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MODELING IMPACT OF THE HEALTH FINANCE AND GOVERNANCE PROJECT

September 2018

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The Health Finance and Governance Project

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CONTENTS

Acronyms.....	iii
Executive Summary	v
1. Introduction	1
2. Methodology for Impact Modeling.....	3
2.1 The impact modeling process	4
3. Country Results	13
3.1 Interventions for Expanded Packages of Essential Health Services	13
3.2 Interventions for Improved Human Resources for Health.....	22
3.3 Interventions for Improved Insurance Coverage and Service Quality	26
4. Conclusion and Lessons Learned	37
References	39

List of Tables

Table 1. Country health system improvements and their effects on health services coverage	5
Table 2. Modeling scale-up and counterfactual scenarios	7
Table 3. Illustrative table on calculation of coverage rates for some select services from the essential services package in Bangladesh.....	8
Table 4. Number of deaths averted among mothers, neonates, and children due to scale-up of the essential services package in Bangladesh.....	10
Table 5. Expansion of SUFI and SMC by District	19
Table 6. Target Coverages Rates of SUFI Interventions and SMC.....	20



List of Figures

Figure 1. Diagrammatic representation of the casual pathway.....	3
Figure 2. Estimated number of maternal and child deaths averted over 2017–2022 if the ESP is successfully scaled up in Bangladesh.....	14
Figure 3. Estimated number of stunting cases averted over 2017–2022 if the ESP is successfully scaled up in Bangladesh	14
Figure 4. Estimated number of deaths averted and healthy life years gained over 2017–2022 if the ESP is successfully scaled up in Bangladesh	15
Figure 5. Estimated number of maternal and child deaths averted over 2019–2027 if the benefit package is successfully operationalized in Cameroon	17
Figure 6. Estimated number of deaths averted and healthy life years gained over 2019–2027 if the benefit package is successfully operationalized in Cameroon.....	17
Figure 7. Estimated number of AIDS deaths averted over 2019–2027 if the benefit package is successfully operationalized in Cameroon	18
Figure 8. Estimated number of malaria deaths averted over 2017–2020 through scale-up of cost-effective malaria interventions in Senegal.....	21
Figure 9. Estimated number of AIDS deaths averted over 2016–2020 through implementation of task sharing in Cote d'Ivoire	23
Figure 10. Estimated number of maternal and neonatal deaths averted in Haiti in 2018–2023 due to increased number of midwives	25
Figure 11. Projected CBHI and fee waiver coverage in Ethiopia	27
Figure 12. Projected deaths averted in Ethiopia during 2013–2020 due to CBHI, fee waiver, and revenue retention programs.....	28
Figure 13. Number of maternal and child deaths averted in Nigeria during 2017–2022 due to health insurance and health facility improvements	32
Figure 14. Number of new HIV infections and HIV deaths averted in Nigeria during 2017–2022 due to health insurance and domestic resource mobilization	32
Figure 15: ART coverage in Vietnam by funding sources and year (2017–2022).....	34
Figure 16. Number of AIDS averted in Vietnam during 2018–2022 due to incorporation of ART in social health insurance.....	35

ACRONYMS

ART	Antiretroviral treatment
ARV	Antiretroviral
CBHI	Community-based health insurance
COPD	Chronic obstructive pulmonary disease
DALY	Disability-adjusted life years
DHS	Demographic Health Survey
EHIA	Ethiopian Health Insurance Agency
EPI	Expanded Program on Immunization
ESPs	Essential services package
FTAT	Focal test and treat
FTEs	Full-time equivalent
FMOH	Federal Ministry of Health
HFG	Health Finance and Governance Project
HPNSP	Health, Population, and Nutrition Sector Program
HRH	Human resources for health
IRS	Indoor residual spraying
LiST	Lives Saved Tool
M&E	Monitoring and evaluation
MCH	Maternal and child health
MNCH	Maternal, neonatal, and child health
MOH	Ministry of Health
MSPP	Ministry of Health and Population
NCDs	Non-communicable diseases
NGN	Nigerian Naira
NMCP	National Malaria Control Program
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
PLHIV	People living with HIV
RMNCH	Reproductive, maternal, newborn, and child health
SARA	Service availability and readiness assessment
SHI	Social health insurance



SMC	Seasonal malaria chemoprophylaxis
SSHIS	State-sponsored health insurance scheme
SUFI	Scale-up for impact
UHC	Universal health coverage
UNAIDS	United Nations Programme on HIV/AIDS
USAID	United States Agency for International Development
VAAC	Vietnam Administration for HIV/AIDS Control
VSS	Vietnam Social Security
VIA	Visual inspection with acetic acid
WHO	World Health Organization

EXECUTIVE SUMMARY

The Health Finance and Governance (HFG) project is a global flagship health project of the United States Agency for International Development (USAID). Over its six-year life (2012-2018), the project worked with more than 40 partner countries to increase their domestic resources for health, manage resources more effectively, and reduce system bottlenecks in order to increase access to and use of priority health services and strengthen health systems overall. HFG provided state-of-the-art and country-specific technical assistance to remove obstacles that impede effective health system functioning and essential reforms. Recognizing the importance of measuring its impact, HFG quantified its return on investment for HFG health systems strengthening efforts.

HFG and its partner Avenir Health conducted a rigorous exercise to estimate the impact of the project's health systems strengthening activities on its overall goal: *increased use of priority health services*. We used Spectrum, a suite of modeling tools developed by Avenir Health and partners, to quantify impact on mortality and morbidity based on changes in the coverage of specific priority health services due to the project's activities aimed at improving access, quality, and use of health care. Given the diverse activities of HFG and the challenge of establishing a measurable causal link between project activities and coverage effects, we adopted a conservative approach and chose for this impact modeling exercise a subset of HFG activities for which a direct link was apparent. Based on these parameters, the exercise was conducted for eight country programs: Bangladesh, Cote d'Ivoire, Cameroon, Ethiopia, Haiti, Nigeria, Senegal, and Vietnam.

Using a methodical approach, we analyzed individual project activities in these countries and the expected effects on service coverage to estimate the impact on morbidity and mortality. We examined how our activities, including implementing strategies for improved human resources for health, operationalizing health insurance schemes, rolling out packages of health services, and using costed plans and packages to advocate for more financial resources, will increase access to health services, which in turn will lead to greater coverage of health services among targeted populations and ultimately to reduced morbidity and mortality. We modeled the impact of HFG's activities by quantifying the number of deaths that were averted as a result of HFG-supported strategies and reforms.

The modeling results indicate that continued implementation of health systems strengthening strategies like those HFG supported would bring significant expansion of health care coverage and enhanced health outcomes.

This report presents country- and activity-specific results and the methodology for estimating coverage changes and impact. We hope this modeling exercise adds to the global understanding of how the impact of health systems strengthening can be measured. It provides powerful evidence on why investment and effort in strengthening health systems must continue.



I. INTRODUCTION

Over the life of the project, from 2012 to 2018, the USAID Health Finance and Governance (HFG) project worked with counterparts in more than 40 countries to address some of the greatest challenges facing health systems today: How to protect families from catastrophic health care costs and increase the use of priority services, such as maternal and child health care, that would prevent illness and save lives. To do this, we implemented a wide variety of activities that aimed to:

- Increase health financing, for example, by mobilizing domestic resources and introducing more strategic provider payment systems;
- Enhance governance by improving health system management, and accountability and transparency;
- Improve management and operations systems to advance the delivery and effectiveness of health care, by using mobile money and public financial management; and
- Advance techniques to measure progress in health systems performance, especially around universal health coverage (UHC).

Throughout its six years, HFG maintained a monitoring and evaluation (M&E) system that tracked implementation, project deliverables, and other outputs in detail. However, information on how the project performed against its overall goal to “*increase the use of priority health care services, including primary health care, by partner countries’ populations*” was more limited. Therefore, in the final year of the project, HFG and its partner Avenir Health conducted an exercise to estimate the impact of its health systems strengthening activities on the use of priority health services and health status in terms of morbidity and mortality.

We used Spectrum, a suite of modeling tools developed by Avenir Health and partners, to quantify project outcomes and impact on health by analyzing individual project activities and their expected effects on population service coverage and estimating the impact on morbidity and mortality. Given the diverse range of activities conducted under HFG and the challenge of establishing a measurable causal link between project activities and coverage effects, we adopted a conservative approach and identified specific HFG activities within country programs for which such a direct link was apparent. The impact modeling exercise was considered feasible for the following:

- A subset of HFG project activities that established or expanded essential health services packages (ESPs), human resources for health (HRH), health insurance, and service quality improvement; and
- A subset of country programs: Bangladesh, Cote d’Ivoire, Cameroon, Ethiopia, Haiti, Nigeria, Senegal, and Vietnam (we were able to model select activities from these programs).

The methodology used to conduct this analysis and reach results demonstrates the feasibility and utility of this approach and, importantly, provides evidence on the health impact that investing in health systems strengthening yields on the ground.



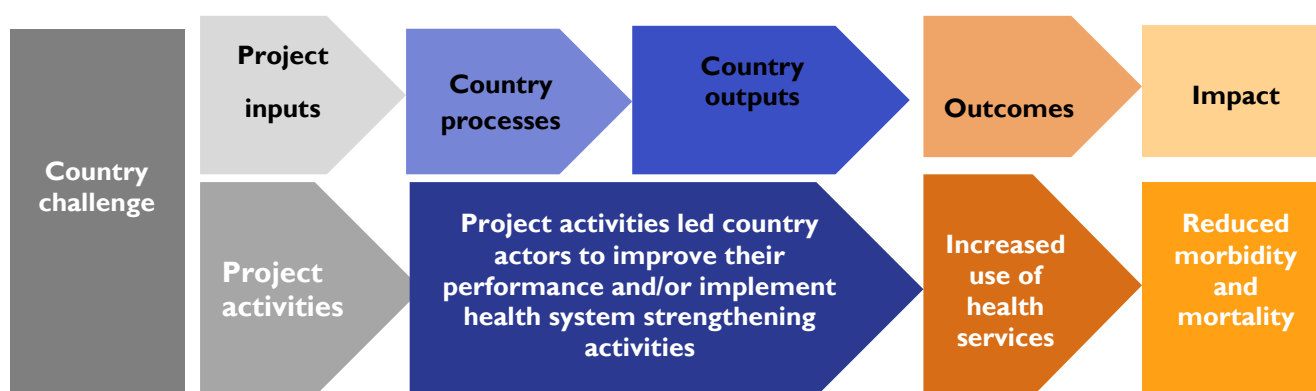
2. METHODOLOGY FOR IMPACT MODELING

Delineating the causal pathway was central to our efforts to ascertain whether our interventions produced effects in the project countries' health systems, leading to changes in health outcomes. The causal pathway maps project activities and the resulting country actions that are expected to lead to increased service coverage, which in turn leads to averted morbidity and mortality (see Figure 1).

In countries where HFG operated, project interventions typically responded to a problem or challenges that government counterparts and/or other in-country stakeholders had identified as something they wanted to address. HFG worked with in-country counterparts and USAID to design solutions and activities that would address the problems identified. In addition to addressing specific technical issues, our activities and inputs focused on building the capacity of our in-country partners to better manage their own health systems after HFG ended. Our support included training and coaching, technical assistance, tools, and other support in areas such as resource tracking, costing health plans and ESPs, developing insurance schemes, and developing HRH strategies (project inputs). These tools and resources gave in-country stakeholders the ability to continue this work in the future. They will be able to implement strategies and reforms, for example to deploy more health workers; operationalize health insurance schemes; roll out ESPs; and use costed plans and packages to advocate for more financial resources (country processes and outputs).

Their implementation of the aforementioned activities will increase access to health services, which will lead to greater coverage of targeted beneficiaries (outcomes). Expanded access and increased coverage will in turn lead to reduced morbidity and mortality (impact). This modeling exercise estimates the impact of HFG's activities by quantifying the mortality (number of deaths) that will be averted if country partners continue the HFG-supported strategies and reforms as planned.

Figure 1. Diagrammatic representation of the casual pathway



Note: 1) Effects on outcome and impact variables are estimated potential effects. 2) Effects are not exclusively attributable to HFG interventions.

2.1 The impact modeling process

2.1.1 Step 1: Identify activities to model

Spectrum modeling software has been used for more than 10 years in different settings globally and are regularly updated to incorporate the latest evidence from scientific literature and household survey data. It includes pre-populated country profiles with demographic and epidemiological data specific to the country. Spectrum estimates health impact based on changes in the coverage of specific health interventions such as antiretroviral treatment (ART), antenatal care, obstetric care, integrated management of childhood illnesses, and treatment of malaria. Therefore, for this type of modeling to be applicable, the project activity must be one that aims to lead to expanded population coverage rates for one or more services in the Spectrum models.

