated in the overall national health system planning, given access to mobile technology, and enrolled as salaried employees on the national payroll, ensuring proper supervision and performance monitoring. Integrated, salaried cadres of CHWs—as opposed to CHWs receiving intermittent, limited incentives from vertical, disease control programs—are the lynchpin of strong community health systems.⁴⁷ A report co-authored by USAID and the Financing Alliance for Health also declared that “channeling existing community health funds towards strong, well-compensated, integrated cadres can begin to close the financing gap.”⁴⁸

Recommendations

Insufficient funding has kept national CHW programs from reaching their full potential. The 2018 WHO guidelines emphasize that CHW programs “require long-term, dedicated financing: attempts to set up and run a large scale CHW initiative on a shoestring budget is likely to yield disappointing outcomes.”⁴⁹ To advocate for additional resources to support the CHW program, this investment case makes the following recommendations as next steps to make the best use of this work. For both short- and long-term sustainability of the program, there is a very strong need for strengthened domestic resource mobilization and increased efficiency in resource use.

- 1. Develop a strong lobbying team to mobilize political will and commitment from the government and donors.**
Mobilizing political will is a prerequisite for moving forward with stronger financing for CHW programs, and champions are needed to create political will. A strong lobbying team comprising the MoHS, international NGOs, and implementing partners should campaign for financial support to the program by the Government of Sierra Leone and funding partners. The recent report co-authored by USAID and Financing Alliance for Health asserts: *“Mobilizing political will is a prerequisite for developing a community health system and an ongoing requirement for sustaining it. Political will, and the continued advocacy needed to build it, is key to harnessing the resources required to close the funding gap. Diverse champions can build support for community health across ministries of health and finance, donors, and local stakeholders.”*⁴⁹
- 2. Disseminate the findings from the investment case to key stakeholders of the program.**
With clear evidence of the ROI and potential savings, the results of this analysis should be shared broadly, including within the Government of Sierra Leone, Ministries of Finance and Health and Sanitation, to mobilize and prioritize financing of the CHW program by allocating more funds to the program. In addition, the Ministry of Finance should set aside funding for the program while the MoHS should internally allocate more funds to the CHW program, given the documented ROI.
- 3. Utilize the results for external donors and funding opportunities.**
To ensure sustainability of the program, this work strongly encourages the exploration of more direct financing from the Government of Sierra Leone. The analysis within this report can also be used to support future funding opportunities to ensure the sustainability of the program, such as in the upcoming Global Fund grant application process or private sector support.
- 4. Organize regular annual planning sessions to develop an action plan for the CHW program**
These meetings should be data-driven planning and monitoring sessions led by the Government of Sierra Leone with stakeholders, especially development partners, to develop a joint annual action plan to channel resources towards addressing needs-based analysis, effectiveness of the program and efficiency in the CHW program resource allocation and use. Consider additional meetings for data review and monitoring.

Limitations

Limitations were recognized in both the design and analysis of the costing and investment case of the CHW program in Sierra Leone. Almost all aspects of this work were carried out using secondary data obtained from different sources including the CHW Hub, MoHS, Statistics Sierra Leone, UNICEF, World Bank, WHO database, and others. Primary data was sourced from only two districts—Falaba and Tonkolili—to validate service delivery and to observe the duration required to perform CHW activities.

However, some of the limitations in this work include:

- Lack of data for the population of Sierra Leone the CHW program is supposed to cover
- Lack of data to support the distribution of the CHWs in EtR and HtR areas
- Costs included in the analysis are from the provider perspective while the socioeconomic costs incurred by patients were not included
- Focus was on the financial cost of the program; there was no mention of opportunity cost
- C3 tool analysis was based mainly on data from two districts out of 16 in the country.

