How did the Global Fund Allocation Model Strategically Respond to the Global Fund's Strategic Objectives and the Country's Needs?
A Mixed Method Study

by

Runpeng Sun

DKU Global Health Program
Duke University

Defense Date: March 29, 2024

Approved:

Qian Long, Chair

Jinkou Zhao, Advisor

Yunguo Liu

Thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in the Department of DKU Global Health Program in The Graduate School of
Duke University
2024

ABSTRACT

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Abstract

The Global Fund is the world's largest global health financing organization to fight AIDS, tuberculosis, and malaria, which provides about $4 billion annually to support countries and organizations fighting the three infectious diseases. However, no literature has been published to give a detailed assessment of its allocation model. This study examines the Global Fund's allocation process for the 2020-2022 cycle, using both qualitative and quantitative methods to explore whether the Global Fund's allocation model can effectively respond to its strategic objectives and the needs of the countries.

After the 2017-2019 allocation, the Global Fund reported effective fund absorption across HIV, tuberculosis, and malaria, employing measures like "portfolio optimization," mid-cycle fund reprogramming, and intentional overallocation to stimulate optimal fund utilization and prevent returns to the central pool.

Experts provided a positive assessment of the allocation process, emphasizing consistency in disease split percentages (HIV=50%, TB=18%, Malaria=32%) and adjustments to address historical issues. Challenges encompassed human costs, data quality, financial issues, and factors beyond epidemiology. The disease split design, unchanged since 2014-2016, historically favored HIV due to the Global Fund's initial focus on AIDS. Suggestions for dynamic disease split percentages in future cycles were made, acknowledging challenges in adjusting the split and potential impacts on underfunded programs.

Financial need assessment aimed for equitable fund distribution, considering disease burden, economic capacity, and other indicators. Prevention needs focused on disease burden

and key populations, while community delivery needs were treated as implementation issues. Countries' specific needs evolved annually, necessitating continuous evaluation. However, experts expressed pessimism, asserting that current allocations did not cover all essential services due to significant funding gaps attributed to the COVID-19 pandemic, inflation, and political issues.

Quantitative analysis of allocation data from 112 countries, totaling $12,659,254,481, revealed a disease split following the Global Fund's methodology, with regional variations. Strong correlations were observed globally and continentally between Allocation and Budget, Allocation and Disease Burden, and Budget and Disease Burden for the three diseases. The analysis found weak correlations for malaria at the continent level in LAC. The budget for the 2020-2022 cycle exceeded the allocation by $3,605,274,211 due to carry-over and additional COVID-19 Response Mechanism resources. Africa received the largest budget, especially in HIV, Malaria, TB&HIV, and standalone RSSH components. EECA did not receive Malaria and standalone RSSH budgets. The global standalone RSSH budget constituted about 4.16% of the total budget. Combining HIV, TB, and TB/HIV components, the budget for total HIV and TB represented 66% of the total budget, with Africa receiving the largest budget for the three disease components.

The Global Fund's implementation currently relies heavily on government and civil society organizations to ensure country ownership. Governments, representing nations at the international level, contribute to negotiations and resource allocation, leveraging their larger resources for stable and sustainable support. Civil society organizations, with a better understanding of local needs, enhance realistic project implementation. However, private

sector involvement is limited due to potential profit prioritization and concerns about regulation and transparency. While the private sector may be necessary in certain projects, alignment with the Global Fund's objectives and values is crucial. At the country level, the response to diseases like AIDS faces human resource shortages, affecting healthcare access and fund absorption delays.

This study underscores the intricate interplay between qualitative and quantitative aspects in the Global Fund's allocation process, recognizing ongoing efforts to address challenges, balance disease and RSSH priorities, and adapt to changing global circumstances.

Dedication

Thank you to my advisors Dr. Jinkou Zhao, Dr. Yunguo Liu, and Dr. Qian Long for their great support in my internship, data collection and thesis writing. Thank you to Ms Shreya Ramesh from Baylor University for her efforts in conducting interviews and analysis.

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Acknowledgements

Thanks to the Global Fund in Geneva, Global Health Research Center at Duke Kunshan and Duke Global Health Institute for all the resources and cooperation provided for this study.

1. Introduction

1.1 Background and Motivation

The Global Fund to Fight AIDS, Tuberculosis, and Malaria (the Global Fund) is an international financing organization established in 2002 that aims to end human immunodeficiency virus (HIV), tuberculosis (TB) and malaria as pandemics. The organization has a substantial impact on enhancing health systems in countries that receive its support. It offers financial resources to address the three diseases and also aids in strengthening overall healthcare systems through actively investing in Resilient and Sustainable Systems for Health (RSSH).

The Global Fund has made a significant contribution to public health worldwide. The Global Fund provides about $4 billion annually to support projects and organizations that target the three infectious diseases (Olufadewa et al., 2021). The funds are used for a wide range of public health causes, including procurement of essential commodities and human resource costs for the prevention, diagnosis and treatment of infectious diseases (Wafula et al., 2014) (Bowser et al., 2014), strengthening of health systems supported by the construction of health infrastructure, the training of personnel, and the purchase of medical equipment (Okunogbe, et al., 2020), fighting new infectious diseases around the world (White et al., 2022), encouragement and support at the community level (Amaya et al., 2014), and gender and health equality (Abdool et al., 2012). In addition, as the largest funder of Africa's HIV response, the Global Fund is the main source of funding for HIV prevention in the African region. On average, 15-16% of Global Fund allocations are dedicated to HIV prevention in

the examined African countries (Oberth et al., 2017). In the more than two decades since the creation of the Global Fund, a growing number of real-world examples have demonstrated the positive impact of active investment on a wide range of health and social outcomes, such as dramatic reductions in deaths from three infectious diseases and improvements in educational attainment in sub-Saharan Africa (Kuecken et al., 2014).

To examine whether the Global Fund's allocation strategies respond strategically to the needs of the countries concerned and have a positive impact on health, I went to the Global Fund in June 2023 to conduct a series of qualitative and quantitative research and evaluation on the 2020-2022 allocation cycle, trying to find out the unique methods and practices of the Global Fund in resource allocation as well as the shortcomings and challenges at the present stage through data analysis and experts' conclusions. The findings of my research can be used to further inform for designing and adjusting for the Global Fund's future allocation model to make better use of funds and greater impact at the country level, and ultimately achieve the ambitious goal of ending the three infectious diseases worldwide.

1.2 Significance of the Global Fund's Strategic Objectives and Allocation Model

"Strategic Investment towards Ending the Epidemic" delineates the fundamental essence of the Global Fund's strategic objectives during the 2017-2022 cycle. This cycle aspires to cultivate a world emancipated from the scourge of AIDS, tuberculosis, and malaria, ensuring enhanced well-being for all individuals (‘The Global Fund Strategy 2017-2022: Investing to end epidemics’,

https://archive.theglobalfund.org/media/2531/archive_global-fund-strategy-2017-2022_strate

gy_en.pdf). The strategic framework encompasses four pivotal elements: 1. Maximizing Impact against HIV, TB, and malaria: to highlight the overarching goal of reducing the prevalence and impact of HIV/AIDS, TB and malaria globally. 2. Fostering Resilient and Sustainable Health Systems: to emphasize the need to consolidate health systems, ensuring their sustainability and resilience to effectively address health challenges that go beyond target diseases. 3. Advancing Human Rights and Gender Equality: to promote and protect of human rights and the promotion of gender equality, recognizing their critical role in achieving overall health outcomes. 4. Mobilizing Enhanced Resources: to mobilize increased resources, both financial and non-financial, that are critical to scaling up global health interventions and ensuring their effectiveness and reach. The allocation model, constituting the fundamental methodology of the Global Fund, necessitates an effective alignment with these strategic objectives and a phased attainment of outcomes. This imperative aligns with the Global Fund's ambitious aim of ending the impact of the three infectious diseases on the international community by 2030.

Furthermore, the call for healthcare aid in low- and middle-income nations is escalating, surging to $54.8 billion in 2020, marking a nearly fivefold surge from the levels observed in the early 2000s (Bendavid et al., 2017) (Micah et al., 2021). According to a report released by UNAIDS, $26.2 billion is needed for an effective international response to HIV in 2020 (UNAIDS, 2020). In 2020 alone, the Global Fund provide 25 percent of global international aid for AIDS, 77 percent for tuberculosis, and 56 percent for malaria. It is estimated that from 2002 to 2020, deaths from AIDS, tuberculosis and malaria in countries supported by the Global Fund have been reduced by 46% (The Global Fund, 2021).

As the major financier of HIV,TB, and malaria prevention, treatment, and care initiatives globally, the Global Fund encounters a significant dilemma: delineating the allocation of limited resources across diverse countries and programs to effectively address varying national needs. This poses several critical questions: What criteria govern the eligibility of countries for funding? What criteria dictate the distribution of funds among countries and diseases? How is the assessment and quantification of investments in Resilient and Sustainable Systems for Health (RSSH) conducted? Are funding decisions meticulously deliberated upon, incorporating predictable mechanisms that facilitate countries in strategizing their overarching health budgets? A sufficiently rigorous and standardized allocation model is the necessary foundation to address the above questions.

1.3 Research Purpose and Significance

This study examines the viewpoints of those who are actively involved in the Global Fund allocation process, providing significant and in-depth information. The main objective is to reveal the underlying reasoning, difficulties, and considerations that impact financing choices and illuminate the complex process of allocating resources in the field of global health.

This paper thoroughly analyzes the many methods used by the Global Fund to adjust its allocation strategy in accordance with its strategic goals and the varying requirements of recipient nations. The research intends to assess the efficiency of the cash allocation methodology in satisfying the specific needs of different countries by analyzing how it strategically fits with the Global Fund strategic objectives.

