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SUSTAINABILITY ANALYSIS OF HIV/AIDS SERVICES IN THE REPUBLIC OF COTE D'IVOIRE, USING HAPSAT

October 2009

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ACRONYMS

AB	Abstinence, Be Faithful
ABC	Abstinence, Be Faithful, Condoms
AIDS	Acquired Immunodeficiency Syndrome
ART	Antiretroviral Therapy
ARV	Antiretroviral drug
BCC	Behavioral Change Communication
CBO	Community-based Organization
CD4	Cluster of Differentiation 4
CHR	Regional Hospital (Centre Hospitalier Régional)
CHU	Teaching (Tertiary) Hospital (Centre Hospitalier Universitaire)
CNLS	National Advisory Board for the Fight Against AIDS (Conseil National de Lutte contre le SIDA)
CSS	Care and Support Services
CSO	Civil Society Organization
CT	Counseling and Testing
FTE	Full-Time Equivalent
GF	Global Fund to Fight AIDS, Tuberculosis and Malaria
HAPSAT	HIV/AIDS Program Sustainability Analysis Tool
HIV	Human Immunodeficiency Virus
IEC	Information, Education and Communication
LOE	Level of Effort
MAP	Multi-Country HIV/AIDS Program (World Bank)
M&E	Monitoring and Evaluation
MEN	Ministry of National Education (Ministère d'Éducation Nationale)
MLS	Ministry for the Fight Against AIDS (Ministère de Lutte contre le SIDA)
MSHP	Ministry of Health and Public Hygiene (Ministère de la Santé et de l'Hygiène Publique)
MTC	Mother-to-Child
NASA	National AIDS Spending Accounts
NGO	Nongovernmental Organization
NHA	National Health Accounts

OI	Opportunistic Infection
OVC	Orphans and Vulnerable Children
PC	Palliative Care
PEP	Post-Exposure Prophylaxis
PEPFAR	President’s Emergency Plan for AIDS Relief
PLHIV	People Living with HIV
PMTCT	Prevention of Mother-to-Child Transmission of HIV
PNDS	National Health Sector Plan (Plan National de Développement Sanitaire– PNDS)
PNOEV	National Program for the Care of Orphans and Vulnerable Children (Programme National des Orphelins et Enfants Vulnérables du fait du VIH)
PNPEC	National Program of Medical Care for PLHIV (Programme National de Prise en Charge médicale des personnes vivant avec la VIH)
RCI	Republic of Cote d’Ivoire (République de Cote d’Ivoire)
RETRO-CI/CDC	Retrovirus-Cote d’Ivoire/Center for Disease Control
SCMS	Supply Chain Management System
STI	Sexually Transmitted Infection
TB	Tuberculosis
TDF	Tenofovir disoproxil fumarate
UNICEF	United Nations International Children’s Emergency Fund
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

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EXECUTIVE SUMMARY

BACKGROUND

The Republic of Cote d'Ivoire (RCI) has an HIV/AIDS prevalence rate of 3.9 percent, the highest in West Africa.¹ The epidemic has had a profound impact on the country's population and every dimension of its health system as well as its capacity for socioeconomic growth. In this context, RCI has implemented a multi-sector approach to fighting the epidemic and mitigating its impact on Ivoirians, through several ministries and agencies. The HIV program covers a wide range activities, and has resulted in more readily available HIV counseling and testing (CT), prevention of mother-to-child transmission (PMTCT) services being offered in over 150 facilities, and free antiretroviral medication (ARV) for people living with HIV provided at all public health facilities. Prevention activities have been intensified and focus placed on such areas as CT, behavioral change communication (BCC), PMTCT, condom usage, and prevention of accidental exposure. Despite this effort, however, the number of patients on ARV remains low in terms of need addressed (approximately 30 percent of those eligible in 2008), BCC is limited, and PMTCT remains far from achieving its target of universal coverage.

The financing availability and requirements of the current program and its scale-up remain uncertain and unsatisfied. This is because the bulk of the financing for RCI's HIV program both currently and in the near term is expected to come from international sources, multilateral partners, etc., with only the U.S. Government (USG) financing levels being known with any certainty. This situation means that RCI will need to address the numerous challenges associated with unpredictable funding streams, which have severe implications for the sustainability of HIV treatment programs in particular that require consistent long-term funding to finance recurrent expenditures and to determine what size program is sustainable. To date, the government of RCI has been most heavily dependent upon the resources provided by the USG through the President's Emergency Plan for AIDS Relief (PEPFAR) and the Global Fund to Fight AIDS, Tuberculosis and Malaria (GF). At present, no GF funding is available to RCI in the near future, although this situation may change. This leaves the bulk of the financing of the program to PEPFAR, which will no longer experience the growth in funding going forward that it has been occurring over the last four years, and to the government of RCI, whose resources are limited and not currently anticipated to increase substantially in the short term.

RATIONALE AND OBJECTIVE

It is in this context that USAID's Health Systems 20/20 project was asked to assist PEPFAR RCI with its country operational plan programming for 2010 using the HIV/AIDS Program Sustainability Analysis Tool (HAPSAT). Several recent policy developments in RCI's response to the epidemic and PEPFAR's future funding stream have made a sustainability analysis necessary including:

- A proposed scale-up of RCI's ARV treatment (ART) program.
- Several proposed changes to treatment regimens, in particularly the phasing out of the cheap d4T-

¹ http://data.unaids.org/pub/BaseDocument/2009/20090622_sie_countrysummaryreport_cotedivoire_en.pdf.

based fixed-dose combination pill and the reduction in the number of first-line regimens.

- Some proposed changes to laboratory test protocols with the addition of certain tests to the current protocol.
- The anticipated availability of PEPFAR funding at a constant level rather than with the annual increases experienced to date.
- The ensuing questions would that need to be answered by sustainability analysis are:
- What resources are available for the HIV/AIDS program, and how are they earmarked for the various service delivery areas?
- What financial and human resources will be required to deliver HIV/AIDS service under various scale-up scenarios within each service deliver area?
- Based upon a comparison of resources available and required, what future scale-up plans are sustainable and feasible?
- What can be done to make sustainability and scale-up possible?

The HAPSAT was designed to provide evidence and information about costs that can help answer each of these questions. The HAPSAT tool not only provides evidence of current costs and needs, but can project various financing and service delivery scenarios to assist countries and donors with the development of policies and solutions to address a national HIV/AIDS response. This analysis serves to reduce uncertainty around the financial and human resource impact of changes to a country's HIV program where the program consists of one or all of the following: ART, care and support services (CSS) to HIV-positive patients, PMTCT, CT, support of orphans and vulnerable children (OVC), and prevention activities.

HAPSAT EXERCISE IN RCI

The HAPSAT analysis in RCI was conducted in May-August 2009 and comprised three main steps. Data collection through key information interviews at government agencies and facilities were conducted and secondary data sources utilized to determine the epidemiological profile of HIV in RCI as well as the make-up of the government and PEPFAR's response. The first section of the analysis combined the epidemiological data with service delivery data to quantify both the level of service delivery currently available and the level of service delivery required to meet population targets. The second section of the analysis determined the unit costs for each service using either an ingredients-based approach (ART, PMTCT, CT, CSS) or a top-down budget allocation approach (budget divided by number of people reached) where an ingredients-based approach was not feasible (OVC, prevention). The third section of the analysis combined the resources required as estimated by the first and second sections of the analysis, with the resources available to conduct the sustainability analyses. A sustainability analysis was conducted in detail for ART, PMTCT, and OVC, while prevention was only broadly addressed. Following these analyses, possible scenarios including important scale-up plans were built based upon the feed back from a scenario-building workshop conducted in RCI in August 2009. This workshop was attended by up to 20 partners and government agencies who reviewed preliminary HAPSAT findings and brainstormed policy changes or activities that could improve the sustainability of RCI's HIV program.

RESULTS

Current known funding is inadequate for either current HIV service levels or for scale-up of service delivery levels

Given the current estimates of known funding (i.e., PEPFAR and government of RCI), RCI can provide the current (2009) level of services (ART, PMTCT, CSS, OVC, and prevention) over the 2009-2013 period with a financial gap of US\$3.7 million projected to occur in 2011 that will widen to US\$14.5 million by 2013, by which time only 86 percent of the required funding will be available. If RCI extends current scale-up plans (for 2009-2011) out to 2013, a small financial gap (US\$1 million) occurs almost immediately in 2010, rising to US\$87.5 million by 2013, by which time only 48 percent of the required funding will be available.

ART drugs alone account for almost US\$30 million of the financial gap in the scale-up scenario

At the individual program level, ART drugs alone account for almost US\$30 million of the gap from scale-up by 2013. Driving the cost of ART in turn are the regimen changes that RCI is currently undertaking to reduce the use of the cheapest available regimens (d4T-based regimens) because of the relatively high levels of toxicity and side effects that they cause. This switch results in higher average regimen costs per patient (increases of between 26 percent and 60 percent). ART services include all the drug, labor, and laboratory costs associated with providing care to patients not yet eligible for ART, patients who are eligible and on ART, and patients who are eligible but not on ART.

Current funding allocated to laboratory services is inadequate and this is made more severe by new ART patient monitoring protocols

Laboratory protocols are currently being changed in RCI. With additional laboratory tests being required for monitoring ART patients, the increases in funding needs are not currently sourced (Only the additional pediatric testing will be covered by PEPFAR.) The current allocation of funding to laboratory activities results in a gap of just over US\$15 million a year by 2013 at the current rate of scale-up. This gap will occur even before considering the financial implications of the protocol changes.

Current funding for PMTCT targets is adequate but the coverage will be low representing missed opportunities to prevent HIV in children and spouses, treat HIV in women with young children, and sensitize HIV-positive women.