APPENDIX A. COMPARATIVE SUMMARY OF TOOLS

Name	Description	Advantages	Disadvantages
Community Health Planning and Cost Tool (CHPCT)	A cost-based tool that classifies the CHW program costs into key cost drivers	<ul style="list-style-type: none"> • Specific for Community health • An input-based model, hence it is customizable • Widely used and broadly endorsed by organizations and countries 	<ul style="list-style-type: none"> • Its usefulness depends heavily on the availability of data • Does not have an inbuilt function for calculating benefits and ROI
Community Health Worker Coverage and Costing (C3) Tool	Applied to support discussion and scenario-based analysis with CHW policy-makers and program managers regarding CHW time allocation, workload, and population coverage assumptions	<ul style="list-style-type: none"> • Used to give the efficient number of CHWs needed to carry out specified health interventions • Used to optimize CHW time allocation • Used to define, rationalize, and optimize the effective level of coverage for and mix of activities/interventions that a predetermined number of CHWs undertake for a given population 	<ul style="list-style-type: none"> • Doesn't measure the cost of the CHW program • Relies mainly on coverage and time used to carry out tasks/interventions, which can be erroneous especially in developing countries where data collection and management is a challenge
Lives Saved Tool (LiST)	A benefit-based tool that is widely used and appropriate for calculating the benefits of scaling up the CHW program	<ul style="list-style-type: none"> • Calculates the benefits of CHW programs in term of lives saved • Used to estimate the effectiveness of CHW programs • Widely used to influence policy in low- and middle-income countries • Only tool among the three that calculates both cost and benefits 	<ul style="list-style-type: none"> • Usefulness depends on availability of data on the expected increase in coverage of specific interventions over the projection period • Does not compute benefits resulting from increased employment and insurance against future health crises

APPENDIX B. KEY ASSUMPTIONS

Program Data

Population: According to the CHW policy it states nationwide coverage. however scope of CHWs is minimal in cities and district townships. We deducted the total population not covered by the program from the total national population to get the targeted population for the program.

- **What % of Sierra Leone's population lives in rural areas?**

HtR areas cover 40% of the targeted population, and HtR CHWs operate in rural and difficult-to-reach communities; EtR areas cover 60% of the targeted population, and EtR CHWs operate in urban and easy terrains.

CHWs population coverage target: In EtR areas, CHWs cover between 500–1,000 people per catchment area; in HtR areas, CHWs cover between 300–350 per catchment population.

Number of CHWs and monthly incentives: As at the 2021 baseline, there were 7,909 CHWs in Sierra Leone, of which 60% were EtR CHWs (4,745) and 40% HtR CHWs (3,164). CHWs in EtR and HtR areas earn yearly incentives of \$180 and \$300 respectively.

Rural population of Sierra Leone at baseline: Population covered by HtR CHWs: 40% of total population targeted by CHW program.

Urban population of Sierra Leone at baseline: Population covered by EtR CHWs: 60% of total population targeted by CHW program.

What % of Sierra Leone's rural population was covered by CHWs in 2021? (43%) This is calculated as the actual population covered by HtR CHWs (number of HtR CHWs multiplied by the average population covered by each HtR CHW) divided by the targeted rural population equals, 2,413,468.

What % of Sierra Leone's urban population is covered by CHWs in 2021? (98%) This is calculated as the actual population covered by EtR CHWs (Number of EtR CHWs multiplied by the average population covered by each EtR CHW) divided by the targeted rural population, equals 3,620,201.

Chiefdom analysis: There are 190 chiefdoms in Sierra Leone, excluding the Western Area. However, to cover that gap in the analysis, we assumed each constituency in Western Area is represented by one chiefdom. As per the 2015 population data and boundary demarcation, there are 28 constituencies, which were converted into chiefdoms, hence the reason for 218 chiefdoms in the analysis.

Total number of communities: Each CHW covers between 1 to 3 communities. So, an average of two communities was taken and multiplied by the number of CHWs (7,909) to get the number of communities covered by the program (15,818).

Program Structure

CHW: The program is such that there are two types of CHWs, those working in easy- and hard-to-reach areas.