Furthermore, this study aims to provide useful insights into improving the health system

and optimizing resources by examining the flexibility and effectiveness of the allocation model. The expected results will not only provide an essential point of reference for informing the Global Fund's future allocation methods but also make a substantial contribution to the ongoing discussion on improving global health finance.

It emphasizes the significant insights it hopes to give for conversations on global health funding and resource allocation.

1.4 Research Questions and Hypotheses

Research Question 1:

Is the Global Disease Split for the 2020-2022 Allocation Methodology justified?

Hypothesis 1:

The Global Disease Split for the 2020-2022 Allocation Methodology is justified. The new disease split makes the right adjustments to address the changing burden of disease.

Research Question 2:

Does the new allocation of the Global Fund meet countries' needs?

Hypothesis 2:

The new allocation of the Global Fund can meet countries' needs.

Research Question 3:

Can the fund allocation be translated effectively through funding requests?

Hypothesis 3:

The funding requests from countries can efficiently transform the fund allocation.

Here are some examples for questions in the interview:

Question 1: Whether Global Disease Split for Allocation Methodology is justified?

Question 2: Whether the allocation of the Global Fund meets countries' needs?

Question 3: What has been improved and adjusted from the allocation model for the 2020-2022 cycle compared to the previous allocation (2017-2019) cycle?

Question 4: What has the Global Fund learned from past cycles?

Question 5: What help does the Global Fund expect from the international community?

2. Methods

This was a mixed methods study conducted in the Global Fund in Geneva. For the quantitative portion, the study used a range of data publicly available on the Global Fund website, including the Grant Agreement Implementation Cycle Detailed Budgets, Disease Burden Share etc. For the qualitative portion, relevant staff from various teams at the Global Fund were interviewed about their options and experiences concerning allocation processes.

2.1 Setting

This cross-sectional study was conducted at the Global Health Campus (GHC) in Le Grand-Saconnex, Geneva. Located on the first to fourth floors of the GHC, the Global Fund provides fundraising and grant management services for three infectious diseases worldwide. The Global Fund has a number of departments to dealing with a range of complex tasks related to financing, including Allocation, HIV, TB, Malaria, AME, CRG, PMRD, RSSH. Demographics vary from department to department, and generally each department contains a panel of dozens of technical and management experts.

2.2 Quantitative Study

2.2.1 Procedures

The data used in this study was published on the official website of the Global Fund. The Global Fund operates with a high degree of transparency and has a data services page on its official website. Pre-packaged datasets and reports generated based on the Application Programming Interface (API) and database are available for public download. For this study, I used the 2020-2022 allocation dataset released on July 3, 2020, Disease burden share

2023-2025 allocation dataset and 2020-2022 grant agreement implementation cycle detailed budgets dataset. All quantitative studies were conducted using officially published secondary data without any ethical controversy, so the study did not apply for ethical review.

2.2.2 Measure

2.2.2.1 2020-2022 Allocation Dataset

The data set details the amounts allocated to eligible countries over the 2020-2022 cycle and contains multiple variables in which ISO3 code, Country, Disease, and Allocation values (USD Equivalent) are included in the quantitative study.

2.2.2.2 Disease Burden Share 2023-2025 Allocation Dataset

Due to the COVID-19 pandemic, the Global Fund has not officially published its burden of disease data for 2020-2022. Under the guidance of Dr. Jinkou Zhao, the 2023-2025 burden of disease data set with little overall change was included in this study. This dataset contains multiple variables in which ISO3 code, Country, Continent, Disease Component, Eligibility and Burden Share are included in the quantitative study.

2.2.2.3 2020-2022 Grant Agreement Implementation Cycle Detailed Budgets Dataset

The data set details every budget for each country in the 2020-2022 cycle and contains multiple variables in which ISO3 code, Country, Component name, Grant Cycle Coverage cycle, Implementer Classification Parent Code and Budget Amount (USD Equivalent) are included in the quantitative study.

2.2.3 Data Analysis

To answer the above research questions, the above data was used to draw several charts. Allocation data from 112 countries and regions were used for disease split analysis and

2020-2022 Allocation Fund flow analysis. In the dataset, a total of 50 countries were selected to have both HIV Allocation and Budget data, 34 countries had both TB Allocation and Budget data, and 58 countries had both Malaria Allocation and Budget data. Relevant countries and data were included in correlation coefficient analysis. HIV,TB and Malaria Budget data from 103 countries were included in the implementer analysis.

All statistical analysis was performed in Origin 2022 and Excel. Because the data of Budget, Allocation, and Disease Burden variables are not normally distributed, and the two variables tend to be consistent in their changing trends, Spearman correlation coefficient was used to explore the monotonic relationship between the two variables in this study. Statistical significance was deemed as a p-value of less than 0.05.

2.2.4 Ethical Review and Clearance

The quantitative study used secondary aggregated data published by the Global Fund for its analysis, ethical clearance was therefore not pursued.

2.3 Qualitative Study

2.3.1 Participants

This study was conducted from June to July 2023. The study team conducted semi-structured interviews with 17 employees from different departments and positions in the Global Fund in Geneva, Switzerland. Ten interviewees were purposively selected by the supervisor. The remaining seven participants were referred by initial interviewees. All respondents participated in at least one of these allocation cycles, 2017-2019, 2020-2022, or 2023-2025.

2.3.2 Procedures

Before the interview, the study team designed two draft interview guidelines for different groups of people, and rehearsed the interview with Dr. Zhao, the interview guide was improved after several rehearsals.

Under the guidance of Dr Zhao, Runpeng and Shreya started the interviews on June 19th. Dr. Zhao contacted the interviewees and asked if they were willing to accept the invitation. After obtaining their consent, Dr. Zhao assisted the study team to arrange the specific time of the interview. Before the interview, Runpeng and Shreya fully informed the interviewees about the directions and goals of the research. They understood that the responses will be used for qualitative research and the study team indicated that all personal information will be kept confidential. After obtaining the consent of the interviewees, the study team recorded the sessions and transcribed the qualitative data using Teams. Each interview lasted between 40 minutes and an hour.

All interviews were conducted entirely in English, and the interview guides were also written in English and covered these five exploratory thematic modules: the Global Fund's allocation process, the needs of recipient countries, the efficiency in the use of funds, practices, and opinions on program split, and the consideration for future Global Fund allocation. The content of these guidelines was informed by an earlier literature review and reflections gained from quantitative research in the 2020-2022 allocation cycle and cleared by Dr. Zhao. The transcription of qualitative data was jointly completed by Runpeng Sun and Shreya Ramesh.

2.3.3 Analysis

Runpeng and Shreya went through the transcripts line by line to find essential ideas and

created a coding scheme. This report is written based on the data obtained from these fifteen interviews. Nvivo13 was used to extract key information. For data analysis, Runpeng and Shreya performed a Topic Content Analysis (TCA). This method was chosen because it provides flexibility for developing code, which is useful for summarizing rich data and helps examine the perspectives of different research participants.

2.3.4 Ethical Review and Clearance

Ethical approval from an institutional review board was not applied for this study, but Runpeng and Shreya sought the consent of each interviewee. This research was conducted under the guidance of the Global Fund. Before the interview, the study team would briefly introduce the research purpose, expected output, and the individual information was not collected. Analysis was done to reveal themes, no individual attribution was made. All the qualitative data was collected with the interviewees' consent and was not ethically controversial.

3. Result

3.1 Quantitative Results

Allocation data from 112 countries were included in the disease split study and the total allocation is $12,659,254,481. Allocation amounts for the same diseases from different countries were summed and placed in the second column of the table below. Share of total allocation for each disease were placed in the third column of the table below, which remains the same as allocation methodology published by the Global Fund: HIV=50%; TB=18%; Malaria=32% ('41st Board Meeting Allocation Methodology for the 2020-2022 Allocation cycle',https://www.readkong.com/page/41st-board-meeting-allocation-methodology-for-the-2020-2022-6666021). (Figure 1)

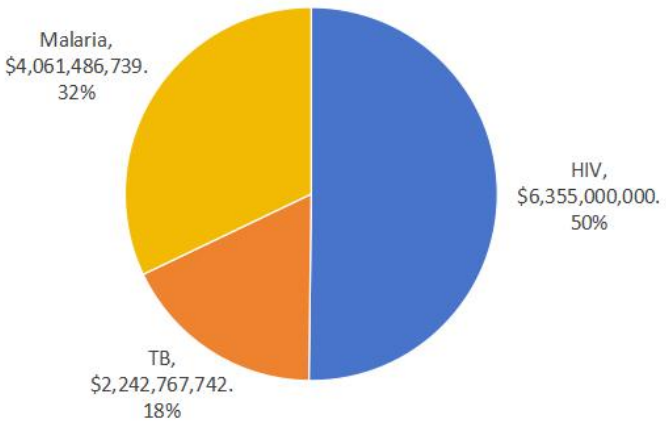

Figure 1. The Global Fund 2020-2022 cycle total disease split

The disease split by region (continent) is shown in the table below. The disease split is diverse in different regions, and there are great differences with the global disease split. For AIDS, Africa (n=47) received the largest share of funding ($5,155,282,408), and LAC received the highest proportion of disease split (68%). For TB, Asia (n=18), as the region with

the highest relative and absolute burden received the largest share of funding ($1,122,462,525), and also the highest proportion of disease split (51%). For Malaria, Africa (n=47), as the region with the highest relative and absolute burden received the largest share of funding ($3,613,157,276), and the also highest proportion of disease split (37%). Notably, EECA (n=0) did not receive any malaria allocation in 2020-2022 cycle. (Table 1) (Figure 2)