Hence, the first step in our process was for the HFG modeling team to identify the project activities that were expected to affect population coverage for defined service interventions. The modeling team worked closely with HFG country teams to analyze project activities and results in terms of improvements they produced in the health system that in turn led to increased coverage for the health service interventions. Most HFG activities were not appropriate for the modeling exercise because the evidence base that links these upstream activities with coverage changes is limited. For example, there was no documented evidence that could link changes in service coverage to HFG activities such as building the capacity of the Ministry of Health (MOH) in Guinea to respond to health system shocks, monitoring and evaluating national health sector plan implementation in Angola, or undertaking a governance survey on informal fees in public health facilities in Côte d'Ivoire.

Modules in Spectrum

Demproj is the demographic projection underlying all impact models in the suite.

Lives saved Tool (LiST) links interventions to cause-specific mortality or risk factors based on the efficacy of that intervention in reducing mortality or the risk factor (the efficacy assumes quality service delivery). It includes preventive measures as well as treatments for diseases and health and nutrition conditions across reproductive, maternal, neonatal and child health. As interventions are scaled up, levels of cause-specific mortality and risk factors are re-computed based on the efficacy link between interventions and outcomes (Avenir Health).

AIDS Impact Model (AIM) and Goals module were developed in coordination with UNAIDS and the UNAIDS estimation reference group. AIM and Goals projects the consequences of the HIV epidemic, including the number of people living with HIV, new infections, and AIDS deaths by age and sex, as well as the new cases of tuberculosis and AIDS orphans (Avenir Health).

The **Non-communicable Disease Impact model** estimates prevalence and incidence of NCDs including cardiovascular disease, lung health, diabetes, and mental, neurological, and substance abuse disorders (Stenberg et al., 2017).

Spectrum Malaria is calibrated onto – and prepopulated with – WHO and Oxford University estimates of historic and current malaria burdens, and historic intervention coverage scale-up patterns, at provincial level for *falciparum*-endemic African countries (Korenromp et al., 2016; Hamilton et al. 2017). Malaria impact functions were validated against randomized intervention trial data, and in line with internationally agreed effectiveness estimates also assumed in the LiST model.

What is a coverage rate?

Coverage rate = $\frac{\text{The number of people receiving a service}}{\text{The number of people needing the service}}$

Example:

Under one immunization coverage = $\frac{\text{The number of children <1 having received a specific vaccine}}{\text{The total population of children under one}}$

Table I summarizes the HFG activities that ultimately were included in the modeling exercise and the theory of change that explains their effects on access to services and service coverage.

Table I. Country health system improvements and their effects on health services coverage

Health system improvement as a result of HFG activities	Effects of country outputs on health services access and coverage
Expanded package of essential health services	Establishing or expanding ESPs involves defining the priority services that the government will cover. ESPs are linked to the needs or social preferences of the population to be covered and are often expected to achieve multiple goals: improved efficiency, equity, and accountability. Defining the ESPs can expand coverage when it is part of other reforms to mobilize new government funding and expand the supply and quality of services. • HFG supported Bangladesh to cost an expansion of its existing ESP, which added non-communicable diseases and select maternal and child health (MCH) services. The new package is part of Bangladesh government's strategy to achieve UHC. • HFG supported the Government of Cameroon in defining and costing an ESP as a key measure for achieving UHC. HFG is also supporting Cameroon in advocating for government financing of the ESP. • HFG carried out a cost-effectiveness study on the malaria prevention and treatment packages in Senegal, which vary by district and region. The study's results enabled policymakers to scale up the most cost-effective interventions.
Increased number of qualified health workers	Improved health services coverage and delivery depend on the availability of qualified health workers to directly provide health services to those in need. Adequate quantity and appropriate distribution of health workers with competencies leads to improved accessibility of health services by the population, and in turn to expanded service coverage. • In Cote d'Ivoire, HFG worked with the MOH to get a task-sharing policy approved that enables nurses to initiate patients on ART. HFG then incorporated ART provision into the nurse pre-service training curriculum. HFG also trained nurses who were already deployed in ART provision. These activities resulted in increased availability of health workers that are able to deliver ART. • In Haiti, HFG supported the MOH to develop a five-year HRH strategy that included training and deployment of more health workers across the country, including in rural areas with severe shortages of health workers.

Health system improvement as a result of HFG activities	Effects of country outputs on health services access and coverage
Improved quality of health services	HFG's activities geared to quality improvement involved mobilizing domestic financial resources for allocation to health facilities. Health facilities used the financial resources to ensure availability of adequate infrastructure (electricity, water), medical equipment, supplies, and medicines. Improved availability of these inputs enhanced the facilities' capacity to correctly diagnose and treat patients, leading to reduced morbidity and mortality. • HFG supported Ethiopia to expand its policy of allowing health facilities to retain user fee revenues, which enabled the facilities to invest in infrastructure improvements and procurement of medical equipment, supplies, and medicines. • HFG carried out service availability and readiness assessments (SARA) in nearly 4,000 health facilities in six states of Nigeria, following which HFG estimated the cost of addressing the identified service input gaps. This data formed the basis for advocacy and state-level planning for more financial investment in medical equipment and supplies.
Expanded health insurance coverage	Health insurance is a financing mechanism that entails collection of regular and predictable contributions from large numbers of people (who have varying risks of illness, and include both the healthy and the sick), which "pools" these resources, and disburses payment for health care when needed. By separating the ability to pay for care from the ability to obtain care when needed, insurance coverage can mitigate financial access barriers, encouraging individuals to utilize preventive care and seek and receive timely care when they are sick. • HFG provided assistance to Ethiopia to pilot and then expand government-subsidized community-based health insurance. • HFG supported states in Nigeria to mobilize additional domestic resources and launch state-supported social health insurance schemes, which will provide coverage for MCH and HIV/AIDS services. • HFG supported Vietnam to add ART services to social health insurance.

2.1.2 Step 2: Analyze and compare scenarios

To model the impact of health system interventions, at least two scenarios are modeled and compared. The first scenario is the counterfactual, which is defined as the current trend or baseline service coverage rates. In most cases, the counterfactual scenario relies on baseline data in Spectrum, which is based on data from the World Health Organization (WHO) and country Demographic and Health Surveys (DHS) (USAID, various dates). The second scenario is scale-up, in which there is an increase in service coverage rates due to HFG activities and anticipated country outputs (improved health system performance).

The HFG modeling team and country teams invested significant effort in collecting reliable country data to quantify anticipated coverage changes resulting from project activities in the scale-up scenario. Estimates of coverage in the scale-up scenario were generally derived using targets established by the government and referenced in country implementation plans and strategies. Both the counterfactual and scale-up scenarios were projections of coverage rates for a specified future timeframe. The projection timeframe varies by country from three to eight years, depending on the nature of intervention and the timelines set by the government. Table 2 details the types and sources of data for each scenario and by the type of health system intervention.

Table 2. Modeling scale-up and counterfactual scenarios

Scenario and countries	Description	Types and sources of data
Counterfactual scenario	Coverage remains unchanged from the current value or the average country-specific historical trends in coverage change continue. Although this may not represent the real country path, it helps isolate the changes in health status due to project activities.	- Data on the number of people currently receiving services, as provided in Spectrum or country statistics. - Data on the number of people needing specified services, based on World Population Prospect population projections, country epidemiological profiles, and Spectrum modeling.
Scale-up scenario	Coverage projected to increase due to the health system intervention (health system improvement achieved by HFG activities) initiated and/or scaled up.	- Population enrollment targets set by the government. - Historical trends of population coverage changes in cases when the health system intervention already existed on a smaller scale. By type of health system improvement: Domestic resource mobilization: Data on the amount of additional funds mobilized and how they have been used or intend to be used. ESP: Targets for the number of people expected to benefit from the package; services included in the package. Improved health workforce: Targets for the number of new health workers deployed or trained; number of existing health workers trained with a new skill; time allocated to specific services; observed changes in service coverage after implementation of the project activity. Improved quality: Number of health facilities that are applying facility infrastructure improvements; number of people served by the health facility that would benefit from the improvements; effect sizes established in literature review on reduction of unmet need. Health insurance: Targets for number of people to be covered by the insurance scheme; services covered by the insurance scheme; effect sizes established in literature review on reduction of unmet need.

2.1.3 Step 3: Model impact using Spectrum

After estimating coverage as described above, Avenir Health used Spectrum to model the impact on health status.

Avenir entered the coverage rates for baseline and scale-up scenarios into the appropriate Spectrum module to project the health impacts of changes in coverage rates brought in over time by specific health interventions for MCH, non-communicable diseases (NCDs), HIV, and malaria. Typically, Spectrum calculates health impact in terms of deaths averted. Using Bangladesh as an example, Table 3 shows illustrative coverage rates for the scale-up scenario from 2016 (baseline year) to 2022 (target coverage rates established by the government).

Table 3. Illustrative table on calculation of coverage rates for some select services from the essential services package in Bangladesh

Selected interventions for impact modeling	Coverage rate (% of target population receiving the services)						
	Baseline	Linear annual increase in coverage needed to meet the 2022 target					Target established by the government
	2016	2017	2018	2019	2020	2021	2022
Maternal health (Target population is all pregnant women)							
Daily iron and folic acid supplementation	18.6	20.5	22.4	24.3	26.2	28.1	30.0
Tetanus toxoid	38.3	42.1	45.9	49.7	53.4	57.2	61.0
Sepsis case management	12.4	14.2	15.9	17.7	19.5	21.2	23.0
Management of eclampsia	14.2	14.7	15.1	15.6	16.1	16.5	17.0
Management of obstructed labor	13.7	14.8	15.8	16.9	17.9	19.0	20.0
Neonatal health (Target population is all live births 0–28 days)							
Immediate newborn care	1.8	2.5	3.2	4.0	4.7	5.4	6.1
Newborn sepsis (injectable antibiotics)	26.3	27.8	29.4	30.9	32.4	34.0	35.5
Child health and EPI* (Target population is all children of 0–59 months)							
Treatment of severe diarrhea	19.3	19.9	20.5	21.2	21.8	22.4	23.0
Treatment of severe pneumonia	10.5	11.0	11.6	12.1	12.6	13.2	13.7
Pneumococcal vaccine	39.8	41.8	43.9	45.9	47.9	50.0	52.0
Nutrition (Target population differs by target program)							
Management of anemia during pregnancy	12.5	13.6	14.6	15.7	16.7	17.8	18.8
Deworming	10.0	10.8	11.7	12.5	13.3	14.2	15.0
Complementary feeding counseling and support	16.0	17.3	18.7	20.0	21.3	22.7	24.0
Management of severe acute malnutrition	10.6	12.4	14.1	15.9	17.6	19.4	21.1

Selected interventions for impact modeling	Coverage rate (% of target population receiving the services)						
	Baseline	Linear annual increase in coverage needed to meet the 2022 target					Target established by the government
	2016	2017	2018	2019	2020	2021	2022
Non-communicable diseases (Target population is all adult population)							
Diagnosis of diabetes mellitus	25.6	32.0	38.4	44.8	51.1	57.5	63.9
Screening for breast cancer (breast exam)	22.9	28.6	34.4	40.1	45.8	51.6	57.3
Visual inspection with acetic acid (VIA) for cervical cancer	22.9	28.6	34.4	40.1	45.8	51.6	57.3
Diagnosis and management of ambulatory chronic obstructive pulmonary disease	3.8	4.8	5.7	6.7	7.6	8.6	9.5
Screening for risk of cardiovascular disease and diabetes	6.1	8.1	10.1	12.2	14.2	16.2	18.2
Management of depression	25.5	29.8	34.0	38.3	42.5	46.8	51.0
Identification of the signs of mental health conditions and referral	25.5	29.8	34.0	38.3	42.5	46.8	51.0
Diagnosis of hypertension	3.6	4.2	4.8	5.4	5.9	6.5	7.1

* EPI=Expanded Program on Immunization

The final step was to compare the number of deaths in the counterfactual scenario with the number in the scale-up scenario. Continuing with the Bangladesh example, Table 4 presents the projected number of counterfactual deaths (how many people would die without HFG activities) and the lower number of deaths that would occur under the scale-up scenario. The number of deaths averted is calculated as the counterfactual minus scale-up, and represents HFG impact. These projections are presented as graphs in the next section on country results.

