



# Value for Money of Donor-Funded Health Programs: The Case of HIV/AIDS Programming in Mozambique

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This doctoral thesis, Value for Money of Donor-Funded Health Programs: The Case of  
HIV/AIDS Programming in Mozambique, presented by Joseph Alan Corlis, and  
submitted to the Faculty of The Harvard T.H. Chan School of Public Health in partial  
fulfillment of the requirements for the Degree of Doctor of Public Health,  
has been read and approved by:




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Date: March 30, 2021



VALUE FOR MONEY OF DONOR-FUNDED HEALTH PROGRAMS: THE CASE OF  
HIV/AIDS PROGRAMMING IN MOZAMBIQUE

JOSEPH ALAN CORLIS

A Doctoral Thesis Submitted to the Faculty of  
The Harvard T.H. Chan School of Public Health  
in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Public Health

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Value for Money of Donor-Funded Health Programs: The Case of HIV/AIDS Programming  
in Mozambique

**ABSTRACT**

Value for money represents a critical component of development assistance for health programming in low- and middle-income countries. The costs that local individuals pay to access and use these programs seldom figure into calculations of value for money, however. Instead, donor organizations and host-country governments often prioritize their perspectives of value for money in the planning, implementation, and evaluation of health programs. This imbalance affects beneficiary participation, diminishing the health and economic benefits of donor-funded programs.

To understand how donor agencies, governments, and implementing organizations make decisions based on value for money, this project engaged in three arms of research: 14 semi-structured interviews; participant observation in the development of Mozambique's fifth National Strategic Plan for HIV/AIDS Response; and a cost-effectiveness analysis of six HIV treatment interventions in Mozambique. The first of these methods aimed to analyze the definition and use of value for money in donor-funded health programs worldwide while the latter two methods situated the HIV/AIDS response in Mozambique within the greater global context.

Based on this research, this project established six global themes: 1) value for money as a decision-making framework; 2) pressure on low- and middle-income countries to sustain programs; 3) limited temporal and technical scope of program evaluations; 4) current donor-funded initiatives to gather and analyze total economic costs of health activities; 5) limited

data on the economic cost of healthcare for strategic planning; and 6) the economic, political, and moral case for considering beneficiary perspectives of value for money in decision-making. This project also identified and contextualized four cost-effective interventions for HIV treatment in Mozambique from the healthcare payer (i.e., government and donor) perspective as well as one cost-saving and one cost-effective intervention from the beneficiary (or patient) perspective.

Given the widespread practice of considering value for money in decision-making, this project concluded with three recommendations for donor agencies, government bodies, and nongovernmental organizations in Mozambique and other low- and middle-income countries.

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## LIST OF ACRONYMS

3Es	economy, efficiency, and effectiveness
4Es	economy, efficiency, effectiveness, and equity
AIDS	acquired immunodeficiency syndrome
ART	antiretroviral therapy
ARV	antiretroviral drug
BCA	benefit-cost analysis
CEA	cost-effectiveness analysis
Covid-19	severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)
CNCS	Mozambique's National AIDS Council (Conselho Nacional de Combate ao SIDA)
DAH	development assistance for health
DALY	disability-adjusted life year
DCP3	Disease Control Priorities, 3 <sup>rd</sup> Edition
DFID	United Kingdom's Department for International Development
ECEA	extended cost-effectiveness analysis
FCDO	United Kingdom's Foreign, Commonwealth, and Development Office
HCD	human-centered design
HIV	human immunodeficiency virus
GHCC	Global Health Cost Consortium
Global Fund	Global Fund to Fight AIDS, Tuberculosis, and Malaria
Goals-ASM	Goals Age-Sex Model
ICER	incremental cost-effectiveness ratio
IMF	International Monetary Fund
LMIC	low- and middle-income country

LTFU	lost-to-follow-up
MCDA	multiple criteria decision analysis
NASA	National AIDS Spending Assessment
NGO	nongovernmental organization
OOP	out-of-pocket
PEN IV	Mozambique’s National Strategic Plan for HIV/AIDS Response, 2015-2019 (Plano Estratégico Nacional de Resposta ao HIV e SIDA, 2015-2019)
PEN V	Mozambique’s National Strategic Plan for HIV/AIDS Response, 2021-2025 (Plano Estratégico Nacional de Resposta ao HIV e SIDA, 2021-2025)
PEPFAR	United States President’s Emergency Plan for AIDS Relief
PESS	Mozambique’s Health Sector Strategic Plan for 2014-2019 (Plano Estratégico do Sector da Saúde, 2014-2019)
PLHIV	people living with HIV
QALY	quality-adjusted life year
SROI	social return on investment
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development
VMMC	voluntary medical male circumcision

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## CHAPTER 1: INTRODUCTION

Value for money is not a new term. Originating as a business concept, value for money relates to processes that enable companies or customers to “do more with the same resources and become more effective; ... do the same with fewer resources, thereby improving their efficiency; or... do less with far fewer resources” to economize [1, p. 3].

The World Bank first introduced the application of value for money to development assistance for health (DAH)<sup>1</sup> programming in its *World Development Report 1993: Investing in Health* as a means of prioritizing certain vertical health programs over more general horizontal investments in the health system [2 – 4]. The report posits a simple definition—“allocating resources so as to obtain the most improvement in health per public dollar”—and concedes that what constitutes an improvement will naturally vary by context [3, p. 53]. Since then, value for money of donor-funded interventions has frequently meant, with slight nuances, the level of health impact that bilateral and multilateral donor agencies can attribute to their funding [5, 6].

Strategic plans for health activities, which governments often develop with assistance from donors and the nongovernmental organizations (NGOs) that implement the programs, have doubled down on calculating and considering cost implications as donor agencies fund ever-larger investments in low- and middle-income countries (LMICs) [7, 8]. This trend is likely to continue as pressures to sustain DAH activities shift to local sources [9].

This doctoral project aimed to glimpse the myriad factors that influence and reflect value for money in the context of a single health area—one highly supported by donor agency funding—in a single country: Mozambique’s ongoing response to HIV/AIDS. This project,

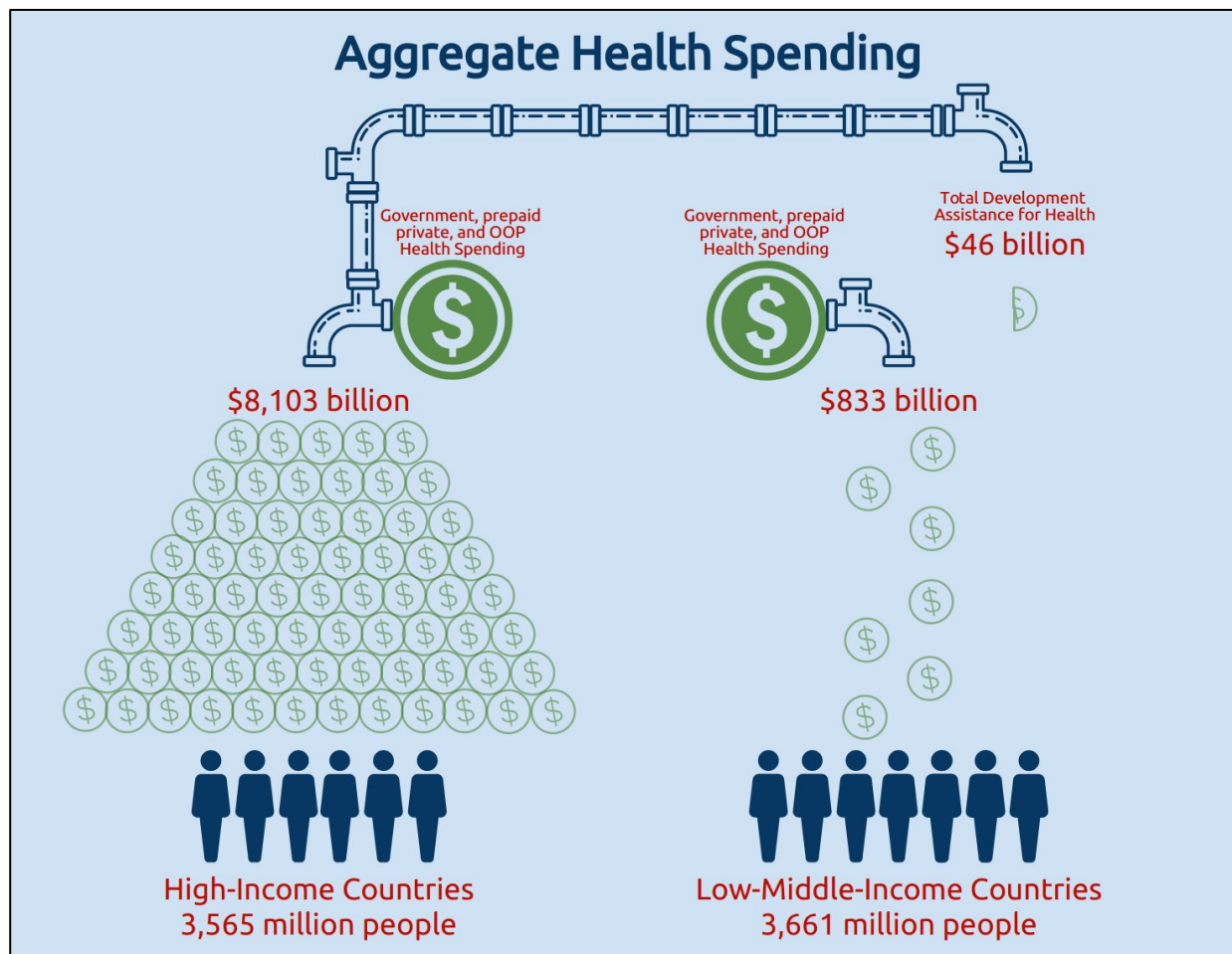
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<sup>1</sup> The field of development assistance for health seems to pride itself on producing acronyms. It is my experience that these abbreviations, meant to facilitate reading, often jumble together and render a text impenetrable. I have therefore limited my use of acronyms whenever possible.

therefore, investigated the process of identifying health strategies for a major epidemic, forecasting multi-year investments, and optimizing plans to create the most impact within a projected range of resources. The project also trialed the application of a widely used technical tool as a novel method for advancing beneficiary perspectives in strategic planning. The optimization process, coupled with this additional consideration of beneficiary perspectives, represented an effort to enable a positive (even if incremental) change in the application of value for money to DAH programming in one country—and potentially beyond.

The second chapter of this document—entitled Background, Literature Review, and Framework for Change—delves into the range of definitions and uses of value for money in

**Figure 1: Aggregate health spending by type and country income level in 2014.**



Source: [10].

the DAH context. From the history of DAH programs to the legacy of paternalism that continues to permeate decisions related to investments and cost in LMICs, the chapter introduces the imbalances in decision-making power wielded by, and financial investments made by, different stakeholders in the DAH process. For example, Figure 1 illustrates the relative expenditures on health that individuals, governments, and donor agencies make in high-income countries versus LMICs. Rather than scrutinize the differences between high-income and LMIC gross expenditures, however, this thesis probes the disparities between LMIC government and individual out-of-pocket expenditures on health (grouped together in Figure 1) and DAH investments coming from high-income countries. This is particularly important because out-of-pocket expenditures have doubled in LMICs between 2000 and 2017, and they account for the largest proportion of health spending in those countries [11].

Chapter 2 also presents varying definitions that different donor agencies presently use to describe value for money, methods for measuring and evaluating value for money in DAH programs, and the tradeoffs that decision-makers must weigh every time they design or select a new health strategy or program in order to maximize value for money. The chapter also examines value for money as a consideration in strategic planning. Finally, the chapter explores the specific context of Mozambique, the nature of this doctoral project, and the framework for change.

The third chapter of this thesis, Methods and Analysis, opens with a description of the project's aims: understanding how DAH stakeholders define and apply value for money; capturing best practices in accounting for beneficiary values and opportunity costs in DAH programs; and exhibiting a technique for analyzing beneficiary perspectives on value for money. The chapter then offers an explanation of the scientific methodologies that underpin the activities and results of this doctoral project, beginning with the procedure for conducting and analyzing semi-structured interviews of distinguished professionals who have



contributed to and actively spearhead DAH initiatives, including: current and former government officials, donor agency leaders and experts, and NGO directors and chiefs of party. An account of the participant-observer approach I took during this project, working as an international costing consultant for Mozambique's National Strategic Plan for HIV/AIDS Response, 2021-2025, follows the interview section. The chapter concludes with a description of the methods and inputs for a cost-effectiveness analysis of six possible modalities for HIV/AIDS treatment in Mozambique.

The fourth chapter of this doctoral thesis, Results and Discussion, details the findings of 14 interviews, nine months of participant observation, and the cost-effectiveness analysis. Interweaving the results of the interviews and participant observation through a thematic network analysis, this chapter categorizes the qualitative data into six global themes, which include: sustainability pressures, short-term cost-effectiveness at the expense of long-term progress, and the moral case for including beneficiary perspectives in economic evaluations.

The Results and Discussion chapter also reveals results and insights from the cost-effectiveness analysis, which juxtaposes the perspectives of healthcare payers (i.e., government and donors) and beneficiaries, in order to demonstrate the utility of such an analysis. Finally, the chapter examines the results and limitations of the Enabling Change component of this doctoral project.

The fifth chapter of this thesis, Conclusions, presents the final thoughts of the doctoral project, including three recommendations for future strategic planning in Mozambique and DAH initiatives worldwide.

The doctoral project, research, and collaboration reflected in these chapters culminated not only in a profound learning experience for me but also in a contribution to global public health practice. First, Mozambique's National Strategic Plan for HIV/AIDS Response, 2021-2025 frames, *inter alia*, the rationale for how and why the country's National

AIDS Council prioritized the effectiveness of the interventions over the economy of the five-year plan's investments. As well, this thesis links, perhaps for the first time, descriptions of value for money, inconsistencies in decision-making practices, and footholds for future action globally. Finally, this document presents a method for discovering additional information that can enrich future strategic planning without wholly redefining the process of DAH program design and selection.

Ultimately, my doctoral project attempted to maximize consideration of value for money in health programming so that people in Mozambique—and perhaps elsewhere—may live healthier, more productive lives.

## **CHAPTER 2: BACKGROUND, LITERATURE REVIEW, AND FRAMEWORK FOR CHANGE**

In 2018, the worldwide total of DAH expenditures topped \$38.9 billion [12]. These DAH investments represent only spending by major development agencies in high-income countries directed to LMICs. In total, in 2017, low-income countries<sup>2</sup> received 40% of all DAH contributions, while lower middle-income countries accepted 44%, and upper middle-income countries secured the remainder [11]. Yet, as substantial as \$38.9 billion in global DAH investments may be, out-of-pocket (OOP) spending on health surpasses all other types of health spending in LMICs [11, 12].

### **A brief history of development assistance for health**

The history of international development stretches back to the wars and colonialism of the 18<sup>th</sup> century when medicine was developed and distributed to protect European invaders and the local laborers extracting resources for colonial powers [13]. For example, Hubert Lyautey, a French colonial administrator in Asia and Africa, once declared in a speech that if one thing “ennobles [colonialism] and justifies it, it is the action of the doctor, understood as a mission and an apostleship” [14, p. 7]. He later praised doctors as “the most effective of [France’s] agents of penetration and pacification” [15, p. 297].

For the bulk of DAH history, major international donors—be they government representatives, philanthropic individuals or groups, religious bodies, multilateral organizations, or other entities—have designed and implemented public health initiatives with little-to-no input from local populations [16]. This is for several reasons: The donors are based in countries that enjoy historical power imbalances over the recipient populations; the

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<sup>2</sup> The World Bank calculates the income level of countries based on its World Bank Atlas method. For 2021, countries are categorized by gross national income per capita as follows: low-income: \$1,035 or less; lower middle-income: between \$1,036 and \$4,045; upper middle-income: between \$4,046 and \$12,535; and high-income: \$12,536 or more [17].

programs promise influxes of money; and the programs may provide desperately needed solutions to health problems that local populations cannot otherwise address [18, 19].

For example, in 1914, Wickliffe Rose of the Rockefeller Foundation's International Health Board began lobbying for the British colony of Ceylon (now Sri Lanka) to replicate successful hookworm treatment campaigns of the American South [20, 21]. Plantation owners, planters, and laborers in Sri Lanka all understood that the laborers had no interest in using expensive latrines and that neither the colonizers nor local communities would invest in health and sanitation improvements for the laborers. "Nevertheless, American money once again spoke volumes, and planters fell over themselves promising Rose their hearty cooperation," even though the latrines predictably went unused and the parasite persisted [20, p. 68]. By 1920, the four-year hookworm campaign had failed.

In the decades since Wickliffe Rose, other health interventions—including the crowning achievement of global health: the eradication of smallpox in 1980—have been designed by Western technocrats and "prioritized technological fixes over consideration of local context and broader infrastructure, and which at times compromised the agency of the populations targeted for intervention" [2, p. 69]. While current DAH programming has not entirely shed the legacy of paternalism that characterized the beginnings of international aid,<sup>3</sup> two critical changes have taken root over the last two decades which aim to both transform the dynamics between DAH organizations and local populations as well as increase the impact of donor dollars.

First, donors and implementing partners have made strides in including local insights

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<sup>3</sup> For further reading about the history of global health and DAH programming, refer to: "Accountability in International Development Aid" in *Ethics and International Affairs* 20, no. 1 (2006) by Leif Wenar; *Reimagining Global Health: An Introduction* by Paul Farmer, Jim Yong Kim, Arthur Kleinman, and Matthew Basilico; *Epidemic Illusions: On the Coloniality of Global Public Health* by Eugene T. Richardson; and "Modernization and Dependency: Alternative Perspectives in the Study of Latin American Underdevelopment" in *Comparative Politics* 10, no. 4 (1978) by J. Samuel Valenzuela and Arturo Valenzuela.

in the design of health programs [2]. Human-centered design (HCD), for example, has emerged as an approach that many NGOs use to gather insights about how, when, and where local communities would prefer DAH activities to take place [22, 23].

Second, donor agencies, host-country governments, universities, and implementing organizations have augmented their efforts to ensure that DAH investments yield the results that they were designed to realize [16, 24, 25]. In spite of the socialized notion that money for DAH programming faces perpetual scarcity, donor investments have increased dramatically over the last quarter century [26]. By 2018, the United States, United Kingdom, and Bill & Melinda Gates Foundation stood as the three largest DAH contributors, investing some \$13.2 billion, \$3.3 billion, and \$3.2 billion, respectively, in health programs around the world [12]. These investments represent roughly half of all DAH spending worldwide.

Years of experience have shown that a myriad of factors can limit the impact of DAH contributions on local communities: government instability; corruption; DAH substitution for local government investments in health; poorly designed health programs; and a lack of coordination between donors and the organizations that implement the health programs [27, 28]. What is more, debate has raged regarding how best to measure and prioritize the results of DAH programming [29]. In this push to increase financial accountability and maximize planned health outcomes, many international donors have adopted value for money as their guiding star—both in assessing the success of health activities around the world and in bolstering public confidence in that success [6, 28, 30, 31].

These dual shifts do not yet operate in concert, however. Considerations of *values* in DAH programming—the extent to which various stakeholders share goals, priorities, thresholds of acceptability, preferences for how activities are conducted, etc.—may be accounted for in technical activities but not in calculating the costs of those activities and therefore not in assessing value for money.

## **Which values? Whose money?**

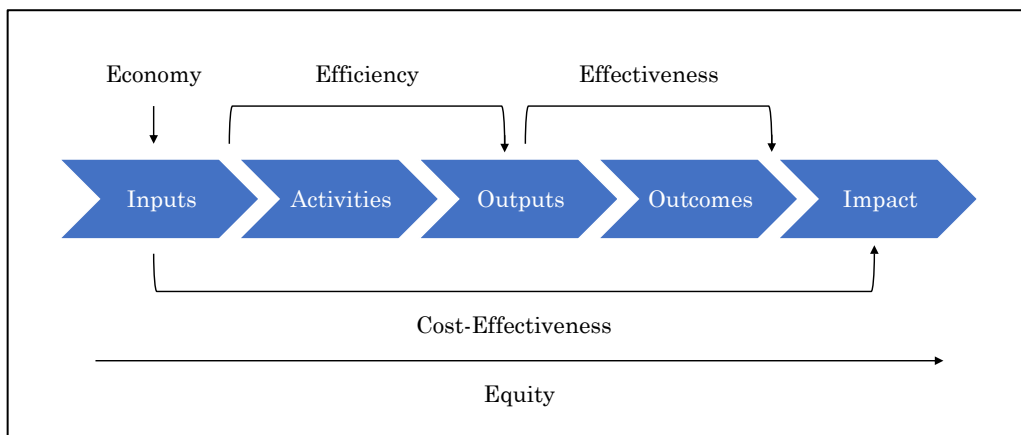
Perhaps the best way to begin the study of value for money in DAH programming is to ask some basic questions, such as: *Who gets to define value? Whose money are we counting? How do we define and measure value for money?* For, within these questions lie the inconsistencies of current value for money practices in global health.