RCI had adequate financing for the proposed level of scale-up of the PMTCT program. However, the target of 12,000 women receiving treatment per year, although higher than the 2008 coverage level, implies that only between 25 percent and 30 percent of HIV-positive pregnant women are receiving treatment and preventing transmission of HIV to their child. By treating up to 80 percent of known pregnancies, assuming that 40 percent of untreated pregnancies result in an HIV-positive child, approximately 28,000 new cases of HIV could be averted during the time horizon, at an additional cost of US\$31 million over the period 2009-2013.

Costing of OVC services and specific impact knowledge is largely unclear, making projecting the cost of scaling up OVC services very difficult.

Coverage of the current level of OVC is low but projecting the cost of scale-up is extremely difficult because there is significant variation in the package of services provided to OVC and the need for services by OVC is also subject to variation depending on upon their circumstance. The analysis showed

little variation in the cost of providing health and educational support to OVC using two different sources of costs. The cost of scaling up the current RCI government targets for health, educational, and psychosocial support at 10 percent per year will cost about US\$28 million per year by 2013. The cost of providing nutrition however varied widely for the two sources of costing data and even the cheapest of the nutrition interventions was several orders of magnitude more expensive than the provision of psychosocial, medical and health services.

Nursing resources gaps will be acute even without scale-up and are of concern

The HAPSAT analysis found that while there will be shortages of all medical labor cadres as scale-up is implemented, given rate of scale-up and the imbalance between new recruits into the public sector and attrition from the sector, the nursing shortages will be of particular concern – nurses and nurse-midwife staff provide the bulk of clinical care, including all PMTCT, all regularly scheduled ART follow-up visits, and a significant level of CT activities. With less than 7,000 nurses nationwide and even those distributed unevenly, the HIV program will not be able to maintain even the current level of service without additional nursing labor or some form of task-shifting to less-skilled labor during the period under discussion.

RECOMMENDATIONS

Given the current estimates of known funding (i.e., PEPFAR and government of RCI), RCI can provide the current (2009) level of services (ART, PMTCT, CSS, OVC, and prevention) over the 2009-2013 period with a financial gap of US\$3.7 million projected to occur in 2011 that will widen to US\$14.5 million by 2013. Maintaining the current level of service in terms of the number of people treated with ART and PMTCT is not an acceptable solution for RCI in the long run. At the current level and given the incidence of HIV, coverage of the HIV-positive population with services, i.e., meeting the need for services, will actually fall substantially over this time horizon. Scale-up at the target rate will also not be feasible and the increasing financing requirements for ART could put substantial pressure on other aspects of the HIV program. Therefore the following recommendations are put forward to assist the development of HIV program strategies in RCI:

1. Re-evaluating the scale-up strategy for ART – the HAPSAT projects significant financing shortfall for the ART program driven primarily by drug costs. The scale-up targets are set in terms of numbers of patients on ART added to the system. It may be worth defining prioritizing criteria along with those targets to ensure equitable distribution of services geographically and to focus on those most in need of treatment.
2. Broadening the ART drug regimen strategy – to go beyond the mere setting of protocols but to also include the training of the relevant doctors and pharmacists and improved data collection in order to ensure adherence to the protocols to ensure that AZT regimen prescriptions are favored and the more expensive TDF regimens are used effectively.
3. Scale-up of pediatric ART – must be addressed as this population is grossly under-represented in terms of numbers on treatment. More effective use of PMTCT services and OVC outreach are suggested as ways to identify and improve access of HIV-positive children.
4. Effective laboratory service monitoring and coverage – will require increased funding. Therefore with no additional funding sources currently identified it will be difficult to support the extra tests being added to the protocol while simultaneously making significant increases to the

number of patients enrolled on ART. Emphasis should be directed on ensuring the availability of both human and financial resources so that the current protocol can be implemented for all those who need to be monitored.

5. Better OVC costing information – is critical if the current low coverage of OVC with support is to be improved. Currently, the wide variation in need and the combination of services provided combines with the lack of specific monitoring data to make planning a scale-up very difficult.
6. Strengthening local government welfare systems/labor – to enable the leveraging of public health and education services by increasing the capacity of community health workers attached to government facilities to carry out many of the tasks that OVC organizations currently undertake.
7. Prevention directed at young girls and women – must be prioritized going forward. Currently a wide range of activities are included and costed in the national strategy with few directed at young girls and women, which is unfortunate given the increased risks faced by this population as shown by current prevalence rates. Reducing incidence in this group will improve the sustainability of the HIV program in the medium term.
8. Addressing nursing labor shortages – possibly with bursaries/scholarships or other incentives to attract nurses as well some skill cadre just below nurses that can be trained in a shorter time period to deliver counseling or conduct monitoring visits under nursing supervision. This task shift alone could substantially relieve the burden of routine patient monitoring from nursing labor, facilitating scale-up and possibly improving access in rural areas since less-skilled workers are more likely to be willing to work there.
9. Investing in a strong GF application – with the support of data/analyses like the kind provided in this report. By not only identifying critical areas for attention, like prevention, PMTCT, and nursing labor shortages but also providing costing data, stronger applications for additional financing can be drafted.

This analysis has provided costing information that it is hoped will prove useful for policy development and resource allocation as RCI continues to refine and develop its HIV/AIDS Strategy and its financing requirements. The report has also pointed out several important areas for further analysis and clarification in terms of activity costs and benefits, for example, OVC and prevention services, that can strengthen strategies to reduce the resource gaps that have been estimated and discussed herein.

I. INTRODUCTION

I.1 HIV IN REPUBLIC OF COTE D'IVOIRE

The Republic of Cote d'Ivoire (RCI) has an HIV/AIDS prevalence rate of 3.9 percent, the highest in West Africa.² The epidemic has had a profound impact on the country's population and every dimension of its health system as well as its capacity for socioeconomic growth. By 2008, 750,000 Ivoirians were estimated to be HIV positive. With an HIV/AIDS-specific mortality rate of 257 per 100,000 people, HIV is the leading cause of death among all age groups, accounting for 19 percent of all annual deaths.³ In fact, HIV/AIDS results in nearly twice as many deaths per year as the second leading cause, malaria (10 percent), and its impact is estimated to decrease Ivorian life expectancy by 21 years. While there are indications that the incidence of new infections has started to decline, in 2009, 150,000 Ivoirians will need treatment for HIV.⁴

As is the case in most high-prevalence countries, the vast majority of those affected by the HIV virus are adults ages 15-49 years (approximately 360,000). Prevalence is much higher among women (6.4 percent) than men (2.9 percent) illustrating what is referred to in RCI as the 'feminization' of the disease.⁵ Consequently, it is estimated that approximately one in 20 pregnant women have the virus⁶ but that less than a quarter of these women are tested and that only 17 percent of the pregnant women living with HIV/AIDS actually received antiretroviral therapy (ART) for the prevention of mother-to-child transmission (PMTCT).⁷ Approximately 52,000 children ages 0-14 years were HIV positive in 2007 and a further 864,000 have been orphaned or rendered vulnerable due to HIV.

I.1.1 NATIONAL RESPONSE TO HIV

The first case of HIV/AIDS in RCI was reported in 1987. By 1988, the RCI government had begun implementing a multi-sector and decentralized approach, with several ministries and agencies charged with addressing, coordinating, and/or implementing various elements of the national response. For example, the Ministry of Health and Public Hygiene (MSHP) collaborated with the National Program for Health Care (PNPEC) to provide care for people living with HIV (PLHIV). The Ministry of National Education (MEN) facilitated HIV/AIDS education in schools and the National Program for the Care of OVC (PNOEV) coordinated programs for orphan and vulnerable children (OVC) with the assistance of the Ministry of Family, Women and Social Affairs. By 1998, the government had launched the HIV/AIDS Treatment Access Initiative, which collaborated with The Joint United Nations Program on HIV/AIDS (UNAIDS), Retrovirus-Cote d'Ivoire/Center for Disease Control (RETRO-CI/CDC), and other partners to provide HIV-positive individuals with ART.

² http://data.unaids.org/pub/BaseDocument/2009/20090622_sie_countrysummaryreport_cotedivoire_en.pdf.

³ http://www.who.int/whosis/whostat/EN_WHS08_Full.pdf.

⁴ http://data.unaids.org/pub/BaseDocument/2009/20090622_sie_countrysummaryreport_cotedivoire_en.pdf.

⁵ http://www.unicef.org/cotedivoire/hiv_aids.html.

⁶ http://www.unicef.org/cotedivoire/hiv_aids.html.

⁷ Data received from President's Emergency Plan for AIDS Relief (PEPFAR)/ National Program of Medical Care for PLHIV (PNPEC).

However, the sustained military and political conflict that began in 2002 has had serious implications for the national HIV/AIDS response, disrupting both the administration and delivery of health care as well as the displacement of health professionals from the predominantly affected Central, Northern, and Western regions of RCI. This situation has led to a severe lack of services in the affected regions that has only recently been addressed by the 2007 Ouagadougou Political Agreement, whereby government administration started to be re-established through the country.