Table 4. Number of deaths averted among mothers, neonates, and children due to scale-up of the essential services package in Bangladesh

	Counterfactual								Scale up Scenario								Deaths averted (counterfactual deaths minus scale up deaths)
	2016	2017	2018	2019	2020	2021	2022	Total deaths	2016	2017	2018	2019	2020	2021	2022	Total deaths	
<1 month - Neonatal deaths	60,888	61,323	61,800	62,227	62,598	62,904	63,139	434,879	60,888	60,126	59,327	58,470	57,564	56,605	55,590	408,570	26,309
1-59 months deaths	44,983	44,865	43,655	43,633	43,734	43,665	43,890	308,425	44,983	44,347	42,538	41,852	41,259	40,489	40,003	295,471	12,954
Total Child deaths (0-59 months)	105,871	106,188	105,455	105,860	106,332	106,569	107,029	743,304	105,871	104,473	101,865	100,322	98,823	97,094	95,593	704,041	39,263
Maternal deaths	5,336	5,374	5,417	5,454	5,487	5,515	5,536	38,119	5,336	5,316	5,293	5,265	5,232	5,193	5,149	36,784	1,335

2.1.4 Limitations

While the impact modeling methodology has proved both useful and feasible, there are limitations in both Spectrum and the methodology used. The limitations are listed below:

- The modeling team was careful to focus on health system improvements (country outputs) where HFG played a major role. However, given the broad and long-term nature of health system improvements, we recognize that other actors contribute to and influence the country's implementation of any intervention.
- The team also was careful to focus on countries where implementation of scale-up plans and strategies is probable. Actual results will, however, depend on a variety of factors, such as the availability of funding (e.g., for an expanded benefits package), continued political commitment (e.g., commitment by Nigerian state-level authorities to state-sponsored health insurance), and operational capacity to scale up (e.g., geographic expansion of community-based health insurance in Ethiopia). Actual results will also depend on demand for health services, availability of health commodities, quality of service delivery, and factors outside the health system, such as macro-economic performance and political stability (Spectrum models assumes these elements are in place).
- Modeling analysis relies on an anticipated number of people receiving services, based on historical trends or targets set by the government. If the targets are not achieved or trends are not sustained, the corresponding mortality effects will be less.
- Many socio-economic factors influence population health status (Houweling and Kunst 2010). These factors may dilute the effect of the health system improvement (country output) that was modeled.

Limitations related to impact modeling:

- While Spectrum models include nearly 200 health services and interventions (see illustrative service interventions in Table 3 above), some of the services addressed through HFG activities are not included. For example, interventions to address arsenic poisoning (arsenicosis), which is prevalent in Bangladesh, is not included in Spectrum. Therefore, the projected impact may be more conservative than if Spectrum were able to model 100 percent of the health services and interventions expected to experience expanded coverage in HFG project countries.
- Spectrum estimates mortality reductions based on global and regional effectiveness rates of health interventions, which may vary from real-world, country-specific settings. The effectiveness rates in Spectrum incorporate the latest evidence from scientific literature and household survey data. These effectiveness rates assume that services are delivered according to established quality of care standards, when in actuality quality of care varies.



3. COUNTRY RESULTS

3.1 Interventions for Expanded Packages of Essential Health Services

HFG focused on expanding access to an ESP in two HFG project countries: Bangladesh and Cameroon.

3.1.1 Bangladesh

Since its independence almost five decades ago, Bangladesh has made rapid and remarkable progress on many health indicators and outcomes, such as child and maternal mortality rates and immunization coverage. These outcomes are largely the result of marked increases in access to and high coverage of select health interventions. In 2010, the government publicly committed to achieving UHC by 2030. However, the country continues to battle several challenges including high out-of-pocket health spending, low government spending on health, and limited fiscal space. To address these challenges, the country's Health Care Financing Strategy calls for design and implementation of a social health protection scheme and strengthened financing and provision of public health care services.

Expanding the essential service package in Bangladesh

To reach UHC, Bangladesh's Ministry of Health and Family Welfare revised the existing ESP in 2016 to meet the changing trend of disease burden and population needs. The revision consisted of: 1) expansion of existing services in terms of wider population coverage and addition of new subcomponents in the areas of maternal, neonatal, child and adolescent health, family planning, and nutrition, and 2) addition of new services, such as NCD screening and treatment, and mental health services.

The country's 4th Health, Population, and Nutrition Sector Program (4th HPNSP) includes target population coverage rates for both the expansion of existing services and the new services. Starting in 2016, HFG worked closely with the Health Economics Unit and Planning wing at the Bangladesh health ministry to estimate the cost of ESP to support the operational and financial feasibility of ESP implementation. Additionally, HFG estimated the additional resources required to reach the ESP goals. Costing the revised ESP and estimating the gaps in resources has enabled the health ministry to advocate for additional budget allocation to fund the expansion of services under the ESP.

Method for estimating coverage

We modeled the impact of the expanded ESP based on the government's 2022 coverage targets for each service, as established in the 4th HPNSP. Baseline coverage rates for 2016 were drawn from DHS and service statistics. Hence, to calculate coverage for 2017–2021, we applied a linear rate of increase between the baseline coverage rate and the target coverage rate for 2022 (see Table 3 above for calculation of coverage for illustrative services from the ESP).

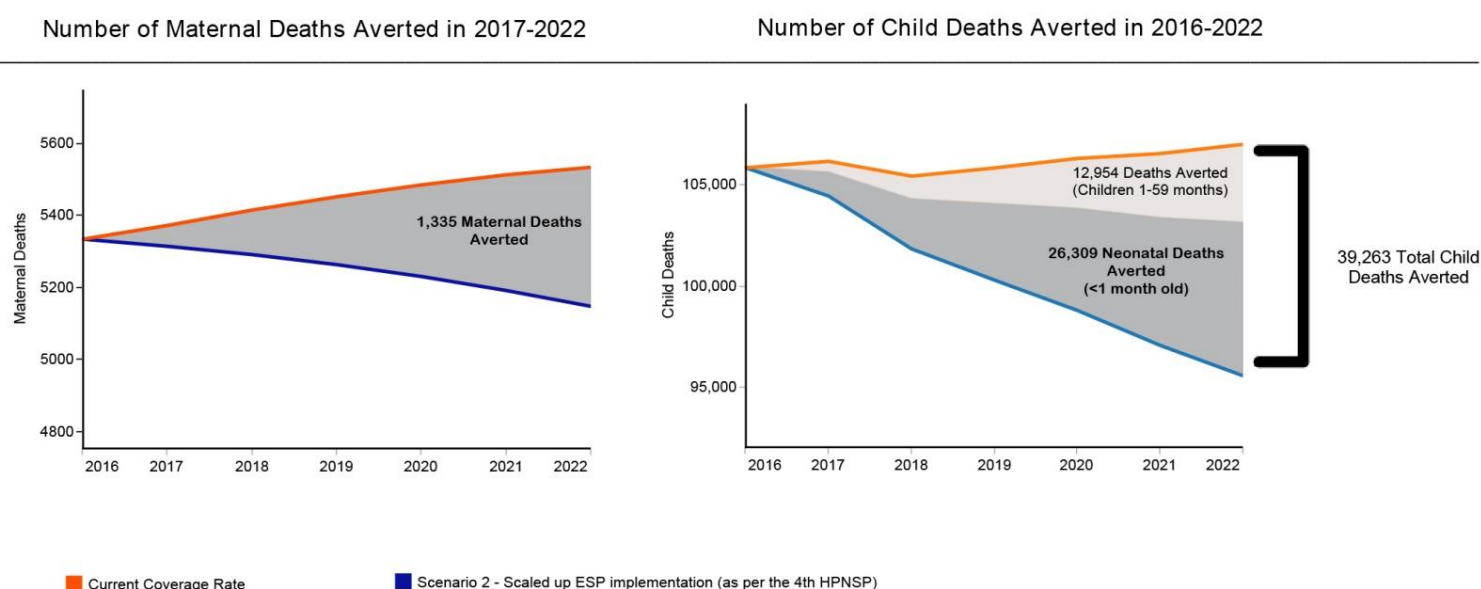
We then modeled the following scenarios for 2016–2022:

- Counterfactual scenario: Current coverage levels (for 2016) in Spectrum continue.
- Scale-up scenario: Target coverage rates, as provided in the 4th HPNSP, are achieved for existing and new services as a result of additional financial resource allocation to the ESP.

Modeling results

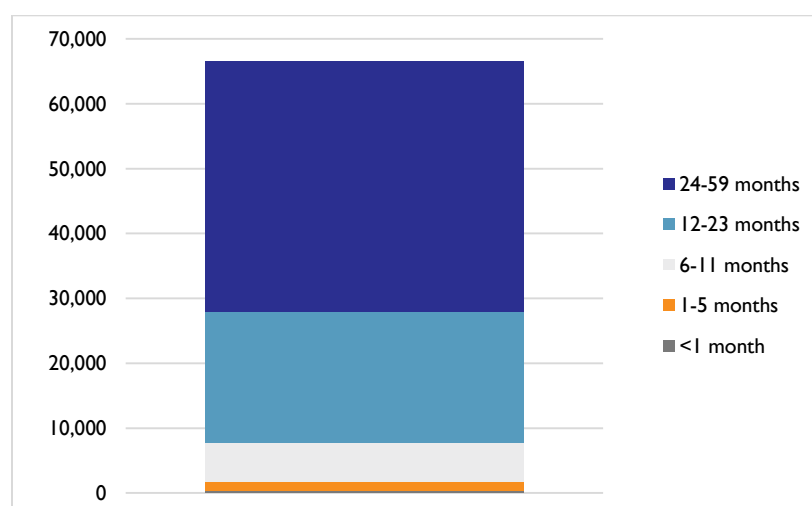
Expanding the coverage for maternal health services in the ESP is estimated to avert more than 1,300 maternal deaths in 2017–2022 (see Figure 2). Expanding ESP coverage for neonatal and child health services would avert nearly 27,000 neonatal deaths and more than 12,000 deaths among children 1–59 months during the same period (see Table 4 for calculation of deaths averted).

Figure 2. Estimated number of maternal and child deaths averted over 2017–2022 if the ESP is successfully scaled up in Bangladesh



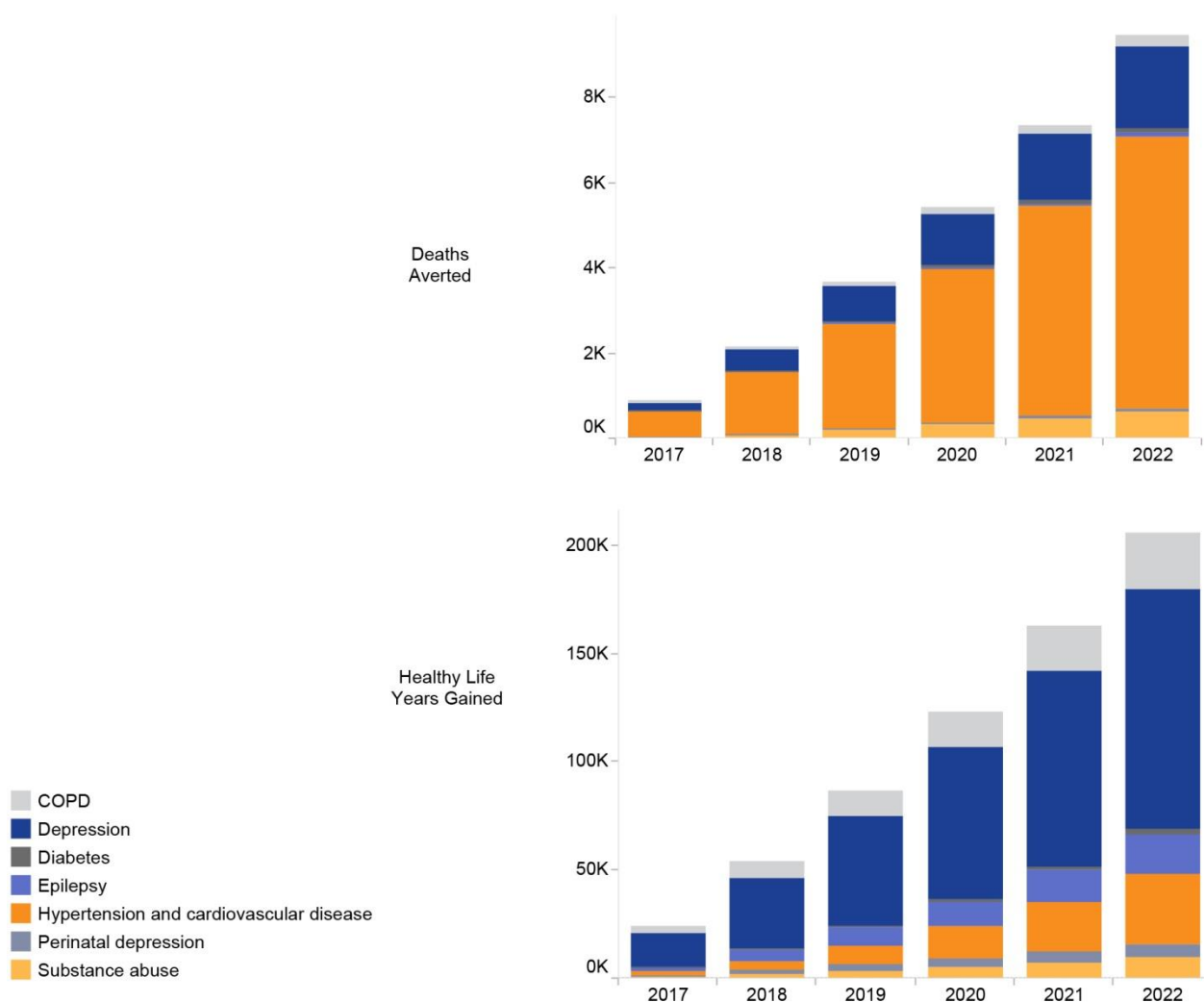
Implementation of the expanded ESP will also help to improve nutritional outcomes among children under five, averting more than 66,000 cases of stunting (see Figure 3).