Table 1. The Global Fund 2020-2022 cycle region disease split

	Region Disease Split(USD Equivalent)	N(Number of countries concerned)	Proportion
Asia	HIV: $731,498,408	19	0.33
	TB: $1,122,462,525	18	0.51
	Malaria: $364,265,846	16	0.17
Africa	HIV: $5,155,282,408	47	0.53
	TB: $888,045,669	47	0.09
	Malaria: $3,613,157,276	43	0.37
EECA*	HIV: $183,373,309	14	0.55
	TB: $152,903,991	12	0.45
	Malaria:0	0	N/A
LAC	HIV: $249,779,465	17	0.68
	TB: $57,181,457	8	0.15
	Malaria: $66,065,676	8	0.18
MENA*	HIV: $35,066,410	3	0.47
	TB: $22,174,100	2	0.29
	Malaria: $17,997,941	1	0.24

*Abbreviation: EECA, Eastern Europe and Central Asia; MENA, Middle East and North Africa; LAC, Latin American and the Caribbean

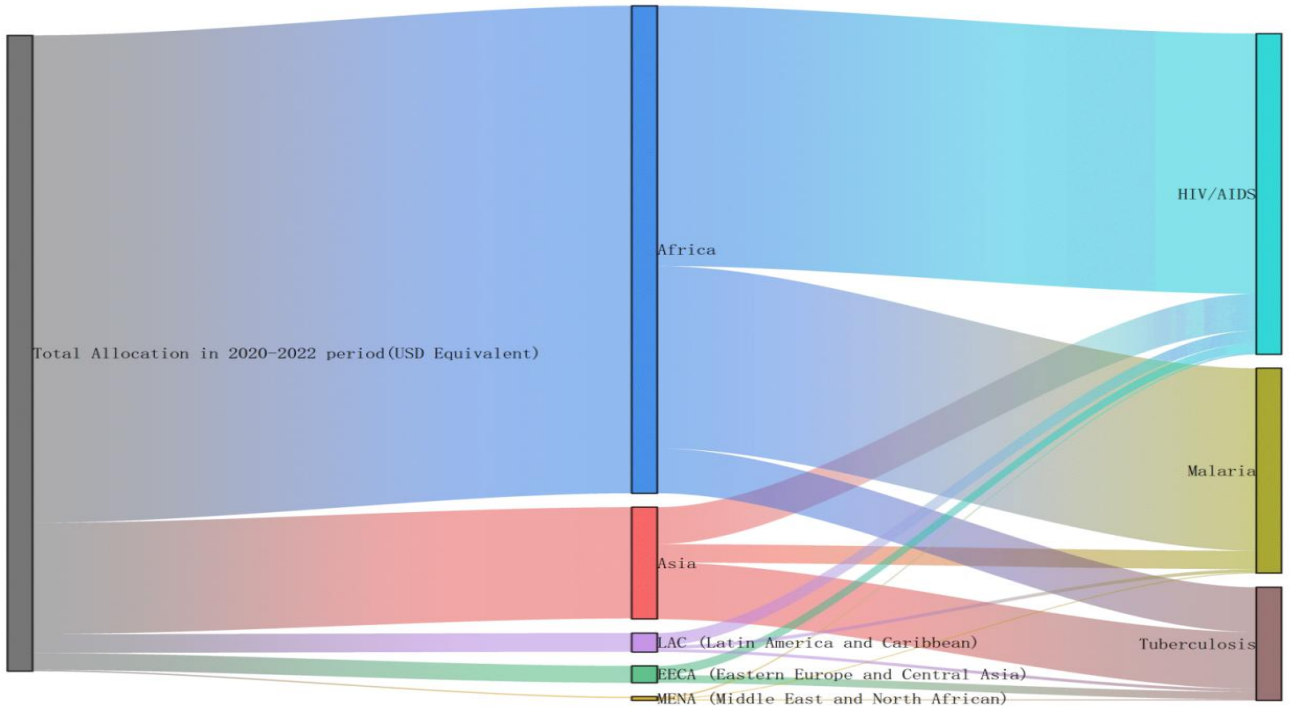

Figure 2. Allocation Sankey Diagram of the Global Fund in 2020-2022 cycle (conventional components)

In different levels, the correlation coefficients of budget and allocation, budget and disease burden, allocation and disease burden in 2020-2022 cycle for different diseases are shown in the Table 2. Allocation and budget data for the three diseases show strong correlations at both the global ($r=0.921-0.969$, $p<0.05$) and continental levels ($r=0.774-1$, $p<0.05$). Allocation and disease burden, budget and disease burden data for the three diseases also show strong correlations at global level($r=0.743-1$, $p<0.05$) and most continent level. However, for malaria at continent level, budget and disease burden data show middle correlations in Asia ($n=15$, $r=0.571$) and both allocation and disease burden/budget and disease burden data show weak correlations in LAC ($n=8$, $r=-0.524$, -0.333, $p=0.183$, 0.420). (Table 2)

Table 2. Analysis of Spearman correlation coefficients between Allocation, Budget, and Disease Burden for the Global Fund's 2020-2022 cycle

	Variable 1	Variable 2	N	Correlation Index(r)	P-value
Global Level					
	HIV Budget	HIV Allocation	50	0.921	<0.001
	TB Budget	TB Allocation	34	0.969	<0.001
	Malaria Budget	Malaria Allocation	58	0.951	<0.001
Continent Level					
Asia	HIV Budget	HIV Allocation	13	0.956	<0.001
	TB Budget	TB Allocation	12	0.993	<0.001
	Malaria Budget	Malaria Allocation	16	0.889	<0.001

Africa	HIV Budget	HIV Allocation	21	0.774	<0.001
	TB Budget	TB Allocation	19	0.925	<0.001
	Malaria Budget	Malaria Allocation	34	0.91	<0.001
LAC	HIV Budget	HIV Allocation	11	0.891	<0.001
	Malaria Budget	Malaria Allocation	8	0.929	0.001
EECA	HIV Budget	HIV Allocation	4	1	<0.001
Global Level	By disease component(%)				
	HIV Budget	HIV Disease Burden(%)	50	0.783	<0.001
	TB Budget	TB Disease Burden(%)	34	0.922	<0.001
	Malaria Budget	Malaria Disease Burden(%)	58	0.914	<0.001
	HIV allocation	HIV Disease Burden(%)	50	0.825	<0.001
	TB allocation	TB Disease Burden(%)	34	0.951	<0.001
	Malaria allocation	Malaria Disease Burden(%)	58	0.849	<0.001
Continent Level	By disease component(%)				
Asia	HIV Budget	HIV Disease Burden(%)	13	0.819	0.001
	TB Budget	TB Disease Burden(%)	12	0.993	<0.001
	Malaria	Malaria	15	0.571	0.026

	Budget	Disease Burden(%)			
	HIV allocation	HIV Disease Burden(%)	13	0.852	<0.001
	TB allocation	TB Disease Burden(%)	12	0.986	<0.001
	Malaria allocation	Malaria Disease Burden(%)	15	0.811	<0.001
Africa	HIV Budget	HIV Disease Burden(%)	21	0.743	<0.001
	TB Budget	TB Disease Burden(%)	19	0.87	<0.001
	Malaria Budget	Malaria Disease Burden(%)	34	0.801	0.001
	HIV allocation	HIV Disease Burden(%)	21	0.952	<0.001
	TB allocation	TB Disease Burden(%)	19	0.94	<0.001
	Malaria allocation	Malaria Disease Burden(%)	34	0.922	<0.001
LAC	HIV Budget	HIV Disease Burden(%)	11	0.709	0.015
	Malaria Budget	Malaria Disease Burden(%)	8	-0.333	0.420
	HIV allocation	HIV Disease Burden(%)	11	0.645	0.032
	Malaria allocation	Malaria Disease Burden(%)	8	-0.524	0.183
EECA	HIV Budget	HIV Disease Burden(%)	4	1	<0.001
	HIV allocation	HIV Disease Burden(%)	4	1	<0.001

In the 2020-2022 cycle, the budget is $16,264,528,692, which is $3,605,274,211 more than the Allocation, as there were carry-over of unspent grant budget from 2017-2019 cycle, and additional resources from the COVID-19 Response Mechanism. The region with the largest Budget disbursement was Africa, with a total transfer of $12,098,023,200; The least disbursed region was MENA, with a total of $54,879,613. Apart from TB, Africa received the largest budgets in HIV($3,417,728,765), Malaria($4,232,887,521), TB&HIV($3,053,045,711), and standalone RSSH($616,312,295) components. Asia received the largest budget in TB component ($1,469,189,880). In addition, EECA did not receive Malaria and standalone RSSH budgets. The global standalone RSSH budget is $675,320,080, which is about 4.16% of the total budget. (Table 3) (Figure 3)

Table 3. Budget flow in 2020-2022 allocation cycle (conventional components)

Budget source	Continents or components	Amount of budget transferred
Detailed Budgets in 2020-2022 cycle	Asia	$3,073,250,992
Detailed Budgets in 2020-2022 cycle	Africa	$12,098,023,200
Detailed Budgets in 2020-2022 cycle	EECA	$504,673,311
Detailed Budgets in 2020-2022 cycle	LAC	$533,701,576
Detailed Budgets in 2020-2022 cycle	MENA	$54,879,613
Asia	HIV/AIDS	$748,482,789
Asia	Tuberculosis	$1,469,189,880
Asia	Malaria	$483,956,361
Asia	TB & HIV	$342,440,671
Asia	Standalone RSSH	$29,181,290
Africa	HIV/AIDS	$3,417,728,765
Africa	Tuberculosis	$778,048,908
Africa	Malaria	$4,232,887,521