The Ministry of AIDS Control (MLS) was created and charged with the task of coordinating HIV/AIDS-related activities in 2001. The MLS serves as the Secretariat of the National Council to Control AIDS (CNLS), which was created in 2004 to serve as the main body responsible for coordinating efforts relating to HIV/AIDS interventions. The overarching mandate of the CNLS is resource mobilization, donor coordination and advocacy, as well as monitoring and evaluation (M&E). The MLS and CNLS are also responsible for devising strategic HIV/AIDS plans and, since their inception, have developed the 2002-2004 plan to address HIV in RCI, an interim 2005 plan, the Strategic Plan to Control HIV/AIDS 2006-2010, and an updated 2008-2009 HIV Strategic Plan (*Plan d'Action Nationale de Lutte Contre le SIDA, 2008-2009*).⁸

The 2008-2009 HIV Strategic Plan outlines priority interventions to reduce the incidence of HIV/AIDS and Sexually Transmitted Infections (STIs), with a specific emphasis on OVC, at-risk populations, youth, and pregnant women. The Strategic National Plan 2006-2010 is built around seven strategic areas of intervention: prevention; care and treatment; coordination; financing; M&E; capacity building; and operational research. Prevention activities were intensified in the plan, as was focus on such areas as behavioral change communication (BCC), voluntary HIV counseling and testing (CT), prevention of mother-to-child transmission (PMTCT), condom usage, and prevention of accidental exposure. The number of patients on ART was very low at the time of plan development so its care and treatment component centered on expanding ART services with a particular emphasis on care and support services (CSS) for women and children. Emphasis was also placed on greater coordination between the central and decentralized levels and ensuring greater coordination in mobilizing the estimated US\$557 million necessary to implement the plan.⁹

Currently, RCI's multi-faceted strategy to address HIV/AIDS has resulted in more readily available CT, PMTCT services being offered in over 150 facilities, and free antiretroviral medication (ARV) for PLHIV at all public health facilities. The latter accomplishment has been in effect since August 2008 and was the culmination of decade-long advocacy efforts by key stakeholders to eliminate barriers to universal access to necessary medical treatments.¹⁰ Despite this effort, however, the number of patients on ARV remains low (59,517) in terms of need addressed (approximately 30 percent of those eligible 2008), BCC is limited, and PMTCT remains far from achieving treatment targets—only 17 percent of pregnant women were receiving ART in 2007 although the national target is 100 percent.¹¹

1.1.2 FUNDING THE HIV EPIDEMIC RESPONSE

State-level funding for HIV services is extremely limited. In fact, the Strategic Plan to Control HIV/AIDS 2006-2010 estimated that the state would only provide 4.9 percent of the \$557 million that was considered necessary to carry out the strategy. The bulk of the financing for RCI's HIV program both

⁸ http://data.unaids.org/pub/BaseDocument/2009/20090622_sie_countrysummaryreport_cotedivoire_en.pdf.

⁹ National Strategic Plan 2006-2010.

¹⁰ <http://abidjan.usembassy.gov/uploads/images/MIE-x4NYrcTzI84I0SBivg/PEPtalk4-English-final-VP.pdf>.

¹¹ http://data.unaids.org/pub/BaseDocument/2009/20090622_sie_countrysummaryreport_cotedivoire_en.pdf.

currently and in the near term is expected to come from international sources, the United Nations, and other multilateral partners¹² with only the U.S. Government (USG) financing levels being known with any certainty. This situation means that RCI will need to address the numerous challenges associated with unpredictable funding streams, which have severe implications for the sustainability of HIV treatment programs in particular that require consistent long-term funding to finance recurrent expenditures and to determine what size program is sustainable.¹³ To date, the government of RCI has been most heavily dependent upon the resources provided by USG through the President's Emergency Plan for AIDS Relief (PEPFAR) and the Global Fund to Fight AIDS, Tuberculosis and Malaria (GF), discussed here although a more detailed table of funding sources is available in Section 4.1 of this report.

PEPFAR

The USG, through PEPFAR, provides by far the largest portion of financial support for HIV/AIDS programming in RCI. The program provided more than \$24 million in fiscal year (FY) 2004, \$44 million in FY 2005, \$46 million in FY 2006, \$84 million in FY 2007, and \$120 million in FY 2008.¹⁴ In 2008, PEPFAR estimates that its funding supported the provision of ART to approximately 50,000 individuals, CSS to 103,200 individuals, CT services to 285,000 individuals, and PMTCT services to 343,300 pregnant women. In addition, nearly 77,000 OVC received essential services as a result of PEPFAR support to RCI.

Global Fund

Much of the funding provided by the GF has been through Rounds 2, 3, and 5 activities implemented by CARE International, CARE Cote d'Ivoire, and CARE France, respectively. However, RCI has not been approved for any funding in the past four rounds, which severely hinders the sustainability of activities reliant upon those resources.¹⁵ The GF is currently expected to contribute approximately US\$8 million to the national strategy through 2010.

I.1.3 EMERGING CHALLENGES

The possibility of flat-lined PEPFAR funding, limited national financing, and the fact that RCI has not been awarded any GF money in the past four rounds has created an urgent need to assess the current portfolio of HIV/AIDS activities and estimate funding gaps at national and program levels. It is also necessary to assess human resource and infrastructure constraints to ensure that the targets outlined in the Strategic Plan to Control HIV/AIDS 2006-2010 are feasible given the expected availability of resources. More specifically, it is necessary to plan ahead to ensure that the supply of human resources needed to deliver adequate HIV/AIDS services is available and does not hinder progress toward reaching service goals. RCI must identify and subsequently address these gaps to achieve target levels relating to treatment, care, and prevention. This is a significant undertaking for RCI and its development partners, requiring extensive and iterative consultation and stakeholder consensus building to ensure that the appropriate level of human resources, financing, and infrastructure are sustained over the medium term.

¹² http://data.unaids.org/pub/BaseDocument/2009/20090622_sie_countrysummaryreport_cotedivoire_en.pdf.

¹³ <http://www.healthsystems2020.org/content/resource/detail/2271/>.

¹⁴ <http://www.pepfar.gov/countries/cotedivoire/index.htm>.

¹⁵ <http://www.theglobalfund.org/programs/search/index.aspx>.

1.2 HIV/AIDS PROGRAM SUSTAINABILITY ANALYSIS FOR RCI

Health Systems 20/20 is a five-year (2006-2011) cooperative agreement (no. GHS-A00-06-000-00), led by Abt Associates Inc. and funded by USAID. The project addresses the financing, governance, operational, and capacity-building constraints that block access to and the use of priority population, health, and nutrition services by people in developing countries. Health Systems 20/20 offers global leadership, technical assistance, training, grants, research, and information dissemination.

Health Systems 20/20 developed the HIV/AIDS Program Sustainability Analysis Tool (HAPSAT) to assist government and donors forecast and analyze the sustainability of HIV/AIDS programs. HAPSAT, a Microsoft-Excel-based tool, synthesizes detailed epidemiological, demographic, and economic data to generate a country-specific HIV policy model that can be used to cost alternative policy scenarios. HAPSAT can produce estimates of the financial and human resources required to sustain or scale up HIV/AIDS services. The analysis estimates such resource requirements for a comprehensive portfolio of HIV/AIDS services including CT, adult and pediatric ART, PMTCT, CSS for PLHIV (e.g., home-based care, palliative care, psychosocial support), TB/HIV services, OVC support, and prevention activities.

HAPSAT has been used to conduct sustainability analyses in Ethiopia, Nigeria, and Zambia. The HAPSAT activity in each country has the most impact when it has been strongly supported by the ministries of health, the national nodal HIV/AIDS agency or commission, PEPFAR and GF implementing agencies/partners, and other donors. The results from these analyses have been used for strategic planning, budgeting (e.g., the preliminary results were used during the application process for World Bank Multi-Country AIDS Program [MAPII] funding in Nigeria), and advocacy.

1.3 HAPSAT IN RCI

In March 2009, Health Systems 20/20 was asked to assist PEPFAR RCI with its country operational plan programming for 2010. Several recent policy developments in RCI's response to the epidemic and PEPFAR's future funding stream have made a sustainability analysis necessary including:

- A proposed scale-up of RCI's ART program.
- Several proposed changes to treatment regimens, in particular the phasing out of the cheap d4T-based fixed-dose combination pill and the reduction in the number of first-line regimens.
- Some proposed changes to laboratory test protocols with the addition of certain tests to the current protocol.
- The anticipated availability of PEPFAR funding at a constant level rather than with the annual increases experienced to date.

Each of these developments will have consequences on the financial and human resource needs of RCI's HIV/AIDS programs. In addition to these developments, the consensus-building focus of the HAPSAT tool brought to light other important elements of the program that are of concern to both PEPFAR and the government of RCI namely, the importance expanding the reach of the current PMTCT program and the potential of solutions such as streamlined drug regimens and widespread use of co-trimoxazole prophylaxis to increase the efficiency of the program. The HAPSAT tool is particularly suited to exploring and quantifying the financial and human resource implications of these developments for several reasons. First, HAPSAT can cost not only clinical services but can also account for non-facility-based care and support such as OVC care or home-based care in the sustainability analysis. Second, a

HAPSAT analysis can also account for prevention costs, which is particularly important given the role of prevention in ensuring sustainability by reducing incidence and the potential pressure on prevention budgets in general as ART programs are scaled up.¹⁶ Third, HAPSAT can provide human resource needs, projections, and gap analysis for human resource planning purposes. Finally, the HAPSAT primary objective, to reduce uncertainty with regard to the future needs and sustainability issues, is of particular use when resource availability is becoming limited at the same time that needs and service delivery levels are being increased. The HAPSAT tool not only provides evidence of current costs and needs, but can project various financing and service delivery scenarios to assist countries and donors with the development of policies and solutions to address a national HIV/AIDS response. This analysis serves to reduce uncertainty around the financial and human resource impact of changes to a country's HIV program, examples of which include scale-up and drug regimen changes, two changes that are discussed extensively in the HAPSAT analysis of RCI's HIV program.

¹⁶ HAPSAT's capacity to cost OVC and home-based care and the cost of prevention activities is limited and not as detailed as its clinical service delivery costing; these limitations are discussed in more detail in Section 2.2.