The UK's Department for International Development (DFID)—precursor to the newly established Foreign, Commonwealth, and Development Office (FCDO)—defined value for money as “maximi[z]ing the impact of each pound spent to improve poor people’s lives,” which DFID added “is a process of continuous improvement” [30, p. 2]. Similarly, the Bill & Melinda Gates Foundation aims to improve the effectiveness of development aid by “work[ing] with donors and other development partners ... to modernize development aid systems, unlock more funding, and get more value from each aid dollar spent” [32, para. 6]. The Global Fund to Fight AIDS, Tuberculosis, and Malaria (the Global Fund) explains that value for money “is a concept that defines how to maximize and sustain equitable and quality outputs, outcomes or impact for a given level of resources,” adding that “[value for money] entails understanding the cost-effectiveness of different investment options, as well as associated equity and sustainability implications to make sound investment decisions” [33, p. 7]. Meanwhile, the World Bank declares, “For every investment project, Bank staff conduct economic analysis to determine whether the project creates more net benefits to the economy than other mutually exclusive options for the use of the resources in question” [34, p. 55].

Most definitions posit that four components determine value for money: economy, efficiency, effectiveness, and cost-effectiveness [6, 30, 35]. Simply put, economy accounts for any spending on inputs and activities of a program, efficiency relates to the outputs of a program for each given input, effectiveness measures the extent to which a program yields desired results, and cost-effectiveness accounts for how many results a program achieves for

every unit of cost spent. Donors like FCDO and the United Nations Development Programme often refer to economy, efficiency, and effectiveness collectively as the 3Es, with equity increasingly added as a fourth E (illustrated in Figure 2 below) [35 – 38].

**Figure 2: DFID’s 4Es + CE framework for value for money as a logic model.**



Source: [39].

The Global Fund omits cost-effectiveness from its model—classifying it as just one aspect of effectiveness—but adds sustainability alongside equity as a cross-cutting component of the model, thereby creating a 4Es + S framework [40].

While value for money depends on what goes into a program and what comes out—no matter the model—it is also more. The health strategy which appears cheapest or easiest to measure may not represent the best value for money, for example. As Podger states, value for money “is inherently political, reflecting subjective judgments about the scope and role of government, priorities in allocating scarce resources and optimi[z]ing impacts among competing policy objectives” [41, p. 367]. Donors often point out the inherent tradeoffs involved in operationalizing value for money considerations. Because of limited budgets and capacity, each health strategy and program should define how stakeholders prioritize the following: one program component versus another, efficiency versus equity, large

investments for impact versus financially sustainable sums that can be scaled in the future, and controlling a health threat(s) versus eliminating it [40]. So, given its myriad dimensions, how do health decision-makers evaluate value for money?

### Capturing value for money

While no standardized way to account for the 4Es of value for money exists, two approaches have emerged as the most common: the cost-effectiveness analysis (CEA) and the benefit-cost analysis (BCA) [6, 24, 33, 42 – 44]. According to the US Centers for Disease Control and Prevention, a CEA “compares [one] intervention to another intervention (or the status quo) by estimating how much it costs to gain a unit of a health outcome, like a life year gained or a death prevented” [45, para. 1]. CEA studies always compare two or more interventions—even if one intervention simply means doing nothing. BCA studies, on the other hand, do not require a comparator intervention, since the analysis “compares the expected costs and benefits (both in monetary terms) of an investment” [46, p. 2]. Neither the CEA nor the BCA offers a complete account of all 4Es, cost-effectiveness, or sustainability, however. For example, the theoretical underpinnings of the analyses result in fungible measures of effectiveness, meaning that one life saved is interchangeable with another regardless of equity considerations (i.e., an analysis could demonstrate that an intervention averts HIV infections the greatest number of people without revealing sociodemographic characteristics of which individuals would enjoy fewer infections, which may matter to decision-makers) [47].

Despite these limitations, CEAs and BCAs remain popular. Although donors like the World Bank and the Joint United Nations Programme on HIV/AIDS (UNAIDS) frequently fund CEA and BCA studies, a review of 204 economic evaluations published between 2000 and 2013 determined that CEAs constituted 99% of the papers [48]. Two critical issues arise



with the current use of economic evaluations in decision-making, however. First, value for money analyses conducted for and by major donors rarely apply CEA and BCA techniques correctly; for example, an investigation of World Bank assessments of development assistance found that only one of the 24 CEA studies used to justify funding health programs in 2008 “offers what appears to be a real cost-effectiveness analysis” [34, p. 15]. Second, and perhaps more critically, these same CEA and BCA studies that legitimize the value for money rationale for DAH programs exclude or minimize the perspectives of the local populations, even as beneficiary perspectives figure more centrally in the technical design, implementation, and evaluation of each health program [49 – 53]. Below, Table 1 explains the cost considerations of commonly analyzed perspectives in economic evaluations.

Most CEAs and BCAs of internationally funded health programs restrict their analysis to healthcare payer costs—meaning the donor and host country government costs to provide health services and products without including OOP expenses or time costs that individuals must pay to access and use those health services [52 – 55]. Even studies that purport to adopt a societal perspective still often exclude costs like patient travel time and lost wages [44, 51, 56, 57]. Research demonstrates that these patient costs in particular affect whether would-be beneficiaries participate in programs, a key factor in effectiveness [58].

**Table 1: Perspectives commonly used in economic evaluations.**

<i>Perspective</i>	<i>Cost considerations</i>
Societal	All monetary and opportunity costs that the health system, donors, communities, beneficiaries, and non-health sectors bear (e.g., impact of an intervention on educational achievement, production of toxic waste by an intervention)
Healthcare sector	Monetary costs related to the intervention being studied, including OOP expenditures, regardless of who pays
Healthcare payer	Monetary costs (e.g., HIV treatment, condom purchases) paid by a (typically) third-party payer (e.g., PEPFAR, insurance company)
Beneficiary or patient	All monetary and opportunity costs (e.g., missed work, time in transit) that an individual bears in order to access, receive, and recover from an intervention

*Sources:* [59, 60].

Even when these costs are small relative to the donor or government costs typically included in a value for money analysis, beneficiary costs remain critical because they can be large from the perspective of the people who have to pay them [61]. That is, \$10 certainly matters more to a farmer in Ethiopia than it does to PEPFAR.

For the United States Agency for International Development (USAID) and multiple other DAH donors, the process by which would-be implementing organizations bid for upcoming projects through open announcements and competing proposals has been the keystone to capturing value for money. After “encourag[ing] competitors to develop and institute innovative and cost-effective methods of performing the work,” USAID selects an implementing organization from among the alternative visions of value for money [62, p. 95]. While this method fails to guarantee any rigor in determining cost-effective methods for performance and does not require that the organization is selected based on innovation, quality, or value for money, the process does allow organizations to champion local perspectives and demonstrate how those perspectives complement the donor’s.

In 2010, however, USAID expanded its interest in the cost-effectiveness of its programming [63, 64]. While CEA studies remain quite uncommon for USAID, the agency began cash benchmarking<sup>4</sup> as an alternative to conducting CEAs and BCAs in order to weigh how well the agency’s programs address specific development issues in terms of the 3Es and cost-effectiveness [65]. According to Rose and Glassman,

If the proposed program is likely to achieve less development impact than an equivalent amount of cash, this should prompt staff to rethink the design or pursue a different type of assistance—maybe even, in some cases, a cash transfer itself. [63, p. 4]

A 2020 study of a USAID-funded workforce training program in Rwanda, for example, found

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<sup>4</sup> Cash benchmarking compares the monetized benefits (in health, social welfare, etc.) of a proposed program to the benefit that a comparably sized cash transfer would generate. This comparison is similar to how a BCA calculates cost-benefit.

that even though the program improved several core measures—including productive work hours, personal savings, and subjective well-being—cash transfers costing the donor the same amount likewise improved those measures; unlike the training program, however, cash transfers also increased the consumption, income, and wealth of program participants [66].

Cash benchmarking nevertheless suffers from several drawbacks. While cash benchmarking accounts for the use of donor dollars, it lacks an applicability to large-scale public infrastructure investments for programs that require large overhead and indirect costs [63]. Cash benchmarking can incorporate household debt, savings acquired, personal assets, and individual health effects for program participants, but the benchmarking still seems to fall short of accounting for the OOP expenditures that an individual or family must bear in order to access and use donor health programs [65]. Furthermore, cash benchmarking can suffer from the same flaws as CEAs and BCAs if the measures of value—e.g., hours worked, household debt—are not the costs that the population cares about (or cares about most). Still, donors such as USAID and GiveDirectly are pushing for cash benchmarking to force DAH implementing organizations to prove that they can do more with a donor dollar for a local population than that population can do for itself.

#### Using value for money in strategic planning and health program design

In 2013, an NGO implementing a USAID-funded HIV prevention project in Zimbabwe surveyed 1,165 males (aged 15-49 years old) [67]. Sixty percent of the survey respondents reported a willingness to undergo voluntary medical male circumcision (VMMC), yet only 11% of eligible males in that age group ultimately went through with the VMMC as part of the project's implementation [68]. By using HCD approaches such as journey mapping; empathy, insights, and prototyping; and market segmentation, the NGO redesigned the donor-funded VMMC program in 2016 to account for patient fears of lowered sexual

desirability, lost wages, and pain (see Figure 3) [69]. By 2018, the project’s intention-to-action conversion rate—an indicator of beneficiary demand—for undergoing VMMC increased to 78% of the possible participants [68]. This program stands as just one example illustrating the dampening effect that limited

**Figure 3: Advertisement for VMMC in Zimbabwe based on HCD.**



Source: [68].

beneficiary participation during program planning can have on participation (even when an intention to participate exists) as well as the catalytic effect that addressing stakeholder values during program planning can have on participation.

Because of this dampening effect, many researchers and donor agencies advise host-country governments and NGO partners to include representatives of beneficiary populations in any strategic and operational planning for health programs [70]. Governments often shoulder the responsibility of coordinating the overall planning for their countries. In its 2011 *Countdown to Zero* report, UNAIDS calls on national ministries of health to:

[T]ake the lead in all processes of priority setting, strategic planning, performance monitoring, and progress tracking, in close collaboration with other critical stakeholders, including networks of women living with HIV, civil society, private sector, bilateral and international organizations. [71, p. 8]

The World Health Organization’s support for LMICs responding to Covid-19 cites the host country’s responsibility of coordinating all internal health services and financial management [72]. Thus, the impetus for host-country governments to direct the health

responses within their borders has shifted somewhat away from the designs of Wickliffe Rose, even if the DAH paradigm continues to rely on historical patterns of inequity that donor-funded programs reinforce while purporting to address them [5, 73].

There is also great pressure for national governments to conduct costings of their national plans [71, 74, 75]. Such costings, however, have become ritualistic, typically relating to donor and host-country government resources only and mostly occurring as *ex-post* exercises that neither inform strategy selection nor serve to cap expected expenditures [76]. And so, common critiques of modern strategic plans include: “inaccurate cost estimation and budgeting, and poor tracking of the contribution of the private sector” [77, p. 8]. In fact, just like the VMMC example above, national strategic plans are rarely designed to account for economic impacts other than for the donor (i.e., excluding costs related to public-private partnerships, individual OOP expenses, lost wages, and volunteer hours of community workers) and often are costed in a way that “leav[es] tradeoffs between the desires of different stakeholders to the future or to negotiations over budget allocations,” thereby undermining the purpose of strategic planning and considerations of value for money altogether [76, p. 16].

Universities, consulting firms, and donor agencies have collaborated to develop more than 20 costing tools and step-by-step costing guides for countries that receive DAH funding to inform strategic planning and maximize the allocative efficiency of health programs [33, 78 – 80]. The World Bank, for example, developed the AIDS Strategy and Action Plan Costing Tool, which relies on Microsoft Excel-based spreadsheets and incorporates the cost classifications that a National AIDS Spending Assessment (NASA) uses, as a resource that is compatible to other DAH financial tools [81]. For years, Avenir Health has collaborated with a consortium of health finance experts representing the World Health Organization, UN agencies, and other international bodies to create the suite of Spectrum products, which stands as another example of costing tools. Spectrum’s various models—the Resource Needs

Model, Goals Model, Tuberculosis Impact Model and Estimates, and Malaria Model—are all programs with specific costing functions to estimate the costs for disease care and treatment, disease prevention, and policy and program support [82]. In theory, the unit cost estimates that decision-makers enter into these Spectrum models could account for beneficiary costs, either alone or in addition to other stakeholder costs [4]. In practice, however, research studies and strategic plans based on Spectrum files for LMICs frequently model the economic impact of programs using a healthcare payer or sector perspective (while still excluding OOP costs) [83, 84]. The OneHealth Tool is a separate Avenir Health resource for assessing the financial needs of the entire health sector (i.e., all health areas and cross-cutting systems), which more than 25 LMICs have used to cost strategic plans [85 – 87]. None of the 13 example strategic plans listed on the OneHealth Tool’s website includes health costs other than healthcare payer costs, however [88].

Instead of including OOP costs in strategic plans, donors, NGOs and LMIC governments typically rely on ad hoc household expenditure surveys and extended cost-effectiveness analysis (ECEA) studies to determine potential economic shocks and benefits for beneficiaries [89, 90].

ECEAs have emerged as valuable tools in strategic planning because they investigate distributional health impacts, financial risk protections for the population (in segments and as a whole), and health expenditures due to downstream health effects [91]. Armed with this crucial information, health decision-makers stand better equipped to protect the population against catastrophic losses in welfare from interlinked threats: diseases, downstream health problems resulting from untreated disease, OOP expenditures, and impoverishment. Nevertheless, an ECEA does not offer decision-makers an answer to the question: *Will people participate?* Nor does an ECEA facilitate a comparison or reconciliation of different stakeholders’ experiences or preferences. These limitations detract from an ECEA’s ability to

predict an intervention's efficiency or effectiveness. After all, people do not need to suffer catastrophic financial shocks in order to find OOP costs exorbitant or to simply be unwilling to pay to access and participate in a health intervention [92].

Assessments of value for money that are made based on incomplete considerations of each stakeholder's values, money, and context occur frequently and can exacerbate aspects of paternalism in the DAH paradigm [54, 93, 94]. Even if LMICs spearhead decisions in DAH program planning, basing strategic plans off of incomplete assessments of stakeholder values and money means that beneficiaries must likely pay to use suboptimal programs, which do not align with their preferences [30, 95, 96].

#### What are local populations already doing for themselves?

Although some vertical health programs (e.g., HIV/AIDS) receive sufficient donor investments to eliminate user fees at healthcare facilities, OOP expenditures represent the largest proportion of overall healthcare spending in low- and lower-middle-income countries—at 42.4% and 56.1%, respectively, in 2016 [12]. For every \$10 a low-income country government spends on health services, products, and programs, international donors spend \$12 while the average person in that country spends \$18—almost double the host-country government's expenditure [11]. Local perspectives, therefore, should factor heavily into DAH decision-making not only for ethical reasons but also for economic ones [97]. That this is not the case typifies the power imbalance that local individuals and communities face as participants in their own health systems [5].

Scores of surveys, interviews, and case studies in diverse locations have revealed that people consistently value feeling heard, involved in decision-making, and economically empowered by health programs [98 – 100]. In fact, community participation in program design and selection improves health status, which is critical given that the World Bank and

others note that value for money does not equate to mere satisfaction with a given program [34, 43, 101]. Instead, value for money requires generating public value via social outcomes to which various stakeholders have guided decision-making and attributed value [102].

Sometimes those social outcomes include minimizing stigma, improving psychological safety, and decreasing an environmental burden. Given the difficulty of quantifying such issues in dollar values, researchers and implementers have developed alternative forms of assessing value for money such as the social return on investment (SROI) analysis,<sup>5</sup> which uses a so-called “triple bottom line” to weigh the social, economic, and environmental impacts of an intervention while consolidating the perspectives of multiple stakeholders in a single monetary value [103]. Despite its capabilities, donors, researchers, and implementers rarely conduct SROI analyses, especially outside of the UK [103, 104]. Other researchers have suggested that multiple criteria decision analysis (MCDA)<sup>6</sup> may offer the best framework for considering cost-effectiveness, equity, and local constraints [105 – 107].

Still, it is already possible to conduct CEAs that account for patient perspectives. The Second Panel on Cost-Effectiveness in Health and Medicine recommends modeling beneficiary or health system perspectives alongside a more encompassing societal perspective so as to contextualize the CEA perspectives [56]. As noted above, however, this seldom occurs; instead, researchers of programs in LMICs typically conduct CEAs using payer or donor costs and little else [44]. Given that conducting a societal perspective can become onerous because of input requirements, isn't adding the analysis of a beneficiary perspective alongside the

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<sup>5</sup> For further information on SROI, refer to “Social return on investment” by M. Salverda available online at [betterevaluation.org/approach/SROI](http://betterevaluation.org/approach/SROI) and “Social Return on Investment (SROI): Problems, solutions ... and is SROI a good investment?” in *Evaluation and Program Planning* 64 (2017) by Brian T. Yates and Mita Marra.

<sup>6</sup> For further reading regarding MCDA, refer to “Multicriteria decision analysis (MCDA) in health care: a systematic review of the main characteristics and methodological steps” in *BMC Medical Informatics and Decision Making* 18 (2018) by Talita D.C. Frazão, et al.; and “MCDA from a health economics perspective: opportunities and pitfalls of extending economic evaluation to incorporate broader outcomes” in *Cost Effectiveness and Resource Allocation* 16, supplement 1 (2018) by Mark Jit.



donor perspective a relatively easy step in the right direction? After all, the purpose of a CEA is to aid decision-making and the Second Panel recognizes that analysts should avoid overburdening themselves with societal and healthcare sector reference cases “when an element of the analysis is unlikely to have an appreciable effect on the result” [108, p. 15].

A side-by-side comparison of healthcare payer and beneficiary perspectives could improve decision-making because beneficiaries are the most commonly excluded group from the decision-making process [59]. Strategic planners might merge the two perspectives into an additional perspective (e.g., healthcare sector, limited societal) that includes OOP expenditures, time costs of volunteer community health workers, etc., for analysis, but such merged perspectives may underestimate the impact that beneficiary costs have on beneficiaries because of the scale of overall healthcare sector costs [60, 107]. Rather, a side-by-side comparison of the beneficiary and donor perspectives would throw into relief how any proposed interventions might impact the average participant and the donor respectively in terms of health benefits and costs accrued in ways that ECEA, SROI, and MCDA cannot.

### **Framework for change**

While people around the globe have inherent health needs and DAH programs can serve those needs, the focus solely on donor costs in DAH program design and national strategic plans perpetuates a power imbalance that hinders true collaboration between donors, host-country governments, and the people they serve [2, 5, 109]. The trend of recognizing local populations as priority stakeholders in donor-funded health interventions can extend to considerations of costs, too.

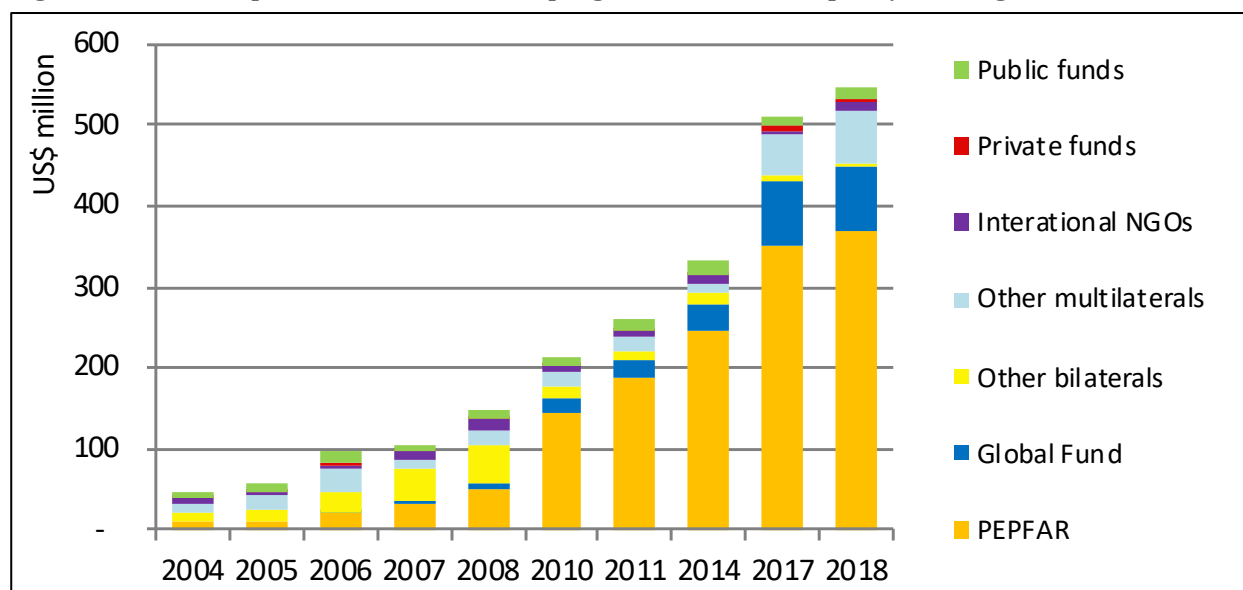
### Mozambique: a microcosm of DAH history and practice

Mozambique has borne and participated in global health’s evolution over centuries.