Figure 3. Estimated number of stunting cases averted over 2017–2022 if the ESP is successfully scaled up in Bangladesh



Similarly, the inclusion of NCD and mental health services in the ESP would avert nearly 30,000 deaths and gain more than 650,000 healthy life years over the period of 2017-2022 (see Figure 4).

Figure 4. Estimated number of deaths averted and healthy life years gained over 2017–2022 if the ESP is successfully scaled up in Bangladesh



Limitations/caveats

In addition to the limitations presented in the previous section of this report, some other limitations are also relevant for Bangladesh. The present analysis assumes that the pace of expanded ESP roll-out will align with the timeline and targets set in the 4th HPNSP. If this does not happen, the corresponding mortality effects will be less. As noted earlier, the results may underestimate the actual impact of ESP because many ESP interventions are not included in Spectrum. For example, the impact of programs to reduce arsenic poisoning (arsenicosis) could not be modeled because the data available on the corresponding effectiveness of interventions to prevent or treat arsenicosis are not yet sufficient.

3.1.2 Cameroon

In Cameroon, households contribute 52 percent of total health spending, indicating that many households face inadequate levels of financial protection from health care costs (Wright et al. 2016). Enrollment in prepayment health insurance schemes is very low and the general public widely regards health insurance as a product for the wealthy. Further, community-based health insurance covers less than 2 percent of the population and is considered high cost as its premiums are not government-subsidized. Government financing for health services offers some degree of financial protection from health care costs, but it is insufficient. To address the current health care-associated financial risks to its population, the Government of Cameroon has committed to UHC.

Planning for universal health coverage in Cameroon

The Government of Cameroon has been working on strategies to achieve UHC. Part of that work is to define a basic benefit package. The first phase of UHC in Cameroon will start from 2019 and primarily focus on vaccination for children under five years of age, pediatric care for children 0–15 years, and gynecological/obstetric care for pregnant women. The second phase will focus on budget allocation and expansion to include major health services for the general population, such as services for HIV/AIDS, malaria, tuberculosis, NCDs, parasitic diseases, and community health. The government's goal is to achieve UHC for the services in the benefit package by 2027.

HFG has supported the Government of Cameroon to cost the benefit package. The government is using the cost analysis to mobilize the financial resources necessary to expand and operationalize the benefits package over the next 10 years. Using the costed benefit package, the country's health ministry has already developed a health financing strategy to mobilize the required financial resources.

Method for estimating coverage

HFG modeled the impact of operationalizing the benefits package in both phases of UHC. We assumed a target of 100 percent coverage in order to be consistent with the government's goal of reaching universal coverage. We used a linear incremental increase each year from the baseline coverage rate in 2018 to 100 percent coverage in 2027.

For Cameroon, we developed the following scenarios for the period of 2018–2027:

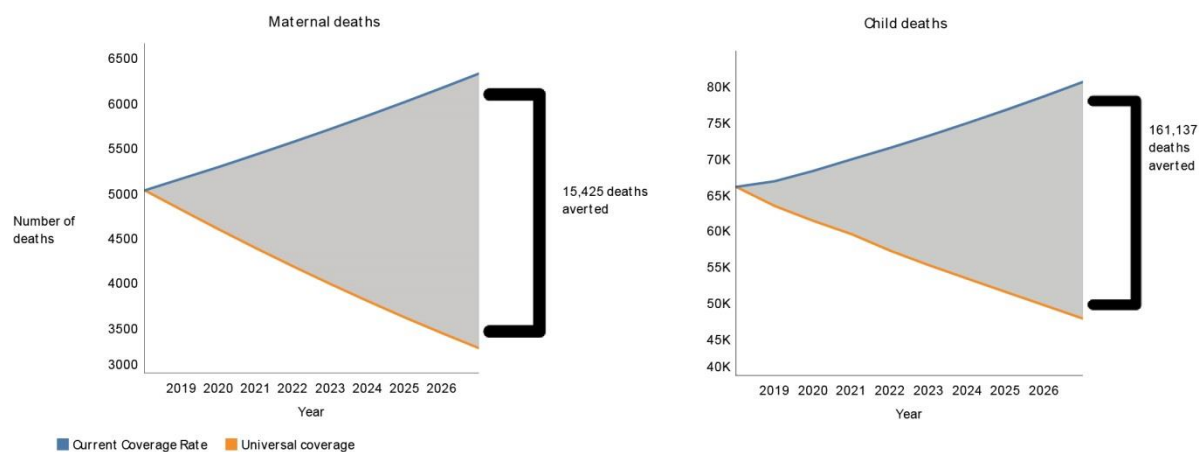
- Counterfactual scenario: 2018 baseline coverage levels continue
- Scale-up scenario: 100 percent coverage rates are achieved for existing services as well as new services by the target year of 2027

These coverage levels were entered into the corresponding Spectrum impact models (LiST, NCD model, and the AIDS Impact Module) to estimate the impact on mortality and morbidity.

Modeling results

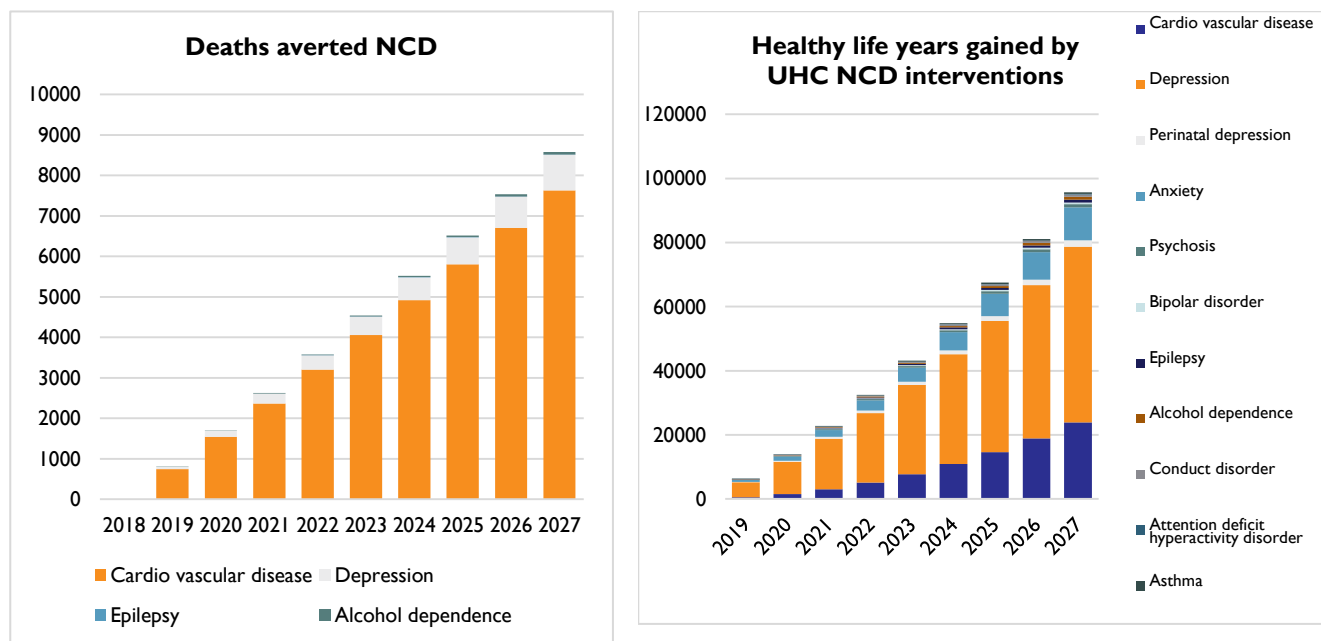
Achieving UHC for maternal health services as indicated in the benefit package would avert more than 15,000 maternal deaths over 2019–2027. Expansion of child health services coverage would avert more than 160,000 child deaths in the same time period (see Figure 5).

Figure 5. Estimated number of maternal and child deaths averted over 2019–2027 if the benefit package is successfully operationalized in Cameroon



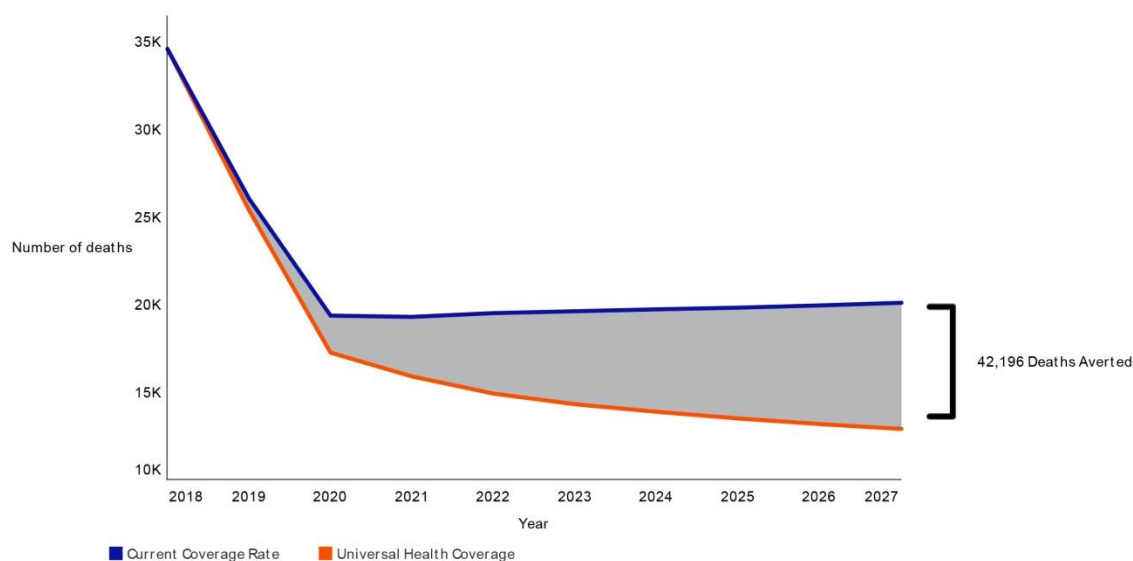
Inclusion of cardiovascular disease, asthma, mental, neurological, substance abuse, and management of depression, epilepsy, and anxiety in the benefits package is projected to avert more than 41,000 deaths and gain more than 95,000 healthy life years over the period of 2019-2027 (see Figure 6).

Figure 6. Estimated number of deaths averted and healthy life years gained over 2019–2027 if the benefit package is successfully operationalized in Cameroon



Achieving 100 percent coverage of HIV/AIDS related services would avert more than 42,000 deaths (see Figure 7) and reduce the mother-to-child transmission rate to 2.6 percent.

Figure 7. Estimated number of AIDS deaths averted over 2019–2027 if the benefit package is successfully operationalized in Cameroon



Limitations/caveats

Similar to Bangladesh, not all services in the benefit package were included in the modeling exercise due to lack of data, which would understate the impact of the interventions. The present analysis assumes that 100 percent coverage of the modeled services will be achieved by 2027. If that goal is not achieved, the corresponding mortality effects will be less. Attribution to HFG activities is limited to UHC costing, which is expected to support mobilization of more funds for health. HFG recognizes that effective expansion of the benefit package depends on a variety of other factors and actors in Cameroon.

3.1.3 Senegal

Senegal has regions with seasonal variations in malaria transmission. The seasonal patterns present an opportunity to attain “pre-elimination” by disrupting transmission through appropriately timed and targeted packages of interventions implemented at scale. However, planning and implementation of such intervention packages requires evidence on which packages of malaria control interventions are the most cost effective.

Scaling up evidence-based malaria interventions

Under the U.S. Government’s President’s Malaria Initiative, HFG lent support to Senegal’s National Malaria Control Program (NMCP) to achieve its overarching goal of reducing malaria mortality and morbidity through more targeted interventions to combat malaria. We collaborated with the NMCP to conduct a cost-effectiveness study of five malaria prevention and treatment intervention packages. Effectiveness was measured in terms of disability-adjusted life years (DALY) averted; one DALY is one year of “healthy” life lost due to a disease such as malaria. DALY is the sum of the years of life lost due to premature death plus the years lost due to disability for people living with the disease.

The interventions included in the packages vary by region and include the following combinations: 1) scale-up for impact (SUFI) ,which includes bed nets, intermittent preventive treatment in pregnancy, rapid diagnostic tests, and artemisinin combination therapy; 2) SUFI + reactive case investigation (focal test and treat [FTAT]); 3) SUFI + indoor residual spraying (IRS); 4) SUFI + seasonal malaria chemoprophylaxis (SMC); and 5) SUFI+SMC+IRS. The study found that, using the WHO threshold of GDP per capita¹, all intervention packages are “very cost-effective” except for SUFI+FTAT which is “cost effective”. Of the other four packages, SUFI+SMC is the most cost effective (US\$76 per DALY averted), followed sequentially by SUFI only (US\$130 per DALY averted), SUFI+SMC+ IRS (US\$272 per DALY averted), and SUFI+IRS (US\$582 per DALY averted).

The cost effectiveness analysis enabled the NMCP to make informed decisions about how malaria control funds could be allocated most cost-effectively. Based on the study’s findings, NMCP plans to scale up the most cost-effective interventions by 2020— expanded population coverage of SUFI and scale up of SUFI+SMC to select high malaria incidence districts where this package would be most cost effective (see table 5).