2. HAPSAT METHODOLOGY AND IMPLEMENTATION

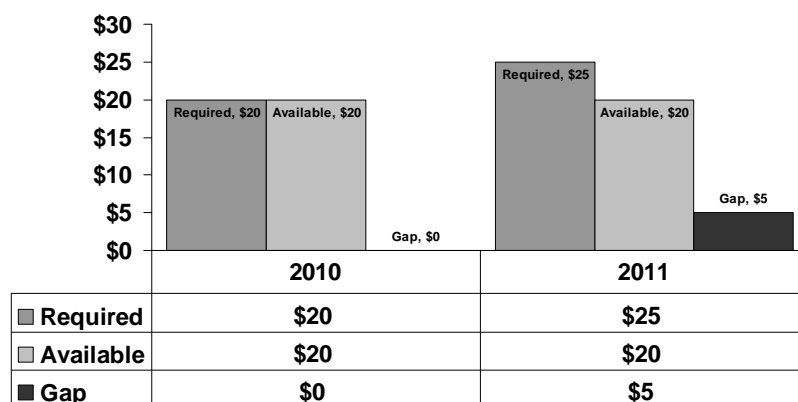
HAPSAT is a Microsoft Excel-based tool that was developed for modeling HIV/AIDS programs, estimating resource needs, and comparing alternative policies related to the delivery of HIV/AIDS treatment, care, prevention, and mitigation. This report describes its use and the results of sustainability of RCI's HIV/AIDS services over a five-year time horizon, from 2009-2013.

The HAPSAT comprehensively modeled RCI's HIV/AIDS program (i.e., the national response) as a collection of interconnected component HIV/AIDS services. Medical services include ART, PMTCT, CT, CSS for PLHIV including palliative care and home-based care. Non-medical services include BCC, prevention commodities (e.g., condoms), and the support of OVC.

2.1 HAPSAT METHODOLOGY

The resources available to maintain or scale up the HIV/AIDS program in RCI over the time horizon are obtained from funding sources. The resources required to deliver HIV/AIDS services are broken into two categories: financial resources (donor and government funding) and human resources for service delivery (e.g., medical doctors, medical officers, nurses, midwives, laboratory scientists and technologists, pharmacists and pharmacy assistants, and counselors). Sustainability analysis is the measurement of the gap between the resource available and the resources needed to implement an HIV/AIDS program and is summarized in Figure 1.

FIGURE 1: HAPSAT'S SUSTAINABILITY ANALYSIS OR GAP MEASUREMENT



If an HIV program needing \$20 million in resources in 2010 is scaled up in 2011 and projected to need \$25 million in resources but resources remain fixed at \$20 million, then a funding gap of \$5 million is projected in 2011.

Country-specific data were collected from PEPFAR, PNPEC, MLS, implementing partners, other donors, and health facilities to inform HAPSAT model parameters (Table 1). The baseline data encompass the general parameters that represent the context with which any program and policy design must contend. Baseline data can be differentiated into six major categories: demographic, epidemiological, financing, labor and service, medical, and cost data.

TABLE 1: ELEMENTS OF SERVICE DELIVERY COSTS VS. NOT COSTED IN HAPSAT FOR RCI

Costed Directly with Data from RCI	Costed Indirectly Using Appropriate % Mark-ups on Aggregated Program Costs, Based on Country Data*	Not Costed (outside HAPSAT scope)
<ul style="list-style-type: none"> • Drugs and commodities for ARV and PMTCT treatment • HIV-related laboratory reagents and consumables for testing and monitoring • Professional health worker labor for HIV/AIDS clinical services • PEPFAR implementing partner costs for OVC services • Prevention activity costs** 	<ul style="list-style-type: none"> • IEC, BCC, blood safety, injection safety • Training for new health workers 	<ul style="list-style-type: none"> • New facility infrastructure or renovation • Laboratory equipment • M&E, studies, research • Individual partner overheads • Administration and support staff in regions and lower tiers of the health system** • MLS,PNPEC, staff salaries** • Health system strengthening**

Note: IEC=information, education and communication

* Example of data sources for this data includes the National AIDS Spending Accounts (NASA) 2009.

** These data are potentially available from the RCI NHA activity currently ongoing with results due in November 2009.

Each component service in RCI’s HIV/AIDS program has a defined *unit of service* by which the program’s direct output (service volume) can be measured and reported. For example, a unit of ART service is one patient-year of ART. Using country-specific data wherever possible, unit costs were estimated for each service using an ingredients approach that quantifies what level of inputs is required to produce a service and the cost of each of these inputs. When country-specific data were not available, regional estimates from the literature or other sources were utilized. After the HAPSAT model was calibrated to represent the HIV/AIDS epidemic and response in RCI for 2008, the gaps in financial resources were estimated for sustaining current service levels and for scaling up over a five-year time horizon in accordance with policy goals. Policy goals were revealed in a stakeholder consensus meeting and obtained from the March 2009 ARV quantification exercise and from PEPFAR country operating plans. The current national strategy was of limited assistance for this exercise given that it covers the 2006-2010 period. However, prevention and OVC targets from the 2008-2009 HIV Strategic Plan were utilized in this analysis where appropriate.

2.2 DATA COLLECTION

2.2.1 KEY INFORMANT INTERVIEW

The HAPSAT team met with the relevant officers in the focal government agencies: MSHP, MLS, PNOEV, and PNPEC. In addition to these meetings, the team met with a range of implementers and donors including several key personnel in the PEPFAR office of the U.S. Mission to Abidjan. Secondary

data sources providing relevant inputs for the HAPSAT were kindly provided from all of the sources visited.

2.2.2 EPIDEMIOLOGICAL DATA

HAPSAT uses key epidemiological data to determine both the current and forecasted number of people in need of HIV services over the period being costed. These data were obtained from the most recently available data sources recommended and used by the in-country government agencies visited by the HAPSAT team, including the UNAIDS 2008 Report for RCI¹⁷ for prevalence data and the World Health Organization (WHO) Statistical Information Service (SIS) for basic demographic data. The March 2009 quantification exercise based forecasted need for ARV commodities on the targeted level of uptake of ART rather than on need. The costing team were not able to locate any projected HIV epidemiological trend data more recent than the UNAIDS 2008 report with which to calibrate the epidemiological projection of the HAPSAT model. Such a calibration is usually part of the HAPSAT analysis to ensure that decision-makers are confident that the tool's underlying assumptions and results are consistent with other estimates or short-term trends. To address the limitation that this lack of recent data presents, the epidemiological and demographic parameters that were used in the HAPSAT analysis were shared with government planning officials and USG staff familiar with RCI's HIV/AIDS epidemic for their verification. The key assumptions used for this analysis can be found in Annex A of this report.

2.2.3 UNIT PRICES AND LABOR COSTS

Costs are required for both consumables and labor utilized by the program. The main consumables in this analysis are the drugs, nutritional supplies and laboratory consumables. Drug costs were taken directly from the March 2009 Quantification exercise documents. Nutritional commodity requirements and prices were obtained from both PEPFAR and the World Food Program. Laboratory consumable prices were obtained from the RETRO-CI quantification analysis for 2009.

Determining the cost of labor requires data on how much labor by skill type is currently being used to provide each unit of service being delivered. First, it is necessary to determine how much doctor/nurse/pharmacist/laboratory technician time is required to produce each clinic visit made by an ART patient must be obtained. Second, salary and benefit data are used to determine how much labor is required to provide care to one ART patient for one year. For PMTCT and CT, the unit of cost determined is the cost per pregnancy and cost per counseling session respectively.

Costing OVC services was particularly challenging as there were no readily available data on the scope of services delivered or their specific inputs in RCI, which is not unusual for most PEPFAR countries. The significant variation in the 'bundle' of services provided to OVC by the large number of OVC care providers means that unit costs per OVC care provider are not the same across providers. In addition, the largest provider of OVC care in RCI for 2007/2008, in terms of number of children reached, was evaluated; due to concerns raised regarding its program management, its funds were re-programmed to several other institutions over this period. This makes it hard to determine the costs of reaching the majority of OVC that received services. Therefore the costing team took the approach of selecting two OVC service providers that were considered by the team and PEPFAR staff to have the most clear available data on the services they provide, the number of clients receiving those services, and the inputs required to deliver these services. The inputs required included labor categories and costs for the

¹⁷ http://data.unaids.org/pub/BaseDocument/2009/20090622_sie_countrysummaryreport_cotedivoire_en.pdf.

package of services delivered by each of these providers. The HAPSAT model does not estimate gaps in the human resources required for OVC care as it does for clinical care. This is because there is a wide variation in the types of care and cadre of skills required for OVC care compared to clinical care, which is delivered to a given protocol by a relatively small limited set of skill cadres. However, the HAPSAT does estimate the required funding, including labor costs, required to reach the population estimated to be in need of OVC services, see Section 4.2.3.

2.2.4 FACILITY-LEVEL PARAMETERS

Three regional health centers and two teaching university hospitals (Table 2) were surveyed to determine the key human resources parameters for clinical HIV/service delivery, i.e., the set of skill cadres that currently deliver ART, PMTCT, and CT services. The surveys were administered to the clinical directors for HIV services in these facilities with supplementary information being obtained from staffing schedules, service delivery reports and interviews with clinical service staff. An obvious limitation of this approach is that PMTCT and CT services are also provided in smaller health facilities than those visited by the costing team, which may have different cadres of staff and thus different costs. This is less of an issue for ART services, which are mainly provided by the larger facilities and are therefore well represented by the five visited.

TABLE 2: ART SERVICE PROVIDERS VISITED FOR FACILITY-LEVEL PARAMETER ESTIMATION

Facility	Type
CHU Cocody	University Health Center
CHU Treichville	University Health Center
CHR Abengourou	Regional Health Center
CHR Aboisso	Regional Health Center
CHR Agboville	Regional Health Center

2.2.5 SERVICE UTILIZATION

Service utilization data for 2008 were obtained from PNPEC. These data provide information on all the HIV services provided in the all RCI's public facilities. However, it must be noted that these data were incomplete because only approximately 50 percent of the reports required from all public facilities providing HIV services were received by PNPEC in 2008 (slightly more for ART services). For ART, this is less problematic because the reported are typically cumulative and therefore, as long as some reports for the end of the year are available, the annual total is relatively reliable. For CT and PMTCT, however, the incomplete reporting is more problematic because missing monthly reports represent services delivered that cannot be counted in the annual figure. Therefore, PEPFAR data for 2008 were used for service delivery in this analysis. This was considered to be appropriate since PEPFAR supports the bulk of HIV service delivery in RCI through its implementing partners. However differences between PNPEC and PEPFAR figures are noted where appropriate.