For nearly half a millennium—from the construction of its fortress in Sofala in 1505 until the outbreak of World War I—Portugal trafficked native inhabitants of Mozambique, ultimately enslaving an estimated 2 million Mozambicans [110 – 112]. Today, anyone over the age of 50 in Mozambique remembers the country’s 10-year war to free itself from colonial rule [113]. During Mozambique’s 15-year-long civil war, which followed independence in 1975, the country accepted loans from the World Bank and International Monetary Fund (IMF) with structural adjustment stipulations [111, 114].

When the HIV epidemic erupted in southern Africa in the late 1980s, restrictive policies and caps on state health investments had already curtailed the response that Mozambique’s skeleton public health system could muster [115]. While international donors quadrupled aid to the health sector between 2005 and 2010 (see Figure 4), some 64,000 people died of HIV-related causes in Mozambique in 2010 alone [116]. With no clear sense of irony, the World Bank’s 2017 Country Partnership Framework cites Mozambique’s weak governance of public sector institutions as a cross-cutting limitation for economic growth and

**Figure 4: Annual expenditure on HIV/AIDS programs in Mozambique by funding source.**



Source: [117].

social stability [118].

By 2018, annual HIV-related spending in the country topped \$545 million [117]. To mobilize such sums, the country leveraged substantial international contributions; donors funded 97% of the HIV budget in 2018, with PEPFAR and the Global Fund providing 82% combined [117]. And the investments have generated an impact: Deaths from AIDS and related coinfections dropped 16% from 2010 to 2018 [116]. However, only 34% of international aid investments are channeled through Mozambique's national budget; that is, international organizations receive 66% of donor dollars directly with no host-country oversight of money flow or use, complicating efforts for national planning, accountability, and coordination [115, 118, 119].

Also in 2018, Mozambique's public debts to entities outside the country exceeded \$13 billion as the country's total debt stock accounted for 110% of total GDP [120]. The country continued paying toward these debts even though the World Bank, IMF, and foreign governments (e.g., the UK) had suspended all aid in 2016 because of a scandal involving \$2 billion in illegal loans financed by Credit Suisse and Russian bank VTB [121 – 124].

In 2020, Mozambique had the second-highest number of people living with HIV (PLHIV) in the world—ahead of countries with significantly larger populations, including India and Nigeria—behind only South Africa [125]. The percentage of PLHIV who knew their status reached 75% in 2020, with 72% of people who knew their seropositive status on antiretroviral therapy (ART) and 81% of individuals on ART having suppressed their viral loads [126]. That same year, the United Nations ranked Mozambique 180 out of 189 countries on its Human Development Index [127]. In this context, the Government of Mozambique and donors active in the country are seeking clearer ways to maximize the allocative efficiency of HIV/AIDS programs.

### Doctoral project description

Every five years, Mozambique’s National AIDS Council (called CNCS) drafts and approves a national strategy for HIV/AIDS programming. This strategic plan and its corresponding cost projections serve as the basis for all HIV-related activities in the country, including international collaborations with PEPFAR, the Global Fund, and other DAH donors. Among other things, this document forms the foundation for Mozambique’s conversations with DAH donors and implementing partners regarding the country’s needs and expectations for HIV-related products and services. The previous version of this strategy was the National Strategic Plan for HIV/AIDS Response, 2015-2019 (called PEN IV). As the PEN IV expired, the CNCS began crafting the next edition—the National Strategic Plan for HIV/AIDS Response, 2021-2025 (called PEN V).

In June 2020, the CNCS—in tandem with UNAIDS and other members of the country’s Multisectoral Technical Working Group—selected a team from Harvard University as the international costing consultant for the creation of the PEN V. As the only member of the Harvard team who speaks Portuguese, I led the day-to-day activities of this work and served as the point-of-contact for collaboration with the greater PEN V team. A key aspect of this consultancy involved capacity building, and so the CNCS partnered the Harvard team with a local costing consultant in order to develop several key deliverables for the PEN V: a budget, a financial gap analysis, and a prioritization plan for the myriad interventions.

### The enabling change framework

Mozambique’s HIV/AIDS programs are almost exclusively donor-funded, and the previous plan, the PEN IV, was the first plan presenting a complete budget for all proposed technical areas [128]. For the PEN V, the CNCS and its partners requested a clear optimization of all programming based on cost-effectiveness. No comprehensive list of unit

**Table 2: Distinguishing technical problems and adaptive challenges.**

<i>Kind of challenge</i>	<i>Problem definition</i>	<i>Solution</i>	<i>Locus of work</i>
Technical	Clear	Clear	Authority
Technical + adaptive	Clear	Requires learning	Authority and stakeholders
Adaptive	Requires learning	Requires learning	Stakeholders

*Source:* [129].

costs for HIV-related products and services existed in the country, however. What is more, the potential funding scenarios required economic modeling and alignment of the modeled projections with the PEN V's monitoring and evaluation plan.

Beyond this use of economic evaluations to inform strategic planning, the lack of consideration of beneficiary perspectives on value for money in DAH programming constitutes an adaptive challenge for the country, and the DAH universe more generally. This disregard represents a gap between the values that DAH donors, implementers, and host-country governments purport to hold (i.e., benefitting local individuals and communities is the crux of DAH programming) and the reality that exists (i.e., praxis often excludes consideration of how programs impact local populations financially) [129].

This doctoral project, therefore, aims to introduce and use technical tools for evaluating the value for money of PEN V interventions in the costing process as well as to pilot the inclusion of beneficiary perspectives of value for money in strategic planning for DAH funding. The proof of concept for considering beneficiary perspectives in Mozambique's HIV/AIDS programming appertains to the use of one or more technical tools to facilitate stakeholder learning and provide footholds for addressing adaptive challenges anent value for money in the future (see Table 2 above).

### CHAPTER 3: METHODS AND ANALYSES

Given the messy history of donor-funded interventions as well as the current inconsistencies in the consideration of value for money in DAH programming, I devised this project to gather and apply best practices related to value for money in DAH programs and national strategic planning. Specifically, I designed this project to address the following aims:

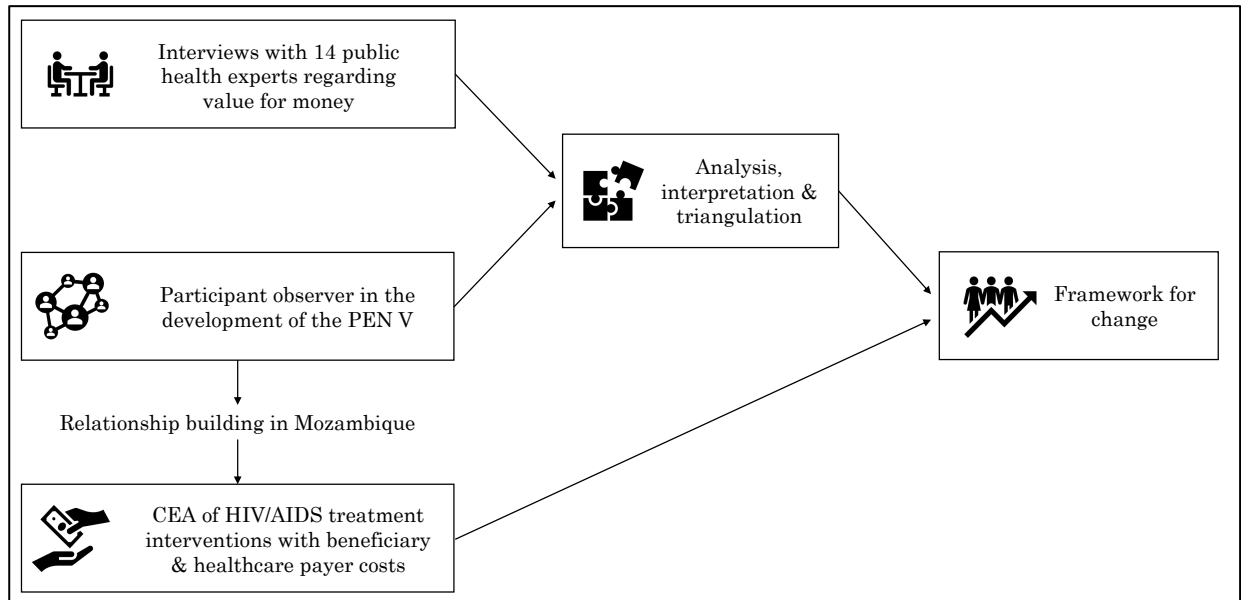
- Aim 1. Examine how governments, donors, and implementing organizations conceive of, calculate, and prioritize value for money of health programs in a global context;
- Aim 2. Identify best practices in accounting for individual values and opportunity costs in health programs; and
- Aim 3. Provide a proof of concept for analyzing diverse perspectives on value for money in planning of health programming in order to guide future decisions relating to the design and selection of donor-funded health programs.

To satisfy these aims, this project combines multiple phases of research and technical assistance. Between June 2020 and March 2021, I collaborated with Mozambique’s CNCS, UNAIDS, and other consultants to conduct the costing for the PEN V, which served as an opportunity to engage as a participant-observer, learning firsthand how the government and its technical working groups sought to program its HIV/AIDS response as well as contributing directly to the strategic planning of that response. Additionally, during those nine months, I interviewed 14 global health experts working around the world and I completed a CEA of HIV/AIDS treatment programs in Mozambique with collaborators.

The workstreams of these methods (illustrated in Figure 5) align to impact the aforementioned adaptive challenge by providing stakeholders in the DAH program design process with technical tools—e.g., a list of unit costs for costing a suite of HIV-related interventions, a CEA study that includes beneficiary perspectives—that can expose gaps in

the information considered, aggregate known information, and analyze expected outcomes to inform the strategic and operational planning processes. This increase in information exemplifies the learning that adaptive solutions require on the part of all stakeholders vis-à-vis differing priorities for technical intervention areas (e.g., HIV versus non-communicable diseases), intervention modalities (e.g., in-patient versus community-based delivery of medication), and targets for those interventions.

**Figure 5: Diagram of this doctoral project’s methods and their impact on the framework for change.**



### **Project hypothesis, base assumptions, and research limitations**

Simply put, this thesis hypothesizes that limited stakeholder participation in the design or selection of DAH programs hampers value for money. This study therefore examines the appetite among global DAH participants and Mozambique’s PEN V contributors for the inclusion of beneficiaries in the program design and selection process. As Rose and Glassman note, “USAID staff are encouraged to ‘seek out and respond to the

priorities and perspectives of local stakeholders,' including beneficiaries" [63, p. 9]. This study explores the current practices that governments and donors use to capture and contemplate those priorities and perspectives in order to arrive at recommendations for how best to include and represent the diverse costs and impacts of health programs. After all, the success of donor-funded health programs hinges on decisions that both donors and beneficiaries make. For instance, the end-user's choice to use or not use a program—to bear the burden of going to and participating in a program because of its perceived benefit—rests on the demand-side acceptability of that program.

But why does this matter? Surely, if individuals could design health programs worth billions of dollars annually, people would simply opt to have personal doctors accompany them at all times to prevent and respond to health threats because of moral hazard, right? Possibly [130 – 132]. But local communities do not get to make all the decisions in health program design—especially not for how philanthropies and donor agencies based half the world away distribute their financial resources. Accounting for beneficiary perspectives in program design, after all, is not the same as cutting out all other perspectives.

The motivation for this study was thus never to ascertain how beneficiaries would most like to spend donor's money. Instead, the project seeks to determine: 1) How host-country governments include economic evaluations in the priority setting process, and 2) How governments, donors, and implementing partners can integrate the analysis of local beneficiary perspectives regarding health program costs and value for money into the design and prioritization processes of future donor-funded health programs.

#### Some topics that this study does not investigate and some base assumptions

While numerous religious groups, for-profit companies, school organizations, and other associations no doubt implement donor-funded health programs across the globe, this



doctoral thesis narrows its consideration of implementing partners to international governments and NGOs alone. This decision stems largely from the station that host-country governments and NGOs enjoy—as representatives of the local populations tasked with making decisions to maintain or improve the health of the People and as the largest proportion of DAH program implementers for US donor agencies, respectively [133]. Furthermore, my previous professional experience has included several years working with the US Government and various major public health NGOs operating internationally.

Additionally, this entire study rests on the assumption that donors, governments, implementing organizations, and communities want DAH programs to succeed at generating the greatest health benefit possible [25, 134, 135]. What counts as a health benefit is based on the stated objectives of a donor agency, local government, and community for a program rather than on the undisclosed—and even unconscious—reasons that surely underlie many health funding decisions [136]. After all, DAH funding to combat HIV/AIDS, for example, has no association with national prevalence of the disease or recipient-country income level (with the exception of the Global Fund, whose funding determination shifted in the early 2010s from a performance-based model to application-based allotments to align each recipient country’s funding levels with the country’s disease burden) [137, 138]. HIV-related programs the world over, however, consistently champion as most successful those interventions that prevent new infections or that keep people living with the virus healthy.

The assumption that programs calculate success based on generating health benefits (i.e., effectiveness) nonetheless impacts this study since analyses of value for money, such as CEAs, commonly suffer from people wanting to present the lowest cost and greatest effect possible, usually because of vested interests—be they donors wanting to show taxpayers that small sums are solving big problems or NGOs wanting to present themselves as the cost-effective implementing partner when vying for further funding from donors [11, 93]. Each

phase of this project involved discussions about which costs are and ought to be counted or disregarded.

Notably, behavioral economics offers several explanations for why people may claim to value one thing yet choose another [139]. No doubt this holds true for preferences and values revealed via community participation in health program design and selection as well. When assessing the value for money of DAH programming, this doctoral thesis does not delve into ways that people fail to maximize their own self-interests.

This project, therefore, comprises three phases of work in order to enable change: interviews, participant observation, and decision science. The interviews situate the topics of this doctoral project within a greater history and context, while the participant observation provides concrete examples of value for money consideration during the creation of Mozambique's national HIV/AIDS strategic plan. The CEA study then trial-balloons a process for widening the scope of cost considerations in economic evaluations that commonly inform strategic plans. Taken together, these phases reveal whether and how donors, governments, and implementing partners consider value for money in DAH program planning while also pointing to key waypoints during the strategic planning process when analyzing local population experiences, priorities, and expenditures can help maximize overall value for money.

### **Interviewing global health organizations about value for money**

What steps do or could governments, donors, and implementing organizations take to account for the many perspectives of diverse DAH stakeholders regarding value for money? This doctoral project examines the process by which donors and implementing partners define, measure, and consider value for money by asking the experts who lead the process.

## Interview methods

Between October 2020 and February 2021, I conducted 14 one-on-one interviews with professionals working for bilateral and multilateral donor agencies and philanthropies (e.g., PEPFAR, the Bill & Melinda Gates Foundation), governments (e.g., Peru, India), and NGOs operating internationally (e.g., ICAP, Management Sciences for Health). This number of interviews appeared sufficient to confer the requisite information power to the qualitative arm of the project [140]. Professionals with four or more years of experience working on the design, selection, implementation, or evaluation of donor-funded health programs who could speak to the ways in which organizations or communities conceive of value for money and use value for money (or not) in decision-making were eligible for inclusion in the qualitative study. Exclusion criteria included: fewer than four years of such professional work or a lack of access to Zoom either via Internet or telephone for the interview. I recruited participants to represent a variety of ages, genders, cultures, geographies, organizations, and professional experiences. Referrals and relationships facilitated my connection with many of the interviewees and also provided a foundation for meaningful dialogue. The perspectives presented in the interviews represent the opinions and experiences of the participants alone, and not the official positions of their respective organizations.

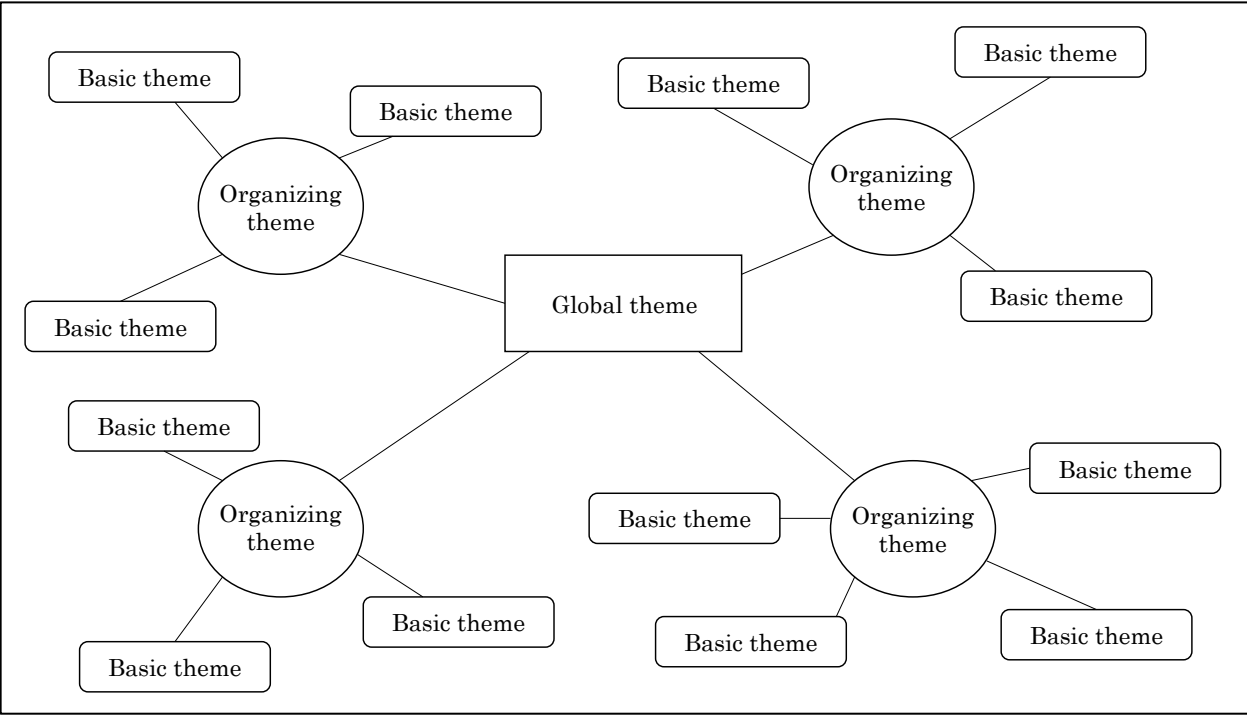
Each interview lasted between 30-90 minutes. The one-on-one interviews followed a semi-structured format, which provided the flexibility to rephrase a question, pose follow-up questions, or refocus the discussion, thereby “leav[ing] room for the unknown to emerge” [141, p. 51]. I developed the interview guide (see Appendix 1) based on existing literature, past experiences working in the DAH field, courses taken during my Master and Doctor of Public Health degree programs, and conversations with my doctoral thesis committee. I conducted all interviews via Zoom using password-protected virtual meeting rooms due to Covid-19 restrictions on travel and norms for social distancing. The Human Research Protection

Program in the Office of Regulatory Affairs and Research Compliance at the Harvard T.H. Chan School of Public Health deemed this research protocol exempt (Protocol IRB20-1383).

Analyzing the interviews

I used thematic networks (see Figure 6) to tease out and analyze the basic, organizing, and global themes that emerged during the interviews [142]. Basic themes, which by themselves often connote very little about a topic, are single ideas or insights pulled from the interview transcripts. Clustering these basic themes into organizing themes confers meaning relating to value for money. Finally, a constellation of organizing themes forms an argument—a global theme. Thematic networks thus aided me in generating conclusions by mapping interconnected qualitative data, working inward from the basic themes to global themes, and by providing a visual framework that illustrates the underlying construction of

**Figure 6: Structure of a thematic network.**



Source: [142].

the conclusions. For this research, thematic networks encompass the array of perspectives evident among the interview participants while still enabling the interviews to yield meaningful conclusions.

The qualitative phase of this research is not without limitations, however. For example, I must acknowledge the possibility that I introduced confirmation bias into the interviews when questions deviated from the interview guide and during the thematic network analysis.