Table 5. Expansion of SUFI and SMC by District

District	SUFI Expansion of population Coverage	SMC Scale up to districts with high incidence of malaria
Kaolack	X	
Kedougou	X	X
Kolda	X	X
Sedhiou	X	X
Tambacounda	X	X
Kaffrine	X	
Dakar	X	
Thies	X	
Ziguinchor	X	
Diourbel	X	X
Fatick	X	
Louga	X	
Matam	X	
Saint louis	X	

¹ An intervention is “very cost effective “ if the cost per DALY is lower than the country GDP per capita. An intervention is “cost effective” if the cost per DALY is lower than three times the country GDP per capita.

Target coverage rates across the different interventions that are included in SUFI and for SMC vary between 80 and 100 percent. The coverage rates for each intervention in SUFI and SMC are provided in the Table 6 below.

Table 6. Target Coverages Rates of SUFI Interventions and SMC

SUFI Intervention/SMC	NMCP Target Coverage Rate for 2020
SUFI	
Bed nets	80%
Intermittent preventative treatment	80%
Rapid diagnostic tests	100%
Artemisinin combination therapy	100%
SMC	95%

Method for estimating coverage

HFG modeled only SUFI and SUFI+SMC, as these were the two most cost-effective packages. Based on the NMCP-established population coverage targets, we used a linear incremental increase by year from the baseline coverage rate in 2010 to target coverage rates identified by the national strategic plan for 2020.

We developed the following scenarios for the period of 2017–2020:

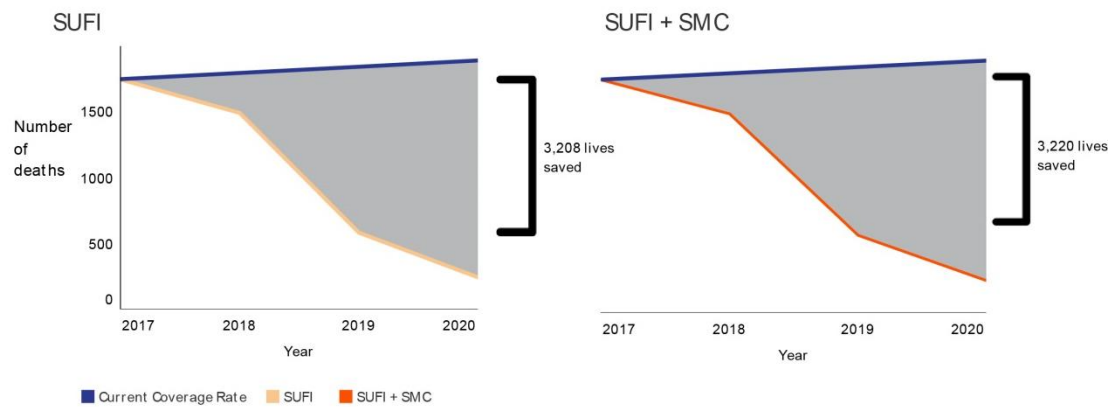
- Counterfactual scenario: Current coverage levels for SUFI and SUFI+SMC, as provided by the NMCP, continue
- Scale-up scenario 1: Nationwide scale-up of SUFI interventions to 80–100 percent coverage
- Scale-up scenario 2: Nationwide scale-up of SUFI along with scale-up of SMC to 80–100 percent coverage in select districts with high incidence of malaria

These coverage levels were entered into the Spectrum Malaria model to estimate the impact on case incidence and mortality from malaria.

Modeling results

Nationwide scale-up of the SUFI package would avert more than 750,000 cases of malaria and 3,200 deaths (see Figure 8). Adding SMC in select high malaria incidence districts where it would be cost effective would avert nearly 9,000 additional cases.

Figure 8. Estimated number of malaria deaths averted over 2017–2020 through scale-up of cost-effective malaria interventions in Senegal



Limitations/caveats

The estimated impact of scaling up SUFI and SUFI+SMC packages depends on many factors, including the targets set in the national strategic plan and the identification of high- and low-burden districts. If scaled-up implementation of selected packages does not proceed as assumed in these scenarios, the actual impact will differ from the results presented above.

3.2 Interventions for Improved Human Resources for Health

HFG contributed to increased number of qualified health workers in two HFG project countries: Cote d'Ivoire and Haiti.

3.2.1 Cote d'Ivoire

At 3.2 percent, the HIV prevalence in Cote d'Ivoire remains one of the highest in West Africa. More than 50 percent of the country's HIV-positive adults and children have yet to receive ART (UNAIDS 2017). Shortage of health workers presents a major challenge to better service provision. With 1.8 health care workers per 1,000 inhabitants, Côte d'Ivoire has fewer health care workers than the threshold of 2.3 per 1,000 inhabitants recommended by the WHO for proper support of the population (WHO 2008). Further, the country's health workforce is unevenly distributed, with health facilities largely concentrated in and around the major city of Abidjan. Given the shortfall of skilled health workers, many adults and children do not receive the life-saving HIV and other health treatment they need. Cote d'Ivoire faces challenges with recruiting, deploying, and retaining health workers in the country's rural and remote areas, posing significant barriers to scaling up HIV/AIDS services and improving health outcomes.

Increasing access to ART through task sharing

Undertaken in partnership with the Ministry of Health and Public Hygiene, HFG's advocacy efforts convinced professional associations and other stakeholders to support a national task sharing policy. The new policy mandates an expanded role for nurses and midwives – a change from previous policies allowing only physicians to provide ART services. To address the unmet need for ART, HFG also helped the health ministry to design and deliver a pre-service education curriculum to build the capacity of nurses and midwives in HIV care and treatment, in line with the new task-sharing policy. In addition, HFG advocated for placement of 229 of the first cohort of newly trained health workers in eight scale-up districts with a high HIV burden.

With HFG's support over the past five years, Cote d'Ivoire has experienced an exponential increase in the number of health workers trained to provide vital health services to adults and children living with HIV. Notably, the number of health care workers graduating with the skills needed to initiate ART increased from 300 physicians to a total of 1,800 health workers each year, a six-fold increase. By including task shifting in the training curriculum, Cote d'Ivoire will have a more productive health workforce that is qualified to deliver life-saving HIV care and treatment services to people in areas where they are most needed.

Method for estimating coverage

In February 2018, HFG conducted an internal evaluation of the contributions of HFG project-trained nurses and midwives, based on analysis of ART delivery statistics from health facilities. The evaluation found that after the implementation of task sharing, ART coverage had increased by 10 percent (during 2016–2018) in the catchment areas of project-supported health facilities. We used the findings of the internal evaluation to model the impact of task sharing. We applied an annual increase of 10 percent to ART coverage through 2020. We stopped at 2020, since by then ART coverage would reach 95 percent, which is considered full or maximum coverage that can be achieved given the reach of any health system.

For Cote d'Ivoire, we developed the following scenarios for the period 2016–2020:

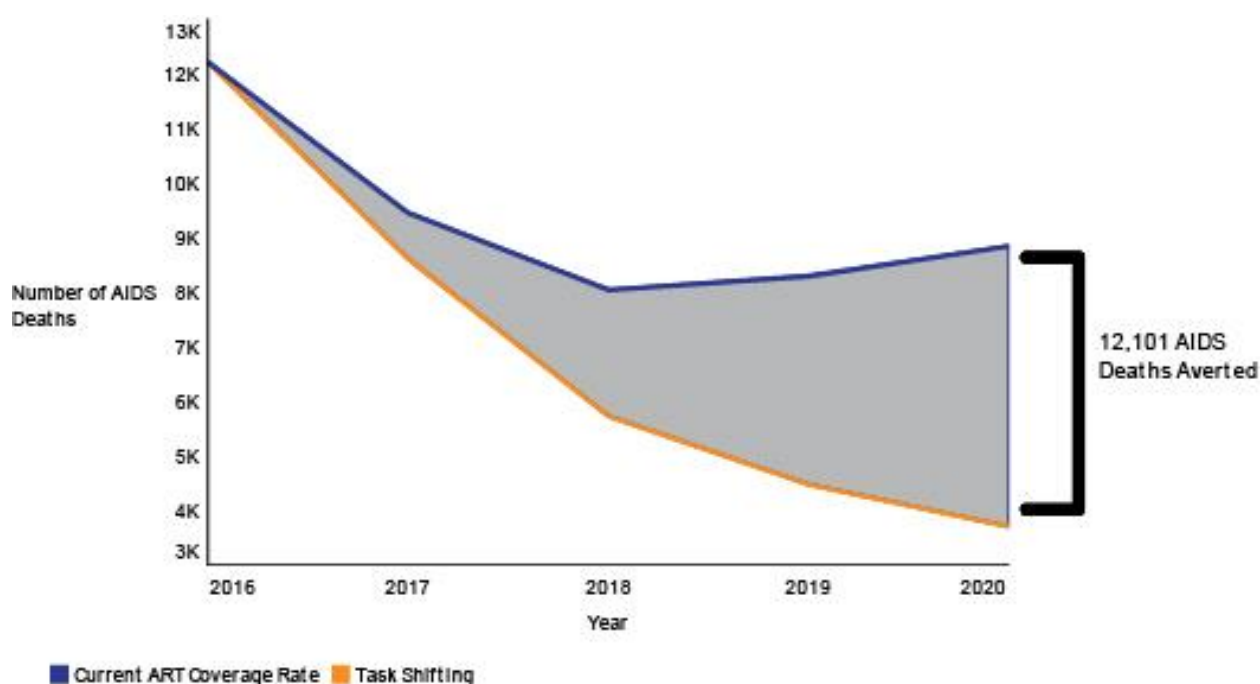
- Counterfactual scenario: Baseline coverage of ART in 2016 continues
- Scale-up scenario: Task sharing continues to be implemented, resulting in a 10 percent annual increase in ART between 2016 and 2020

The analysis relied on an anticipated number of people needing and receiving ART based on baseline ART coverage rates and unmet need as quantified in Spectrum. It also relied on projections of estimated coverage based on scaled-up coverage of ART through the implementation of task sharing.

Modeling results

We estimate that implementing task sharing in Cote d'Ivoire has led to and will continue to increase initiation on ART, averting more than 12,000 AIDS deaths during 2016–2020 (see Figure 9).

Figure 9. Estimated number of AIDS deaths averted over 2016–2020 through implementation of task sharing in Cote d'Ivoire



Limitations/caveats

If the future ART coverage rates and unmet need differ from our projections, then the corresponding mortality effects will also differ from our results. The 10 percent increase in ART was based on an internal evaluation at selected sites. Other sites in the country could experience higher or lower effect size from task sharing and the corresponding mortality effects would, therefore, differ from our estimates. HFG contributed to the development and implementation of task sharing, but an increase in ART coverage depends on a variety of other factors and actors, including commodity availability, and the effectiveness of HIV testing and referral for treatment.

3.2.2 Haiti

Haiti has a severe shortage of health workers, including doctors, nurses, and midwives. With only 0.65 doctors, nurses, and midwives per 1,000 people, the country falls well below the WHO's recommendation of 4.45 doctors, nurses, and midwives per 1,000 people to achieve the Sustainable Development Goals. The Haitian health sector's lack of human resources and weak capacity to manage the health workforce present major challenges to universal access to health care.

Haiti's HRH Plan at a glance

The HFG-supported HRH plan calls for the following additions:

- 600 midwives
- 3,000 community health workers
- 30 nurses

Improved management and planning of public and private health workforce

HFG undertook multiple activities to optimize the quality and efficiency of Haiti's health workforce. Our support helped Haiti's Ministry of Public Health and Population (MSPP) to develop an HRH strategy and undertake initiatives to address shortages and inefficiencies. To lay the foundation for increased equity and access to health services, HFG provided technical assistance to the MSPP to draft its first national HRH strategy.

As a first step, HFG assisted the MSPP in completing data quality audits and an HRH situational analysis, which found that the most critical shortage was midwives. Given the geographic imbalance and difficulty in recruiting and retaining higher-level cadres in rural areas, the finalized strategy proposes a major shift to prioritize primary care by hiring approximately 600 additional midwives over the next eight years, and 30 nurses and 3,000 community health workers and over the next five years. The HRH strategy enables the MSPP to address health workforce shortages and inefficiencies through ensuring the sufficient quantity and appropriate distribution of health workers, which will lead to improved accessibility of health services by the population.

Method for estimating coverage

Since there is a lack of data on the current number of midwives in Haiti, HFG used the data in the LiST model to estimate the current full-time equivalent (FTE)² number of midwives. LiST includes standardized time allocations for midwives and baseline coverage data for reproductive, maternal, newborn, and child health (RMNCH) services in Haiti. Based on standard provider time allocations across cadres, we assume that midwives deliver approximately half of the antenatal care, labor and delivery management, and neonatal services, and the remainder is delivered by community health workers, pediatricians, obstetricians/gynecologists, and other specialists. Given the baseline coverage levels in Haiti, we estimate that 602 midwife FTEs are required to deliver the baseline coverage level of antenatal care, labor and delivery management, and neonatal services. Therefore, the addition of 600 midwives, or 75 midwives per year, over the next eight years represents a 6 percent annual increase over the baseline levels of midwife FTEs ($75/602 \times 100 = 12.4\%$). We applied that same rate of increase to the current antenatal care, labor and delivery management, and newborn care coverage levels, estimating a 6 percent increase in coverage for those interventions.