2.2.6 RESOURCE EXPENDITURE

Data on expenditures for HIV/AIDS services in 2008 and expected allocations for 2009 came primarily from PEPFAR. Other sources included the GF and World Bank. Limited use was made of the National AIDS Spending Accounts (NASA) conducted by UNAIDS for 2008 because the preliminary draft available for review was yet to include nearly over a US\$100 million of expenditures by USG/PEPFAR.

However, the NASA contained more complete expenditure data for RCI, the UN organizations, and other bilateral donors, particularly on administration, management, and other overhead that provided the costing team with guidance on these expenditures. It is anticipated that more detailed data on prevention and other non-clinical services will be available to refine the analysis in this report when the currently ongoing RCI National Health Accounts (NHA) exercise is completed in November 2009.

2.2.7 STAKEHOLDER SCENARIO-BUILDING WORKSHOP

A stakeholder scenario-building workshop was conducted in Abidjan in August 2009, where the preliminary results of this analysis, the 'maintain' and 'scale-up' scenarios, were presented. Prior to the workshop, two half-day HAPSAT training sessions were conducted to ensure that participants understood the analysis and assumptions behind the sustainability analysis.¹⁸ These results provided stakeholders with guidance in terms of unit costs, total costs, and financial/human resources gaps that will impact the sustainability of RCI's HIV/AIDS program between 2009 and 2013. Stakeholders were given the opportunity to look at the results and further examine the model's assumptions. Following this discussion, two break-out groups were given the task of coming up with specific actions that could be undertaken to address the anticipated sustainability limitations. These suggestions were then presented to the entire audience and several scenarios were drawn up for analysis. These scenarios and the results from their sub-analyses are presented in Section 6.

¹⁸ Not all workshop participants attended the HAPSAT training.

3. EPIDEMIOLOGY, CURRENT AND TARGET SERVICE DELIVERY LEVELS

Using the epidemiological, human, and financial resource data collected for RCI, the HAPSAT produces several initial outputs that should be reviewed and understood prior to the sustainability analysis. HAPSAT used the sociodemographic and epidemiological data to determine how many people need HIV services currently and projects how many will need service in the future. These results are shown in Section 3.1. Following this, HAPSAT combined RCI’s HIV service targets with the human resource and unit cost data (discussed in Sections 3.2 and 3.3) to determine RCI’s capacity to meet the needs implied by the epidemiological analysis. These results are shown in Section 3.4.

3.1 KEY EPIDEMIOLOGICAL PROJECTIONS FROM THE HAPSAT MODEL

Following the input of key epidemiological parameters and current service delivery levels, HAPSAT produced the following epidemiological projections for the period 2009-2013, shown in Table 3. Numbers indicating need for CT, OVC, and prevention services are not usually based upon epidemiological criteria but are determined other by direct measurement or are determined on the basis of coverage targets set for the program. In other words, these figures are those projected under the current scale-up assumptions described in detail in the rest of this section. Under a maintain scenario, fewer HIV positives would survive, fewer people would be on treatment, more people would be ART eligible but not on ART, and fewer HIV-positive pregnancies would be known.

TABLE 3: HAPSAT’S EPIDEMIOLOGICAL PROJECTIONS FOR HIV/AIDS SERVICES NEED (ART, PRE-ART, AND PMTCT)

	2009	2010	2011	2012	2013
Total population	19,971,291	20,737,338	21,541,969	22,377,190	23,240,810
Total HIV-positive population	503,285	570,163	649,772	736,531	826,619
HAPSAT adult ART eligible	144,635	148,163	154,939	165,004	176,747
Number of people on ART with scale-up	69,775	86,882	108,378	132,285	158,355
% met ART need	48%	59%	65%	69%	71%
Number of people ART eligible but not on ART	32,357	23,388	18,620	18,984	21,118
Number of people pre-ART	68,327	111,988	154,476	196,644	238,934
Number of known HIV-positive pregnancies	36,514	39,103	44,926	51,707	59,048

Note: PEPFAR estimates 59,517 on ART March 2009.

3.1.1 ART SERVICE DELIVERY

PEPFAR reports having supported the treatment of 59,517 people for the 12-month period ending in March 2009. PNPEC reports that 41,090 patients were served in public facilities but with incomplete reporting to PNPEC. The quantification analysis of March 2009 used the target of adding 1,900 patients

to the ART program per month in 2010 and 2011. The HAPSAT model used the same figures out to 2013 as shown in Table 3.

3.1.2 CT SERVICE DELIVERY

PEPFAR reported that 285,000 people received CT in 2008 with PEPFAR support. PNPEC reported that 151,000 people were counseled and slightly fewer (137,000) were tested at public facilities but with incomplete reporting. Therefore, the PEPFAR and PNPEC numbers are commensurate. Of those tested in public facilities, PNPEC reports that 22,262 tested positive for HIV. Thus, about 16 percent of those tested in these facilities were positive, a higher percentage than the general population but reasonable given that this was facility-based testing. In addition, PNPEC reports that 80 percent of those who tested positive returned for their tests. No CT targets were available for the period being costed so HAPSAT was set to hold the percentage of the population being tested constant thus increasing the number of CT visits in a moderate manner. This scale-up was enough to ensure that an adequate number of HIV-positive and ART-eligible people are identified each year to meet ART scale-up targets.

3.1.3 PMTCT SERVICE DELIVERY

PEPFAR reported that 343,000 pregnant women were tested for HIV in 2008. PNPEC reported 139,673 with incomplete reporting. In addition, PNPEC reports that 36 percent of those women found positive received PMTCT. HAPSAT was calibrated using these data and projects that approximately 6,764 women would have received PMTCT in 2008. PNPEC reported that 4,032 HIV-positive women received treatment in 2008 and given that only 63 percent of sites reported, it would appear that the HAPSAT's projections are reasonable. In order to meet the goal of treating 12,000 women a year, at least a third of the women in RCI who make at least one antenatal visit, estimated by the WHO to be 84 percent, must be tested. This number tested will remain relatively steady over the time period being costed as the program reaches 100 percent testing of pregnant women since more women will already know their status for subsequent pregnancies and not require testing but will still require PMTCT.

3.1.4 OVC SERVICE DELIVERY

National targets for OVC are not available for the period under analysis (the current strategic plan covers 2006-2010 with an updated document covering the 2008-2009 period.) Therefore, the following targets, based upon PEPFAR annual reporting from 2008, were used as the basis for analysis. Since it is known that there are over 800,000 OVC in RCI but only 10 percent received care during 2008, a scale-up target of 50 percent coverage by 2013 was assumed. This means that 400,000 OVC would be reached with at least 1-2 of the services most commonly provided by implementing partners in 2008, namely, medical, educational, or psychosocial support. This implies an additional 80,775 need to be reached each year. These figures **do not** assume that each OVC receives the **same** level of care because a priori we know that the needs of OVC vary widely from case to case. In addition, it was assumed that 5 percent of the OVC served would benefit from nutritional support each year.

TABLE 4: NUMBER OF OVC REACHED

	2009	2010	2011	2012	2013
Number reached with OVC package containing at least 1-2 of the following services: medical, educational, or psychosocial support	76,900	84,590	93,049	102,353	112,589
Number reached with nutritional support (5%)	3,845	7,883	11,921	15,510	20,000

Note: 10% scale-up used for OVC services 2009-2013

National OVC targets as laid out in 2008-2009 HIV Strategic Plan are shown in Table 5, and these figures imply that at least 95,000 ‘service interventions’ would be delivered to OVC in 2009, but it is important to note that this refers to the level of service delivery, not the number of OVC reached, since one OVC could receive more than one service or intervention.

TABLE 5: OVC TARGETS AS OUTLINED IN THE 2008-2009 HIV STRATEGIC PLAN

Type of Support	Number Supported (annually 2009/10)
Nutritional support	20,000
Educational support (Uniform)	20,000
Educational support (Professional training)	15,000
Medical support	20,000
Psychosocial support	20,000
Total	95,000

3.1.5 PREVENTION SERVICE DELIVERY

National targets for prevention could not be obtained for the period under analysis. The numbers shown in Table 6 are the targets used to project the cost of prevention measures for the period 2009-2013. A 10 percent scale-up of services is assumed for the costing period.

TABLE 6: NUMBER OF PEOPLE REACHED WITH PREVENTION MEASURES

	2009	2010	2011	2012	2013
Number reached with Abstinence and Be Faithful interventions	1,216,688	1,338,356	1,472,192	1,619,411	1,781,352
Number reached with Condoms and other interventions	997,471	1,097,218	1,206,940	1,327,634	1,460,397

Note: AB+C= Abstinence, Be Faithful + Condoms

The strategic plan contains targets for prevention and breaks down interventions in a similar manner to PEPFAR in that a suite of activities promoting abstinence and faithfulness are proposed. The targets are difficult to compare, because many of the strategic plans activities are non-exclusive activities such as sensitization meetings where any number of people will be reached in the meeting (directly) or afterward (indirectly). Therefore, the total costs of these activities are used in the HAPSAT analysis with a breakdown provided in Annex B.

3.2 PROGRAM LABOR COSTS

Program labor costs are estimated for the provision of clinical care (ART, PMTCT, and CT) in terms of per unit costs. These inputs are described below and were observed directly during data collection. The equivalent costs for OVC could not be observed directly given the wide range of services that constitute OVC care. Therefore alternative methods used for determining labor costs as part of the total unit cost

of OVC care are described. Prevention labor costs are also not included in the analysis given the broad range of activities (and associate skill types) that are covered by the term prevention.