### **The PEN V participant observation**

For this doctoral project, I worked full-time for nine months as a paid member of a team implementing a grant that the Bill & Melinda Gates Foundation funded named Improving Data, Systems, and Methods for Estimating Costs of HIV Program Service Delivery. The team working on this grant was based at Harvard University in Boston, Massachusetts, and I joined the grant after the Harvard team had already established contact with the CNCS and UNAIDS in Mozambique regarding possible technical assistance for the PEN V and the creation of a national unit cost repository. Beyond costing the national strategic plan, the terms of reference for the collaboration, which the CNCS and UNAIDS designed for the Harvard team, included partnering with a local costing consultant to create the budget for the PEN V and to document the strategic planning process. As well, the Harvard team proposed coupling the experience of creating the PEN V in Mozambique with similar experiences delivering technical assistance through the grant in other countries (e.g., Kenya, South Africa, Zimbabwe) to produce several deliverables that could be shared widely in numerous countries, including a how-to guide examining the costing process and best practices for future plans as well as a roadmap for strengthening local capacity in using cost analysis in strategic planning. As described above, I became the leader of day-to-day

activities for the Harvard team in its role as international costing consultant for the PEN V process, so it was fitting that I also lead the participant observation as part of the Harvard team's terms of reference. Because the participant observation constituted research for quality improvement of the strategic planning process, this portion of my doctoral project did not require IRB approval.

### The process for participation

My role was thus that of an overt participant with a disclosed position. Given the travel restrictions in place because of Covid-19, I participated in the collaboration via email, Zoom or Microsoft Teams video calls, and WhatsApp text messages. Almost all correspondence was conducted in Portuguese, which greatly limited the participation of the other members of the Harvard team. My working hours shifted to accommodate the time zone difference, with meetings regularly occurring between 6am and 2pm Eastern Time. I led standing, one-on-one check-in meetings with the local costing consultant on Mondays and Thursdays of each week. I also participated in numerous ad hoc meetings with various technical working groups and consultants. The UNAIDS point-of-contact helped to facilitate a 2.5-hour meeting of the Multisectoral Technical Working Group—with roughly 5-15 participants—every Wednesday.

The PEN V development process afforded me access to draft and published plans, reports, data, and evaluations—some of which I would not have obtained without my insider status. To fulfill the job description of the consultancy, I created tools, templates, and modeling scenarios for the PEN V costing targets. I gave presentations on the methods for collecting and analyzing data on unit costs and allocative efficiency. I built the PEN V budget and wrote large sections of the narrative (and corresponding annexes) related to costs and resource mobilization. I therefore, no doubt, influenced many facets of the PEN V process

that I sought to observe as I conducted my work. Given the expertise and experience required for this costing work, another participant-observer in my same position may have noted different observations or exerted dissimilar effects on the process itself, especially if a language barrier complicated most communications.

### The process for observation

During the PEN V creation, I maintained a daily log of activities and observations relating to the process. While I frequently sent emails and arranged meetings to clarify work-related issues as they arose, I did not request conversations over the course of the PEN V process to discuss specific observations with the other collaborators.

It is important to note that Covid-19 limited my opportunity to participate in informal social activities with colleagues in Mozambique—eliminating the possibility of impromptu conversations during coffee breaks, meals at local restaurants or the CNCS building, and social events outside of work hours. Such occasions typically provide momentary pause from the task at hand and allow a participant-observer, or even just a new colleague, to get to know their teammates personally and obtain different perspectives on the process, people, and aims involved in the ongoing strategic planning.

In spite of the remote nature of this participant observation, my work resulted in more than one hundred handwritten pages of logged observations, which I compiled into a 12-page case description in February after the PEN V contributors submitted the penultimate draft of the strategic plan to the CNCS. This case description detailed the PEN V development process chronologically and included analysis and interpretation. I shared a copy of the case with the Multisectoral Technical Working Group, and the group members furnished feedback and additional observations over the following weeks. Many members of the process, including staff of Avenir Health, UNAIDS, and the CNCS, became coauthors of the document.

### Analysis of the observations

Given the retrospective nature of recording observations at the end of each working day, the time lapse between events and their recording may have resulted in omissions or misremembering [143]. Nevertheless, daily notations seemed to be the most practical.

As with the interviews, I used thematic networks (see Figure 6 on page 31) for analysis of the participant observation [142]. Basic themes consist of bullet points taken from the observation log. Again, I clustered the basic themes into organizing themes around a global theme to form conclusions from the content of the observations.

### Ethical considerations of the participant observation

Although the consultant terms of reference outlined the costing process report as a deliverable, my simultaneous roles as participant and as observer may have given rise to several potential ethical dilemmas. In spite of my overt role within the PEN V creation as a contributing consultant and the stated nature of my observation of the process as part of the Harvard team's terms of reference with the CNCS, the impression that our Harvard-based team was directly monitoring or reporting on the behavior of others may have existed. Conflict, mistakes, and even friendly working relationships—all normal aspects of a multi-stakeholder process—likely occurred during the development of the PEN V, and, because of my dual role, could have caused my fellow collaborators—consultants, donor organization staff, and government agents alike—to feel exposed, judged, or otherwise uncomfortable.

The power imbalance inherent to a non-member of Mozambican society (i.e., me) observing a process and drawing conclusions about it may have introduced confirmation bias [144]. These ethical issues could have caused my colleagues psychological distress, affected the study, and harmed the relationships I built with colleagues in Mozambique with whom I collaborated on the CEA and the overall doctoral project. For the participant observation, I



sought to minimize potential ethical concerns by sharing the case description with fellow consultants, members of the Multisectoral Technical Working Group, and the CNCS. I received written and verbal feedback on drafts of the case description.

### **Decision science and determining value for money**

This project also entails completing a CEA of HIV/AIDS treatment interventions in Mozambique with a resource case from the healthcare payer perspective, to include government and donor costs, as well as a beneficiary perspective case, in accordance with recommendations from the Second Panel on Cost-Effectiveness in Health and Medicine [44]. This CEA not only reports the cost-effective HIV treatment activities according to each perspective but also juxtaposes those perspectives to draw conclusions regarding the appropriateness of including beneficiary perspectives in CEAs to determine the overall value for money and feasibility of health programming. I led the conception, modeling, analysis, and writing of this CEA while collaborating closely with Harvard professors and teaching assistants, UNAIDS staff, and members of Mozambique's CNCS.

This CEA serves as a proof of concept for how the CNCS—and indeed other agencies and organizations—might best model DAH programs during any strategic or operational planning in order to maximize value for money for different stakeholders while also accounting for contextual issues (e.g., the effect of Covid-19 on services, OOP expenditure limitations, increasing healthcare system demands when more PLHIV access treatment).

### **Methods of the CEA**

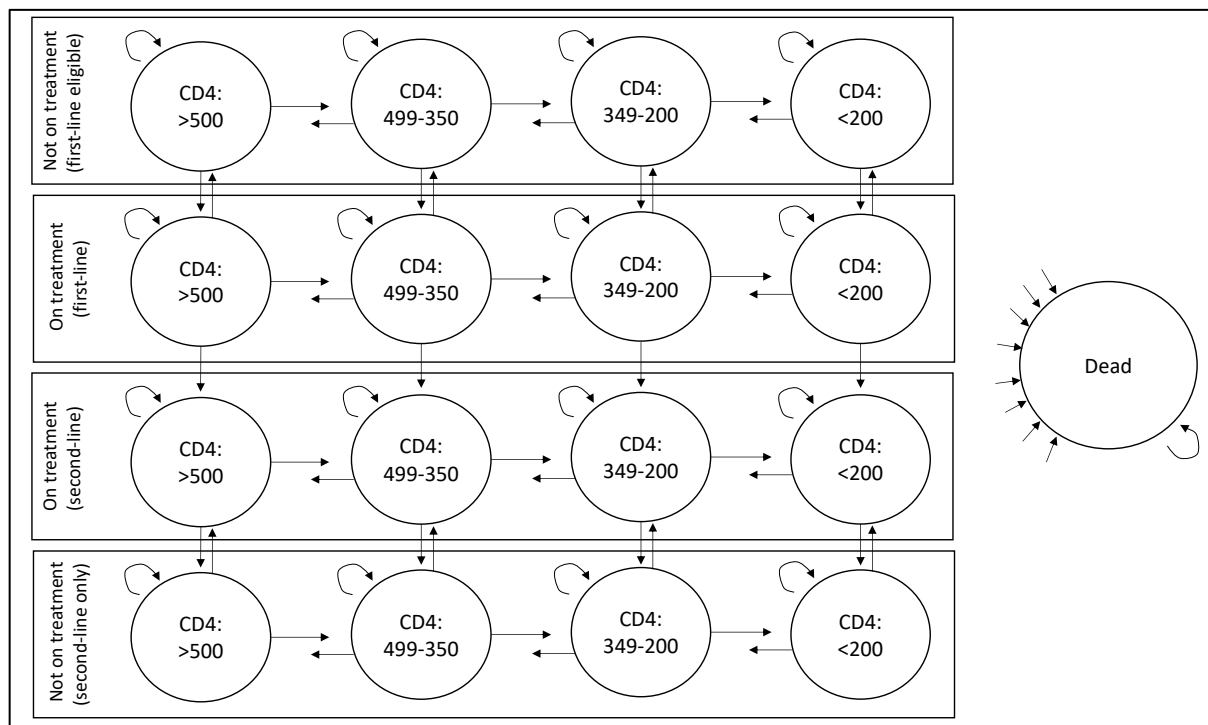
This study uses a Markov cohort simulation with a 1-month cycle. The widespread, pre-Covid-19 practice of providing 1-month antiretroviral drug (ARV) prescriptions drives

the cycle length. The estimated 2.2 million adults<sup>7</sup> living with HIV/AIDS in Mozambique represents the study's population. The time horizon of the study lasts 100 years with a lifetime analysis of cost-effectiveness and health outcomes. All health outcomes and costs are discounted at a 5% annual rate [145]. The modeling was conducted using TreeAge Pro Healthcare 2021, R1 software (Williamstown, Massachusetts), which is capable of running directly from Microsoft Excel.

The objective of the study is to determine optimal HIV/AIDS treatment strategies according to each perspective examined (i.e., healthcare payer versus beneficiary) and identify overlaps of the perspectives that might facilitate operationalization of the PEN V.

The bubble diagram in Figure 7 illustrates 17 possible health states for HIV progression; Avenir Health's Spectrum AIDS Impact Model for estimating the effects of

**Figure 7: Bubble diagram of the health states modeled in the CEA.**



<sup>7</sup> This study defines adults as individuals over 15 years old who do, or could, receive the dosage of ARVs prescribed for adults.

interventions and resource allocation on HIV infections and deaths serves as the basis for the model [146]. The model includes four CD4 count states (i.e., CD4 >500, 499-350, 349-200, and <200) for four PLHIV groups: people on first-line ARVs, people not on ART who could take first-line drugs, people on second-line ARVs, and people not on ART who could only take second-line drugs. Each month, PLHIV can transition to higher or lower CD4 count states, remain in the same CD4 count state within the same treatment regimen, transition from first-line to second-line ARVs, or cease taking ARVs. The model does not allow for both CD4 count to drop and for PLHIV to stop taking medication in the same month-long cycle. PLHIV can switch from first-line to second-line ARVs only once. We have half-cycle corrected all costs and health effects in the model.

The CEA focuses on a competing choice of individual treatment interventions for adults living with HIV/AIDS. The six treatment interventions under consideration include:

1. The pre-Covid-19 practice of distributing one month of ARVs at health facilities;
2. The status quo practice of distributing three months of ARVs in health facilities;
3. Distributing six months of ARVs in health facilities;
4. The status quo practice of distributing three months of ARVs in health facilities paired with increased lost-to-follow-up (LTFU) case management for individuals with CD4 counts lower than 200/L;
5. Distributing three months of ARVs in communities through mobile brigades; and
6. A potential bundled intervention of 6-month ARV distribution at clinics and mobile brigades distributing 3-month supplies of ARVs in communities.

The base case for this study assumes: current ART adherence levels for each intervention, 3-month ARV distributions (which the CNCS and PEPFAR had already begun rolling out in several sites before Covid-19), an LTFU rate of roughly 0.02 each month, an

increase in the rate of return to ART for people LTFU who receive case management support, a 1-hour wait time at clinics and hospitals to receive ARVs, and no mobile brigade activity for the general population. The study includes one-way sensitivity analyses for the LTFU rate, cost of transportation, and average cost of providing ART in clinic as well as a probabilistic sensitivity analysis. Table 3 demonstrates the model's inputs and sources as well as sensitivity analysis ranges and distributions for the probabilistic sensitivity analysis.

**Table 3: Parameter values used in the CEA of HIV treatment options in Mozambique.**

Parameter	Value(s)	Sensitivity Analysis Range	Probability Distribution	Source(s)
<i>Epidemiology</i>				
Number of people >15 years old living with HIV	2,049,519 PLHIV	N/A	N/A	[147]
Distribution between CD4 count stages at time of ART initiation	CD4 >500: 0% CD4 499-350: 21% CD4 349-200: 37% CD4 <200: 42%	N/A	N/A	[148, 149]
Mortality rates per 100 person-years for individuals with untreated HIV, by CD4 stage (with 95% CI)	CD4 >500: 0.6 CD4 499-350: 1.6 CD4 349-200: 4.2 CD4 <200: 21.2	CD4 >500: 0.1-2.0 CD4 499-350: 0.8-3.0 CD4 349-200: 2.8-5.7 CD4 <200: 13.2-41.5	PERT distributions	[150]
CD4 count decrease per year without ART (range)	60 cells/L	50-80 cells/L	PERT distribution	[151]
CD4 count decrease per year while on ART (inadequate adherence, viral resistance)	14 cells/L	0-20 cells/L	PERT distribution	[152, 153]
CD4 count increase per year while on ART	205 cells/L	170-250 cells/L	PERT distribution	[154, 155]
Two-year LTFU risk of 1-month clinical ARV distribution	38.1%	25-50%	PERT distribution	[156 – 158]
LTFU rate for 3-month community ARV distribution	5.1 per 100 person-years	1.59-8.61 per 100 person-years	PERT distribution	[159]
Discount rate	5%	N/A	N/A	[145]

**Table 3 (continued).**

Parameter	Value(s)	Sensitivity Analysis Range	Probability Distribution	Source(s)
Adjusted odds ratio of LTFU in 2 years with multi-month ARV distribution (compared to 1-month clinical distributions)	3-month: 0.79 6-month: 0.41	3-month: 0.76-0.82 6-month: 0.31-0.54	PERT distributions	[160]
Rate of return to treatment within 3 months of LTFU with/without case management	With: 0.313 Without: 0.0614	With: 0.25-0.37 Without: 0.0-0.2	PERT distributions	[161] [162]
Proportion of PLHIV on ART taking first-line ARVs	95%	75-98%	PERT distribution	[163, 164]
Distribution of first-line ARV regimens by base-drug	Dolutegravir: 99% Efavirenz: 1%	N/A	N/A	CNCS data, 2021
Risk of ART failing while on second-line ARVs	15 per 100 person-years	13-18 per 100 person-years	PERT distribution	[165]
Risk of progressing to second-line ARVs by base-drug regimen	Dolutegravir: 0.25% Efavirenz: 2.5%	Dolutegravir: 0-0.5% Efavirenz: 2.0-3.3%	PERT distributions	[163] [166, 167]
<i>Health Effects</i>				
DALY weight for one year while on ART, by CD4 stage	CD4 >500: 0.078 CD4 499-350: 0.1 CD4 349-200: 0.15 CD4 <200: 0.2	N/A	N/A	[168]
DALY weight for one year without ART, by CD4 stage	CD4 >500: 0.012 CD4 499-350: 0.27 CD4 349-200: 0.377 CD4 <200: 0.58	N/A	N/A	[168]
<i>Costs (in 2020 US\$)</i>				
Currency conversion	US\$1 = 73.37 metical 1 metical = US\$0.014	N/A	N/A	[169]
Gross national income (GNI) per capita in Mozambique	2,562 metical (US\$35) per month 30,748 metical (US\$419) per year	N/A	N/A	[170]
Average annual cost of ART to healthcare payer per PLHIV	\$201	\$170-\$250	PERT distribution	[117]
Per-person cost to travel by minibus taxi ( <i>chapa</i> )	20 metical (US\$0.28) per hour	\$0.05-\$1.00	PERT distribution	[171]

**Table 3 (continued).**

Parameter	Value(s)	Sensitivity Analysis Range	Probability Distribution	Source(s)
Average patient transit time to ART provision site (by <i>chapa</i> )	<30 minutes: 51% 30-120 minutes: 43% >120 minutes: 6%	N/A	N/A	[172]
Average patient transit time to ART provision site (walking)	3 hours	1-12 hours	PERT distribution	[171, 173]
Number of health units in Mozambique	Level 1: 1,395 Level 2: 48 Level 3: 14 Level 4: 4	N/A	N/A	[174, 175]
Percentage of health units offering ART	65%	50-80%	PERT distribution	[176]
Number of health professionals able to distribute ARVs in Mozambique (doctors, nurses, pharmacists)	34,507	N/A	N/A	[174]
Average cost in healthcare worker salaries to treat a PLHIV >15 years old with ART	\$0.91 per encounter	\$0.75-\$2.00	PERT distribution	[117]
Percent of time spent treating PLHIV >15 years old with ART	Doctors: 15% Medical aides: 65% Nurses: 20%	N/A	N/A	[117]
Average monthly cost for case management and patient support	\$37.97	\$25-50	PERT distribution	[177]
Average cost of new mobile brigade vehicle and replacement rate	\$35,000 (replaced every 5 years)	N/A	N/A	Internal NGO data, 2018
Annual cost of mobile brigade vehicle operations, servicing, and gasoline	\$650	\$400-750	PERT distribution	Internal NGO data, 2018
Number of mobile brigade units operating each month	35	15-50	PERT distribution	Internal NGO data, 2018
Average patient wait time for ART	1 hour	0.25-4 hours	PERT distribution	[178]
Per person cost of first-line ARV regimens per month	Dolutegravir: \$5.55 Efavirenz: \$6.40	N/A	N/A	[179]

**Table 3 (continued).**

Parameter	Value(s)	Sensitivity Analysis Range	Probability Distribution	Source(s)
Per person cost of second-line ARVs per month	Ritonavir: \$23.15	N/A	N/A	[179]
Willingness-to-pay thresholds by perspective	Healthcare payer (3 times GDP): \$1,500 Patient: \$500	N/A	N/A	[180 – 182]

The study models the cost, incremental disability-adjusted life years (DALYs) averted, and the cost per DALY averted for each HIV/AIDS treatment intervention. Harms considered in the modeling include time costs and adverse treatment reactions.

This phase of the study also has limitations. First, the nature of the model assumes that all costs are uniform throughout the country, which is not the case. To address this issue, sensitivity analyses demonstrate the ranges of costs under which the expected outcomes hold true. Second, the model does not capture spillover of costs between the national HIV/AIDS program and the entire health system. Finally, the study does not factor preferences that individuals may have regarding stigma aversion, location of services, or treatment options into the model.

### **Tying it all together**

The literature review and interviews of this doctoral project provided me with insights regarding how I should calculate and present costs for HIV/AIDS programs in the PEN V budget. Similarly, the CEA draws from values that my coauthors and I gathered to input into the PEN V budget and financial landscape analysis. While the allocative efficiency analysis conducted during the PEN V creation process helped to determine which objectives and

intervention areas (e.g., preventing new HIV infections versus averting AIDS-related deaths) figure most prominently in the PEN V, the CEA evaluates modalities for delivering HIV treatment services (e.g., 3-month versus 6-month ARV distribution). Hence, the CEA happened as development of the PEN V was concluding; the CEA thus reflects an opportunity for further technical and adaptive change in future strategic and operational planning.