SUPERVISORS: There are three categories of supervisors: namely peer supervisors, PHU in charges, and chiefdom supervisors

MANAGEMENT: There are four categories of management staff: 1) district focal persons; 2) regional coordinators; 3) program management, which includes the CHW Hub coordinator, operations, monitoring and supervision etc.; and 4) the directorate.

Medicines

We assumed a 30% mark-up on medicines and supplies for transport, storage, management, and distribution.

We also assumed a 70% wastage for amoxicillin and 10% for all the other medicines used.

Oral rehydration salt and zinc are administered in combined dose.

Amoxicillin is administered based on various age brackets: namely 2–11 months, 12–35 months, and 36–59 months.

Artemether-lumefantrine doses are administered as: 6–35 months, 3–8 years, 9–13 years, and 14+ years.

APPENDIX C. TABLES OF COST BY INPUT AND INTERVENTION, AND COST OF MEDICINE BY INTERVENTION

Total Cost by Input (US \$)						
Input	2021	2022	2023	2024	2025	2026
CHW Salaries	1,809,780	2,116,800	2,406,934	2,717,803	3,060,742	3,438,915
CHW Equipment	-	1,671,843	1,774,382	2,452,641	2,523,602	3,472,755
Medicines	804,664	1,104,504	1,509,915	1,987,203	2,592,220	3,352,500
Supervision Costs	423,476	563,016	1,360,928	1,304,565	1,505,173	2,124,412
Recurrent Training	-	261,585	206,496	1,026,415	258,427	1,605,247
Management Costs	157,900	167,964	337,363	224,983	237,896	261,939
Other Recurrent Costs	89,660	100,303	112,209	125,528	140,428	157,097
Initial Training (CHWs)	-	303,485	324,476	366,704	425,137	493,094
Capital Costs	-	-	205,745	-	-	-
Total	3,285,480	6,289,499	8,238,448	10,205,840	10,743,625	14,905,959

Total Cost by Intervention (US \$)						
Intervention	2021	2022	2023	2024	2025	2026
iCCM	879,560	2,136,808	2,806,321	3,771,923	4,283,298	6,350,468
Maternal and Newborn Health	923,269	1,604,021	2,017,547	2,371,888	2,347,592	3,073,897
Reproductive Health / Family Planning	1,112,946	1,901,095	2,447,265	2,928,617	2,977,923	3,988,953
Immunization	94,675	164,745	196,922	223,019	216,512	279,137
Nutrition	33,393	65,426	87,715	112,163	122,254	173,315
TB	1,493	2,365	3,345	4,356	4,402	6,224
Other	240,143	415,039	679,332	793,875	791,643	1,033,965
Total	3,285,480	6,289,499	8,238,448	10,205,840	10,743,625	14,905,959

Cost of Medicine Per Intervention						
Intervention	2021	2022	2023	2024	2025	2026
iCCM	500,776	726,439	989,959	1,328,936	1,764,070	2,315,828
Maternal and Newborn Health	27,887	40,125	54,291	72,479	95,663	125,025
Reproductive Health/Family Planning	268,814	327,611	451,703	567,165	707,878	879,512
Nutrition	7,188	10,329	13,962	18,623	24,608	32,135
Total	804,664	1,104,504	1,509,915	1,987,203	2,592,220	3,352,500