3.2.1 LABOR COSTS FOR CARE AND TREATMENT SERVICES

HAPSAT determines labor costs by using data on the type and amount of labor currently being used in the public sector to deliver these services. During the analysis HAPSAT determines unit costs for type of service delivered by combining level of effort (LOE) data with salary data for each cadre of labor. Data on the types and amounts of labor used to delivery PMTCT, CT, and ART were collected from facility-level interviews of service providers and administrative staff where appropriate. In addition, the RCI guidelines/protocol for the delivery of HIV/AIDS services was referred to where appropriate. Unit labor inputs and costs can be viewed in Annex B, Table B-2.

3.2.2 LABOR COSTS FOR OVC SERVICES

Labor costing for OVC services presents a challenge compared to the delivery of health services for several reasons. Firstly, a wide range of services are delivered under the banner of OVC programming (see Table 8), each of which may require very different personnel cadres. This is significantly different from clinical services where the same basic types of personnel (doctors, nurses, counselors) may be used in different combinations to provide PMTCT, CT, or ART services. Secondly, there is no set 'level' or even definition of service delivery that can be applied to each service across a range of providers. For example, one Ivorian implementing partner provides educational support to OVC by covering tuition costs¹⁹ with its PEPFAR grant whereas another procures and distributes a package of school supplies to OVC and this is also classified as educational support. It is not clear that the provision of each of these services requires the same labor skills and therefore they are not likely to have the same labor costs much less the same unit costs per child reached with educational support. Thirdly, an implementing partner can choose which of the OVC services to provide to its target population and in what combination, making data collection and analysis of OVC costs very cumbersome to undertake as part of a wider HIV/AIDS program costing exercise. Therefore labor costs are not estimated separately for OVC but are included as the cost of providing a package of OVC services by each of the partners described in Section 3.3.2. Similar reasoning is applied to the labor costing of prevention, which is also not analyzed separately in this analysis.

3.3 HIV SERVICES' UNIT COSTS

HAPSAT combines epidemiological and service delivery data with unit cost data for each service to determine total cost of providing HIV/AIDS services. This section described the service unit costs produced by HAPSAT RCI given the input data obtained for this analysis.

3.3.1 CARE, TREATMENT, AND CLINICAL PREVENTION UNIT COSTS

The unit cost figure for each service shown in Table 7 combines labor, facility overhead (implementing partner or health facility), drug (if any), laboratory tests (if any) and general overhead costs (costs

¹⁹ Tuition costs are not even a standard intervention, because some partners don't actually pay tuition costs but arrange for the OVC to have tuition waived in public school. Nevertheless, in both cases, the OVC is referred to as having received tuition support.

associated with ministry or funding agent-level²⁰ management costs). Facility and general overhead costs are estimated as a percentage mark-up of all costs (20 percent and 30 percent figures were used respectively).

TABLE 7: SUMMARY OF UNIT COSTS OF HIV/AIDS PROGRAM SERVICES

Service	Unit Cost per Defined Unit	Notes
ART	\$625 per patient per year	Averaged over both 1st and 2nd line therapies (switching 1st line from d4T to AZT-based regimens)
ART	\$1,116 per patient per year	Averaged over both 1st and 2nd line therapies (switching 1st line from d4T to TDF-based regimens)
Pre-ART/Non-CSS	\$119 per patient per year	Includes co-trimoxazole prophylaxis and monitoring labs
CT	\$16 per patient session	
PMTCT	\$245 per woman treated	Includes ART from 28 weeks for 40% HIV-positive women and NVP administration at birth for 100% HIV-positive women.
OVC	N/A	Based upon detailed analysis of two PEPFAR funded implementers of OVC services. See Section 3.3.2.
Prevention	N/A	N/A

Note: N/A: not applicable

3.3.2 OVC UNIT COSTS

Ideally, the largest (in terms of numbers served) partners would be chosen to determine unit costs that are reasonably applied to available resources and service delivery targets over the period of analysis. However, it was not possible to obtain costs for the largest provider of OVC care (in terms of PEPFAR funding and numbers served) because the organization had recently undergone an evaluation by PEPFAR and its funds were being reprogrammed to several other partners in 2008. Consequently, although this partner still accounted for approximately a third of all OVC reached in the reporting period, it would not have been appropriate to estimate its unit costs. Two alternative methods for estimating OVC costs were utilized. The first used program costs obtained from the two implementing partners referred to as Partner A and Partner B that USG deemed had the clearest program financing data that could be linked to service delivery outputs and also provided a broad package of OVC services. The second method used intervention costs specific to RCI that were collected as part of a OVC resource needs study carried out by Stover et al. in 43 countries in sub-Saharan Africa.²¹

Method I:

For Method I, program costs and service levels were utilized from two OVC implementing partners,²² to determine the cost of a package of educational, health, and psychosocial services to OVC (Table 8).

²⁰ Examples would include the operating costs of MLS, PEPFAR, and UN agencies that play a role in managing RCI's HIV Program.

²¹ Stover, John et al. 2007. Resource needs to support orphans and vulnerable children in sub-Saharan Africa. Health Policy and Planning 22:21-27.

²² Due to confidentiality issues surrounding the sharing of financial information, the OVC implementing partners are not identified in this report.

TABLE 8: SERVICES THAT MAY BE DELIVERED AS PART OF A PEPFAR-FUNDED OVC PROGRAM

OVC Interventions Defined by PEPFAR	Comments
Educational support	Explicitly proposed and provided by Partner A and Partner B* for all children reached
Psychosocial support	Explicitly proposed and provided by Partner A and Partner B for all children reached
Health care and treatment	Explicitly proposed and provided by Partner A and Partner B for all children reached
Nutritional support	Proposed by Partner A and/or Partner B but less than 10% required it
Social protection	Proposed by Partner A and/or Partner B but less than 10% required it
Legal protection	Proposed by Partner A and/or Partner B but less than 10% required it
Housing assistance	Not specifically proposed by Partner A or Partner B

* Partner A and Partner B are the two OVC implementing partners whose budgets, annual reports, and M&E data were used to provide a unit cost per OVC reached.

An average of the two unit costs obtained for a package of service was used for the service delivery targets previously discussed. It was not possible to determine the cost of a specific package of care that could be termed educational support due to the variation of the support provided by Partners A and B. However, data from the World Food Program and Supply Chain Management System (SCMS) showed that the cost of commodities required per child per year for nutritional support and for medical care is US\$100 and US\$76 respectively. An estimate of US\$22 per child for psychosocial is based upon the training and salary expenses used by Partner A to provide services to the OVC that it supported. It was not possible to estimate the direct cost of education support from the financial and service delivery data available for analysis but given that Partners A and B provided a package of medical, educational, and psychosocial support at a cost of US\$248 per child we can infer an educational support cost of approximately US\$76 per child is implied (assuming an implanting partner overhead cost of 29 percent which was directly observed from program financial reports).

TABLE 9: METHOD 1, ESTIMATED UNIT COSTS FOR OVC SERVICES

	Services	# OVC Reached	Implied Unit Costs
Partner A	Medical, educational, ¹ and psychosocial	4,436	US\$ 247.9 per child
Partner B	Medical, educational, ² and psychosocial	4,681	US\$ 248.2 per child
Additional costs available obtained from implementing partners:			
Nutritional Support	HAPSAT assumes target 25,000 ³		US\$ 100 per child
Medical care package	Medical support package includes oral rehydration solution; Paracetamol; and de-worming and malaria treatment procured by SCMS		US\$ 76 per child
Psychosocial Support	Estimated from Partner B budget and annual report		US\$ 22 per child

¹Educational support included tuition, uniforms, meals, summer school, and school renovations.

²Educational support included tuition, school support for recreational activities.

³Target from the 2008-2009 HIV Strategic Plan.

Method 2:

The 2006 Stover et al. study administered a survey in each country to organizations providing OVC care. In RCI, it surveyed 11 organizations that provided care at 27 sites to a total of 3,704 children. Table 10 shows the unit cost estimates that were utilized from this analysis. The figures have been adjusted for inflation to 2010 US dollars.

TABLE 10: METHOD 2, ESTIMATED UNIT COSTS FOR OVC SERVICES USING STOVER ET AL.'S ESTIMATES* (WEIGHTED FOR THE NUMBER OF OVC TARGETED)

Education	Unit Cost	Intervention Summary Cost	Number of OVC Targeted	Total Cost to Reach Targeted OVC	Weighted Unit Cost, used in Method 2
Primary school			10000		\$ 165
1. School fees	21.52				
2. Uniforms	11.49				
3. Books and supplies	20.95				
4. Special fees/assessments	57.54	\$ 112		\$ 1,115,124	
Secondary school			10000		
1. School fees	21.52				
2. Uniforms	19.18				
3. Books and supplies	47.91				
4. Special fees/assessments	57.54				
5. Skills training	57.54				
6. Child care	15.35	\$ 219		\$ 2,190,437	
Nutritional support			20000		\$467
1. One hot meal per day	1.28	1.28		\$ 9,329,776	
Health care support					
Child 0-4		Child 0-4	5000		\$ 36
1. Full course of childhood immunizations	N/A				
2. Vitamin A, zinc and iron supplements	N/A				
3. Routine health care	23.43	\$ 23		\$ 117,155	
Child 5-9		Child 5-9	5000		
1 Vitamin supplements	N/A				
2. Routine health care	15.62	\$ 16		\$ 78,103	
Child 10-18		Child 10-18	10000		
1 Vitamin supplements	15.62				
2. Routine health care	18.38				
3. RH and HIV prevention information and services	37.81	\$ 72		\$ 718,081	
Total cost per OVC					\$ 668

* Stover, John et al. 2007. Resource needs to support orphans and vulnerable children in sub-Saharan Africa. *Health Policy and Planning* 22:21-27.

It is interesting to note that if nutritional support were not included, each method would give a broadly similar result in terms the unit costs of providing an OVC with health and education support. If the \$22 estimate for psychosocial support were included in Method 2, the results would be very similar (US\$222 vs \$248). Psychosocial support was not included as a direct category of support in the Stover et al. analysis.