**CHAPTER 4: RESULTS AND DISCUSSION**

In over 10.5 total hours of interviews, I spoke with 14 professionals for this doctoral project, gleaning insights related to value for money, donor-funded health programs, and the future of DAH initiatives from the participants’ array of DAH experiences. Table 4 catalogues the distribution of the professional roles that the individuals who participated in interviews for this project have occupied

over the course of their careers. Of the 14 experts that spoke with me, 71% mentioned having lived and worked in an LMIC for two years or longer. Of the many

**Table 4: Distribution of interview participants by current and former professional roles within DAH (n = 14 participants).**

<i>Professional role</i>	<i>Percentage<sup>†</sup></i>
Minister of health (or other ministry) or deputy minister	14%
Director of a national health service or deputy director	14%
Senior leader of a donor agency	36%
Regional or country representative for an NGO	21%
Chief of party for a donor-funded health program	29%
Health economist for a donor, NGO, or think tank	43%

*†Sum of the percentages is greater than 100% because many of the interview participants have held multiple roles.*

noteworthy revelations that the interview participants propounded, six global themes emerged which accorded closely with my observations from the PEN V costing process (see Table 5). This chapter intertwines those interview insights with lessons learned during the PEN V process to address the first two aims of the doctoral project. The chapter then presents the findings of the CEA comparing healthcare payer and beneficiary perspectives on HIV treatment interventions in Mozambique, addressing the third aim of the project. Finally, the

**Table 5: Global themes of this doctoral project’s qualitative research by overarching project aim.**

<i>Project Aims</i>	<i>Global themes established in the thematic network analysis</i>
Aim 1: The concept of value for money in the global context	<ol style="list-style-type: none"> <li>1. Value for money as a process, not a decision</li> <li>2. Sustained pressure to sustain programs and financial resources</li> <li>3. Everything aligned to the donor’s scope</li> </ol>
Aim 2: Best practices in accounting for individual values and opportunity costs	<ol style="list-style-type: none"> <li>4. Active initiatives and recommendations from the global experts</li> <li>5. Dearth of data regarding OOP and private sector contributions for the PEN V</li> <li>6. The case for including beneficiary perspectives in economic evaluations</li> </ol>

chapter examines the enabling change efforts of the doctoral project as a whole.

With respect to my PEN V experience, a brief summary of the nine-month costing process may impart foundational information for the lessons learned that this chapter explores. Costing the PEN V involved several key steps: gathering information from technical working groups (TWGs), estimating unit costs, modeling scenarios, and crafting the budget and financial plan.

Initially, the costing team developed a fit-for-purpose tool in Microsoft Excel for identifying activities, target geographies, etc. as a tool for discovering activities, target populations, baseline coverage, annual targets, and more (see Appendix 2). I led the creation of this tool and shared it with the country's various TWGs in order to map expected interventions to the strategic objectives of the plan in a standardized format. After informational sessions to review the spreadsheets, the local costing consultant and I met with the TWGs to identify specific activities or interventions for inclusion in each strategic objective. For each activity, we defined a unit of outcome (e.g., the number of PLHIV receiving prophylaxis against tuberculosis) and specified an expected outcome target for each year (e.g., 46,687 PLHIV treated by prophylaxis in 2025).

Because each planned activity or strategic objective for the PEN V required a corresponding unit cost, we established costs using recent studies (e.g., Mozambique's NASA), scientific literature (e.g., articles on the Global Health Costing Consortium's website), or through two standard means of cost approximation (i.e., top-down or bottom-up costing) [183, 184]. We triangulated each unit cost to ensure the veracity of the value.

After updating the unit costs in the Goals Age-Sex Model (Goals-ASM), we modeled the epidemiological impact and cost of five distinct funding scenarios, per CNCS request:

1. *Continued Performance*: Slight annual increases in funding to continue the current coverage and performance of HIV-related services achieved under the PEN IV. This

scenario served as the baseline for all target and cost comparisons.

2. *50% New Infections*: Funding to achieve the PEN V target of reducing new infections by 50% compared to 2019 (the final year of the PEN IV);
3. *95-95-95 by 2025 Scenario*: Funding to achieve the UNAIDS 95-95-95 targets within the timeframe defined by UNAIDS;
4. *95-95-95 by 2023 Scenario*: Funding to achieve scale-up to meet the UNAIDS 95-95-95 targets by 2023, which would be necessary for the model to demonstrate a 50% reduction in AIDS-related deaths by 2025 (compared to 2019); and
5. *Constrained Resources*: Annual funding levels constrained to a \$600 million ceiling, prioritizing interventions that reduce new infections over all other impacts.

Each scenario set a limit to either economy (e.g., Constrained Resources Scenario) or effectiveness (e.g., 95-95-95 by 2025 Scenario). We iterated the models in accordance with feedback from the CNCS and TWGs. Based on these models, we composed a narrative with four corresponding annexes: a summary budget, a detailed budget, a financial landscape analysis and sustainability plan, and an allocative efficiency analysis.

### **Aim 1: The concept of value for money in the global context**

*Our value for money, our NGO's philosophy is that beneficiaries see every penny we spend. Working for US Government donors, we have a saying: "We don't need a Cadillac. We need a Volkswagen Bug." We'll spend the extra in the field to reach the beneficiaries.*

– NGO country director in Haiti

#### Value for money as a process, not a single decision

Although none of the interview participants cited a specific framework or approach when defining value for money, everyone had a similar definition. Many participants wove

terms like effective, cost-effective, and sustainable into their initial responses. An NGO regional director in Niger focused on impact and allocative efficiency, declaring:

*Value for money is a question of how much money goes to the beneficiaries and how we use that money to provide the right outcomes and impact to make a difference in people's lives, to make their lives better.*

A former Minister of Health for Peru emphasized effectiveness and equity in determining value for money, stating:

*From the point of view of prioritizing interventions, what I tried to do is to look at numbers and impact. The second thing I tried to do was address issues of equity and inequity, because there might be issues that the numbers could not show but that affected populations which are completely ignored.*

While 43% interview participants initially responded “bang for your buck” or “return on investment” when answering what value for money means, almost all interviewees eventually clarified that cost-effectiveness alone does not automatically confer value for money. A health economist working for an NGO phrased the distinction simply:

*A CEA is just a tool. It's never the definitive answer.*

For the interviewees, value for money hinged on tradeoffs and context; calculations like cost-effectiveness were helpful to comprehend those tradeoffs but did not represent the solutions or decisions to be enacted. One former country director of a philanthropic institution in India asserted:

*There's far too much evidence that shows it's cost-effective for me to keep people under 18 years who have never smoked from ever starting. So now when I'm thinking about a strategy, I have to use that evidence. But you know, it has to be evidence in a dynamic model. I can't make a policy just based on that [evidence] alone.*

For each of the interview participants, grappling with the purpose of value for money quickly became much more central to the discussion. The participants explained that value

for money is about making decisions. A former Minister of Public Works for Liberia posited:

*As we move forward, those considerations of value for money, the strategic plans—those are guidelines. They aren't hard, fast, inviolable rules that we have to follow.*

To use these “guidelines,” the Liberian minister offered three decision-making criteria that applied to value for money of DAH investments:

*First, wherever the investment, it had to benefit the greatest number of people. Second, the investment had to build on something that already existed. The goal here is to get some sort of multiplier effect on each subsequent investment. Third, does the investment help the people see the presence of the state? Governments have to deliver services to the people, right? Most people don't think in these terms, but underlying everything is the social contract.*

While the “guidelines” begin with a form of effectiveness (i.e., benefit), the list also casts a new light upon value for money that donor frameworks do not address: relationships. To consider the tradeoffs inherent to value for money, decision-makers must sift through the potential impact that a strategy or program may have on individual health outcomes and costs as well as on formal and informal accountability structures [129]. A government may pose the question simply: What is the State's obligation to its constituents with regard to a health need? For donors, simultaneous accountability to multiple recipient countries, to taxpayers, and to the mission underpinning their DAH programming can complicate value for money decision-making [6]. An advisory board member for the Global Fund provided the following example:

*Over the years, we've encountered a number of country contexts—and disease contexts within particular countries—where we knew we just weren't getting the impact we would get in another context. What if we reallocated the funding of a low-performing country to a country that was already performing well as a plus-up? Or to a middle-income country that wasn't eligible otherwise? Would that align better with our [the Global Fund's] value for money framework? There's no clear yes-or-no answer. For us, it*

*became about predictability for countries to rationally plan what to do with their domestic and donor resources by shifting from a performance-based model to an allocation-based model.*

Several interview participants characterized the dynamism of value for money as a strength for DAH decision-makers. A former government minister in Liberia recalled:

*In the face of something like Ebola, it's difficult for the government to be assertive when so many nongovernment actors are providing what is actually the government's responsibility to provide. You can imagine, we measured value for money in terms of a health facility working where it didn't before. In West Africa, we know that the more you have to turn to [DAH] partners, the more your voice diminishes in terms of determining what needs to be done and how. We tried to be as assertive as possible, but you know: You can be assertive over nothing, or be a partner over something.*

DAH actors, thus, must weigh the 4Es and cost-effectiveness while also considering relationships, accountability, and transparency. These tradeoffs represent decisions to be made, sometimes in real-time where no strategies yet exist. The interviewees disclosed that, by design, cost-effectiveness does not always win out. Echoed one PEPFAR analyst:

*In the post-Soviet and post-structural adjustment program world, we wanted to save lives. I imagine PEPFAR would've been willing to pay \$5 more, \$50 more per person than we actually did to be able to do that.*

PEPFAR's 2021 Annual Report to Congress announces that “the US Government has saved more than 20 million lives and prevented millions of HIV infections through PEPFAR” [185, p. 3]. The text leads with effectiveness rather than cost-effectiveness ratios for infections or deaths averted—although economy and cost-effectiveness figure heavily in later pages.

My experience contributing to the PEN V mirrored the ideas and experiences evoked by these interviews and PEPFAR's annual report. The terms of reference for the Harvard team's contribution to the strategic plan delineated the expectation that we apply efficiency, cost-effectiveness, and sustainability within the PEN V. Because the costing team was

initially unsure of the expected intervention targets, we envisioned four scenarios—not yet modeling the 95-95-95 by 2023 Scenario. We designed two scenarios with cost limitations (i.e., Continued Performance and Constrained Financing) and we built two others with effectiveness thresholds. All of the scenarios except the Continued Performance Scenario aimed to optimize the funding allocations (i.e., efficiency) for interventions that reduced new HIV infections (an early directive) without decreasing intervention coverage levels below the previous PEN IV’s performance or the activity targets given by TWGs for 2021-2025. This meant creating a shopping spree<sup>8</sup> of over 190 intervention line items for the budget.

After the consultants submitted several versions of the complete PEN V for CNCS and TWG review, we became aware of a discordance between the costing expectations and the monitoring and evaluation plan in terms of the projected targets for AIDS-related deaths. In order to adhere to global HIV/AIDS targets, the PEN V committed the country to halving the number of new HIV infections and AIDS-related deaths on the trajectory toward achieving UNAIDS’s 95-95-95 targets. Our costing required recalibration—and the creation of a new scenario (i.e., 95-95-95 by 2023) to achieve a full 50% reduction of new deaths within the five-year period.

Although discussions with the CNCS and TWGs confirmed the expectation that the PEN V would prioritize effectiveness over economy (with scenario budgets rocketing to nearly \$1 billion per year in some drafts), we could not propose impacts at any cost. Thus, we used the Goals-ASM modeling to counter the proposed commitment to the 95-95-95 by 2023 Scenario by demonstrating that, even if such a scale-up might be financial acceptable—albeit more than \$1.4 billion outside the country’s expected five-year financing envelope—the

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<sup>8</sup> A *shopping spree* is a type of CEA model wherein “any combination of program alternatives is feasible—limited only by the budget constraint” [186, p. 271]. Another model type, *competing choice*, evaluates alternatives that are mutually exclusive.

scenario also overestimated the possible technical effectiveness under the plan; to reduce AIDS-related deaths by half in five years, the scenario projected a 47% increase in the number of PLHIV on ART within the first two years of the plan even though ART coverage had increased roughly 5% during the entirety of the previous five-year PEN IV [126, 128]. We also argued that the Goals-ASM model accounted for only 20 biomedical and behavioral intervention categories in each scenario's projections of epidemiologic impact, reasoning that the other interventions included in the Excel-based budget for the PEN V will likely produce an additive effect on the size of the reduction of new deaths. This back-and-forth epitomized a message that one health economist based in southern Africa imparted during an interview:

*It's better to develop strategies and implementation plans that are feasible. Developing plans that are completely aspirational and never get achieved is disheartening for the folks on the ground trying to implement all this stuff.*

The CNCS and Multisectoral TWG decided that the 95-95-95 by 2025 Scenario was the appropriate foundation for the PEN V cost analysis. We therefore shifted the basis for the PEN V costing narrative and annexes accordingly in order to maximize the number of new infections and new deaths averted within boundaries of effectiveness that the local government and donors viewed as realizable.

Our modeling aligned nearly perfectly (in terms of the projected costs and impacts of the 50% New Infections Scenario, the 95-95-95 by 2025 Scenario, and the Constrained Financing Scenario) with a separate analysis of Mozambique's potential progress toward the UNAIDS targets by 2030, which the USAID-funded program Health Policy Plus conducted. This Health Policy Plus analysis also indicated that a so-called "major increase" in funding (tantamount to the 95-95-95 by 2025 Scenario we created for the PEN V) would yield a nationwide productivity gain of \$5.4 billion and a net economic benefit of \$3.7 billion by 2030 [187].



## Sustained pressure to sustain

While only the Global Fund framework for value for money establishes sustainability as a primary consideration, this project's interview participants spotlighted the ubiquity of donor calls for sustainable programming. According to the interviewees, many donor agencies routinely emphasize the need for LMICs to prepare for a transition away from donor assistance to a paradigm in which a host country's public and private sectors assume responsibility for the technical impact and financial resource mobilization of health programs. One former USAID analyst recalled:

*Starting in early 2010s, PEPFAR repeatedly told Botswana and Namibia, "Next year, you're not going to get funding." And we threatened it again and again. It would always go to the brink, and at the last minute PEPFAR would say, "We're not cutting funding this year; we'll do it next year." But it's been eight or nine years now that the countries have had this threat and PEPFAR hasn't done it. And that's a good thing! This is not something you do "next year, next year, next year." This is something you do on a 5- to 10-year basis. You get all your oars in a row.*

To some of the interviewees, this pressure to sustain seemed sensible. Donors cannot operate as they are in perpetuity, many noted. PEPFAR's global funding envelope, for example, has plateaued over the last decade [185]. Phrases like "country ownership," "handover," and "country-owned responses" saturate donor documents [188, 189]. USAID has crafted roadmaps for each LMIC it supports to assess the country's "capacity to plan, finance, and implement solutions to local development challenges, as well as the commitment to see these through effectively, inclusively, and with accountability" on a Journey to Self-Reliance [190, p. 1]. To other interview participants, however, the question of sustainability seems artificial. An advisory board member for the Global Fund explained:

*We had a discussion of the current Global Fund strategy development process where we asked: Do people actually think we're going to end the Global Fund by 2030? Do people think the need isn't going to be there*

*anymore? The people affected by these three diseases will still be there. Some countries may have local civil society, at a certain scale, that's able to take over primary responsibility for the technical implementation of programs—a huge success. But the countries don't have a way to take over the financial responsibility. So, we have to, at the very least, differentiate around that.*

The worst-case scenario, interview participants said, is to have a successful program transition from donor support to local funding only to collapse—typically due to a lack of financial resources. A former Health Secretary of India's Ministry of Health and Family Welfare asserted:

*In many of the big externally assisted projects that we have known in the past—whether in agriculture, whether in primary education, whether in primary healthcare—the big influxes of money through projects were never really subsequently followed up by the government.*

Among other interviewees, Bulgaria and Romania were points of reference for sustainability and transition backfiring. The two countries transitioned from Global Fund and United Nations assistance when they became member states of the European Union, and they subsequently experienced spikes in HIV prevalence among key populations [191, 192].

One Global Fund advisory board member averred:

*The governments didn't take responsibility, the EU didn't take responsibility, the Global Fund was no longer providing funding, and other bilateral donors hadn't been there in the first place. And now these countries have ended up becoming re-eligible [for Global Fund investments], which is exactly what you don't want. When a country graduates, you should never work with them again. That should be something that is unidirectional.*

Sometimes DAH programs appear to sacrifice impact in the name of sustainability, failing to maximize effectiveness in the first place for want of future eventual continuity. An NGO country director in Haiti recounted a donor-funded project that illustrates not only the tradeoffs between economy and sustainability, but also the potential for conflict between beneficiary and healthcare payer perspectives. He recalled:

*Let's say we had 10,000 inhabitants around a health center that only received 50 people per working day. The issue for us was supporting the center to serve 200 people per day. Staff from the center went to the community and came back saying, "You know the issue? The people must pay 250 gourdes for a medical consultation and no one in the town makes 250 gourdes per day. They cannot afford the consultation. They said services should be 50 gourdes, including medicines, and then they would all come to be treated for the diseases they're facing." But most of these programs are [donor] funded. So, the 250 was not to fund the program but to keep the center alive after the program. We had to analyze having 50 people at 250 gourdes versus 200 people at 50 gourdes. The good decision is charging less money for more people. It was more affordable to have only 50 people.*

In deciding whether this DAH project represented value for money, would-be beneficiaries stayed home with unmet health needs—not in protest, but in poverty. Pressures on that health center to sustain itself financially beyond the donor commitment impeded the project and the center from maximizing the immediate health impact on the local community.

But some projects and even countries are eventually able to transition from donor support to host country control. This does not represent the end of value for money consideration, however. The countries that manage to successfully transition away from DAH funding may find themselves in a veritable No Man's Land for international collaboration. A former Minister of Health for Peru commented:

*The countries that have a lot of money can get all the vaccines they want. The ones that are poor get Gavi [the Vaccine Alliance] support and other countries helping them. Countries like mine, which have money but are a small market with an unstable political situation? We're stuck with nothing.*

This quick rupture in collaboration can prove detrimental. One former Health Secretary of India's Ministry of Health and Family Welfare explained:

*It's no longer a question of money. What we lost in giving up aid assistance was the degree of oversight that we are unable to manage within our own systems.*

Thus, sustainability may come at the cost of the very relationships, tools, and systems

that made the transition away from DAH support possible in the first place. Sustainability may be less of a handover of programming that represents value for money than a reconstruction of services in a new paradigm. While multiple interviewees recounted such fragmented transitions, the former Minister of Health for Peru added that there are positive examples that the DAH world can emulate, stating:

*[The United Nations Population Fund (UNFPA)], for example, is very interested in continuing to work with us, because Peru buys contraceptives through UNFPA's procurement system, which is very convenient for us. They buy lots of contraceptives, and we are a small market so if we try to buy alone, the prices would be much higher. When we buy through them, we get better deals and they get an administrative fee, which is important. So, even though we don't get things for free, it's a cooperative type of relation.*

Thus, symbiotic relationships that traverse the transition chasm are possible. One director at a global philanthropic organization opted to reframe sustainability as “institutionalization,” remarking:

*We see a spectrum from tighter [funder] control to progressively less control, hand-in-hand with the government.*

Accountability considerations between DAH agencies and transitioned countries surely shift once donors eliminate funding inflows, but the ongoing business relationships that can replace time-limited grants and contracts may yet bolster value for money. Conversely, halting collaboration once funding ends in an all-or-nothing approach may also negatively impact donors—as, without ongoing collaboration, UNFPA would lose the fee that Peru pays when purchasing family planning products, for example.