Africa	TB & HIV	$3,053,045,711
Africa	Standalone RSSH	$616,312,295
EECA	HIV/AIDS	$25,919,496
EECA	Tuberculosis	$17,752,618
EECA	TB & HIV	$461,001,197
LAC	HIV/AIDS	$180,280,085
LAC	Tuberculosis	$4,387,112
LAC	Malaria	$119,616,370
LAC	TB & HIV	$199,591,514
LAC	Standalone RSSH	$29,826,495
MENA	HIV/AIDS	$6,465,494
MENA	TB & HIV	$48,414,119

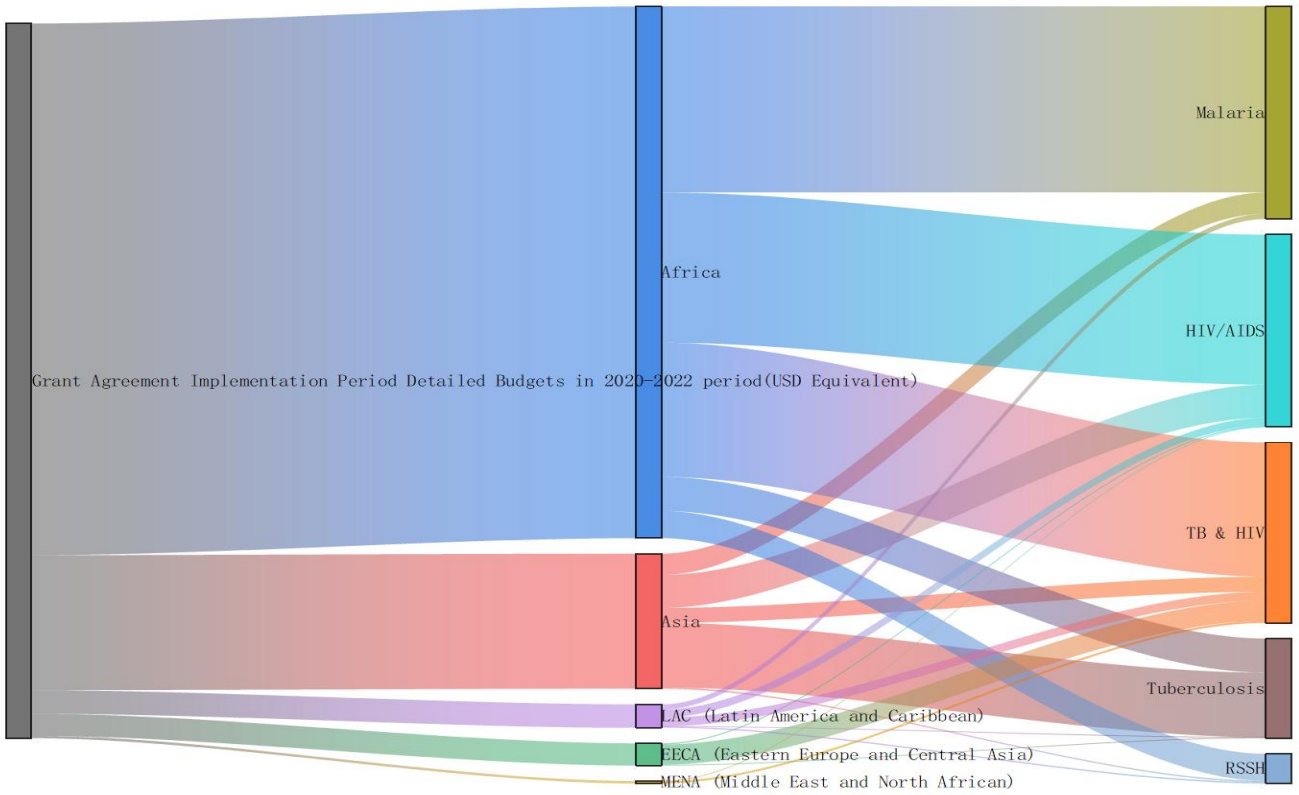

Figure 3. Budgets Sankey Diagram of the Global Fund in 2020-2022 cycle (conventional component)

After combining the three components of HIV,TB,TB/HIV, the budget for total HIV and TB is $10,752,748,360, which is 66% of the total budget. Africa received the largest budget for the three components. (Table 4) (Figure 4)

Table 4. Budget flow in 2020-2022 cycle (Combined HIV and TB components)

Budget source	Continents or components	Amount of budget transferred
Detailed Budgets in 2020-2022 cycle	Asia	$3,073,250,992
Detailed Budgets in 2020-2022 cycle	Africa	$12,098,023,200
Detailed Budgets in 2020-2022 cycle	EECA	$504,673,311
Detailed Budgets in 2020-2022 cycle	LAC	$533,701,576
Detailed Budgets in 2020-2022 cycle	MENA	$54,879,613
Asia	Malaria	$483,956,361
Asia	Total TB & HIV	$2,560,113,341
Asia	Standalone RSSH	$29,181,290
Africa	Malaria	$4,232,887,521
Africa	Total TB & HIV	$7,248,823,384
Africa	Standalone RSSH	$616,312,295
EECA	Total TB & HIV	$504,673,311
LAC	Malaria	$119,616,370
LAC	Total TB & HIV	$384,258,711
LAC	Standalone RSSH	$29,826,495
MENA	Total TB & HIV	$54,879,613

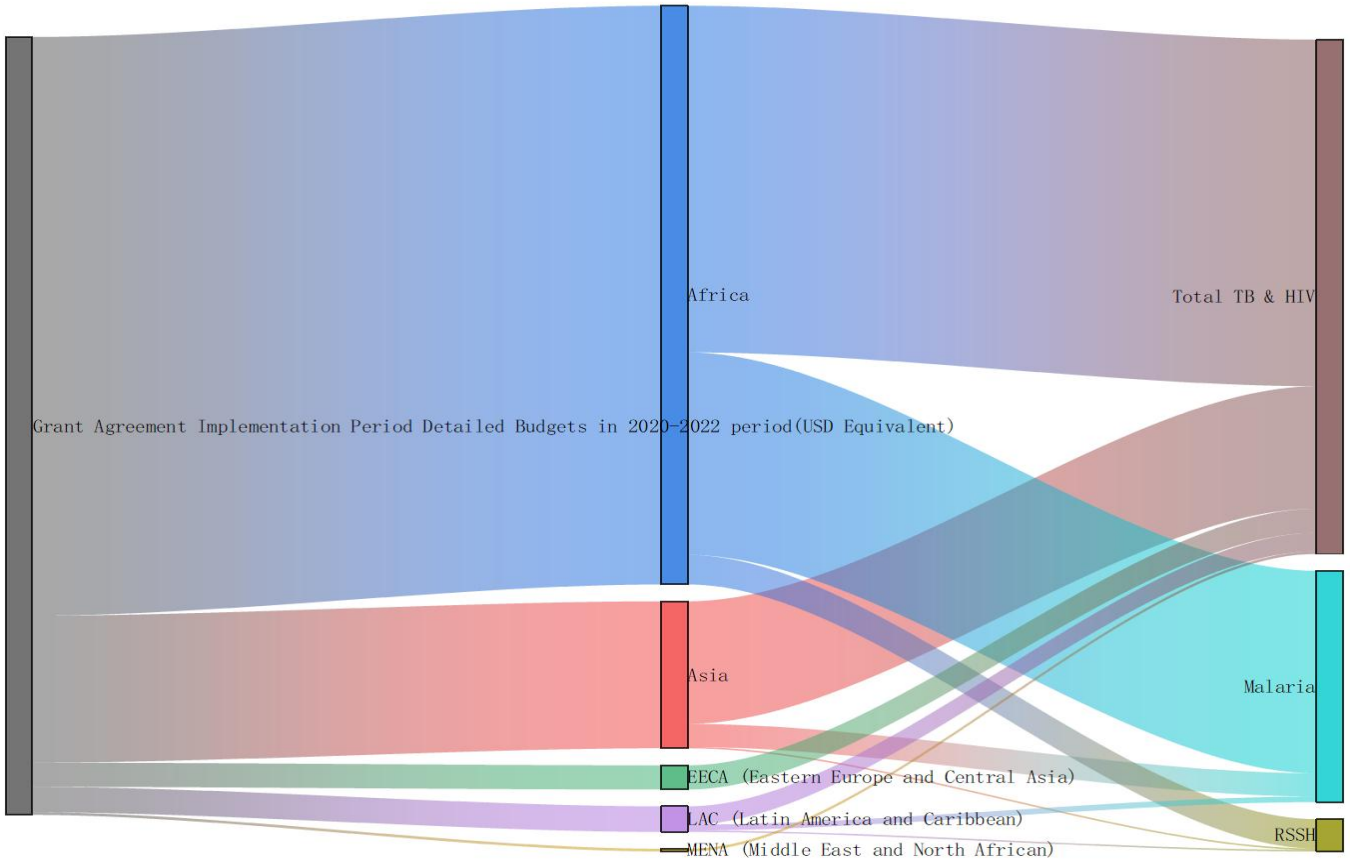

Figure 4. Budgets Sankey Diagram of the Global Fund in 2020-2022 cycle (Combined TB and HIV components)

The implementers of the 2020-2022 cycle are shown in the figure 5. Government organizations and Civil Society Organizations were the two largest fund implementers to the Global Fund, accounting for about 89% of the total. The Private Sector has the smallest share, accounting for just 0.6% of the total.