² FTE is the total time worked expressed as the number of employees working full time. For example: 3 employees work 50 hours, 40 hours, and 10 hours per week, for a total of 100 hours. Assuming a full-time employee works 40 hours per week, the FTE calculation is 100 hours divided by 40 hours, or 2.5 FTE. <http://www.businessdictionary.com/definition/full-time-equivalent-FTE.html>

For Haiti, we developed the following scenarios for the period of 2018–2025 (timeframe of eight years, which corresponds with the country’s HRH strategic plan):

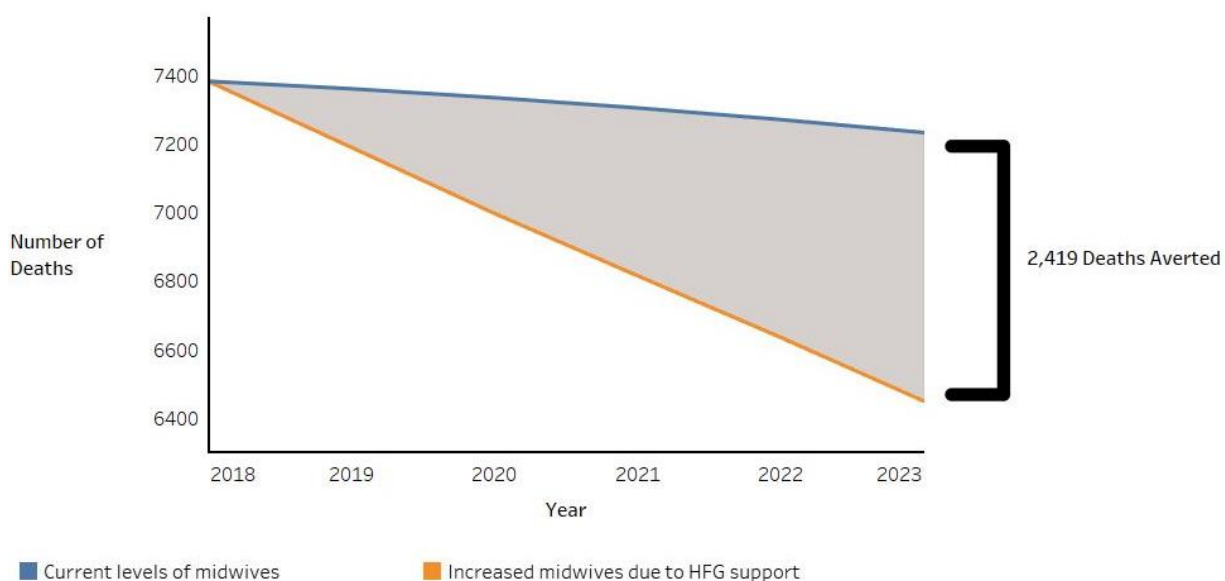
- Counterfactual scenario: Baseline levels of midwives in Haiti (602 midwives FTEs) continues
- Scale-up scenario: Increased number of midwives through an additional 75 midwives per year over the next eight years

While HFG also provided support for the planned hiring of 30 nurses and 3,000 community health workers, the modeling exercise focused only on the impact of hiring an additional 600 midwives over the next eight years. We did not model the impact of recruiting the other health cadres because time allocations across the different health areas vary considerably. In contrast, time allocations for midwives tend to be standard, because midwives generally focus on fewer services (prenatal care, labor, and delivery management). Hence, because increased number of health workers in other cadres are not included, the modeling results below are a conservative estimate of HFG’s impact on health outcomes.

Modeling results

We estimate that the increased number of midwives would avert more than 2,400 maternal and neonatal deaths during 2018–2023 (see Figure 10).

Figure 10. Estimated number of maternal and neonatal deaths averted in Haiti in 2018–2023 due to increased number of midwives



Limitations/caveats

The present analysis relies on an anticipated number of people in need of prenatal, delivery, and newborn care services; this estimate is based on the population data and projections available in the LiST model and the number of pregnancies in Haiti. If the number of people in need of these services changes over the next five years, the corresponding mortality effects will differ from our results. The scale-up scenario is based on the assumption that HFG’s support to develop the HRH strategic plan will enable the MSPP to deploy more midwives who will provide more services to pregnant women and newborns. However, while HFG has contributed to the HRH strategic planning, which is expected to result in increased deployment of midwives, the actual achievements also depend on a variety of other actors and factors, including demand, availability of health commodities, and health financing.

3.3 Interventions for Improved Insurance Coverage and Service Quality

HFG contributed to expansion of health insurance and improved quality of health services in three project countries: Ethiopia, Nigeria, and Vietnam.

3.3.1 Ethiopia

Approximately one-third of the total spending for health in Ethiopia was out-of-pocket expenditure in 2013/14 (FDRE 2017). High out-of-pocket costs can be catastrophic or impoverishing for the poor who buy health care services and have also been identified as a major barrier to health services utilization (FMOH 2016). With HFG's support, the Ethiopian government's Federal Ministry of Health (FMOH) has been working to alleviate this financial burden.

Expanding access to and quality of health care services

HFG provided technical assistance to the FMOH in pursuing two specific health care financing strategies: retention of user fee revenue and community-based health insurance (CBHI).

Retention of user fee revenue: Historic underfinancing of the health sector and poor operational budget allocation at the health facility level have been major contributors to the low quality of health service delivery in Ethiopia. Prior to the government's health financing strategy, there was little government spending on infrastructure and health workers, and the government-allocated operational budget for medical equipment, drugs, and medical supplies was insufficient to meet health facility daily needs. Moreover, facilities had no authority to decide how to use their government-allocated budget to best address their facility priorities and community health needs. To increase the amount of domestic resources at the health facility level, the FMOH introduced user fee revenue retention in 2005 in three regions. Health centers and hospitals were enabled to retain user fee revenue and spend it to improve the quality of care. HFG, in collaboration with the Regional Health Bureaus, expanded the strategy to all regions of Ethiopia. We recruited and trained 2,062 health facility finance staff on financial management, including on developing revenue utilization plans and budgets and management of financial transactions to ensure that health centers and hospitals use budget allocations and retained revenue to provide the best patient care possible in accordance with standards and guidelines. This capacity building resulted in improved facility management and use of the government budget as well as improvements in infrastructure, such as renovation and expansion of facilities; procurement of medical equipment, supplies, and medicine; availability of utilities (electricity, water supply, and telephone services); and enhanced availability of specialist care on a part-time or contract basis. These enhancements led to improved diagnosis, more appropriate treatment, and overall improved quality of services.

Community-based health insurance: Abt supported the FMOH, Regional Health Bureaus, and district health authorities to introduce CBHI to protect poor rural and informal sector populations from user fees and catastrophic health spending. At the national level, we built the capacity of the FMOH and the Ethiopian Health Insurance Agency (EHIA) to lead the technical aspects of CBHI, including the development of directives and manuals that support CBHI implementation. At the local level, in 2013 Abt supported the FMOH and EHIA to pilot CBHI in 13 districts located in four largest regions of the country (Amhara, Oromia, Southern Nations, Nationalities and Peoples, and Tigray regional states). In 2014, HFG evaluated the pilot program and has, since 2015, been working with the Ethiopian government to expand CBHI in these regions while simultaneously supporting full transition of CBHI to local authorities in these regions. To this end, HFG assisted the FMOH and EHIA to establish local administrative units, including regional cabinets, regional steering committees, zonal and district cabinets, and kebele cabinets to conduct community mobilization for registration and enrollment; target and identify households and allocate government funds to subsidize enrollment of the poorest (indigent)

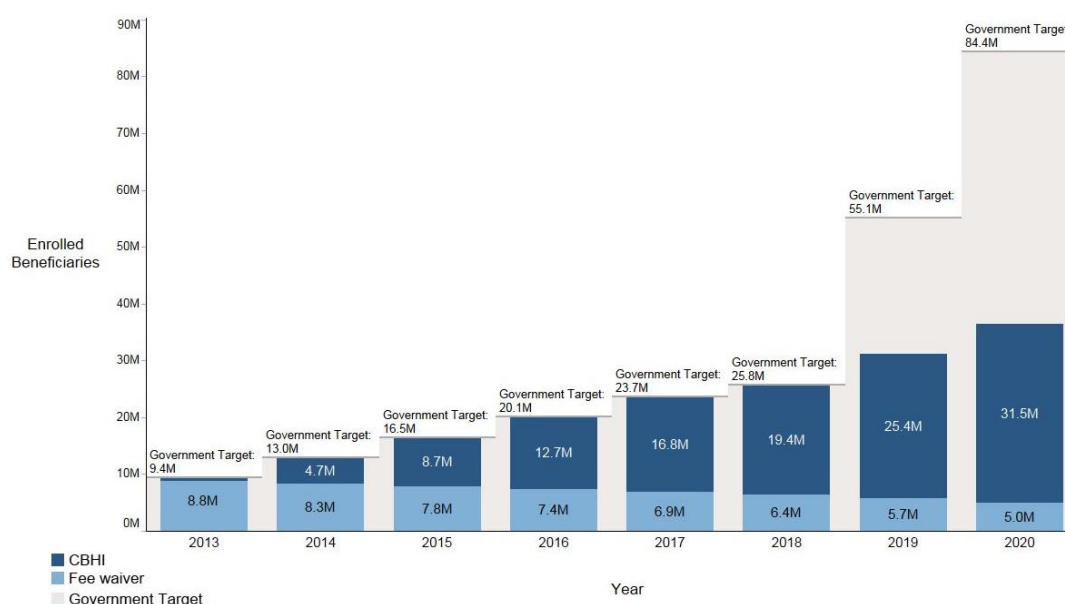
households; and provide political leadership and overall stewardship of the program. CBHI will help mitigate financial access barriers, encourage people to use preventive care, and to seek and receive timely care when they are sick.

Method for estimating coverage

Retention of user fee revenue: In 2015, HFG convened an expert review panel to review the published systematic literature reviews that assessed the documented effects of health systems strengthening interventions on health status and health system outcomes in low- and middle-income countries. Sufficient published evidence on the effects of revenue retention was not found, but the literature review did find that performance-based financing, which has a similar effect of providing facilities with funds to address locally identified needs, reduced unmet need by 23 percent (Hatt et al. 2015).

Community-based health insurance: Baseline coverage of CBHI is based on the enrollment data for 2013. The projected future coverage of CBHI is based on the Ethiopian government's Transformation Plan (2015–2020), which sets ambitious goals to expand CBHI to cover 80 percent of the districts and 80 percent of the informal sector population by 2020. Since the government-established CBHI enrollment targets are ambitious, we also included a conservative scenario that is based on the observed historic trends in enrollment rates during 2013–2018 (see Figure 11). The HFG M&E team also identified a way to quantify the effect of health insurance coverage on service coverage (effective use of health services). We used findings from the expert review panel HFG had convened in 2015. The panel had reviewed published systematic reviews of studies examining the effects that health systems strengthening interventions like insurance have on service use and health status in low- and middle-income countries. The literature review found that health insurance reduces unmet need for curative care by 50 percent. By reducing the financial barrier, insurance encourages individuals to use care and to seek and receive timely care in time of illness (Hatt et al. 2015).

Figure 11. Projected CBHI and fee waiver coverage in Ethiopia



To quantify the change in RMNCH service coverage, we first apportioned services into groups that could be affected by insurance, revenue retention, or both. We then applied a 50 percent reduction in unmet need for the services included in the health insurance package (primarily curative care, because preventive care services are provided without a fee), based on the findings of the literature review. We then applied a 23 percent reduction to the remaining pool of unmet need if the service could be affected by revenue retention.