Taken together, the power dynamics behind the looming expectation of transition and sustainability can undermine the sense of global collaboration and tarnish the notion of DAH partnership. LMIC governments may be justified in believing that decisions about whether a country is ready to sustain health programming and financing stem from paternalism

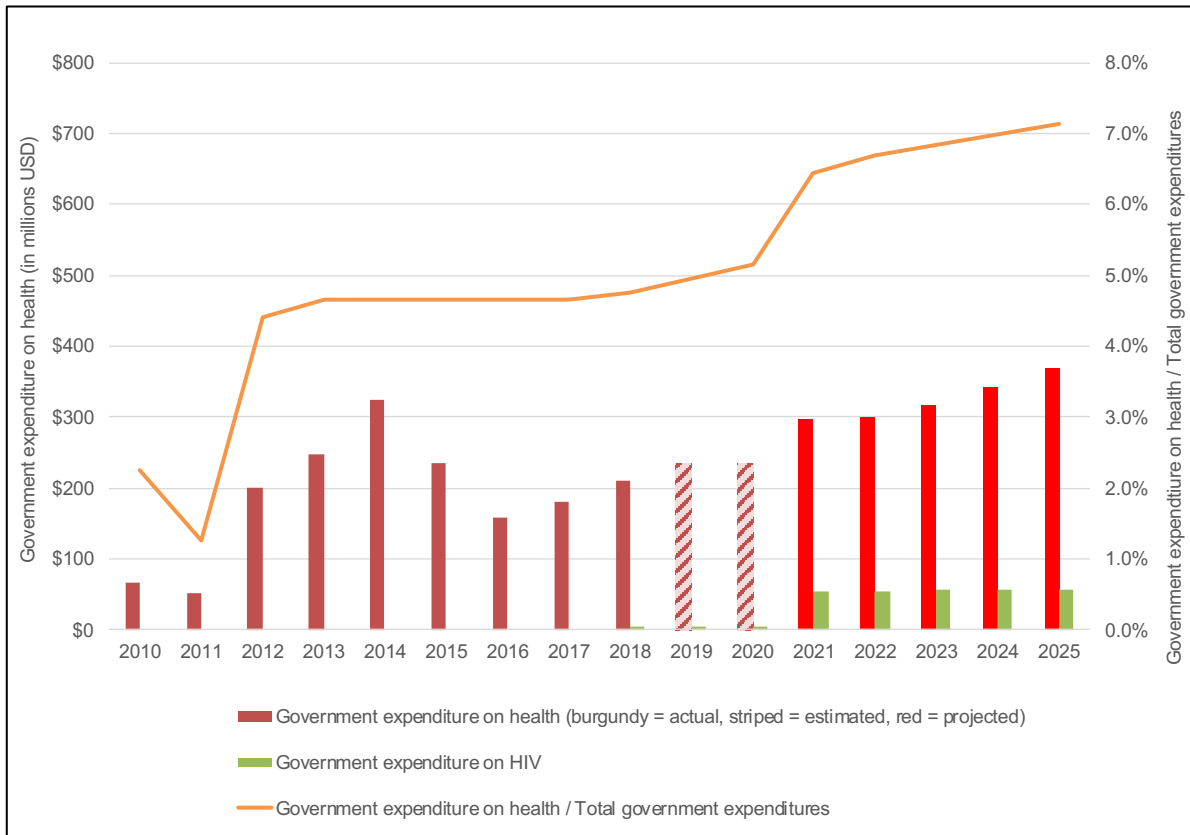
rather than from a tête-à-tête between donors and recipient countries as equals. A former Health Secretary of India's Ministry of Health and Family Welfare offered an example:

*If, for whatever reason, Gavi just stops, then India is completely abandoned. We have no way to mobilize the domestic resources to vaccinate all the babies being born. Those are the kinds of things we should be looking at, because there are still areas where we are dependent on external assistance. Vaccines is a very crucial one. And it's an absurd situation because India supplies vaccines and medicines to 192 countries, or some absolutely amazing figure like this. Yet we don't have an adequate number of vaccines in our domestic stock to meet our own needs. And it's happening right now. Why is this so? I understand diplomacy involves foreign policy gains to be made by being a global supplier of vaccines. I can understand supplying Covid-19 vaccines to countries in Africa, to Nepal, to Bangladesh. I don't see why we're supplying vaccines to the UK or Germany first.*

While creating Mozambique's PEN V, the question of sustainability seemed omnipresent, although no one expressed the belief that the country could or should assume financial responsibility for the entire HIV/AIDS response. The terms of reference, for instance, required that we devote an entire annex of the strategic plan to the country's HIV/AIDS financing gaps and sustainability. Our analysis centered much more on identifying and filling financial resource gaps within the plan's five-year window than on long-term implementation beyond the PEN V. To calculate these resource gaps, we projected donor funding into the future, assuming flat continuations of the most recent documented investments. We compiled historical funding data on numerous sources active in the country: bilateral, multilateral, and philanthropic donors; international and domestic private sector enterprises; the national government; and individual contributions.

Under the 95-95-95 by 2025 Scenario, the budget of the PEN V exceeded all historical figures, with the projected cost for the HIV/AIDS response representing 5.4% of the GDP, far surpassing what DAH donors and researchers consider affordable for an LMIC to pay [193]. To address this excess, we tackled the subject of chronic underinvestment by the public sector

**Figure 8: Domestic spending on HIV/AIDS (projecting a US \$50 million increase in 2021-2025).**



in the country’s HIV/AIDS response. In 2020, public funding for health per capita represented 5.2% of all Government of Mozambique spending—roughly one-third of the 15% committed by Mozambique in the Abuja Declaration of 2000 [194, 195]. We thus recognized that the PEN V serves as a starting point for the country to ensure the continuity of its 2019 commitment to furnish additional funding for reagents and drugs related to HIV [196]. We explored the possibility of creating a nationwide tax—modeled after Kenya’s successful levy on airline traffic—whose revenues would support public health investments [197]. This tax, or another domestic source, could bridge the gap between the levels of funding attained under the PEN IV and the financial resources needed to implement the PEN V. We also modeled an increase of \$50 million per year in domestic spending (see Figure 8), which would close the gap between PEN IV funding levels and the \$600 million annual cost of the PEN V’s

Constrained Financing Scenario. The spending boost we modeled would represent an increase in the percentage of public spending on HIV as part of health spending from 2.2% to 17.2%, which would align much more with the magnitude of country’s HIV challenge—as well as the PEN V’s stated goal of eliminating HIV as a public health threat by 2030 [117].

Beyond these increases in public funding, we included a target—initially suggested by the Resource Mobilization TWG—in the PEN V for the country to develop a social contracting mechanism for engaging with private sector entities and local NGOs by 2023.

### Everything aligned to the donor’s scope

Tangential to the sustainability pressure, the central nature of the donor’s time horizon and metrics in DAH programming arose as another global theme of the interviews.

A former World Bank health economist explained how scope defines the DAH agenda:

*So much of the resource need estimation, and the techniques to be used, depends on the question being asked and the client, on the point of view and the time horizon.*

For many DAH projects and government strategic plans, the time horizon for fund disbursement and programmatic activities lasts roughly 3-5 years [198, 199]. It is also critical to note that the donor agencies which set these timeframes are the same entities that design and espouse the value for money frameworks described in this doctoral thesis. A director at a philanthropic institution identified this critical confluence, saying:

*That kind of framework of value for money, the FCDO (or DFID as it was) framework is a service delivery framework. You are making five-year grants or six-year grants, and you’re assessing the components over a five-year timeframe. You’re saying, “We’re investing in a program in Nigeria that targets maternal newborn child health. We will assess value for money as a reduction in mortality, literally lives saved over the cost of the grant.”*

The former country director of a philanthropic institution in India elaborated on how this

fixation on short-term timelines may actually hurt LMICs, opining:

*While each program may be cost-effective, our overall strategy is highly cost-ineffective when measured over 20 years. But the problem is nobody brings that horizon. And in some ways, this perpetuates the situation.*

The PEN V exemplified this explanation. The five-year time horizon for the strategic plan impacted the interventions that we identified as cost-effective, giving artificial preference to products and services that quickly prevent new infections and deaths. For example, we budgeted for a scale-up of VMMC procedures for males over 15 years old because that age category was more likely to engage in sexual activity within the plan's five-year window, even though the procedure is twice as expensive for males over 15 years as it is for males under 15 years. Circumcising the older age group would reduce the risk of new infections during the PEN V timeframe whereas the younger males would not manifest the reduced risk from their procedures until much later. We noted this modeling distortion in the PEN V's Costing Process and Allocative Efficiency annex, explaining that our models underestimated the importance of interventions which take longer to evidence their effects, like VMMC for children. The country's youth bulge may mean that, on a 15- or 30-year timeline, VMMC for males under 15 years old actually dominates the cost-effectiveness of the procedure for older males. The PEN V did not include an analysis with such a time scope.

Referring back to the internal discussions regarding the prioritization of the 95-95-95 by 2025 Scenario over the more ambitious 95-95-95 by 2023 Scenario, one of the key points that we, the costing consultants, were able to make was that the Goals-ASM model projected the 95-95-95 by 2025 Scenario would reduce the number of deaths by half—compared to PEN IV levels—by 2026 (i.e., one year after the PEN V ended). The measure of effectiveness for the PEN V was therefore given an artificial threshold, not based on lives saved, but based on timing.



Of course, we all appreciated that the data in our models represented real people who would care deeply about accelerating the scale-up of programming to 95-95-95 with the utmost immediacy. Some interviewees, too, noted that focusing only on cost-effectiveness can result in tunnel vision, as one PEPFAR analyst lamented:

*Unfortunately, sometimes we get too much in the weeds, right? We're looking at people's lives on a spreadsheet, looking at value for money on a national level. We don't always think about what reality looks like [for the people].*

## **Aim 2: Best practices in accounting for individual values and opportunity costs**

*In using cost-effectiveness analysis, governments need to think about all the other issues that are going on, and about how to deploy services that can reach communities through participation within the communities.*

– Former Minister of Health for Peru

### Active initiatives and recommendations from the global experts

While many interview participants railed against the hyperfocus on a 3- to 5-year time horizon for most DAH plans, programs, and analyses, none of the experts controverted the importance of analyzing costs and cost-effectiveness. In fact, many of the interviewees cited cost-per-DALY averted as a common discussion topic in their workplaces. They recounted that such cost analysis metrics help them—as donors, governments, and implementers—to conduct their work and motivate others to collaborate. One interviewee explained that relationships and experience affect geographic selection of programs while cost-effectiveness determines intervention selection, saying:

*You know, in India, you could go anywhere and there's a problem. What do you pick? We generally tend to pick places where we are likely to be most effective. And sometimes that is where we have access, we have reach, we have connections. Within that, whatever we do, we will very much have a dollar-per-DALY-type thinking. We have to in any report, any discussion.*

A health economist consulting in southern Africa confirmed that cost analysis enables governments and donors to align DAH programs with stated priorities, reporting:

*When we conduct a costing, we point out to people: You know, you're telling us that a particular program is really important while you're not allocating any money to it compared to another one, which may be unimportant but is enjoying a huge amount of funding. We can point out that.*

For one former Minister of Health for Peru, cost-effectiveness and extended cost-effectiveness analyses supplied the evidence needed to convince other government officials to support a law aiming to raise people's awareness of the content of processed foods.

*One of the documents that was very helpful for me was the Disease Control Priorities series. Ministers of health don't usually bring CEAs to discussions with the Ministry of Finance. I did, and I was able to convince that minister to move ahead with the implementation of a law labeling high sugar, high salt, and high fat foods. Even though they [the Ministry of Finance] were completely against me at first, the CEAs and ECEAs helped.*

The former health minister noted that one important strength of ECEAs comes from the focus on downstream poverty risk and financial protection. The third edition of the Disease Control Priorities books (called DCP3) introduces ECEA studies, which have become a key tool for many health economists [200]. In my discussions with the interviewees about ECEAs, however, one health economist for an NGO described “two fundamental weaknesses”:

*The first is that, for better or for worse, we have a threshold decision-making tool within CEAs—you know, willingness to pay. In inverted commas, we “know” a country's willingness to pay for a QALY gained or DALY averted. But [with ECEAs], we don't have any concept of an individual or population-level willingness to pay for an increase in equity or in financial risk protection. ... I think the other current flaw in ECEAs is how you combine them. What is the population or the individual's or the policy-maker's indifference curve? What is the trade-off? How important is health compared to financial risk or how important is equity compared to health?*

Ergo, while ECEAs can bring critical information regarding financial barriers, equity, financial risk protection, and disease burden to the forefront for decision-makers, the analysis

tool may not offer all the information policy-makers need to weigh the tradeoffs inherent to value for money. And deducing the willingness to pay for one stakeholder group based on another group's preferences typically proves unreliable, as one health economist observed:

*There's a known disconnect between patients and policy-makers around willingness to pay for health. It's likely that there will also be a disconnect between those two groups around willingness to pay for equity.*

Initiatives for gathering and analyzing data regarding beneficiaries—e.g., individual willingness to pay, healthcare preferences, experiences with OOP expenditures—often include household surveys. Commented one former World Bank health economist:

*OOP costs are tied into household surveys rather than using the sources that we use for government and donor spending. They're linked to analysis of financial protection and catastrophic expenditure. I believe the World Bank and UNDP and others continue to sponsor these surveys to pick up information on OOP spending ... We need to keep integrating [the surveys] into thinking about NASAs and overall patterns of spending and costs.*

Several interview participants mentioned another ongoing initiative intended to improve the way in which donors and governments collect and analyze cost data: activity-based costing. A manager at PEPFAR explained:

*With the information we gather, even under a flat high-level budget that we've been getting from Congress over the last 10 years or so, we've been able to continue to meet targets, beat targets, see improvements. It's been very impressive, and our implementing partners are really the driving force behind that progress.*

Knowing that advancements toward disease control in more than 50 countries are possible under flat budget envelopes, donors like PEPFAR have seized upon data-based decision-making as a major stepping stone for both advancing public health worldwide and controlling costs that have grown exponentially over the past 20 years [201]. However, in spite of substantial investments in data systems, training, and reporting requirements,

investigations of health data quality management in LMICs reveal “[p]oor quality health data, poor management of [health information systems] and low usage of health information” [202, p. 286]. This is particularly true for cost-related information, as an analyst at PEPFAR declared:

*The data that we collect is inexact, because we’re only looking at PEPFAR funding. Other partners may be doing reproductive health work and some of that funding bleeds into the HIV work we do, but we don’t get a clear picture of the overlaps. It’s an issue we face with commodities too: It’s not like the Global Fund buys commodities that only go to Global Fund patients. A lot of aid money gets commingled and it’s hard to disentangle as data.*

To illustrate the drawbacks of periodic costing studies, a manager at USAID gave the example of NASA studies, which attempt to offer a holistic snapshot of HIV/AIDS-related spending in a country by all sources, stating:

*NASAs aren’t done on a regular basis, and countries don’t use them as much as they should. Plus, by the time a NASA is available, the data is a bit dated.*

Activity-based costing is therefore a niche alternative with wide-ranging potential. Described simply, activity-based costing generates unit costs for services and products by first identifying the activities an organization conducts and then assigning overhead and indirect costs to the products and services [203]. The methodology then normalizes the costs based on the volume of products (or services) stored and delivered.

Activity-based costing is not new; researchers have recommended its implementation in countries like South Africa and for DAH projects worldwide for years [204, 205]. In 2013, the United Nations called on DAH donors to develop a “Global Partnership on Development Data,” for the purpose of “improv[ing] the quality of information and statistics available to diverse interested stakeholders—people, government, international organi[z]ations, foundations and the private sector” [202, p. 285]. Recently, the world’s major multilateral,

bilateral, and philanthropic donors—comprising, *inter alia*, USAID, UNAIDS, the Global Fund, the Gates Foundation, and the US Centers for Disease Control and Prevention—engaged in months-long negotiations to do just that. Now, these organizations have formed a loose partnership aiming to develop and implement activity-based costing for HIV/AIDS programming globally [206]. For PEPFAR, activity-based costing represents “a key piece of the efficiency agenda,” and the bilateral organization envisions leveraging the costing initiative to inform host-country strategic planning as well as DAH program planning and management [207, p. 33, 208]. One PEPFAR manager elaborated:

*The ultimate goal [of activity-based costing] is to leverage host country data systems to be able to capture the cost data that’s needed to look at health programming on a routine basis without having to roll out cost studies—to have it integrated and institutionalized within [host country] data systems.*

Activity-based costing thus represents an alternative to one-time studies, potentially improving efficiency in data collection, sharing, and use as well as increasing the quality of DAH decision-making through more accurate information. And the donor agencies and philanthropies driving this costing initiative view HIV/AIDS as merely a first step. A USAID manager noted:

*The focus of activity-based costing has been on HIV, but in Kenya, for example, our [agency] Mission team said, “We’re working with the Ministry of Health to move forward on a universal health coverage package, but we still don’t have all the cost data that we need to identify what’s feasible. So, we need activity-based costing to be for more than just HIV.” And so, we aim to expand it beyond HIV to include other essential services, like for maternal and child health, malaria, tuberculosis. We still haven’t rolled it out yet.*

Furthermore, activity-based costing may hold the key to gathering cost information from multiple perspectives at once. For example, although PEPFAR impelled many countries to eliminate user fees and other OOP expenses for HIV-related services under Ambassador Bix, a manager at PEPFAR explained:

*Informal user fees still happen. As part of activity-based costing, we decided it's still important to try and capture what is OOP to the patient, because the activity-based costing approach is really following the patient and the system. But it doesn't account for transportation costs, opportunity costs of lost income to get to the facility or to receive care. So, through client exit interviews, we're able to capture that; it's all part of the approach. We've been able to parse out the economic cost to an individual. And a good thing we're seeing is low-to-no actual OOP costs in the facility for HIV services.*

Activity-based costing could therefore replace one-off studies of a healthcare payer's (i.e., government and donor) costs while concurrently providing decision-makers with the information that household surveys aim to capture. While the benefits of collecting this beneficiary perspective—e.g., ensuring that service providers do not levy unauthorized user fees on patients, tracking impact of Covid-19 on OOP costs—are readily apparent to governments and donors, the initiative has not yet progressed enough for donors to establish a set of analyses that will make use of the data. Explained a PEPFAR manager:

*When we mention allocative efficiency, a lot of times people think about allocating resources. That could entail a budget analysis, expenditure analysis, execution rates, those kinds of things. But there's also that bit around tradeoffs of funding one thing over another, around cost-effectiveness that people don't typically consider. With the results from activity-based costing, we've talked about doing CEAs and ECEAs. We have not gotten to a point of defining what our framework will really be. That's something we're currently developing.*

According to the interview participants, this multi-agency initiative is still in early days, and many of the benefits and challenges of activity-based costing remain unknown. The donors expect that the timeline to advance activity-based costing from pilot to institutionalized practice in multiple LMICs will stretch for several years. The global pandemic of Covid-19 has not halted the costing work, nor has it accelerated the timeline. One health economist explained:

*We're rolling activity-based costing out in a number of countries; Mozambique is one of them. It's moving forward, but Covid-19, of course,*

*has put a damper on all of this work.*

No doubt, the information that donors expect activity-based costing to reveal—economic costs of health programming, capable of disaggregation by stakeholder type, available in real-time—would have facilitated the preparation of Mozambique’s PEN V.

#### Dearth of data regarding OOP and private sector contributions for the PEN V

Both the Goals-ASM and Excel-based costing models used to create the PEN V budget presented a healthcare payer (i.e., government and donor) perspective. Even though the strategic plan champions community inclusion and the creation of public-private partnerships in order to generate financial resources that will ensure greater sustainability and engagement of PLHIV in the country’s HIV response, private sector and OOP expenditures accounted for less than 1% of the projected financing of the PEN V. The data sources that substantiated unit costs, such as a Global Fund assessment for human rights-related activities, seldom reported information beyond government and donor spending [209]. The country’s NASA for 2017-2018 reports precisely one household expenditure category, reported by an NGO, relating to the OOP purchase of condoms—0.09% of the total spend on HIV-related products and services in the country in 2018 [117].

Even the studies spearheaded to support the creation of the PEN V neglected to consider beneficiary and private sector costs. For example, a costing study of 27 nonbiomedical HIV prevention activities in the country reported unit costs based on information provided by 13 NGO implementing organizations regarding donor and government funding and activity outputs. In another example, several PEN V technical consultants creatively circumvented Covid-19 constraints by launching an online survey for PLHIV with the aim of engaging community feedback on potential strategies, activities, and

targets for the plan. This survey, however, did not include questions about the respondents' financial considerations—a lost opportunity to integrate technical and cost feedback and to link the coherence of the strategic and financial frameworks underpinning the PEN V.

Thus, while donor costs constituted 97% of the considered funding for Mozambique's HIV/AIDS response, information on economic costs for private sector and individual actors was largely unavailable for use during the PEN V development, which proved especially problematic given that “what gets measured gets managed” [210, para. 1].

During the creation of the PEN V, I therefore left breadcrumbs in the narrative and its corresponding annexes underscoring instances when the consideration of non-donor costs could complement the existing analysis. For example, the methods section of the Financial Landscape annex of the PEN V mentions that user fees for HIV services are prohibited and that time costs borne by individuals are not measured and therefore could not be used to sharpen the image of potential financial gaps and sustainability issues. As well, the Costing Process and Allocative Efficiency annex includes a complete list of the unit costs that the costing team analyzed. The introduction of this list explains that the costs use a healthcare payer perspective while omitting private sector and OOP cost considerations.

The aforementioned activity-based costing initiative may not reveal all of the patient and private sector costs incurred in Mozambique—or indeed anywhere; however, even an incremental improvement in capturing a more holistic picture of who pays to prevent, treat, and care for HIV infections would likely increase the ability of participants in the strategic planning process to optimize interventions and the use of financial resources [119, 211, 212].

A health economist working in southern Africa challenged:

*The powerful tools that are available to facilitate discussions are not often effectively used to inform [strategic plans], and that's the cost-effectiveness work being done.*



The potential positive impact of analyzing this additional information is likewise apparent to government and donor staff in the country. In February, near the end of the PEN V process, I received an email from members of the Multisectoral TWG inquiring whether the costing team could calculate the possible impact of social contracting with civil society organizations; in the end, we did not include such an analysis in the sustainability portion of the PEN V due to a lack of financial data related to social contracting.