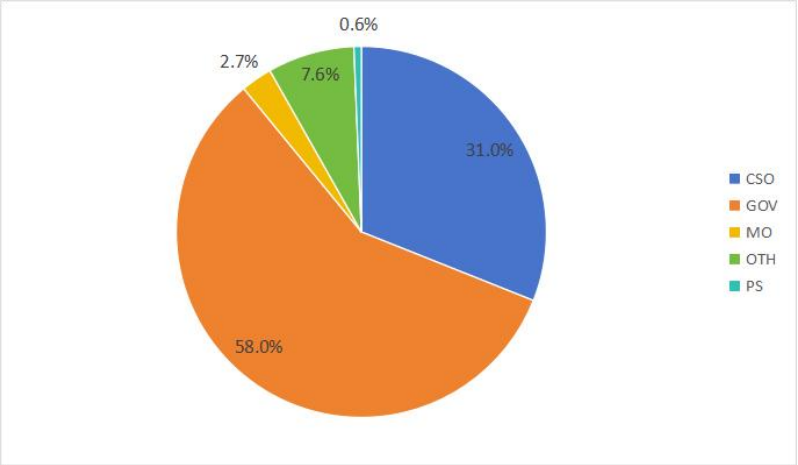

Figure 5. Implementer Classification in 2020-2022 cycle

*Abbreviation: CSO, Civil Society Organization; MO, Multilateral Organization; GOV, Governmental Organization; PS, Private Sector; OTH, Other

3.2 Qualitative Results

Key Informant Interviews

The data gathered from 15 semi-structured interviews with different departments of the Global Fund contribute to the interpretation of the above research questions from professional and diverse perspectives.

All 17 Global Fund employees actively participated in the interviews. Respondents came from 13 different departments or positions at the Global Fund of which 10 (59%) were male and 7 (41%) were female. In general, the respondents have a very rich experience in the field of global health. Before joining the Global Fund, some of the respondents had worked in the CDC (Centers for Disease Control), the Gates Foundation, the World Bank, the World Health Organization and other international organizations. 7 (41%) respondents had worked in the Global Fund for more than 10 years (Table 5).

Table 5: In-Depth Interview Sample characteristics

		People Counting(%)
Gender	Male	10(59%)
	Female	7(41%)
Years of Working in Global Fund	0-5	2(12%)
	5-10	4(24%)
	Above 10	7(41%)
	Unknown	7(41%)
Department/Position	Allocation	3(18%)
	HIV	1(6%)
	TB	1(6%)
	Malaria	1(6%)
	AME*	1(6%)
	CRG*	1(6%)

	PMRD*	1(6%)
	Portfolio Manager	3(18%)
	Strategy and Policy Advisor	1(6%)
	LAC*	1(6%)
	RSSH	2(12%)
	Ex Chief Economist	1(6%)

*Abbreviation: AME, Africa &Middle East; CRG, Community, Rights & Gender; PMRD, Programmatic Monitoring & Risk; LAC, Latin America and the Caribbean

3.2.1 The Global Fund Experts' Assessment of the 2020-2022 Allocation Cycle and Disease Split

3.2.1.1 Overall Assessment

Three experts from allocation team, one portfolio manager and two disease experts who participated in the 2020-2022 allocation cycle gave a positive assessment of the allocation process. The Global Fund's 2020-2022 allocation cycle follows a strict three-stage process: “Phase One is the figures generated from the allocation methodology. Then we have the Secretariat qualitative adjustment process. The last piece is evolving to at country level. How Country Coordinating Mechanism (CCM) make the decisions to “shift money here and there and eventually impact on the final amount” in the component total grant budget. In the 2020-2022 allocation, “HIV receives 50%, malaria receives 32%, and TB receives 18%”, which is consistent with the previous cycle. Decisions about disease split are based on “ a formula model and the specific needs of each country, rather than a simple pursuit of balance between diseases". For the 2020-2022 allocation cycle, all technical parameters of the allocation formula remain consistent with previous cycles, except for the malaria burden indicator. “The latest at-risk population and baseline data has been adjusted” to better improve

robustness.

Two experts pointed out that according to the development history and intended objectives of the Global Fund, as well as the reflection on the problems of the previous allocation methodologies, and especially focus of “previous inequities and unsustainability, in particular inequities in access to finance”, the Global Fund has refined the allocation method for 2020-2022.

One expert described the challenge with the Global Fund's allocation processes before 2014 as "a Russian Roulette." He likened the process by which countries submit proposals for funding according to their own circumstances to a "guessing game." In the absence of guidelines and consultants' assessments, countries with “capacity and money to get technical assistance and get good consultants” always won the games and “ they consistently got more money”, while some countries and regions like “Rwanda, South Africa, Sudan” that really need strong support from the international community were often rejected at the grant approval stage because some of the countries “didn't know how and didn't have sufficient time to crack the code to win the game, they have their own implementation challenges to deal with and they can’t set aside six months to write the Global Fund proposal” so they did not get the help they deserved.

As a result, the Global Fund has gradually adjusted its allocation methodology since 2014 to ensure “equitable and sustainable allocation of funds” based on “epidemiology and country ability to pay”. With this in mind, the Global Fund has completed adjustments to its 2020-2022 allocation model. In summary, the adjustments are based on rethinking and fixing problems with previous models, involving the way to calculate the malaria burden, taking into

account changes in historical data, clearer use of previous funding measures, and more careful consideration of funding absorption. At the same time, all six experts admitted that the allocation cycle also faced a series of challenges including human costs, data quality, financial problems and other issues beyond epidemiology.

3.2.1.2 Disease Split Assessment

Since the Global Disease Split was first introduced in the 2014-2016 allocation cycle as part of the allocation-based New Funding Model, and adopted by the Global Fund Board and informed by the recommendations from three independent expert institutions. It remained the same until the 2020-2022 cycle inclusive. “This ratio has never changed since then”. This may have something to do with the history of the Global Fund; As an innovative multilateral financing mechanism, “ the Global Fund initially focused solely on AIDS prevention and control ”. The actual budget from the proposals approved from 2002 to 2013 was also analyzed to define the disease split. As a result, HIV-related services have enjoyed a high proportion of funding (about 50 percent of total funding for the HIV response) and continue to do so today:

“There was no specific allocation amount but when we moved to the new funding model, we use that historical disease split and you can imagine that by then HIV for good reasons got most of the money.”

Expert from Interviewee 3 argued that the disease split design “lacked attention to disease burden and mortality at the beginning when the burden of malaria and tuberculosis was far less intractable”. Therefore, disease split in 2020-2022 allocation cycle should be adjusted according to environmental changes.

One expert noted that disease split should be more dynamic in the future cycle

"So, the rate of disease play, in my opinion, definitely needs to be adjusted .....needs to stop being a standard percentage, you know X percent for HIV X percent for TB. It has to be a bit more dynamic now."

The Global Fund provides an allocation with an indicative program split for HIV, TB and malaria every funding cycle, and "this allocation is based on a formula, which does not necessarily include RSSH". This indicative program split is given to the CCM, and they are supposed to confirm or adjust it with justification. South Sudan, for example, has a weak health system, a high malaria burden, and a low effective absorption rate of external funding, which urgently needs strengthening. Therefore, South Sudan was categorized as "RSSH priority countries", and "a requirement is for the CCM confirmed/ adjusted program split to include an allocation specifically to RSSH investments". For South Sudan, "the CCM allocated 15% (Approximately US$ 21M) of the total communicated allocation for the 3 diseases for RSSH". The total amount was "pulled from the HIV and Malaria allocation, but the TB allocation was not touched". However, there were significant gaps in the HIV and Malaria funding in South Sudan and by taking RSSH funds from the indicative program split, the money from significantly underfunded programs were taken away.

As one expert mentioned: disease split "should definitely be adjusted, especially for the 20-22 cycle and the 23-25 cycle that has not yet ended ". Disease split should not be a fixed percentage, such a fixed proportion does not "respond to complex changes".

One expert noted the challenges currently faced by the Global Fund in the fund-raising phase, and that insufficient funding would also affect disease split:

"So, the global disease split that got approved was dependent on the amount of funds raised..... if the Global Fund had received enough money from the donors, as expected."

"The current decision to disease split was the best one to make considering many factors, including available funding, environmental factors, disease burden, and data accessibility". The reason that the global disease split was only adjusted for available funding above US$12 billion, is to ensure that "a change would not severely impact current HIV and malaria programs". Therefore, "the funding must be predictable and continuation of live-saving should be guaranteed". The main challenge is that the funds raised have not met expectations. If the Global Fund can raise more funds, the board may make changes to the disease split program in the future. In the case of the current disease split, the board is trying to allocate as much money as possible to TB as long as it can "guarantee the implementation of the AIDS and malaria programs".

3.2.2 The Global Fund's Experts' Multi-dimension Assessment of Countries' Needs

3.2.2.1 Financial Need

The Global Fund tried to align financing with highest disease burden and lowest economic capacity:

"The allocation methodology to do is very much distribute funds as best possible in line with each country's respective financial need for the three diseases."

Determinants contain "each country's disease burden for HIV, TB and malaria, and that's a population based", " number of people living with HIV", "number of multidrug resistance (MDR) cases and Non-drug-resistant (NDR) cases for TB", "four different indicators for

Malaria", and the "greatest weight on them are the number of cases and deaths". The Global Fund uses "gross national income (GNI) per capita to determine the country's economic capacity". And "other donor financing elements", "additional disease burden and program performance indicators" are also used to determine the "country's relative need in the portfolio".

In addition, "subgroups" were emphasized in the qualitative adjustment by two experts:

"We looked at the prevalence of HIV among the top two key populations in each country and if a country has a very high prevalence within those groups but a low prevalent outside, we would be considering increasing that in the qualitative stage."

One expert highlighted two additional things: "One is about program review, and the other thing is called country dialogue." Before/end each cycle, Global Fund conducts program review to see "if there are any efficiency, effectiveness issues to be addressed". For the country dialogue, "all the stakeholders" need to come to the table to have a dialogue. Countries need "understanding why the Global Fund invest on this, and the Global Fund also wanna hear different opinions from governments and communities":

"We hope that the process also address the country needs issues, we need understand where we should put more resources on this specific geographic area and specific groups. And the countries can be very different on in this."