Estimating coverage changes in Ethiopia as a result of both HFG interventions

1. Unmet need = 100% coverage – baseline coverage
2. Projected coverage for CBHI = Unmet need x 50%
3. Projected coverage for revenue retention = Remaining unmet need x 23%

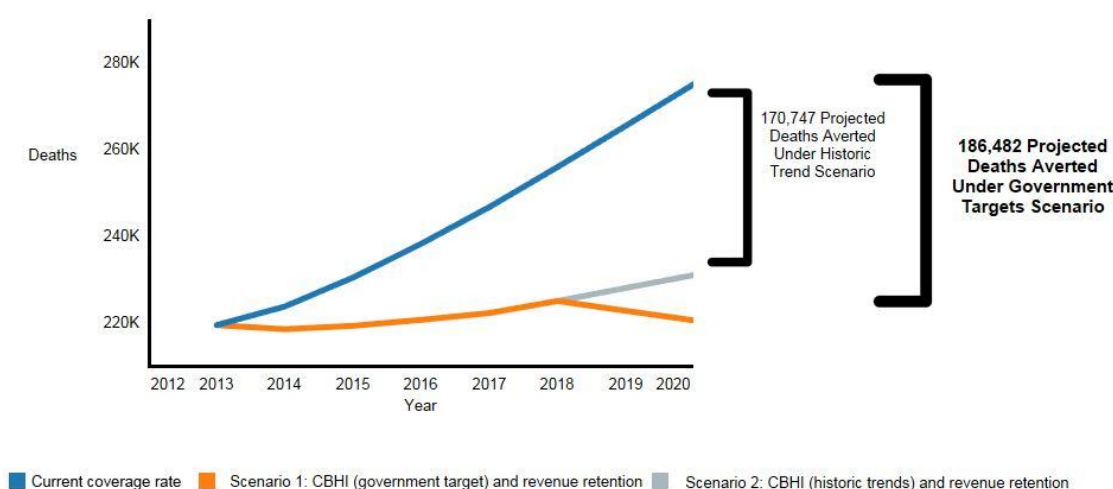
Therefore, for Ethiopia, we developed the following scenarios for the period 2013–2020, which corresponds to the timeframe for government-established CBHI targets:

- Counterfactual scenario: Baseline RMNCH service coverage rates in 2013 continue (with no CBHI or revenue retention)
- Scale-up Scenario 1: CBHI and revenue retention expand geographically, based on government targets for 2020
- Scale-up Scenario 2: CBHI and revenue retention expand geographically, based on historic trends in enrollment rates during 2013–2018

Modeling results

Assuming achievement of the government's more ambitious targets for CBHI expansion (Scenario 1), we estimate that more than 186,000 deaths would be averted as compared to the counterfactual of no coverage increase (status quo) (see Figure 12). Under Scenario 2, approximately 170,000 deaths would be averted by revenue retention and CBHI based on historic trends of CBHI enrollment.

Figure 12. Projected deaths averted in Ethiopia during 2013–2020 due to CBHI, fee waiver, and revenue retention programs



Limitations/caveats

The present analysis relies on an anticipated number of people needing and receiving RMNCH services, based on the baseline RMCNH coverage rates and unmet need and the projections of estimated coverage based on reductions in unmet need through implementation of CBHI and improved service quality due to revenue retention. If future RMNCH coverage rates and unmet need differ from our projections, then the corresponding mortality effects will also differ from our estimated results. Also, this analysis incorporates the effect sizes for health insurance found by the expert panel's literature review. The impact of CBHI in these regions of Ethiopia could differ from the effect sizes based on the literature review due to differences in the benefit package and other aspects, and therefore the corresponding mortality effects could also differ from our results. The analysis focuses on the effect of insurance on the services that are covered under CBHI, which are primarily curative care services. Theoretically, insurance could also increase utilization of preventive care services through increased health system contacts for patients; however, sufficient information was not available for us to model this effect, and hence our estimate of the health impact (deaths averted) may be understated. Also, while HFG has contributed to the implementation of CBHI and revenue retention schemes, the project acknowledges that the expansion of these interventions depends on a variety of factors and actors, not just HFG.

Finally, our estimates of the changes in RMNCH coverage as a result of revenue retention is based on evidence related to performance-based financing, which is similar to revenue retention in that both increase the funding available to be spent at the facility level. However, performance-based financing is a financial reward that is paid only after achievement of the defined performance targets, whereas revenue retention is immediate retention of user fees at the time of service provision and the provider then uses the revenue to make investments that are expected to improve quality. This difference could mean that the actual impact of revenue retention could differ from the effect size of 23 percent reduction in unmet need that was found to be associated with performance-based financing in our literature review.

3.3.2 Nigeria

Only around 4 percent of Nigeria's total annual budget is set aside for health, resulting in insufficient domestic funding for HIV (UNAIDS 2017) and MCH services, infrastructure, and HRH. Together, these conditions severely constrain Nigerian state governments' ability to supply quality HIV/AIDS and maternal, neonatal, and child health (MNCH) care to their populations. Further, donor funds account for more than 70 percent of the country's financial resources for the HIV/AIDS response, and this external funding is expected to decline. Although there has been an urgent need for increased funding to improve and sustain health programs, especially as donor funds decline or flatline at best, health financing has not been a priority at the federal or state level. To address these pressing challenges, HFG worked with the federal and state governments of Nigeria to accomplish health finance and governance transformations through various interventions.

Expanding coverage through health financing interventions

HFG's support to usher in health finance and governance reform in Nigeria focused on three types of interventions that aimed to raise government spending on health: domestic resource mobilization, state-sponsored health insurance schemes (SSHS) implementation, and investments in health facilities for MNCH.

Domestic resource mobilization: HFG worked with national and state-level entities to mobilize more domestic resources to close the HIV/AIDS resource gap. We worked at the state level to help develop resource mobilization strategies in four states: Akwa Ibom, Cross River, Lagos, and Rivers. The strategies, the first-ever at the state level in Nigeria, were designed to stimulate both public and private spending for the HIV/AIDS response. Working in partnership with state institutions, we supported

implementation of specific parts of each strategy. HFG conducted several financial analyses, including a state fiscal space analysis for the HIV/AIDS response, an HIV/AIDS and health sector budget tracking analysis, and a public financial management process review to identify where additional resources could be found, why resources might not flow to health service delivery and where resources should be directed to improve health sector performance. We also provided data to support the quantification of gap costs and worked with state entities to strengthen the budget defense process by highlighting the impact of HIV/AIDS programs on population health, and the danger of failing to finance them given the donor unpredictability. HFG built the capacity of the state ministries of health to use evidence to effectively engage with the finance and economic planning ministries, as well as the legislative bodies. Our multi-dimensional support to domestic resource mobilization, addressing several bottlenecks simultaneously – a first at the state level – has built support for increased state funding for HIV/AIDS. Despite wider economic challenges, including the impact of low oil prices, Lagos state achieved a 449 percent increase in the budget allocated to HIV/AIDS, which rose from 114,850,000 NGN (US\$375,326) in 2016 to 630 million NGN (US\$2,057,823) in 2017; 71 percent of this budget has been spent. With these funds, the government has been able to procure more rapid test kits, invest in patient information systems, and conduct supportive supervision, besides also benefitting the other two interventions described below.

State health insurance schemes: In 2014, Nigeria's National Health Act mandated the launch and funding of SSHIS. The law required that new earmarked federal and state funds go toward health care premiums for vulnerable people, including families that cannot pay for health care, destitute people, pregnant women, and children under five. However, the law was not being implemented due to lack of clarity at all levels on how to proceed. HFG worked with state governments and legislators in Bauchi, Cross Rivers, Sokoto, Lagos, and Osun states to design legal and institutional frameworks for establishing enabling laws and implementing institutions to launch SSHIS. We also supported the states in developing the necessary tools for SSHIS implementation, including operational guidelines and provider payment processes. By leveraging the strong relationship HFG had formed with state legislatures over the course of the domestic resource mobilization activities, HFG helped state ministries of health ensure that the new laws were backed by budget resources. HFG also provided training and mentorship through health insurance advisors embedded in new government-established health insurance agencies. The advisors worked with health insurance agencies to develop operational guidelines and establish processes that will guarantee delivery of services to enrollees, ensure continuous quality improvement, build the capacity of agency staff, and clearly lay out roles and responsibilities. As a result of HFG's efforts, four states passed, or are in the process of passing, health insurance laws that allocate new budget resources to: 1) establish health insurance agencies, and 2) SSHIS coverage of the poor and vulnerable. With HFG's support, more vulnerable Nigerians will have access to vital MNCH and HIV/AIDS services through SSHIS.

Investments in health facilities: HFG supported five states (Bauchi, Cross River, Ebonyi, Kogi, and Sokoto) to conduct MNCH service availability and readiness assessments (SARA) to measure service input gaps, especially those in the areas of human resources, infrastructure, and commodities/equipment; we also costed service inputs gaps. We provided the SARA survey and cost data to policymakers and other stakeholders to explain the negative impact of previous low investment in health care and then to use the data to advocate for increased investment in infrastructure and health workforce to upgrade primary health care facilities. These investments would expand access to quality MNCH services.

Method for estimating coverage

Since modeling for Nigeria involved multiple interventions, each of which affect slightly different health areas and populations, we grouped the modeling for Nigeria as follows:

- MNCH services and populations: Program interventions for both SSHIS and investments in health facilities contribute to increased coverage of MNCH services.

- HIV and AIDS services and populations: SSHIS will contribute to increased coverage of HIV and AIDS services and domestic resource mobilization will supplement PEPFAR coverage or funding.

Estimating coverage for MNCH: To quantify change in MNCH service coverage, we apportioned services into groups that could be affected by insurance, facility upgrades, or both. We then applied a reduction of unmet need as follows:

- First, we applied a 50 percent reduction in unmet need due to health insurance, based on findings from the expert review panel HFG had convened in 2015 to review published literature examining the effects health systems strengthening interventions has on service use and health status (Hatt et al. 2015).
- Second, we estimated the impact facility upgrades have on the remaining pool of unmet need. We quantified the number of health facilities that would receive investments in infrastructure and health workforce, and the population within the catchment areas of these health facilities, who would likely benefit from the facility improvements for MNCH services. We then applied a 23 percent reduction to the remaining pool of unmet need, based on findings from the expert panel's literature review on the impact of health systems strengthening interventions (Hatt et al. 2015).

Childbirth care and family planning were considered as outlier services. Childbirth coverage was based on both a reduction of unmet need and the cascade of care where women who receive antenatal care are more likely to have an institutional delivery. Since coverage of family planning services generally does not increase as quickly as other services, we applied a moderate 1 percentage point per year increase.

For Nigeria, we developed the following scenarios for MNCH services for the period of 2017–2022:

- Counterfactual scenario: Baseline MNCH service coverage rates from 2017 continue
- Scale-up scenario: Coverage of MNCH services increased based on: 1) state-established enrollment targets for SSHIS, and 2) anticipated improvements in health facilities. Coverage rates for skilled assistance for deliveries and deliveries in a facility depend on antenatal care coverage and insurance enrollment. Family planning coverage was assumed to increase by 1 percent per year.

Estimating coverage for HIV/AIDS: To quantify change in HIV/AIDS coverage, we adopted the following process:

- First, we estimated the impact of SSHIS on HIV/AIDS. States have established targets for SSHIS, which are equivalent to an additional 10 percent of current the PEPFAR service coverage levels.
- Second, we estimated the additional impact of domestic resource mobilization will have on HIV/AIDS coverage. Domestic resource mobilization targets were established based on the additional funds mobilized and apportioned between services. The total spending on each service was then divided by cost per service to give an estimate of the number of people reached through domestically mobilized funds for HIV testing and counseling, prevention of mother-to-child transmission, and ART. The number of people was then added to the existing coverage to provide the coverage increase enabled by domestic resource mobilization.

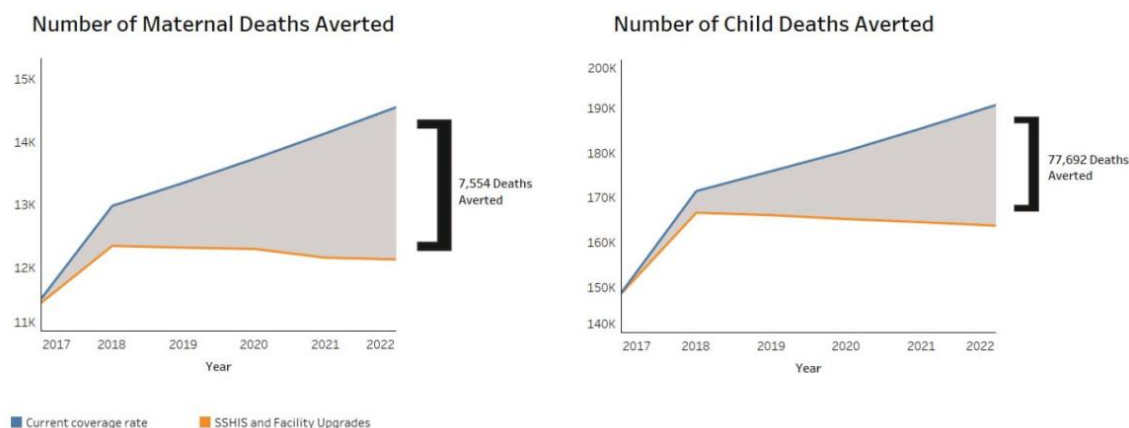
For Nigeria, we developed the following scenarios for HIV/AIDS services for the period 2017–2022:

- Counterfactual scenario: Baseline HIV/AIDS service coverage rates from 2017 continue
- Scale-up scenario: Implementation of state health insurance will supplement PEPFAR funding based on an agreed upon target, which represent a 10 percent increase over the current PEPFAR coverage levels per year for 2017–2022 and implementation of domestic resource mobilization. Coverage increases due to additional people covered by insurance and by domestic funds for HIV testing and counseling, prevention of mother-to-child transmission, and ART.