### The case for including beneficiary perspectives in economic evaluations

During my interview with a former Minister of Health for Peru, the discussion of how to define value for money momentarily fell silent. Then, as if to frame my thesis for me, the minister declared:

*It's not only a matter of talking about value for money from the point of view of the country, but we also need to include—and this is probably what you're doing—to also include what it means to the people that are suffering from disease, because otherwise the whole implementation is going to be a failure.*

The economic case for including beneficiary perspectives in any analysis of value for money centers on a single question: *How is it bad business to consider the perspectives of the people for whom a product, program, or service is being designed?* A former country director of a philanthropic institution in India framed a germane example:

*Uttar Pradesh, for example, is a state with some 220 million people, and the government there spends \$2 billion per year on health. The people there spend \$10 billion on their own healthcare. Fast forward 10 years to 2030, the [Sustainable Development Goals] date, and the government's \$2 billion has become maybe \$5 billion. The people's \$10 billion has become \$50 billion. If you really wanted to transform healthcare for the people of the state, you'd work with the government, as well as the private sector, as well as the people to modulate how the people's \$50 billion is being spent. In Mozambique, in Nigeria, in Ethiopia, I would take the same view.*

To my knowledge, the economic cost of healthcare for individuals or families in

Mozambique has not been established through surveys or models. One interview participant explained the value that such information could hold:

*There is a famous experiment in Kenya which shows how demand drops off as the price of a bed net increases [for people]. Now that's a very useful piece of evidence for me if I'm imagining a primary care strategy, for instance.*

The interviewee alluded to the association between a beneficiary's willingness to pay and DAH program participation. Not only do governments and donors not want to waste money on strategies and programs that fail to draw participants, these stakeholders also appreciate that successful programs can yield an overall net economic benefit to society. This is exactly why the PEPFAR-funded Health Policy Plus project conducted an economic impact study of Mozambique's HIV/AIDS response for 2021-2030 while we were creating the PEN V [187].

One interview participant characterized the crux of net economic benefit bluntly:

*There's also a purely economic argument: If everyone who can buy our stuff dies, then who's going to buy stuff? I mean, it's a bad thing to say but...*

But governments and donors seldom capture or analyze beneficiary willingness to pay for health products or services or the affordability of interventions [180, 213]. Given the possibility of gathering such context-specific information via activity-based costing, donors and governments will have an opportunity to leverage the resultant information to inform their decisions—and impact the value for money of DAH programming on an ongoing basis.

The political case for the inclusion of beneficiary perspectives in value for money decision-making rests upon power dynamics that define DAH in general—not as they are, but as they ought to be. Given that the interview participants identified relationships and accountability as intrinsic aspects of value for money, the consideration (or not) of beneficiary perspectives constitutes a facet of the value for money of any given DAH decision.

When explaining the modern practice, a former country director of a philanthropic

institution commented:

*The Western world has a big interest in HIV/AIDS because of the impact on its own populations. Tuberculosis kills 300,000 people a year in India. HIV does not. So, one would imagine that any analysis would weigh far more in favor of tuberculosis control than HIV/AIDS, but that's not what you find on the ground—even from us. [What gets funded] is a combination of cost-effectiveness work and, you know, preferences of the donor.*

Several interviewees noted that donors will always have preferences and mandates. Indeed, individual beneficiaries, too, have preferences and purpose. The importance of including beneficiary perspectives in economic evaluations is to provide another datapoint to inform the combination of cost-effectiveness and donor preferences each time DAH decision-makers plan strategies or select programs. One interviewee explained why concentrating on one stakeholder's preferences alone is hardly value for money, stating:

*In strategic planning, there's a certain amount of politics that takes over. Some parties are just able to exert more influence and kind of get what they want, even if the numbers don't necessarily support the arguments.*

A former Health Secretary of India's Ministry of Health and Family Welfare shed light on how power imbalances and lopsided decisions can also occur within countries, citing a cogent but non-DAH-related example: the nationwide protests in India by millions of farmers which were sparked by "authoritarianism disguised as capitalism" in the form of new agricultural laws [214 – 217]. The former secretary said:

*One of the main reasons for the protests is that these three new farm reforms were simply stamped through Parliament. The people's views are normally expressed through their MPs [elected representatives]. This time, there was no debate and [the laws] were simply hustled through a voice vote. The present government has stopped the practice of sharing draft legislation online as well—an important way in which public participation happens.*

Active protests represent a dire eventuality of beneficiary exclusion from decisions about their health and livelihoods. Conversely, we can find examples of value for money

decision-making that successfully integrated an analysis of beneficiary economic costs: in the establishment of PEPFAR and the Global Fund, in Covid-19 economic relief for households and small businesses around the world, in menstrual hygiene management programming in LMICs, and in the creation of a cheap device to conduct VMMC without surgery [218 – 223].

Ord characterizes “getting good value for money with scarce resources [as] a substantial moral issue for global health” [224, p. 1]. The moral case for considering beneficiary perspectives of the value for money of health programs derives from the reality that individuals and families in LMICs are active participants in the DAH system, and they possess the fewest resources compared to other DAH stakeholders. Community-based participatory research has emerged to shed light on how programming is conceptualized, implemented, and experienced [225, 226]. Beneficiary perspectives on cost considerations are equally as valuable. One health economist framed the present situation:

*For a lot of the NGO world, “impact” has been defined as volume. For example, delivering 500 surgeries in a month in Nepal. Usually, what people are saying underneath that is: “Because we’ve delivered 500 surgeries, we’ve done good things for the patients.” Patients care about more than QALYs and DALYs. And the out-of-pocket expense part of the conversation has been the hardest to get organizations [that deliver services] to do anything about.*

Some organizations already collect data on beneficiary costs. An NGO leader in Haiti described his experience discussing OOP costs with focus groups:

*Those questions came up often in focus groups: “How do you afford medicine for people? How do you afford your healthcare costs?” Most of the time, they [the participants] have more complaints than suggestions for you, but they contribute both.*

Qualitative data, from focus groups for instance, can contextualize quantitative data. Many times, however, analysts and decision-makers do not harmonize the two types of data to inform strategic planning or program design. One PEPFAR analyst explained:

*Many people might look at a unit cost and say, “Let’s go with what’s cheaper.” But there’s context that’s sometimes missing... that gets lost in those nuances, in value for money.*

Still, no maestro could bring qualitative data on beneficiary experiences into harmony with quantitative data on healthcare payer costs when beneficiary costs are excluded. The quantitative data must be congruous with the qualitative data—either as a single perspective (e.g., donor costs and insights, beneficiary costs and insights) or in a societal perspective that sums all costs and contextualizes them with insights from the diverse group of stakeholders.

### **Aim 3: Proof of concept for value for money from a beneficiary perspective**

*All across rural Liberia there were broken water pumps because communities couldn’t come up with 5 or 10 Liberian dollars to replace a piece. Now, if you don’t pay the out-of-pocket costs, it means getting water from creeks at the risk of cholera and other diseases. But projects stalled and fizzled out because people didn’t pay anything, even though these borehole pump projects were designed so that there would be some out-of-pocket payment. And as hard as it is for us city-dwellers to think, “Ah, there’s no way someone doesn’t have 20 Liberian dollars,” that money means a lot to a person so far away [from the city].*

– Former Minister of Public Works in Liberia

### CEA results

Single-month ARV distributions in health facilities were not cost-effective from either the patient or healthcare payer perspective. This analysis demonstrated the benefit to the CNCS of pivoting away from its pre-Covid-19 practice of 1-month distributions for all PLHIV.

From a patient perspective, 3-month ARV distributions in communities through mobile brigades are cost saving compared to the status quo 3-month ARV distributions in clinics, averting 1.53 additional DALYs while costing \$19 less per person in lifetime OOP and time costs (see Figure 9). A probabilistic sensitivity analysis demonstrated that these mobile brigade distributions are cost-effective for patients with a willingness-to-pay threshold below

**Table 6: Cost-effectiveness of the HIV interventions from the patient and healthcare payer perspectives.**

Intervention	Total cost per PLHIV	Incremental cost*	Incremental DALYs averted*	ICER (cost per DALY averted)
<i>Patient Perspective</i>				
3-month clinical ARV distribution	\$43	reference	reference	reference
3-month community ARV distribution	\$24	-\$19	1.53	cost saving
6-month clinical ARV distribution	\$26	\$2	-2.14	dominated
Bundled 3-month community & 6-month clinical distributions	\$29	\$5	-1.73	dominated
3-month clinical ARV distribution with LTFU case management	\$63	\$39	1.29	\$30
1-month clinical ARV distribution	\$118	\$55	-2.32	dominated
<i>Healthcare Payer Perspective</i>				
3-month clinical ARV distribution	\$1,980	reference	reference	reference
6-month clinical ARV distribution	\$1,609	-\$371	-0.61	\$608 <sup>‡</sup>
Bundled 3-month community & 6-month clinical distributions	\$1,970	-\$10	-0.20	ext. dominated
1-month clinical ARV distribution	\$3,100	\$1,120	0.51	ext. dominated
3-month community ARV distribution	\$5,104	\$3,124	1.53	\$2,042
3-month clinical ARV distribution with LTFU case management	\$9,654	\$4,550	1.29	\$3,527

Abbreviations: antiretroviral drug (ARV); disability-adjusted life year (DALY); human immunodeficiency virus (HIV); incremental cost-effectiveness ratio (ICER); lost-to-follow-up (LTFU); person living with HIV (PLHIV).

All values discounted 5% per year, and all currency values are in 2020 US\$.

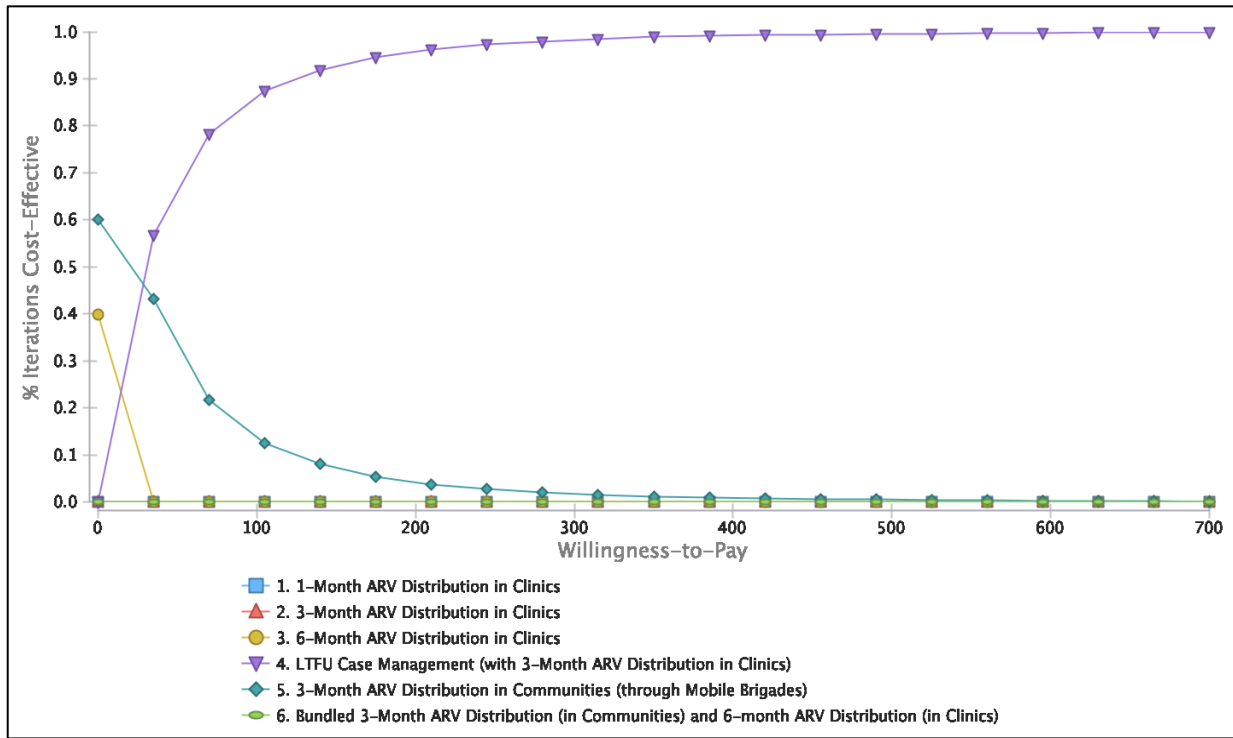
\*Incremental costs and incremental DALYs averted are calculated as the increment between an intervention and the next non-dominated intervention.

<sup>‡</sup>When compared to the reference intervention, 6-month clinical ARV distributions cost less but avert fewer DALYs. This means that the reference intervention is only cost-effective if the willingness-to-pay threshold is greater than \$608 per DALY averted. When the threshold falls below \$608, 6-month distributions are optimal for the healthcare payer perspective.

\$30 per DALY averted 60% of the time. At this same low willingness-to-pay threshold, 6-month distributions in health facilities represent the cost-effective choice 40% of the time. At a willingness-to-pay over \$30 per DALY averted, 3-month ARV distributions in clinics with case management services for patients LTFU become cost-effective from a patient perspective, averting the most additional DALYs of any intervention compared to the status quo (1.29 DALYs averted).

From the healthcare payer perspective, 6-month ARV distributions in clinics are cost-effective at willingness-to-pay thresholds below \$608. This intervention averts the fewest

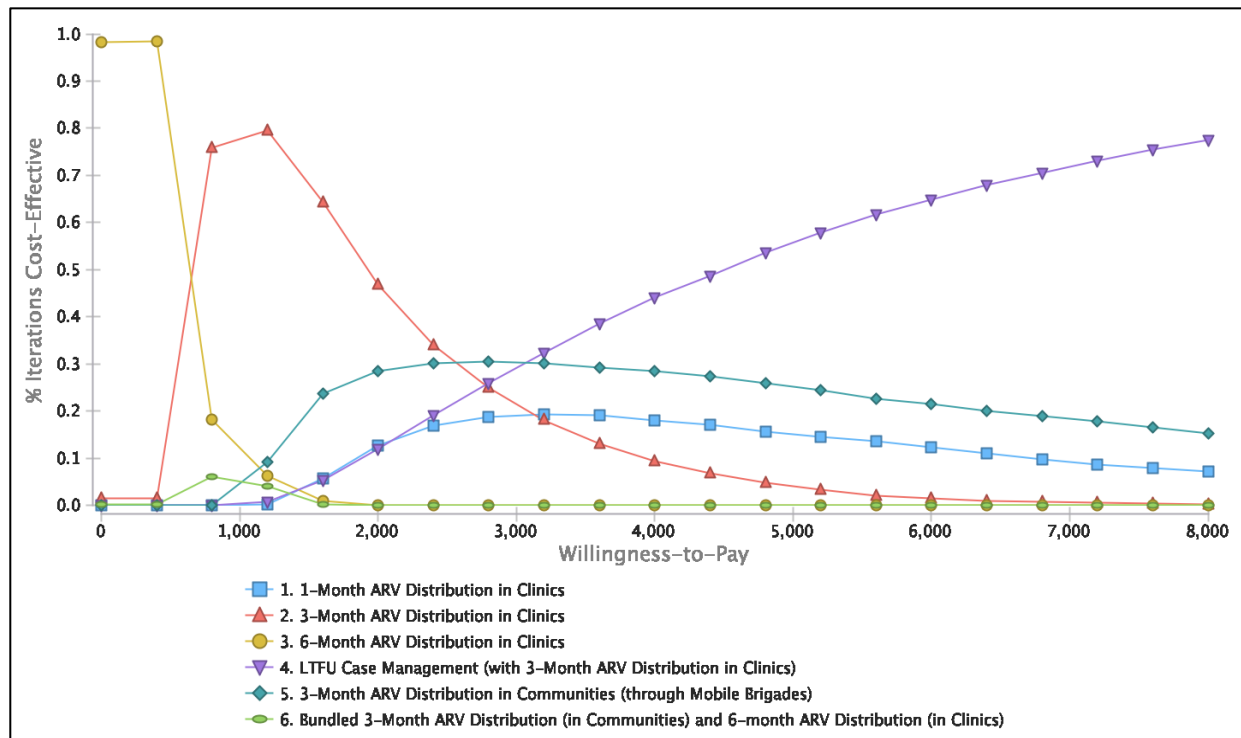
**Figure 9: Probabilistic sensitivity analysis of program cost-effectiveness from the patient perspective.**



DALYs of the six modeled treatment strategies but also costs less than the status quo reference intervention; this intervention costs less than other interventions in the healthcare payer perspective because of the decreased number of patient visits to health clinics (twice annually after the first year of treatment). For a willingness to pay between roughly \$600 and \$2,700 per DALY averted, the healthcare payer perspective ranks 3-month ARV distributions in clinics as the cost-effective choice because of the lowered risk that patients who are LTFU then fail to return to treatment compared to 6-month distributions (see Figure 10). Thus, even though the probabilistic sensitivity analysis shows that other interventions may be cost-effective less than 30% of the time in that willingness-to-pay range, 3-month clinical ARV distributions stand as the cost-effective choice at the expected \$1,500 willingness-to-pay threshold (see Table 3 in Chapter 3).

Because donors subsidize Mozambique’s HIV treatment programs so heavily, a

**Figure 10: Probabilistic sensitivity analysis of program cost-effectiveness from the healthcare payer perspective.**



willingness to pay above \$1,500 may be reasonable, which could mean that 3-month community ARV distributions through mobile brigades are cost-effective for the healthcare payer perspective like they are for the patient perspective. Beyond a willingness-to-pay threshold of \$3,500 per DALY averted, 3-month clinical distributions with case management for LTFU patients become cost-effective.

For patients and healthcare payers alike, the LTFU case management intervention option represents the cost-effective choice at higher willingness-to-pay thresholds because of the additional DALYs averted by the heightened rate of return to ART that case management provides people who are LTFU. As well, the intervention strategy is based on a pattern of 3-month ARV distribution in clinics, which confers lower costs than the pre-Covid-19 norm and a lowered likelihood of a patient being LTFU during treatment.

All multi-month ARV distributions (e.g., 3- and 6-month options) proved superior to



1-month distributions in OOP costs, clinical visit costs for the payer, and LTFU risk. Each strategy that offered multi-month distributions, however, included 1-month distributions for the first 12 months of the analysis in order to align the model with the common clinical practice of closely following patients until they become virally suppressed (or they near viral suppression) before switching to multi-month distributions.

Overlaying the patient and healthcare payer perspectives revealed no clear, best-pick interventions across both perspectives, which illustrates the danger inherent to planning DAH programs based solely on donor preferences and perspectives. Six-month prescriptions of ARVs may prove cost-effective for both perspectives if costs for patients fall to the lower end of the expected range and the healthcare payer willingness to pay falls below \$608 per DALY averted. Meanwhile, 3-month clinical ARV distributions with case management services for PLHIV who are LTFU may also be cost-effective for both perspectives if the healthcare payer's willingness-to-pay threshold for lifetime HIV treatment costs is greater than \$3,500 per PLHIV (seven times GDP per capita). While case management would likely cost less for both patients and healthcare payers if the strategy were coupled with 6-month prescriptions instead of the status quo 3-month prescriptions, the ability to identify people who were, in fact, in need of LTFU case management would also likely decline. This analysis did not model a bundled intervention with 6-month distributions and case management.

A probabilistic sensitivity analysis also demonstrated that 3-month community ARV distributions through mobile brigades are cost-effective for the healthcare payer at a willingness to pay above \$1,500 per DALY averted in roughly 30% of the model iterations. The CNCS should consider ways to reduce the healthcare payer costs and to improve the LTFU return-to-treatment rate of this intervention, both of which would increase the intervention's cost-effectiveness. From the patient's perspective, 3-month community ARV distribution through mobile brigades is cost-saving, which may motivate improved patient

adherence and lower LTFU.

Although this CEA modeled the interventions as competing choices, the CNCS may implement more than one of these strategies concurrently, even if only in select provinces throughout the country. Additionally, case management—in spite of its willingness-to-pay threshold over \$3,500 per DALY averted for healthcare payers—may yet represent value for money to the government and donors in meeting the equity goals for the country’s HIV/AIDS response if deployed in communities with especially high LTFU rates or low return-to-treatment rates.

#### What this CEA revealed that an ECEA could not have shown

This study demonstrates that many interventions suggested by donors may not be cost-effective—for the donors or the patient population. While the CNCS and its associated technical working groups have the prerogative to select which programs the public health sector will implement throughout the country, patients retain the ultimate power of selecting programs to use—even at the peril of not participating in any programs, as the high LTFU rate in Mozambique exemplifies [147].

Since HCD has become such a commonplace technique for gathering local insights and buy-in for future health programs, performing costing analyses from the perspectives of, at least, the main beneficiaries as well as the overarching health system will reduce the risk of creating unrealistic program plans in countries where people rarely have alternative means for adequate healthcare [227, 228]. Notably, modeling the perspectives separately allows the health program decision-maker to see the costs per DALY averted for each intervention in the context of an individual patient as well as the healthcare payer. Integrating beneficiary perspectives with healthcare payer perspectives muddles the ability to glimpse the tradeoffs that beneficiaries make in order to participate in a program (e.g., their lower willingness to

pay). Ignoring OOP costs would miss the opportunity to design the program to maximize social welfare while avoiding unnecessary adverse economic distribution burdens on the beneficiaries. Simply put, it is not enough to know which interventions are cost-effective to society without knowing who bears those costs.