3.2.2.2 Prevention Need

Although the Global Fund determines the total amount each country receives, countries have a great deal of autonomy in how they allocate these investments in prevention:

"But in terms of how each country then divides up those investments across prevention,

across treatment, across other key priorities of the response. That is very much up to the country."

The burden of disease remains the main indicator to reflect the prevention needs of each country. Every three years, the Global Fund "asks technical partners for disease burden estimates to determine the funds allocated to countries". In the allocation of AIDS, emphasis is placed on the adjustment of "key populations", because "using population burden alone as an indicator may not adequately address prevention needs, especially in low-burden areas". In terms of prevention, the Global Fund has highlighted "treatment for HIV patients as a top priority to reduce the risk of new infections":

"We're increasing countries HIV allocation by taking HIV funds from other countries, from their formula amounts. And so would be absolutely important to ensure that that's an adequate number or amount of the HIV allocation is that goes to key populations programming".

Estimates of TB and malaria prevention needs are relatively vague, but the Global Fund still highlighted the need for "sustained prevention efforts to reduce the disease burden". In addition, for countries that are underinvesting in prevention, the Global Fund has taken "some measures to promote investment in key areas".

3.2.2.3 Community Delivery Need

"To your question on the community, the community is not really addressed in the allocation process."

Three experts believe that community delivery needs are essentially implementation issues. And the allocation process "does not really address community delivery needs". When

resources are sufficient, who will “implement the program and provide the services has been quantified in the financial requirements”. One expert pointed out that “different services are suitable for different implementation objects, some services are suitable for social provision, some are suitable for virtual delivery, and some are suitable for face-to-face delivery”, and “all these kinds of things are considered in the qualification of financial need”.

3.2.2.4 Country-specific needs

“Each country’s situation is very much different. The countries' ability to address their own problems can change from year to year. But this every year we cannot really change our policy as our fund run in a three-year cycle even if something happens in between.”

Each country's capacity to solve problems changes from year to year as its own circumstances adjust, and so do its specific needs. For example, a presidential transition may change the “priority of health issues”, so “the Global Fund has policies that emphasize priorities and co-finance to ensure the sustainability of health programs”. In addition, continuous evaluation is essential. Local Fund Agent (LFA) has played a significant role as a fund agent assisting the Global Fund in assessing local conditions. According to the LFA's information, “the national team will check with the Principal Recipient (PR) and CCM”. If necessary, the senior management will “intervene and travel to the country to meet with the president”.

But it's worth noting that estimates can be rough for a particular disease in some regions:

“ We just have to basically estimate from global fund previous funding, financing, programmatic level and the largest donor, and we do these analysis programmatically to go like they're here. If they wanna go there and reach 50,000 more, just simple math”.

The Global Fund considers it a mathematical problem when quantifying country-specific needs, but in reality for some diseases, methodological accuracy and data quality may not be guaranteed, even “there isn't a central database or a standardized methodology to do that”.

3.2.2.5 The Allocation did not Meet all Needs of Essential Services in the Countries in 2020-2022 cycle

Most experts took a pessimistic view of national allocations, arguing that current allocations do not cover all essential services for the three diseases in all countries:

“No, I said that already it cannot, because of the gaps and because of the increase in costs, are you going to know with not enough money.”

In their view, the factor contributing to this result was not the “inadequacy of the Global Fund's allocation process”, but the fact that “the overall funds received from the international community were much lower than expected and there was a large gap”. The serious shortage of funds is the most important challenge facing the Global Fund. The bad financial environment is due to a variety of factors, including “the Covid-19 pandemic”, “inflation”, and “political issues”. Therefore, the Global Fund aims to “push countries to invest a greater share of their domestic resources”. But many countries are also “facing a series of economic problems, and domestic resources do not have the basis to adequately fill the funding gap”.

3.2.3 The Global Fund's Experts' Assessment of Conversion of Funds

3.2.3.1 Impact of Absorption in 2017 to 2019 cycle on Allocation Decisions in 2020-2022 cycle

The Global Fund uses the term "absorption" to denote the ratio of actual expenditure to budget. The absorption of funds becomes one of the criteria for the qualitative adjustment of

the 2020-2022 cycle, ". If a component showing that there were "significant problems with absorbing funds from the 2017 to 2019 cycle", then the "Global Fund would bring down their formula derived allocation and divert those funds elsewhere". It is worth noting that although absorption of underperforming components reduced allocations, "they still gained relative to the previous cycle, because much more funds are available for allocation in 2022". The treatment of the absorption aims to ensure the increase in allocation is feasible, based on the "available data points, including the absorption situation".

3.2.3.2 Reasons for Considering Absorption in Qualitative Adjustment

One expert indicated the reasons for absorption should be considered during the qualitative adjustment phase rather than in the model itself:

"The absorption difficulties are very varied. It could be a single bottleneck in a country that is causing it to not be able to spend the funds, or it could be a more general problem and you know you wouldn't want to penalize the country for one".

The low absorption rate may be caused by diversity, and it is "difficult to quantify" it reasonably by the formula. In the 2020-2022 cycle, some countries "still receive more funds with low absorption". One expert has this explanation for the phenomenon: "If countries are struggling to use the funds effectively on the flight from a financial standpoint, an important part would be to understand what exactly is the root cause." The reason for the low absorption rate in some countries is implementation. If this is the reason for implementation, the Global Fund "would switch to a new to different principal recipients and they'd be strong reasons to think that would then improve absorption."

3.2.3.3 Factors Considered for Effectively Using Funds in 2020-2022 Allocation Cycle

After the 2022 allocation, the Global Fund observed good absorption of funds by countries, particularly with relatively consistent absorption for the three diseases:

"At least based on information at the time, which was in November of last year [2022] for all 3 diseases and funds were absorbing well and they were fairly consistent across the 3 diseases as well".

One expert likened funded countries to hungry people to illustrate their hunger for money :

"Have you been hungry before? When they give you food, you just eat it, whatever they give you."

During the cycle, the Global Fund adopted variety of measures to improve absorption, including "portfolio optimization", "reprogram the funds in the mid cycle" and "overallocation of funds", which was highlighted by an expert:

" We also did something interesting last cycle in 2022 is where we over allocated the amount of funding, meaning we had about 12.11 billion to allocate, but we allocate 12.71".

The intentional overallocation aimed to encourage greater optimization across the portfolio by "slightly more than the available funds", ensuring that countries would "optimize allocations", and less funding would "return to the central pool".

4. Discussion

4.1 Main Findings

For the assessment of disease split for the 2020-2022 allocation methodology, allocation data from 112 countries, totaling $12,659,254,481, was analyzed for the disease split study. Quantitative research shows the disease split percentages in 2020-2022 allocation cycle followed the Global Fund's allocation methodology: HIV=50%, TB=18%, Malaria=32%. The disease split varied significantly by region, with Africa receiving the largest share for AIDS and malaria, and Asia for TB. EECA did not receive any malaria allocation. Qualitative research shows experts gave a positive assessment of the allocation process for the 2020-2022 cycle, which followed a strict three-stage process. The disease split remained consistent, allocating 50% to HIV, 32% to malaria, and 18% to TB, based on a formula model and specific country needs and this confirms the results of quantitative studies. Adjustments to the allocation model aimed at addressing historical problems, including a refined approach to calculating the malaria burden and considering changes in historical data. Allocation methodology adjustments aimed for equitable and sustainable fund distribution based on epidemiology and a country's ability to pay. However, the 2020-2022 allocation cycle also faces a number of challenges, including implementation, human costs, data quality, financial issues, and other factors beyond epidemiology.

For the assessment of countries' needs, quantitative research shows the budget for the 2020-2022 cycle was $16,264,528,692, exceeding the allocation by $3,605,274,211 due to carry-over from the 2017-2019 cycle and additional resources from the COVID-19 Response

Mechanism. Africa received the largest budget disbursement for HIV, TB, malaria components, while MENA received the least. Africa had the highest budget disbursement, and standalone RSSH components, Asia received the largest budget for the TB component and EECA did not receive malaria and standalone RSSH budgets. Combining HIV, TB, and TB/HIV components, the budget for total HIV and TB was $10,752,748,360, representing 66% of the total budget. The global standalone RSSH budget was $675,320,080, constituting about 4.16% of the total budget. And Africa received the largest budget for the three components (HIV&TB, malaria, RSSH). In correlation analysis, strong correlations were observed between most allocation or budget in different regions and the disease burden for HIV and TB, but not for malaria between budget and disease burden in Asia and between budget and disease burden/allocation and disease burden in LAC. The evaluation of implementation shows Government organizations and Civil Society Organizations were the two largest fund implementers, contributing approximately 89% of the total, while the Private Sector had the smallest share at 0.6%. Qualitative research shows in 2020-2022 cycle financial need assessment considered disease burden, economic capacity, and other indicators, aiming for equitable fund distribution, which demonstrates the correlation between allocation/budget and disease burden in quantitative studies. Prevention need emphasized disease burden, with a focus on key populations for HIV prevention, estimations of TB and malaria prevention needs are relatively vague and there is currently no good way to measure them independently. Community delivery needs were considered implementation issues, not directly addressed in the allocation process. Each country's specific needs, priorities, and capacity changed annually, requiring continuous evaluation. Experts expressed a pessimistic

view that the current allocations did not cover essential services due to a significant funding gap. Shortages of funds were attributed to factors like the COVID-19 pandemic, inflation, and political issues, leading to challenges in meeting overall needs.