Nutritional support estimates between the two estimates were very different but they were for different interventions. Method 1's nutritional support refers to the cost of a package of food commodities provided while Method 2's estimates refer to the cost of a hot meal provided to an OVC once a day. Since unit costs obtained for health and education were similar but nutritional cost varied substantially, the OVC sustainability analysis presents the funding requirements for OVC in total without nutritional support costs, first using the package figure from Method 1, then presenting the financing needs for each intervention including nutrition separately (see Section 4.2.3).

3.3.3 PREVENTION COSTS

As previously noted in Section 3.1.5 on prevention service delivery, no prevention unit costs were estimated in this analysis. Prevention activities and their respective costs as laid out in the 2008-2009 HIV Strategic Plan were utilized and details of these activities are included are shown in Annex C.

3.4 MAINTAIN SCENARIO

The first scenario that is estimated in a HAPSAT analysis is the 'maintain' scenario (see Annex D for details). This scenario is costed for the base year of the costing projections, typically the year for which cost data are being collected for the exercise. The base year chosen was 2008 for this HAPSAT analysis; therefore, during data collection visits to implementing partners, donors and facilities, the budgets and expenditure reports for 2008 were requested for data abstraction. In most instances, the FY that covered the largest portion of 2008 were utilized. Once costs are collected for the maintain scenario's base year, HAPSAT projects the resources required for the number of years being covered in the analysis maintaining the base years level of service. While these projected costs may not be particularly useful for planning, it is helpful to understand how the base year costs will change over time because this allows us to see what cost changes will occur solely due to epidemiological or other parameters (e.g., drop-out rates, labor attrition rates) prior to scale-up of the numbers of people eligible and receiving services. For example, the maintain scenario may show that labor resources are currently inadequate to sustain the current levels of service within a few years even before any program scale-up is implemented, possibly because attrition rates exceed recruitment rates for certain cadres of personnel. The following section discusses two such important policy changes in RCI.

3.4.1 IMPACT OF CHANGES TO DRUG REGIMEN OPTIONS

It has been decided that by the end of 2009, the use of d4T-based regimens as first-line therapy will be substantially reduced. Most patients currently on any regimen containing d4T will be moved to other regimens. As this adjustment is ongoing there is no information for whether or not this will be accomplished by 2013. However, PEPFAR has indicated that there is not likely to be further procurement of d4T regimens in any substantial quantity beyond 2009 with PEPFAR funds. This adjustment is in line with what many other countries are doing; d4T regimens are no longer recommended in the developed world due to high rates of toxicities and adverse affects that have negative implications for adherence to therapy. While this adjustment was not primarily implemented to reduce the number of first-line regimens as an efficiency measure it will have the effect of doing so. Currently five of the 10 first-line regimens contain d4T, including two of the most widely used regimens.

Because of this move away from d4T, the HAPSAT analysis includes several scenarios redistributing the patients currently on d4T- to AZT- and TDF-based regimens in two ways. At the end of 2008, 38.5 percent of the patients on first line treatment were using a d4T+3TC+NVP regimen with an additional 19 percent on a d4T+3TC+EFV regimen. Approximately 5 percent of patients were distributed between the three rarely used d4T-based regimens. Therefore, a total of 62.5 percent of patients can be considered potentially eligible for a regimen switch to a non-d4T regimen by the end of 2009. Table 11 shows the potential redistribution patterns that have been estimated in this analysis and the average first-line regimen costs implied by each pattern.

The first redistribution scenario uses the March 2009 quantification exercise projections of patient distribution on first-line regimens. In this scenario, nearly 40 percent of all patients currently on ART will be moved from a d4T-based regimen to an AZT-based one with a further 12 percent moving to a

TDF regimen and just 14 percent remaining on d4T. A second redistribution scenario is also estimated with a slightly higher number of patients switching to a TDF regimen. This second scenario is important to keep in consideration because of the significant difference in price between d4T-, AZT-, and TDF-based regimens. Furthermore, there is anecdotal evidence that doctors in RCI would prefer to switch patients, particularly female patients, to a TDF-based regimen to avoid potential birth defects if patients are at risk of getting pregnant. It is a general observation though that due to the low toxicity of TDF regimens, doctors in many developing countries would rather have their patients on these regimens if they are available.

TABLE 11: REDISTRIBUTION OF D4T PATIENTS TO NON-D4T REGIMENS ESTIMATED BY HAPSAT

d4T Redistribution:	Average 1st Line Cost	d4T-based Regimen	AZT-based Regimen	TDF-based Regimen	Other Regimens
Before the redistribution	US\$214	62%	19%	1%	18%
First redistribution scenario	US\$255	14%	58%	12%	18%
Second redistribution scenario	US\$344	14%	38%	31%	18%

The average first-line regimen cost is the weighted average cost of all the regimens being used. Prior to any d4T patient redistribution the average cost of first-line regimens is US\$214. However, the redistributions shown in Table 11 have a significant impact on the average drug costs per patient on first-line ARV regimens, increasing it from US\$214 in 2008 to US\$270 for 2010 onwards. This represents an approximately 26 percent increase in average drug costs. This cost increase is very important to note as RCI moves forward, and it has implications for the sustainability of the ART component of the program. It is even more important if the switch from d4T follows the second redistribution scenario shown above, in which the increase in average drug costs would be approximately 60 percent. These financial impacts are discussed in Section 4.2.1.

3.4.2 IMPACT OF CHANGES TO LABORATORY PROTOCOLS

In 2009, RCI made significant changes to the numbers and types of tests required as standard protocol for adults and children on ART. For adults, it is now recommended that tests for cholesterol be conducted, in addition to CD4 counts and liver function, renal function, and blood tests that are currently conducted. For pediatric patients, viral load tests will be conducted once a year (supported by the RETRO-CI facility) in addition to all previously recommended laboratory tests. Finally, all female patients will be given pregnancy tests when initiating ART. The previous and current unit costs are shown in Table 12. The same tests are provided to patients on ART and the pre-ART patients but there is difference in costs due to the additional viral load testing required for the small percentage of pediatric ART cases.

TABLE 12 UNIT COST IMPLICATIONS OF CHANGES TO LABORATORY TEST PROTOCOLS, 2009

	ART Patients per Year	Pre ART Patients per Year	CT Patient per Session
Pre-2009 protocol lab costs	US\$ 46.80	US\$ 46.80	US\$ 6.55
2009 protocol lab costs	US\$ 54.00	US\$ 52.80	US\$ 6.55
2009 protocol lab costs*	US\$ 48.00	US\$ 46.80	US\$ 6.55

Note: Consumables only, HAPSAT includes labor costs for lab services with all other labor costs. HAPSAT currently assumes that approximately 2,700 ART patients in 2009 are pediatric cases.

* Unit costs for PEPFAR supported patients

At the present time only the cost of the additional testing for pediatric cases has a known funding source and these costs are substantial because the unit cost of a viral load test is approximately \$15.00. The additional costs implied by the protocol change would be magnified further under a scale up scenario where the number of patients on ART increases substantially.

4. REQUIRED FINANCIAL RESOURCES AND GAP ANALYSIS

4.1 AVAILABLE FINANCIAL RESOURCES

State-level funding for HIV services is extremely limited. In fact, the Strategic Plan to Control HIV/AIDS 2006-2010 estimated that the state would only provide 4.9 percent of the \$557 million necessary to carry out the strategy. Like most developing countries, the bulk of the financing was expected to come from international sources, including the USG (71 percent), the United Nations (9.8 percent), and other multilateral partners (10.1 percent).²³ This analysis uses only PEPFAR funding which is known and certain for 2010-2013.

PEPFAR figures shown in Table 13 came from PEPFAR RCI, and the costing team was told to assume the same total amount and program distribution for the purposes of the HAPSAT analysis. Non-PEPFAR data in the table are from the NASA RCI, 2009, and are shown to illustrate that PEPFAR is by far the largest financing agent for the program and that the use of PEPFAR figures alone does not detract substantially from the validity of the HAPSAT projections. However, it is acknowledged that certain programs do make contributions. For example, the World Food Program donates nutritional support commodities to PEPFAR-supported interventions such as OVC care.

²³ http://data.unaids.org/pub/BaseDocument/2009/20090622_sie_countrysummaryreport_cotedivoire_en.pdf.

TABLE 13: TOTAL FINANCIAL RESOURCES AVAILABLE FOR HIV/AIDS SERVICE DELIVERY FOR BASE YEAR 2008 AND ANALYSIS PERIOD 2009-2013, (US\$ MILLIONS)

The following resources are included in the HAPSAT financial resources envelope:

PEPFAR	2008	Total 2009 – 2013
ART drugs	18.0	90.0
Treatment	18.0	90.0
Treatment of opportunistic infections	6.24	31.2
PMTCT	6.59	32.9
CT	6.84	34.2
Labs	10.0	50.0
OVC	10.07	50.4
Prevention (AB+C)	8.0 + 4.2	61.0
Total	87.94*	439.7
Govt. of RCI	5	25

The following additional sources are available (according to NASA, 2009) but were not included in the HAPSAT financial resources envelope:

RCI (non-government)	2.3					
GF	6.3**					
UN agencies	1.4					
Other	0.8					
Total	15.8					

* An additional US\$40 per year will be programmed by PEPFAR for health systems strengthening and other activities not covered in the HAPSAT analysis.

** This figure is substantially lower than the publicly available GF disbursement figure of US\$11.3 million and these funds are not anticipated to be available beyond 2010.