Modeling results

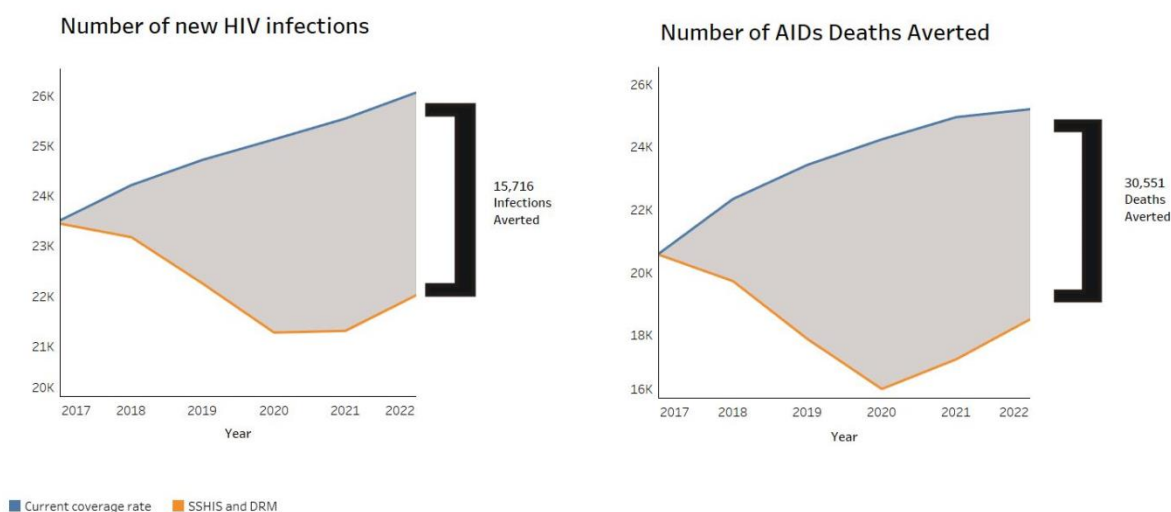
We estimate that more than 7,500 maternal deaths and nearly 78,000 child deaths will be averted as a result of SSHIS and health facility improvements, which will increase coverage of quality MCH services (see Figure 13).

Figure 13. Number of maternal and child deaths averted in Nigeria during 2017–2022 due to health insurance and health facility improvements



We estimate that more than 15,000 HIV infections, and more than 30,000 AIDS deaths will be averted (see Figure 14) as a result of HFG interventions in SSHIS and domestic resource mobilization, which will contribute to increased service delivery coverage for HIV testing and counseling, prevention of mother-to-child transmission, and ART.

Figure 14. Number of new HIV infections and HIV deaths averted in Nigeria during 2017–2022 due to health insurance and domestic resource mobilization



Limitations/caveats

Similar to Ethiopia, this analysis used the effect size for health insurance that was found by the expert panel's review of literature. The impact of health insurance in Nigerian states could differ from the effect sizes based on the literature review due to differences in benefit package and other aspects, and therefore the corresponding mortality effects could also differ from our results. Furthermore, while we modeled a general set of services that SSHIS is likely to include, the actual content of insurance benefit packages can vary by state and this variation will affect the magnitude of the impact. Finally, HFG primarily contributed to the design and development SSHIS, domestic resource mobilization, and facility improvements, but the achievement of these interventions will depend on a variety of factors and actors, not just HFG. Also, if the implementation timeline or targets for the interventions differ from our assumptions, the modeling results will differ.

3.3.3 Vietnam

Vietnam has an estimated 320,000 people living with HIV (PLHIV), of whom over 40% are on ART. The achievement is largely due to the expansion of financial contributions from PEPFAR and the Global Fund over the last decade. However, both the donors have projected massive decline in funds for HIV and AIDS services in Vietnam over the next few years: PEPFAR will withdraw after 2019 and Global Fund after 2020. Consequently, the Government of Vietnam has been working to identify possible alternatives to secure financial sustainability for HIV/AIDS services and sustain or even increase coverage rates.

To ensure treatment and other necessary services to HIV patients, the Government of Vietnam has designed a 'blueprint for transition' and started implementing the transition steps. The four priorities of this blueprint for transition are: 1) increased enrollment of PLHIV in social health insurance; 2) integration of single-function HIV outpatient clinics, currently funded by donors, into the public health delivery system and social health insurance; 3) financial sustainability for patients, providers, and the health insurance fund; and 4) increased domestic resource mobilization for procurement of antiretroviral (ARV) drugs, which are currently supplied by donors.

Integrating HIV/AIDS patients and services into social health insurance

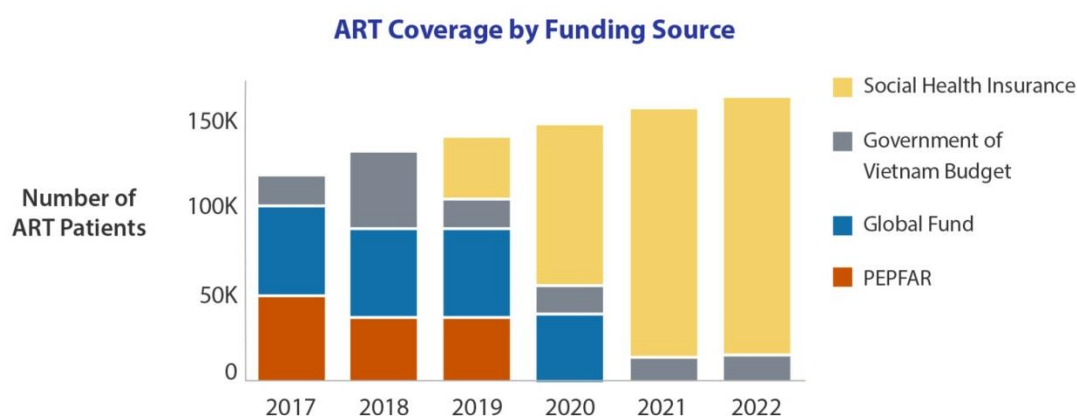
HFG's primary focus in Vietnam was on ensuring financial sustainability of HIV/AIDS services. HFG has been supporting the Government of Vietnam in managing the financial transition from donor funding to domestic resource mobilization through various management, policy, and financing strategies related to HIV/AIDS services. Vietnam's social health insurance is managed by the Vietnam Social Security (VSS) institute. HFG assisted the MOH, VSS, and Vietnam Administration for HIV/AIDS Control (VAAC) to analyze the feasibility of social health insurance covering HIV services currently paid for by donors. HFG worked with the VSS to conduct an actuarial study of the costs of adding HIV services to the social health insurance package and concluded it would be affordable. This led the VSS to formally add HIV/AIDS services to social health insurance. HFG also presented options to the VSS and VAAC to centralize procurement of ARV drugs, and built the capacity of the Central Procurement Unit. In 2018, the local stakeholders and donors established a timeline for funding of ARV drugs to shift to the Government of Vietnam. Finally, HFG developed a standardized procedure to integrate HIV outpatient clinics into the public service delivery system and make the clinics eligible for reimbursement by social health insurance. As of 2018, 90 percent of the HIV outpatient clinics in nine provinces are already integrated into the public system and social health insurance.

Method for estimating coverage

For the present impact analysis, it was only possible to model the additional PLHIV that will receive ART and the resulting increased coverage of ART. This analysis does not model the PLHIV that are currently covered under Global Fund and PEPFAR that will transition to Government of Vietnam-financed SHI.

The Government of Vietnam has already established a timeline for transitional and enrollment/coverage of ART through social health insurance. Figure 15 below shows the coverage in terms of the number of people that will be covered by year and by funding source. Coverage for ART was estimated using the government, PEPFAR, and Global Fund ART coverage. We calculated ART coverage rates (number of people enrolled divided by the total number of PLHIV eligible for ART) to use for impact modeling.

Figure 15: ART coverage in Vietnam by funding sources and year (2017–2022)



The Vietnamese government's plan to add HIV/AIDS services and patients to social health insurance will sustain financing for HIV care and allow Vietnam to provide ART and other HIV-related services to more people than can currently access the service, even while facing substantial reduction in PEPFAR and Global Fund allocations for HIV treatment.

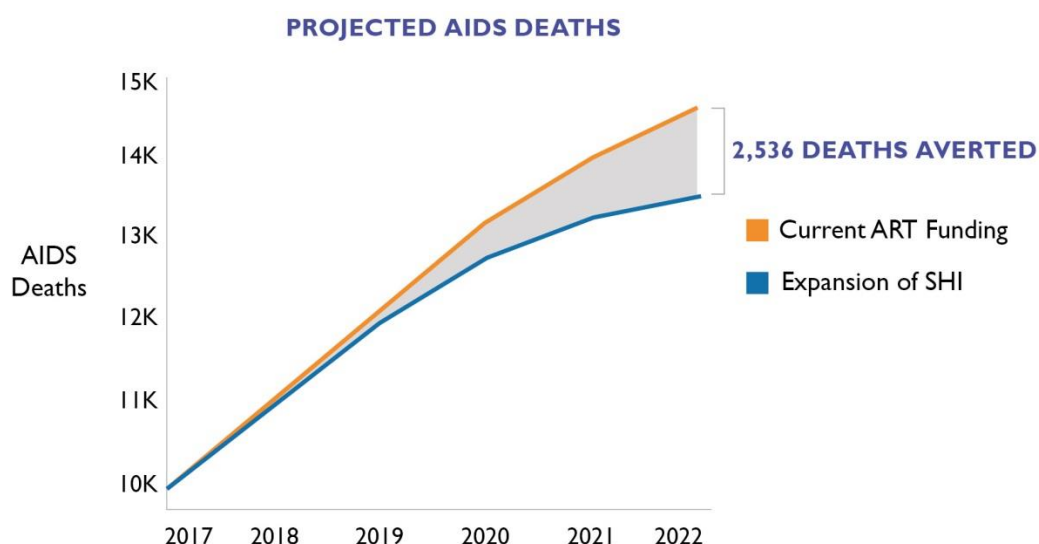
For Vietnam, we developed the following scenarios for the period 2017–2022:

- Counterfactual scenario: Social health insurance does not incorporate ART. ART coverage does not expand and remains at 43 percent. As funding from PEPFAR and the Global Fund phases out, the Government of Vietnam takes on the costs of HIV treatment.
- Scale-up scenario: Social health insurance incorporates ART. ART coverage increases from 43 percent to 52 percent by 2022.

Modeling results

If the coverage of PLHIV through social health insurance is scaled up as planned, the estimated cumulative number of AIDS deaths averted due to increased ART coverage in Vietnam during 2018–2022 would be more than 2,500 (see Figure 16).

Figure 16. Number of AIDS averted in Vietnam during 2018–2022 due to incorporation of ART in social health insurance



Limitations/caveats

The analysis relies on the assumption that the Government of Vietnam will enroll an additional 8,000 PLHIV on ART per year through social health insurance. If the number enrolled changes, the corresponding mortality effects will be different. Also, the actual impact on mortality will depend on a variety of other factors, including the availability of ARV and other commodities, patients' ability to pay any co-payments for HIV services, and their willingness to accept ART and other HIV-related services under social health insurance, given, for example, possible concerns about confidentiality.

4. CONCLUSION AND LESSONS LEARNED

Global interest in measuring the impact of health systems strengthening interventions grew over the life of HFG. In 2015, the project contributed to the global discussion on this question with its publication of a review of systematic reviews on the effects of health systems strengthening on health outcomes. The review identified a significant body of evidence linking health systems strengthening interventions to measureable impact on health for vulnerable people in lower- and middle-income countries (Hatt et al. 2015). More recently, in 2017, USAID released the 4th annual *Acting on the Call* report that focused on how scale-up of health systems strengthening activities can contribute to saving the lives of children and women (USAID 2017).

HFG project carried out this modeling exercise to measure and document the effects of its health systems strengthening work on health outcomes in select country programs. We found that it was possible to conduct the modeling exercise in eight out of 27 country programs due to the nature of many of HFG activities, for which data are not sufficient to link the activities directly to changes in service coverage.

We found during the process that it is important for the modeling team to work closely with country implementation teams to plan and discuss the data requirements for modeling the impact of project activities; this is critical to ensure there is adequate data and evidence to support converting interventions into sound coverage estimations. We also found that it was possible to use secondary data for baseline assumptions and government plans for targets under the scale-up scenarios. Only one country had primary data: in Cote d'Ivoire, data were collected in a sample of districts as part of an internal evaluation of task sharing.

The health systems impact literature review carried out by the expert panel that HFG convened in 2014 had established effect sizes of select health systems strengthening interventions on health outcomes (Hatt et al. 2015). These established effect sizes have been very useful for modeling the health systems interventions. This report presented detailed descriptions of how work being done in the areas of strategic planning, insurance, HRH, and quality can improve health outcomes. It would be beneficial to carry out more systematic literature reviews and expert reviews to establish effect sizes for additional health systems strengthening interventions, such as improving community accountability and financial management to reduce informal fees charged to patients or integration of vertical services into primary health care.

Results from this modeling exercise have provided powerful evidence of the potential impact of health systems strengthening activities. We hope this report will contribute to greater understanding of and support for health systems strengthening.

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