APPENDIX D. ANALYSIS OF CHW SERVICES AND COSTS BY CHW CADRE

Figure 17: Number of Community Health Services by CHW Cadre

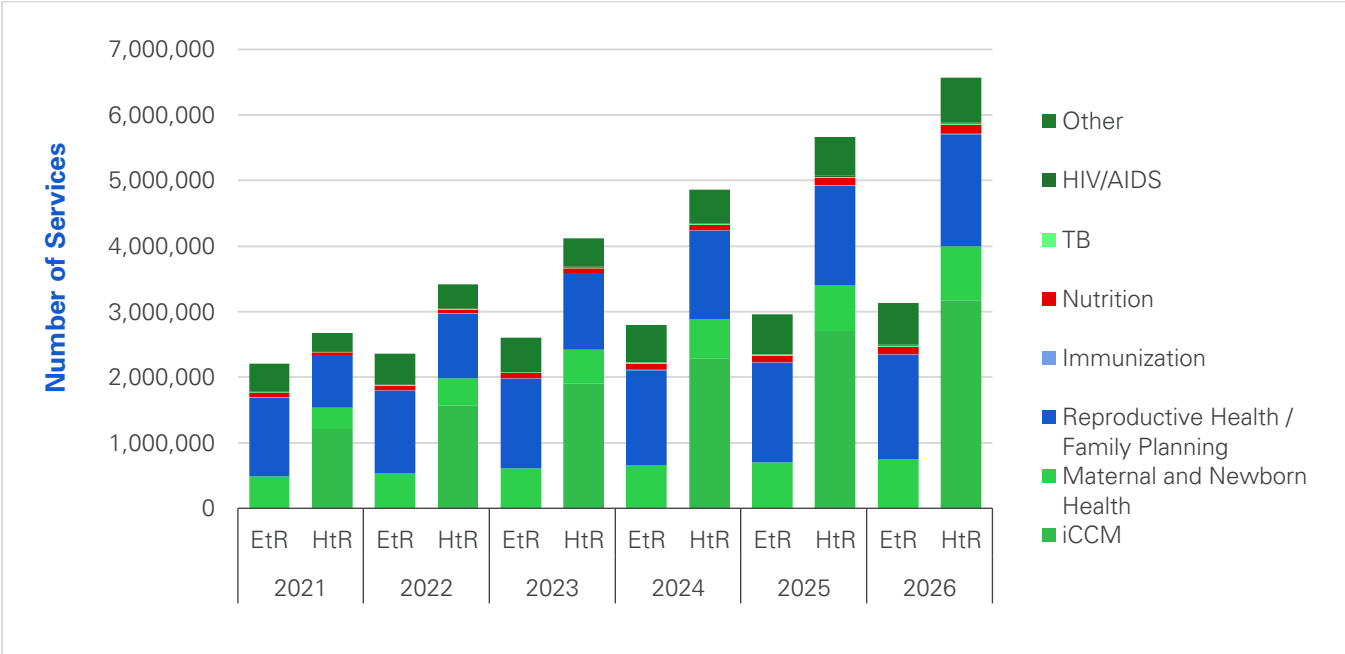


Figure 18: Total Number of Services by Category and by CHW Cadre