Cost-effectiveness modeling with different perspectives during strategic and operational planning or program design can not only save donors and beneficiaries resources, CEAs can also make the most of existing resources. A CEA like this can make use of the patient versus healthcare payer cost data that the activity-based costing initiative may reveal in order to uncover whether interventions marketed to the public as “free” still present patients with opportunity costs that render HIV treatment inaccessible. This analysis can then serve to fill critical gaps in conversations with local communities about expected OOP expenditures, with host country governments about the costs of transitioning programs from donor portfolios to local budgets, and with donor organizations about the potential benefit of targeting specific interventions. In this Mozambique example, the simulation determined that neither the pre-Covid-19 ARV distribution model nor the bundled 3-month community and 6-month clinical distribution is cost-effective for beneficiaries or the healthcare payers.

#### How these CEA results impacted the PEN V and HIV/AIDS programming overall

Because I conducted this CEA much later in the strategic planning process than initially planned (in February-March 2021 rather than November-December 2020), the timeframe for capturing the effects of the analysis on the design of HIV/AIDS programming for inclusion in this doctoral thesis shrank—as if to illustrate the time horizon limitations described earlier in this chapter. As we were finalizing the PEN V narrative in February, members of the Multisectoral TWG questioned the possibility of analyzing technical efficiencies that could improve PEN V implementation. Specifically, the members requested

information on the possible impact of multi-month ARV distribution. I shared this analysis with several of the members to provide information on the potential effect and cost-effectiveness of such a change to the country's distribution model. At the time of writing this document, however, it is yet unknown how the analysis will impact the decisions that the CNCS and its collaborators make.

Without including data from this CEA, I did note the potential benefits of perpetuating the switch to multi-month ARV distributions, which PEPFAR and UNAIDS have recommended in the country for several years and which surged to widespread implementation as a result of the Covid-19 outbreak, in the Costing Process and Allocative Efficiency annex of the PEN V as a suggestion to consider in future program optimization efforts. Having since shared the CEA study with the CNCS and Multisectoral TWG, it is possible that further optimization efforts will happen during implementation of the PEN V.

### **Enabling change**

*For PEPFAR, the emphasis is on data, data, data. And there's the gold standard of how you do [evaluations], but there are other ways you can do it, too. When you're in an environment where you have very limited budgets—and governments have limited budgets—and limited data to work with, you have to be more realistic.*

– Manager at PEPFAR

### Value for money in the PEN V

The PEN V process is an example of value for money in action. We, the consultants, supported the government and donor representatives to craft a national strategy based on all of the considerations comprising value for money in a collaborative approach that juggled countless tradeoffs. To do so, we engaged in a near-constant dialogue and iterative design process over nine months. Assuredly, key figures of the CNCS and TWGs presided over these

discussions and decisions, directing the work of the costing consultant team and our colleagues. The terms of reference for the international costing consultancy outlined the scope of my contributions to the PEN V and its value for money.

Throughout the creation process, we calculated the plan's expected financial resources (i.e., economy). I spearheaded the development of an Excel-based tool for gathering information from the TWGs which could also be used in future collaborations (e.g., with PLHIV community groups). I also led the creation of our extensive list of HIV-related unit costs, which contains details concerning the assumptions and calculations behind each cost, that the CNCS can leverage during future strategic or operational planning. These tools solved technical challenges related to knowledge management and access in order for us to conduct the PEN V costing.

The CNCS and the TWGs identified allocative efficiency as a priority goal for the PEN V costing. A fellow consultant working for Avenir Health ran the Goals-ASM models. The Harvard team met with that consultant often to develop and analyze the scenarios and allocative efficiency of the 20 intervention areas. Leading these meetings with the costing consultants equipped me with a comprehension of the tradeoffs inherent to prioritizing one strategic objective over another (e.g., prevention of new HIV infections versus prevention of AIDS-related deaths). We detailed these tradeoffs in the PEN V narrative and its annexes.

While the modeling for the PEN V optimized allocative efficiency among interventions (e.g., VMMC versus economic empowerment to prevent new infections), it did not account for differences in the modality of interventions (e.g., surgical VMMC versus PrePex devices). We therefore based the unit costs on averages; for example, we agglomerated all HIV testing modes—e.g., clinical testing, self-testing, community-based testing—into a single unit cost. My CEA offered an opportunity to evaluate the next level of operational nuance, contrasting the cost-effectiveness of different HIV treatment modes in a competing choice model. I

intentionally conducted the CEA after fulfilling the analyses that the CNCS requested so as not to prioritize work for this doctoral thesis over the activities outlined in the terms of reference for the Harvard team's contributions to the PEN V.

Relationships, too, likely impacted the PEN V's value for money—both those that existed long before the strategic planning process as well as those initiated during the plan's development. To be sure, the passionate and expert colleagues with whom I collaborated over the course of this project enabled change as much as I did. I acted as a professional in a deliberative process, performing functions that impacted the value for money of the national strategy. Perhaps the principal lesson learned during this doctoral project is that no one creates value for money all by themselves.

#### Value for money successes

One achievement of our PEN V costing was the creation of a scenario that modeled an optimized activity set and budget for the CNCS to use in case of constrained financial resources. Not only can donor prerogatives shift over time, but emergencies, like Covid-19, can alter available funding levels as well as the timeline of already committed donor dollars.

The complete list of unit costs stands as another success. The PEN V describes activities and allots funds necessary to construct a complete unit cost repository and train CNCS staff to administer it. This inclusion will build local capacity to systematize and control cost considerations for future program planning and budget management.

Finally, our modeling and allocative efficiency work resulted in a 42% reduction in the expected cost per HIV infection averted beyond baseline compared to the cost in Mozambique's previous strategic plan (from \$3,677 estimated for the PEN IV<sup>9</sup> to \$2,116 for

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<sup>9</sup> This decrease is likely due to multiple factors, including the decreasing costs of consumables and medications, noise in the Goals-ASM model, and optimization of interventions through the modeling. While the cited article

the PEN V) [229].

### Limitations of this doctoral project

This project, like all projects in the DAH universe, encountered some hiccups over the course of its execution. While many aspects of the project were successful and still others resulted in lessons learned for future studies and strategic plans, there remain several limitations for this thesis to disclose.

First is a crucial limitation to my interviews. This study tried to capture the definition and use of value for money in DAH programming—while promoting the consideration of beneficiary perspectives—yet I did not interview any individual community members. Although there is no shortage of qualitative research on individual values and preferences concerning DAH program design, impact, cost, etc., this shortcoming, motivated largely by Covid-19's travel restrictions, represents an opportunity for future research. I plan to draw from my interview findings to craft standalone documents that can serve as resources for decision-makers on value for money and complement the wealth of existing qualitative research on individual values.

Another limitation relates to conducting a CEA. The CEA and its methods for comparing two perspectives that I propose in this doctoral thesis require some training and access to specialized computer programs. One interview participant cast doubts that an international NGO he consulted for will sustain ECEAs long-term:

*The ECEA framework is not winning out in their current conversations about how to evaluate [themselves] moving forward. Because it's somewhat complex, it takes a lot of work. They liked the results, but they're scared off, I think. I don't know where they're going to come down in the end, but they're*

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estimates the cost per infection averted for the PEN IV as \$16,612, this calculation divides the total cost (rather than incremental cost over baseline) by the incremental effect [229]. We recalculated the quotient using incremental costs and effects to arrive at \$3,677 per infection averted.

*considering other frameworks against which to measure themselves and value for money has kind of moved down on their priority list.*

It, therefore, may not be realistic to expect any LMIC government to uptake this CEA methodology I have presented without technical and financial support from a university, think tank, or donor agency. Furthermore, juxtaposing these CEA perspectives did not present an obvious cost-effective choice for HIV treatment programming. The comparison did identify two treatment modalities that were cost-effective for neither the healthcare payer nor the patients, however, which could help donors deprioritize those interventions.

Additionally, I did not conduct trainings with CNCS staff and TWG members on the costing tools and models we used to create the PEN V costing, as initially planned in the terms of reference. Under more normal circumstances, the Harvard team would have delivered trainings while we costed the PEN V during a short-term technical assistance trip to Mozambique. Travel restrictions due to Covid-19, however, rendered such in-person support impossible. Thus, we tentatively made plans to conduct the trainings after finalizing the PEN V. As of yet, those plans have not come to fruition.

Finally, the delays of the PEN V development meant that this doctoral thesis captures a process to create a product that Mozambique's Government has yet to certify as complete. This could result in discrepancies between the contents of this thesis and the information that the Government of Mozambique releases in its final draft of the strategic plan.



## CHAPTER 5: CONCLUSIONS

As the interview participants of this doctoral project noted, donor-funded health programs can promote healthier, more productive lives in LMICs while concurrently facilitating host-country government investments in other programmatic areas, which improve the lives of local citizens still further. This doctoral thesis does not examine the application of value for money frameworks to macro-level decisions that prioritize vaccinations versus bridges or clean energy versus education. The donor agencies that have created these value for money frameworks—as well as the governments that leverage the framework components for strategic plans and partnerships—often select the technical areas to which they will devote financial resources based on publicized and undisclosed priorities [230, 231]. This project instead centers on the micro-level considerations of value for money that governments and donors contemplate after making the decision to devote resources to health. Joining the PEN V development process offered me the opportunity to ascertain what value for money meant to the CNCS and its collaborators within the context of a comprehensive, nationwide HIV/AIDS response.

While metrics and methods for analysis exist for certain aspects of value for money, no yardstick measures every facet of value for money at once. There is no such thing as 15% or 82% value for money. The experts who participated in interviews for this thesis rebuffed the practice of assessing only one aspect of value for money without equally examining the other aspects. Thus, decision-makers must piece together a vision of value for money for each activity, service, and product by juggling tradeoffs between economy, efficiency, effectiveness, equity, cost-effectiveness, and sustainability for the assorted stakeholders within a particular context; furthermore, this doctoral project identifies three additional cross-cutting elements of value for money that DAH stakeholders heed in decision-making: transparency, accountability, and relationships. Interestingly, neither the interview participants nor the

PEN V process cited quality as a consideration in value for money.

Throughout the development of the PEN V, I coordinated with other consultants, the country's TWGs, and members of the CNCS to piece together a new strategic vision. Value for money in Mozambique's HIV/AIDS response came to center upon high effectiveness, with the country aiming to achieve global UNAIDS targets on or ahead of schedule. We did not, however, eschew consideration of the plan's economy; in fact, we maximized allocative efficiencies and cost-effectiveness within the PEN V timeframe while basing the plan on a realistic "major increase" in funding, which could yield long-term economic benefits for the country [187]. Our inclusion of the complete unit cost list in an annex of the PEN V reflected the transparency of our costing process and target setting. The PEN V's focus on social contracting and increased domestic engagement substantiated the country's push for greater sustainability and accountability—to donor agencies and private sector entities collaborating to end HIV/AIDS as a public health threat as well as to the population. One of the plan's nine strategic objectives focused on the promotion of equity and human rights while other strategic objectives included interventions to foster economic, legal, and social advancements for specific beneficiary groups, such as adolescents and young women.

As expected, these tradeoffs introduced limitations into the strategic plan as well. Although the PEN V proposed activities to bolster involvement of local companies and NGOs in the activity implementation, the plan's budget represented more than 5% of the country's GDP, which no LMIC reasonably expects to sustain without continued donor assistance [193]. Similarly, the time horizon for the strategic plan influenced which interventions represented cost-effective programming for the prevention of new infections and deaths; this timeframe may negatively impact the sustainability of the PEN V's HIV response or its accountability to the country's youth who are not yet at such high risk of contracting the virus.

The DAH program design process does not always include all stakeholders, and the

historical trajectory of DAH programming has demonstrated that overemphasizing one stakeholder's vision of value for money is possible. Including would-be beneficiaries in the design process does not preclude donor-funded programs from perpetuating a lopsided view of value for money which de-emphasizes the importance of economic costs to individuals. Nevertheless, including beneficiaries in the technical design and strategic planning of health programs does offer a foothold for future improvements. As the interviews and PEN V participant observation of this project revealed, opportunities arise in the planning of DAH programs for beneficiaries to express their perspectives on value for money. Focus groups and community surveys, for example, can provide community members with the chance to shed light on beneficiary financial constraints and contributions (e.g., local willingness-to-pay parameters for health services). For this project, I attempted to include individual costs in an economic evaluation that commonly supports DAH decision-making (i.e., a CEA) in order to exhibit the potential benefits of furnishing another perspective for the more regular decision-making representatives. The roll-out of activity-based costing in LMICs may provide information on OOP expenditures that supplements healthcare payer considerations in the future. Though spotlighting beneficiary cost considerations may appear to complicate decision-making efforts based on the CEA study I conducted, donors and governments alike stand to gain insights that can only benefit strategic planning and program design by adding this perspective to economic evaluations.

## **Recommendations**

This doctoral project exposed certain aspects of value for money in donor-funded health programs that resonate beyond Mozambique's strategic planning process. Here, I offer three recommendations for the DAH community in Mozambique and around the globe.

## Recommendation 1: Sustaining the tools developed for the PEN V

Before commencing the PEN V process, the CNCS and its collaborating organizations recognized the need to build a Mozambique-specific unit cost repository for HIV-related costs. I led the creation of a lengthy list of unit costs as part of the PEN V costing, and we included that list in the Allocative Efficiency annex of the plan in order to inform future strategic plans. This list can also form the basis of a unit cost repository, which will no doubt require updating on a regular basis. I, therefore, recommend that the CNCS leverage the ongoing activity-based costing study—coordinated by PEPFAR, Global Fund, and multiple other donors that are already invested in Mozambique—to populate the unit cost repository with unit costs broken down by relevant perspectives (e.g., patient out-of-pocket expenditures, donor funding) at least twice annually to keep costs from becoming outdated.

This recommendation to create and update a unit cost repository pertains to other countries as well. The Bill & Melinda Gates Foundation financed the creation of the Global Health Cost Consortium (GHCC) database, which houses studies that determine unit costs and the cost-effectiveness of countless health products and services in LMICs [232]. The database is fully functional and free to use, yet it remains unfamiliar to many. If the GHCC transitions this database to a health finance-related TWG in an LMIC (or to a collective of TWGs across multiple LMICs), the GHCC could invigorate South-South collaboration; increase the likelihood that this resource informs future strategic planning; and save countries like Mozambique upfront investments required to build one-off, internal unit cost repositories.

Even if this transition to LMIC “ownership” of the GHCC database requires that the Gates Foundation continues to pay for the database’s online storage while LMIC country governments, TWGs, or university partners institutionalize the technical use and upkeep of the website—part of the financial sustainability debate mentioned in Global Theme 2 of

Chapter 4—the move would likely extend the value for money of the GHCC investment beyond the project’s initial time horizon while incorporating new tradeoff considerations regarding effect, equity, sustainability, relationships, and transparency.

### Recommendation 2: Address value for money as a technical + adaptive challenge

Much of Chapter 2 of this doctoral thesis details the use of economic evaluations to demonstrate value for money for donor-funded programs. These economic evaluations (e.g., CEAs, ECEAs, BCAs) provide a level of scientific rigor to justify the selection of specific services and products; however, this rigor can foster a false sense of objectivity and correctness. As the interview participants of this doctoral project stated: These analyses always omit something important. Even if governments and donors adopt wholesale my recommendation to incorporate beneficiary perspectives into CEAs, their results will not present a clear value for money choice. The CEA that I devised for this doctoral project—with its mismatched results for beneficiary and healthcare payer perspectives—evinces this fact clearly. Ultimately, the shortcoming lies in the purely technical nature of the tool.

Value for money is always context-specific and, consequently, always presents a challenge that requires adaptive solutions. Even tools like ECEA and SROI, which attempt to integrate consideration of equity and social justice into their analysis, exclude context-critical information. These tools approximate reality in models, which can supply decision-makers with critical information but which never spit out “the answer.”

In the PEN V, prioritizing VMMC for males over 15 years old represented allocative efficiency, but we could not reasonably suggest eliminating all circumcisions for younger males. Concentrating resources for HIV prevention in metropolitan areas may have registered as cost-effective, but doing so would undermine the CNCS’s commitment to equity so we never entertained the idea. This doctoral project offered me the opportunity to analyze

cost-effectiveness through several models and to leverage that analysis in discussions about tradeoffs which ultimately shaped a national strategic plan. Thus, while this thesis attempts to standardize the use of beneficiary perspectives in CEAs, the doctoral project embodies a more important lesson: There are no roadmaps to value for money, only compasses.

The multifaceted technical + adaptive nature of value money raises the question: *What constitutes evidence-based programming if value for money is not quantifiable?* For some donors, the tendency seems to entail reverting to an overreliance on CEAs. For participants in this project's interviews, however, the answer lies in the best practice of coupling economic evaluations with qualitative data that contextualizes any innovation, activity, or product. These experts thereby continue to learn about technical solutions for health problems without omitting consideration for the nuances of daily life and each donor's ethos [233].

### Recommendation 3: Begin the transition process for donors as well

As many LMICs face decreasing donor investments and increasing calls for local sustainability, donor agencies must also begin grappling with the likelihood of a future wherein the present DAH paradigm no longer exists. What becomes of donor organizations when LMICs strengthen their health systems, transition to domestic funding sources, and develop more effective responses to health threats? While bilateral, multilateral, and philanthropic organizations could all shutter their doors, a more realistic and ethically consistent eventuality would see these agencies transition into facilitator roles. Whether this entails the donors charging (internally or externally) for their technical assistance to LMIC governments and implementing organizations or the donor agencies continue to financially support LMICs while local organizations take on the technical work—or some mixture of both—the Journey to Self-Reliance will likewise impact the donor agencies, their staff, and

the organizations that implement DAH programs.

### **Final thoughts**

As this project offers a step forward in conceptualizing value for money of donor-funded health programs, areas for future study emerge. Investigation of the relationship between value for money and quality could further refine the definition of value for money as well as elucidate the power dynamics that determine whose values and which costs are prioritized in instances when quality deviates from expectations. Similarly, new CEAs that model beneficiary perspectives could describe how the analysis edifies DAH programming, further legitimizing (or debunking) the usefulness of including the perspective in economic evaluations. Finally, a retrospective evaluation of the PEN V—and similar strategic plans—could probe the ability of governments and donors to predict value for money.

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## APPENDICES

### Appendix 1: Interview guiding questions

1. Who are the typical stakeholders that your organization speaks with or researches when designing a new health program?
2. How does your organization gather information on local population preferences?
3. What does your organization use information on local preferences for?
4. About what percentage of your organization's programs use a form of community engagement (like HCD or community-based participatory research) to define program activities?
5. On average, how much do users/beneficiaries have to pay out of pocket to participate in a health service that your organization offers—any service, whichever one you're most familiar with?
6. How does your organization define “value for money”?
7. In what contexts is “value for money” discussed at your organization? How is it used?
8. How does your organization typically calculate value for money? What is the biggest challenge in doing so?
9. When your organization submits a proposal for donor funding, what percentage of donor demands does the proposal address? Does the proposal address the demands of other stakeholders? If so, which ones? How?
10. Have you ever seen an organization or government conduct calculations for beneficiaries or patients? If such studies existed, would they be useful to your organization?

## Appendix 2: Microsoft Excel-based tool for PEN V intervention mapping

No. (Number)	Componente da Intervenção (Intervention Component)	Subcomponentes (Subcomponents)	Medida para os Resultados (Unit Measure for the Results)	População Alvo (Target Population)	Géografia Alvo (Target Geography)	Resultado Esperado em 2021 (Expected Result in 2021)	Resultado Esperado em 2022 (Expected Result in 2022)	Resultado Esperado em 2023 (Expected Result in 2023)	Resultado Esperado em 2024 (Expected Result in 2024)	Resultado Esperado em 2025 (Expected Result in 2025)
<b>Exemplo: Preservativos</b>										
	Preservativos fornecidos à população inteira		Quantidade TOTAL de preservativos distribuídos	População TOTAL	O país inteiro	100000	100000	100000	82000	73000
		Preservativos fornecidos à população alvo	Quantidade de preservativos distribuídos	HSH	O país inteiro	40000	40000	30000	20000	18000
		Preservativos fornecidos à população alvo	Quantidade de preservativos distribuídos	MTS	O país inteiro	10000	10000	10000	12000	15000
		Preservativos fornecidos à população alvo	Quantidade de preservativos distribuídos	População geral	Maputo, Gaza, Zambezia, centros urbanos	20000	20000	30000	25000	20000
		Preservativos fornecidos à população alvo	Quantidade de preservativos distribuídos	Raparigas e mulheres, jovens	O país inteiro	30000	30000	30000	25000	20000
<b>EXEMPLO</b>										