For the assessment of the conversion of funds, strong correlations were observed between Allocation and Budget for the three diseases globally and continentally in quantitative research. Qualitative analysis shows after the 2022 allocation, the Global Fund reported effective fund absorption by countries, particularly noting consistent absorption across the three diseases (HIV, tuberculosis, and malaria). In November 2022, experts observed positive absorption trends, emphasizing countries' eagerness for financial support. The Global Fund implemented various measures during the cycle, such as "portfolio optimization," mid-cycle fund reprogramming, and intentional overallocation of funds (allocating more than available). This intentional overallocation aimed to stimulate portfolio optimization, encouraging countries to utilize allocations fully and minimize funds returning to the central pool.

These findings highlight the complexity of the allocation process, with ongoing efforts to balance disease priorities, address historical inequities, and adapt to changing circumstances. Challenges related to funding gaps and global economic conditions remain significant concerns.

4.2 Interpretations

In the design of the allocation model, the drivers of disease and equity are emphasized. The allocation team attempts to quantify funding needs through disease indicators that need to be universal and strives to achieve equity across geographies and countries. It has been

pointed out in the literature that compared with historical practice, the new financing model approach is expected to improve the allocation efficiency of the Global Fund and focus resources on countries with higher disease burdens and lower per capita income, which confirms the effectiveness of the allocation model (Fan et al., 2014).

The obstacles and challenges beyond epidemiology in the implementation process cannot be ignored. The first is a lack of human resources, which is not only within the Global Fund, but also at the country level. The shortage of human resources in one team from the Global Fund was addressed in one interviewee. The team members are not "sophisticated enough" means their team's review of the qualitative adjustments data was not enough to satisfy, and the three-member team has no time and energy to deal with the qualitative adjustment caused by complex environmental issues such as right contextual factors, absorption, political challenges, etc. As a direct result, this team was unable to prepare for the qualitative adjustment meeting in a way that are rigorous enough to take into account national circumstances when dealing with the complex factors faced by countries in the same region, especially those that are not close to disease control. One study pointed to similar personnel mobility among nonprofits in the same industry (Maletzky & Grosskopf, 2020), which may have contributed to the lack of cycleic human resources within the Global Fund.

At present, the implementation of the Global Fund mainly relies on government organizations and civil society organizations to ensure country ownership. There are several reasons for this: 1. As representatives at the national level, governmental organizations are qualified to participate in negotiations and consultations on the international stage on behalf of the country, and promote the allocation of resources and the realization of cooperation. 2.

Government organizations typically have larger resources and capacity to provide more stable and sustainable support to the Global Fund. The greater involvement of civil society organizations at the local level and their ability to better understand and respond to local needs helps to ensure that aid projects are implemented in a more realistic manner and are more accessible to beneficiary groups. 3. Global health problems require a interdisciplinary combination of expertise. Governments and civil society organizations can provide personnel from a wide range of professional backgrounds to address health challenges more comprehensively. There may be some reservations or restrictions on the private sector in the current implementation of the Global Fund. First, since profit is the primary objective of the private sector, the private sector may prioritize the pursuit of profit when implementing health projects, rather than paying more attention to public health and social benefits. Second, the regulation and transparency requirements to which the private sector may be subject may not be sufficiently stringent. The Global Fund may prefer to work with organizations that are more tightly regulated and provide greater transparency to ensure the effective use of funds and the real impact of projects. However, it is important to note that not all private sectors will be excluded from the Global Fund. In fact, in some projects, private sector cooperation may be necessary, especially in terms of technology, innovation and resources. In working together, it is critical to ensure that the private sector acts in line with the objectives and values of the Global Fund.

At the country level, the response to certain diseases is also facing the challenge of a shortage of human resources. Take AIDS for example, Zimbabwe faces a severe shortage of human resources in fighting against HIV (Ray, & Madzimbamuto, 2013). This shortage of

human resources was not only reflected in the primary healthcare sector, but also the government sector, resulting in problems such as difficult access to health services and a delay in absorbing funds.

In the quantitative analysis, it was found that the Budget of the three diseases in the 2020-2022 cycle was significantly larger than Allocation. This is likely to be due to the release of excess funds resulting from the repatriation of funds from the previous cycle.

In quantitative analysis, malaria Allocation and Budget in Asia and LAC were not associated with disease burden. The reasons for this phenomenon may be as follows: 1. In Asia, a subcontinent-level grant for South-Eastern Asia was not included in the malaria allocation. The grant, which totalled US $33,9252,320.2, was a lump sum and therefore could not be clearly allocated independently at the country level, which may have influenced the analysis. 2. In the process of program split, the highest proportion of funds was allocated from malaria into RSSH allocation, so the allocation and budget for malaria may have additional funds in the process of qualitative adjustment, and the higher budget may have contributed to the distorted correlations between budget and disease burden share.

The example of TB provides a good explanation of the impact of data quality on disease burden. The main challenge with TB data modelling is the quality of incidence data. This is because the incidence of TB is based on model estimates rather than measurements (2.1 TB Incidence, n.d.), and the estimates made by models are not extremely accurate and generally lag. As a result, the disease burden of TB is not always well accounted for. The burden of TB disease had changed significantly as a result of the COVID-19 pandemic, but previous models were unable to adjust to emergent public health situations in a short cycle of time, resulting in

data quality difficult to maintain and thus affecting estimates of the burden of disease. And incorrect estimates often affect the allocation indirectly.

4.3 Implications for Policy and Practice

This study outlines the Global Fund's unique strategy to respond to country needs in the 2020-2022 cycle. Several fields where policy could be reformed were identified by the experts from the Global Fund and elucidated during qualitative analysis.

4.3.1 Ensuring Basic Service Coverage in the Face of Financial Challenges

The most recent annual report from Capital as a Force for Good reveals that the current funding shortfall for achieving global goals has expanded to $137 trillion, compared to the previously assessed shortfall of up to $135 trillion last year (Ford, 2023). There is no doubt that the Global Fund is facing a tight financial situation. Due to the impact of the COVID-19, the international economic situation is sluggish. In the 2020-2022 cycle, the sources of funds for country allocations were US$12 billion. In the 2023-2025 cycle, US$15.7 billion was raised, US$2.3 billion less than the US$18 billion replenishment asked. This resulted in US$13 billion available for county allocations, which is only US$1 billion more than in the 2020-2022 cycle. The chaos and damage caused by COVID-19 require more money to compensate, which may lead to a more cautious and difficult allocation process for the Global Fund. The Global Fund will do everything in its power to ensure the cost of essential services and to be able to achieve universal health coverage. At the same time, the Global Fund found during the funding request development process that some countries, because of their own disease or political reasons, would want to divert disease funds to other matters, which will lead to the failure to cover basic control services. Therefore, the requests for using funds for

purposes other than disease-specific interventions will be rigorously examined and that even if misappropriated funds should be actively invested in RSSH to ensure that funding has a potentially positive impact on the three infectious diseases.

4.3.2 Incorporate RSSH into base formula

More than five experts have advocated incorporating RSSH into the basic formula. The Global Fund believes that RSSH can address the needs of larger systems and primary health care and universal health coverage. Experts in RSSH team stressed that incorporating RSSH into the basic formula is critical because strengthening health systems can indirectly improve control and treatment outcomes for HIV, TB, and malaria. RSSH is designed not only to meet the needs of disease control, but also to build a healthier basic healthcare system and reduce the country's external funding needs for disease control in the long term.

The importance of RSSH and current challenges must be taken into account when discussing whether to adjust disease split at this stage. The role of RSSH in the healthcare system is considered essential, but the funding absorption of RSSH has not been ideal in the past cycles, which indicates certain challenges and difficulties. The current base formula focuses on three diseases and addresses investment in health systems during the qualitative adjustment and program split stages. Therefore, experts believed that the base formula needs to be adjusted to better account for the importance and investment needs of RSSH with fiscal and policy considerations. The Global Fund may weigh the needs of different diseases and decide how to allocate limited resources. At the same time, it is necessary to take into account the actual needs of countries for RSSH and the ability to absorb funds. Taking quality and effectiveness into account in the allocation of funds and systematic investments, and

incorporating relevant indicators into the allocation of RSSH may be a future effort for the Global Fund.

The experts also mentioned the importance of long-term investment and collaboration in RSSH. Under the premise of discussing the inclusion of RSSH in the base formula, it is necessary to consider plans for long-term investment and cooperation. This will require consultation with governments and a plan of up to 10 years to ensure the sustainability and predictability of investments in the system. At the same time, the global fund needs to work with governments and other partners on co-financing to achieve long-term investment and support for RSSH.

For future work in the RSSH direction, clear logic and direction need to be found. A possible way to do so is to tackle RSSH first and then further explain the idea of RSSH supporting HTM control through health systems. By doing this proposed idea, disease control will also occur alongside the system investment strategy as the specialist mentioned. The other strategy is to treat RSSH as a project and use program split and qualitative adjustments to understand and design RSSH allocations. The main consideration is what are the main gaps that were affecting the development of specific RSSH components such as supply chain, health information systems, community systems and planning, governance, the national health system situation, the HIV, TB, and malaria response and adjust the project according to the corresponding results. In short, incorporating RSSH into the base formula could lead to more stable funding allocations for it. However, for now, it is difficult for the Global Fund to quantify RSSH because it covers the entire health system, there is a lack of valid indicators

and parameters to evaluate all countries, and the difficulty of obtaining high-quality data on sustainability is also one of the difficulties in incorporating RSSH into the base formula.

4.3.3 Actively seek external support to help achieve its future mission

In addition to financial support, there have been several other initiatives of help that the Global Fund expects from the international community to fulfill its mission as a global partnership. Some experts expressed how beyond financial support, the Global Fund expects help from an institutional standpoint and to gain academic support to fulfill its mission. Academic institutions can help create the best approach to allocate resource and assist in creating a disease split that leaves the work of the Global Fund and the international community meaningful as a whole process to these countries. The Global Fund should strengthen its extensive and inclusive engagement with international organizations, requiring collaboration with entities such as the World Health Organization (WHO) and the Joint United Nations Programme on HIV/AIDS (UNAIDS), as well as participation from countries at all levels. The necessity of collective investment in the international system needs to be emphasized to ensure comprehensive involvement and commitment from different organizations and countries at every stage, ultimately contributing to the advancement of the Global Fund's mission.