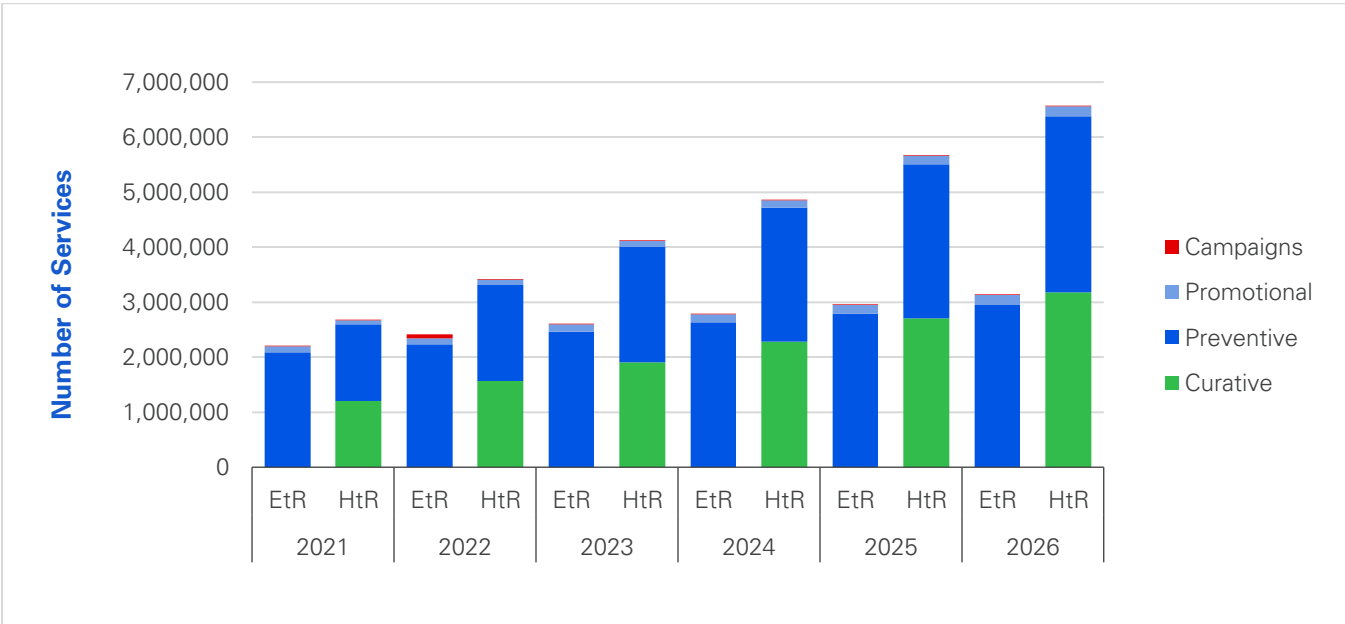


Figure 19: Estimated Cost of the CHW Program by Cost Inputs and Type of CHW

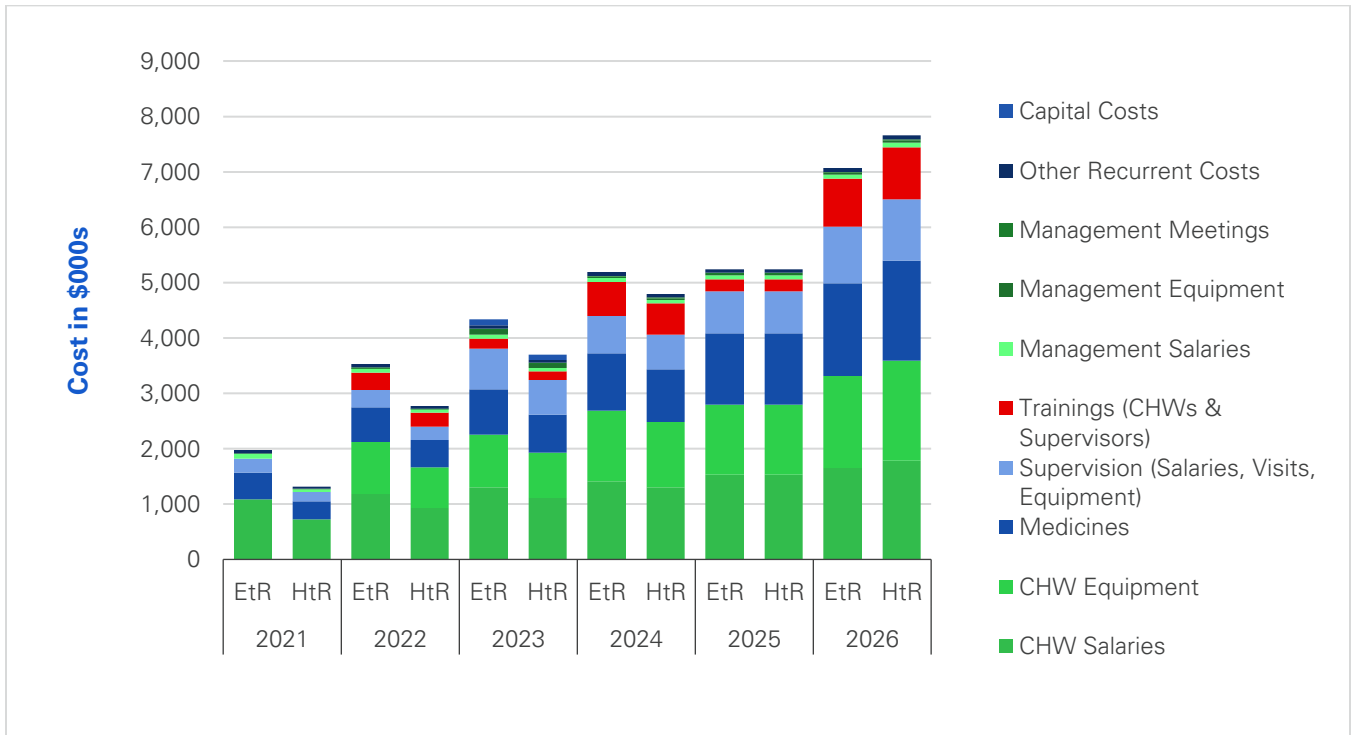
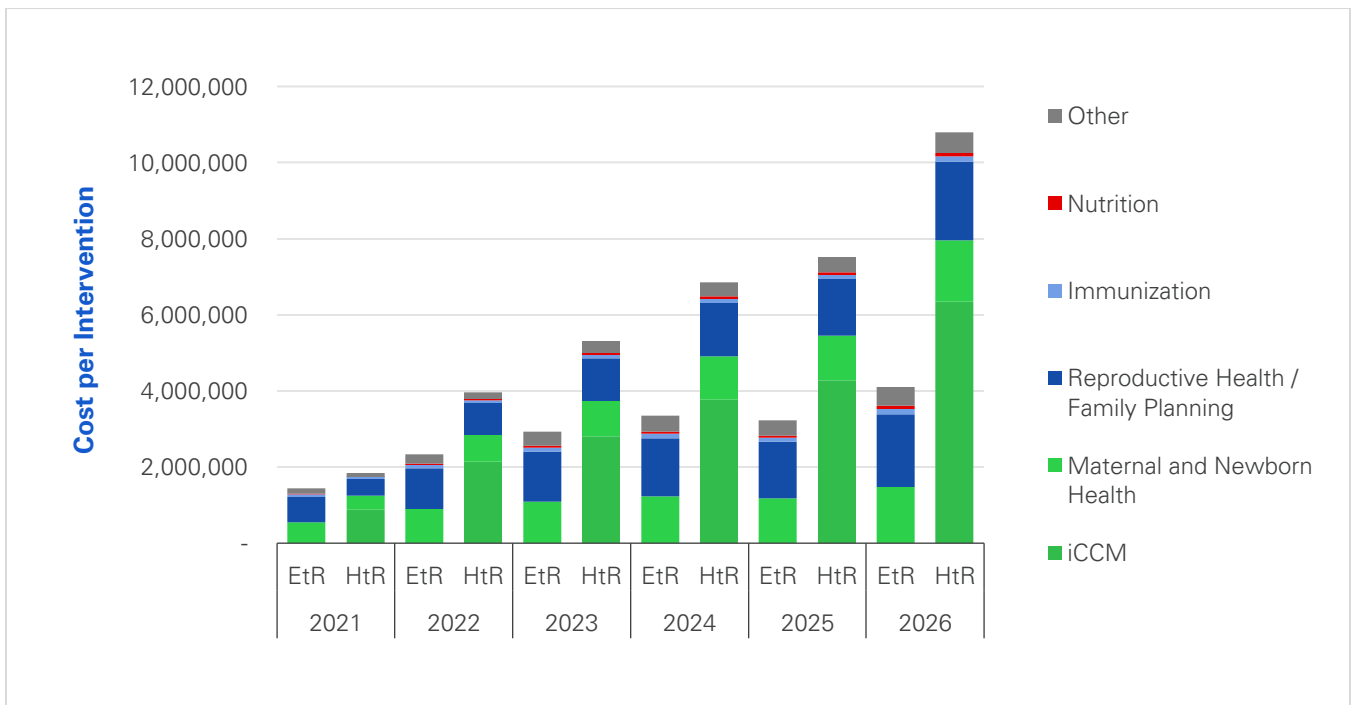


Figure 20: Cost of Program by Intervention/Service



APPENDIX E. C3 TOOL QUESTIONS FOR DISCUSSION WITH CHWS

Instructions:

Please ensure these questions are asked in an interactive way. Encourage the full participation of the CHWs.

SECTION A: SOCIO-DEMOGRAPHIC INFORMATION OF RESPONDENTS			
	Questions	Coded Responses	Comments
A1	Sex	Male Female Other (specify.....)	
A2	Age of beneficiary as at last birthday? (In completed Years)	18 - 20 21 – 30 31 – 40 41 – 50 51 – 60 > 60 I don't know	
A3	Marital Status	Single Married Divorced/ Separated Widowed Widower	
A4	What is your highest educational level attained?	Junior School Senior School TECH/VOC College/University Other (specify.....)	
A5	Do you do any other work?	Yes No I don't know	
A6	What other job do you do apart from the CHW work?	Farming Petty Trading Teaching Cattle Rearing Other (specify.....)	

SECTION B COMMUNITY HEALTH WORKER TASKS AND USE OF TIME

	Questions	Coded Responses	Comments
B1	Among the listed services, which ones do you carryout per month?	Community mapping & household registration Community mobilization and engagement RMNCH Services (Nutrition, Family Planning, Immunization, ANC, PNC etc.) ICCM for sick children Community-Based Surveillance Community Sensitization to HIV/TB Other Services Please specify	
B2	Number of cases seen per week/month?	Cases of Child Illness <ul style="list-style-type: none"> • Fever • Pneumonia • Diarrhea • Malaria Febrile children tested with RDT? Cases of child illnesses treated with the following: <ul style="list-style-type: none"> • ACT • Antibiotics • ORS and Zinc Number of children screened for malnutrition Number of case notifications Loss to follow up (LTFU) for TB Number of Intermittent Preventive Treatment to Pregnant (IPTp) women Number of LTFU followed up by CHWs – HIV/AIDS	
B3	Distance Covered to carry out your task?	What is the average time you spend on distance covered for house to house visits? What is the average time spent on distance covered to accompany a woman in labor?	
B4	Out of 100%, estimate your time spent in carrying out the following?	<ul style="list-style-type: none"> • Training • Administrative Tasks • Local Transport • Campaigns 	
B5	Out of 100%, allocate your working time amongst the following?	<ul style="list-style-type: none"> • Diagnosis, treatment & referral of child illness • Assessing malnutrition status • Postnatal care • Others 	

SECTION B COMMUNITY HEALTH WORKER TASKS AND USE OF TIME

	Questions	Coded Responses	Comments
B6	How many visits per week/month/year do you carry out each of the listed CHW service?	<ul style="list-style-type: none"> • Community mapping & household registration • Community mobilization and engagement • RMNCH Services (Nutrition, Family Planning, Immunization, ANC, PNC etc.) • ICCM for sick children • Community-Based Surveillance • Community Sensitization to HIV/TB • Other Services? 	
B7	Did you receive any form of training before getting this job?	01. Yes 02. No	If No skip to B9
B8	What type of training How long? How often do you get training? Average number of days spent in training	01. Initial 02. Refresher	
B9	What is the number of days you spend per year for each campaign shown?	01. Immunization week 02. Family planning days 03. AIDS day 04. Others	
B10	What is the population covered by your catchment area?		
B11	What is the number of referrals done per month?		
B12	Did you receive any equipment?	01. Yes 02. No	If No skip to B14
B13	Please list the equipment?		
B14	Where their drugs/medicines supplied to you?	01. Yes 02. No	
B15	Did you receive supervisory visit?	01. Yes 02. No	If No skip to B17
B16	<ul style="list-style-type: none"> • How many times where you visited in a month? • What services/activities did the supervisor do? 		
B17	How many times in a month/year do a management staff (District, Regional & HQ) visited you?		

SECTION B COMMUNITY HEALTH WORKER TASKS AND USE OF TIME

	Questions	Coded Responses	Comments
B18	Did you attend meetings?	01. Yes 02. No	If No skip to B20
B19	How many meetings did you attend in a month?		
B20	Challenges faced in carrying out your duties?		

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