4.4 Strengths and Limitations

This study adds to the literature on the Global Fund's unique strategies to responding to counties' needs in 2020-2022 cycle which has not been studied by another research. The study uses officially published quantitative data and interviews with experts from within the Global Fund. The data is complete and of high quality.

However, due to the covid-19 epidemic, the incidence rates of the three diseases in the 2020-2022 cycle have not been officially released, so the study can only use the incidence rates of diseases in 2023-2025 to estimate, which may lead to a certain bias in the results. In Spearman's correlation coefficient analysis, the number of countries included in the EECA region is too small to produce a correlation coefficient of sufficient value.

Due to the limitation of data availability, this study did not obtain appropriate datasets to quantify the economic capacity of relevant countries and explore the relationship between allocation/budget amounts and the economic capacity of countries in the allocation process.

For qualitative study, all the data came from experts within the Global Fund, so there was only a single stakeholder, and the views presented were relatively limited and did not represent the general views of all relevant groups. Future studies could attempt to obtain qualitative data from health officials in relevant countries and employees of other international health organizations. Due to the absence of an effort to establish inter-coder reliability, the analyst may face potential biases or misinterpretations.

5. Conclusions

In the 2020-2022 cycle, the Global Fund attempted to use a variety of unique strategies to achieve its strategic objectives but did not fully meet the needs of countries due to insufficient fund replenished. The Global Fund has designed a rigorous allocation methodology for this cycle. The disease split remained consistent with 2014-2016 cycle, allocating 50% to HIV, 32% to malaria, and 18% to TB, based on a formula model and specific countries' needs. The Global Fund use multiple perspectives and methodologies to comprehensively and objectively assess the needs of the countries concerned and to align financing with highest disease burden and lowest economic capacity in this cycle, but the allocation did not meet all needs of essential services in the countries. High absorption rate and strong correlations between allocation and budget for the three diseases were observed globally and continentally, which stands for the fund allocation can be translated effectively through funding requests in this cycle. Policymakers should fully consider the issues and shortcomings illustrated in this study, improve the efficiency of funding allocation, and ultimately end the three infectious diseases globally.

Appendix A: Interview Guide 1 (For Allocation Team Staff & Policy advisors & Fund Portfolio Managers)

Preliminary Information	
Country	
Agency & Position	

CONTEXT: To begin, we are interested in better understanding the rationality of the allocation model of 2020-2022	
1. What role did you play in the 2020-2022 allocation? *Probe:* Allocation Team Staff & Policy Slash Technical advisors & Fund Portfolio Managers *Probe:* Design and adjust the resource allocation model and formulate related policies.....	

2. What changes and improvements have been made to the 2020-2022 allocation model to compare with last cycle (2017-2019)? What problems were expected to be solved from the last cycle to the 2020-2022 cycle? Probe: Designing more rational distribution mechanism or incorporating new considerations	

3. Do you think the 2020-2022 allocation model is rational? Are these potential shortcomings that can be improved? Probe: Please indicate the evaluation perspective and evidence	
4. After conducing some analysis, we discovered discrepancies between expected and actual allocation in some countries. What can be the main reasons of this phenomenon? Probe: Income level? Actual disease burden? The money Global Fund received less than expected?	

Countries' financial needs: Now we are interested in whether the 2020-2022 allocation of the Global Fund meets countries need	
5. How did the Global Fund assess a country's financial need in 2020-2022? *Probe:* What metrics will you use for evaluation? What kind of data source would you use? ▪ Income level? ▪ Population size? ▪ Disease burden in some sub-groups? ▪ Health system quality?	
6. In the 2020-2022 allocation model, how did you consider the prevention need? How did you consider community-based delivery?	

7. Can you share with us some of your experiences with intervention work and the challenges you have faced? Probe： ▪ Free drugs for AIDS ▪ Universal health education ▪ Childhood BCG vaccination ▪ Mosquito nets for malaria prevention	

8. Because the countries in the 2020-2022 allocation are so different and diverse, how did you consider the specific need of each country? *Probe*: What do you base that on? Is there any evidence of that? What policies and regulations would you consider? How to avoid the potential adverse effects of countries whose actual allocations are lower than expected?	

<u>Efficient conversion of funds:</u> Now we are interested in understanding whether the absorption of funds allocated 2017-2019 cycle impact the allocation decision for 2020-2022 cycle

9. In the 2017-2019 allocation cycle, how did you access weather the countries effectively used the fund?	
10. In the 2020-2022 allocation cycle, what factors should be considered if some countries did not use the fund effectively? *Probe*: Why did the Global Fund still give them more money they couldn't use?	
11. Based on your understanding, how did 2020-2022 allocation cycle to improve the country effectively to use the fund? *Probe*: What are the major considerations during 20-20 allocation cycle to address the weak capacity in countries.	

PLANNING FOR THE FUTURE	
12. Would the resource allocation model, disease split and actual funding available to countries be different if the Global Fund had received enough funding from donors as expected? *Follow up:* ▪ What potential challenges will be addressed? ▪ Which disease will get the most attention with enough funding? ▪ What is the biggest impact of insufficient funding from donor countries on resource allocation in the new funding cycle?	
13. What have you learned from this 2020-2022 allocation cycle? How can what you learned help to improve the new allocation model or adjust the base-formula in the next allocation cycle?	

14. What are the strategies and considerations for the future allocation of Global Fund resources to end the three infectious diseases by 2030? Probe: ▪ How to maximize the financial support from the international community? ▪ What is the most efficient way to deploy work in a situation of insufficient funds?	
15. Because the objective environment is changing rapidly, how will collections if the relevant data for the disease burden pattern change? Probe: ▪ What are the fluctuations in the three disease burdens? ▪ Can allocation models respond positively to fluctuations?	

RECOMMENDATIONS	
16. In addition to financial support, what help does the Global Fund expect from the international community to fulfill its mission? Probe: ▪ Academic support? ▪ Policy support?	

Appendix B: Interview Guide 2 (For CCM, national program managers, in-country partners, and NGO representatives)

Preliminary Information	
Country	
Agency & Position	

CONTEXT: To begin, we are interested in your opinions on overall allocation process in 2020-2022	
1. What role did you play in the 2020-2022 allocation cycle? *Probe:* ▪ CCM, national program managers, in-country partners, and NGO representatives ▪ Which kind of disease? ▪ Which countries do you work for?	
2. What practical work has been done? *Probe:* ▪ Could you tell me briefly what you were doing at that time?	

3. Is the work you were responsible for being adequately funded? *Probe:* ▪ Where did the money come from? ▪ What is the percentage of funding provided by the Global Fund?	
4. How did you evaluate the Global Fund's grant process in 2020-2022? Probe: ▪ Did the distribution seem reasonable to the countries you worked for? ▪ Did the allocation take into account the specific problems of the country? ▪ Was the grant issued on time? Has there been any adverse impact of delayed funding?	
5. For future grant cycles, what aspects of the grant process do you expect to improve?	

Program Split: Now we are interested in your opinions and practices (what factors and how these factors were considered) for program split (namely translating allocation for HTM into grants for HTM and RSSH)

6. What do you think of the Global Fund's active investment in Resilient and Sustainable Systems for Health (RSSH)? Probe: ▪ What do you think is the connection between investing in RSSH and the control efforts of the three infectious diseases?	
7. What criteria do you think should be used to divest RSSH investment from HTM's grant? Probe: ▪ Please talk about your specific strategy for project split? ▪ How can ensure that RSSH is fully funded without affecting HTM works?	
8. Have you ever worked on a program split? Please share your experience Probe: ▪ What exactly did you do? ▪ What results have you achieved? ▪ Do you have any comments or opinions about the program split that you would like to share?	

9. What improvements would you like to make to future program split work? What do you expect to achieve with your investment in RSSH?	

PLANNING FOR THE FUTURE	
10. How would you like to see an individual or your organization work with the Global Fund in the future?	
11. Does the Global Fund provide more than just financial help to recipient countries? Probe: ▪ How can the Global Fund expand its reach? ▪ How does the Global Fund reflect its unique value?	
12. How are Global Fund grants effectively regulated and properly used within countries?	

CONCLUSION	
13. Is there anyone else you think we should talk with about these issues? *Specifically, ask about contacts in the programs that they leveraged (e.g., HIV, TB, or malaria programs)*	
Thank you so much for your time. If you have any questions, or would like to share more with us, please feel free to reach out to us (rs617@duke.edu, shreya_ramesh1@baylor.edu) or to Dr. Jinkou Zhao (jinkou.zhao@theglobalfund.org) from the Global Fund	
After Interview	
Key Takeaways	

Appendix C: Acronyms

HIV	Human Immunodeficiency Virus
EU	European Union
HSS	Health System Strengthening
RSSH	Resilient and Sustainable Systems for Health
TB	Tuberculosis
AME	Africa &Middle East
CRG	Community, Rights & Gender
PMRD	Programmatic Monitoring & Risk Division
LAC	Latin America and the Caribbean
CCM	Country Coordinating Mechanism
GHC	Global Health Campus
API	Application Programming Interface
EECA	Eastern Europe and Central Asia
MENA	Middle East and North African
MDR	Multidrug Resistance
NDR	Non Drug Resistant
GNI	Gross National Income
LFA	Local Fund Agent
PR	Principal Recipient
WHO	World Health Organization
UNAIDS	United Nations Programme on HIV/AIDS
CDC	Centers for Disease Control and Prevention

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