Government of RCI

The government of RCI provides support to the HIV/AIDS program, most importantly in terms of labor costs. Staff who deliver clinical services in public facilities as well as government staff in the various ministries that support the HIV/AIDS program are public officials paid according to government pay scales. The government also makes substantial contributions to the care of OVC in the country. The government provides educational support as it waives tuitions for many OVC in public schools. Many NGOs and other PEPFAR-supported agents that provide educational assistance to OVC assist in the identification of OVC in need of support and provide books and uniforms, but in many cases, the agents arrange for tuition to be waived rather than actually paying tuition on behalf of OVC. The government also provides medical support to OVC, particularly for those under the age of five, since several medical services (e.g., vaccinations) are provided free to this age group whether they are OVC or not. Again, implementing partners may be needed to assist with identifying those in need of care. In the overall program sustainability analysis shown in Section 4.3, government financing is included in the resource envelope available for HIV programming and is assumed constant over the time horizon.

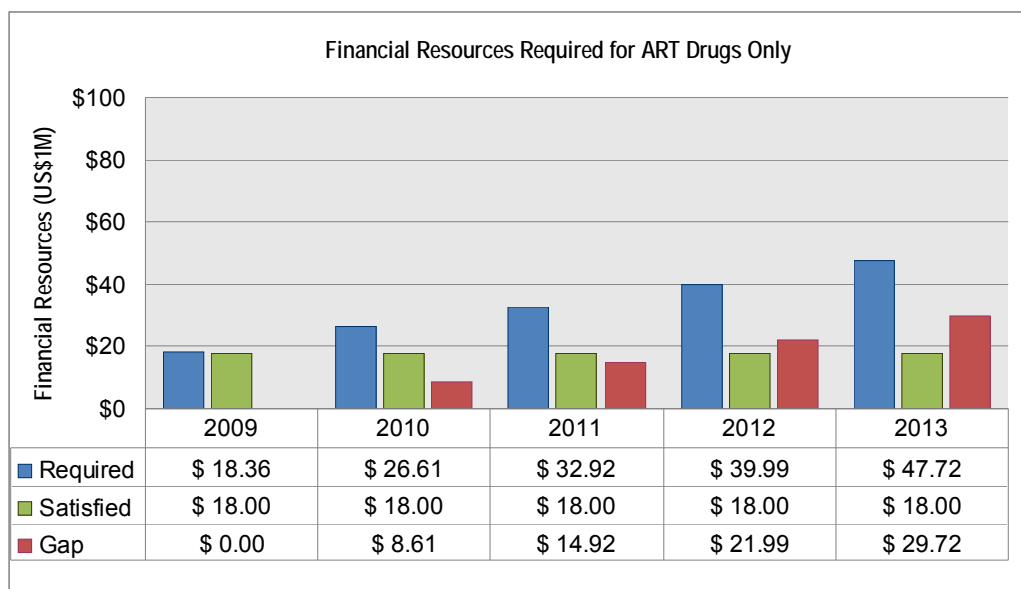
4.2 FINANCIAL REQUIREMENTS AND GAPS

This section shows HAPSAT's sustainability findings in terms of the financial resources available to RCI's HIV/AIDS program and its financial needs for the period 2009-2013. Each program is discussed separately prior to the presentation of the overall program sustainability analysis.

4.2.1 FINANCIAL SUSTAINABILITY OF ART SERVICES

As previously noted in Section 3.1.1, at a rate of 22,800 new ART patients a year, RCI will triple the size of its ART program and have approximately 158,000 patients on ARV by the end of 2013. The current financing levels cannot sustain this level of scale-up. This is partly driven by the level of scale-up, but the regimen change proposed and the resulting increase in average costs is also an important factor. Figure 2 shows the basic sustainability analysis for drug procurement alone.

FIGURE 2: FINANCIAL GAP ANALYSIS FOR ART DRUG PROCUREMENT POST D4T SWITCH

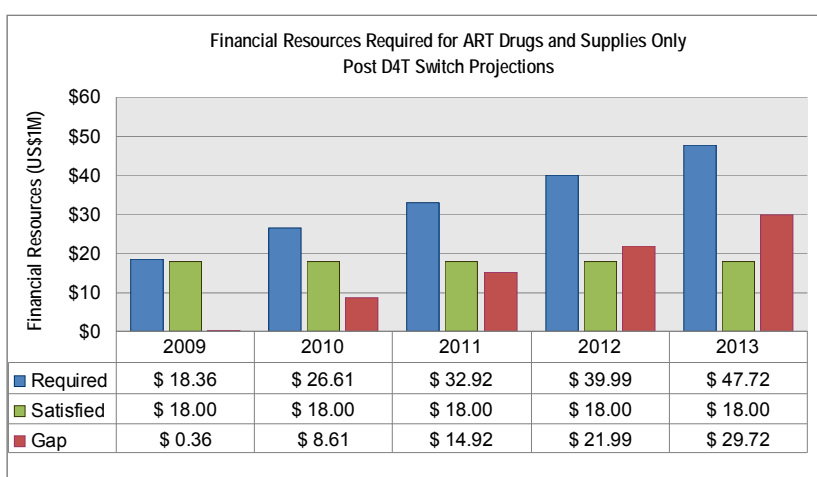
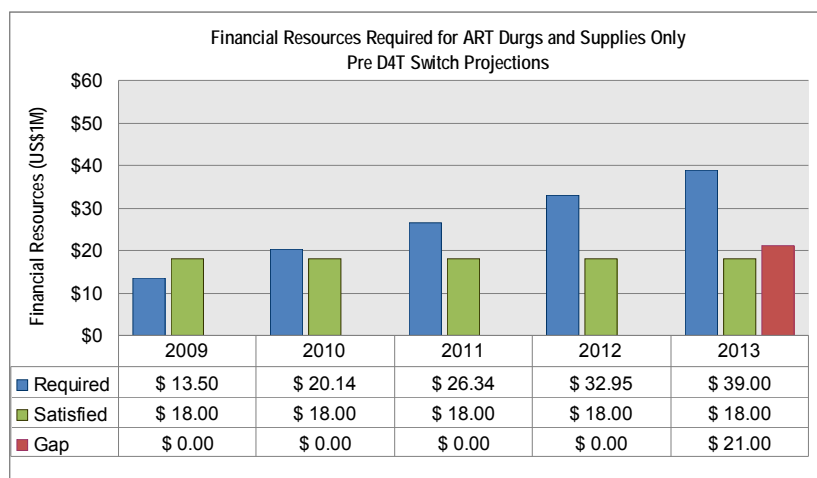


It should be noted that the HAPSAT does not currently differentiate between ART for adults and pediatric cases. This non-differentiation means that there will be an overestimation of procurement financing required by the HAPSAT because pediatric drugs costs will be lower than adult costs by between 10 and 30 percent. However, given the current and projected low proportion of ART recipients that are children, this is not anticipated to be a major issue. In addition, it should be noted that these costs include a commodity supply chain mark-up of 15 percent to cover logistics overhead and freight charges.

Additional resources required for drug regimen changes

As noted earlier, RCI will be reducing the number of patients using d4T-based regimens. This will have significant impact on the funding requirement for drug procurement because the most highly used d4T regimen in 2008 was also the cheapest regimen. Each of the regimens that these patients will be switched to is two (AZT-based) or three (TDF-based) times more expensive. Figure 3 shows the levels of increased funding required to accommodate the switch in regimens. A full list of regimens and distributions can be found in the Annex B, Table B-3. If the regimens and the distribution between regimens in 2008 were held constant through to 2013, there would be no ART drug financing gap, even with scale-up until 2013. The top panel in Figure 3 shows this “Pre d4T” scenario. However, the “Post d4T Switch” scenario in the bottom panel shows that phasing out the relatively cheap d4T regimen and increasing the use of the AZT and TDF will significantly impact financing adequacy. Post d4T switch, a financing gap appears as early as 2010 amounting to a shortfall of nearly US\$9 million. This gap increases steadily with scale-up, reaching nearly US\$30 million by 2013.

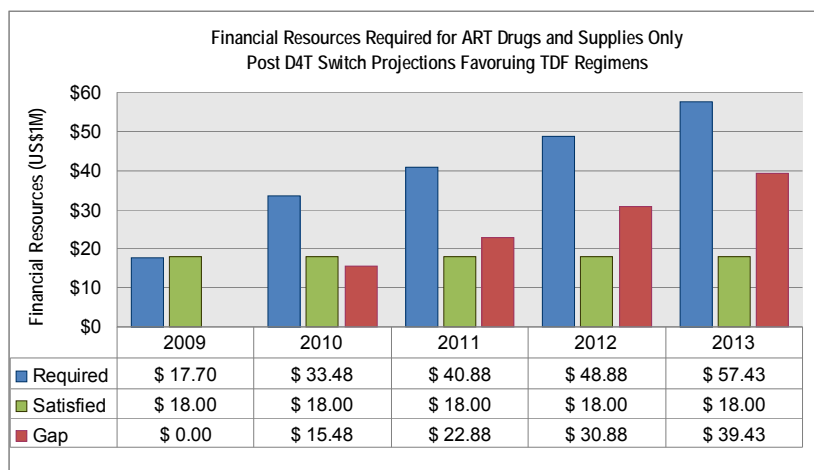
FIGURE 3: ISOLATING THE IMPACT OF D4T SWITCH ON FUNDING REQUIRED FOR ART DRUGS, PRE AND POST GAPS



A caveat that is important to note is, while it is true that d4T is relatively cheap and hence the observed gap, it is very likely that prices, particularly for the newer TDF regimen, will continue to decrease. Thus, if this scenario were to be run again in 2010 with lower prices, the projected gap for 2013 could be considerably less than US\$30 million.

The panels in Figure 3 assume that the distributions used in the quantification report are an accurate projection of regimen distributions in 2010. Specifically, these figures assume that doctors will switch more of their patients to the AZT regimen than the TDF regimen. However, there is substantial anecdotal evidence from RCI that doctors would prefer to switch their patient on to the TDF regimen because of its low levels of toxicity and fewer complications and because AZT's safety in human pregnancies has not been determined combined with the fact that RCI has a history of AZT monotherapy that has resulted in distrust of AZT-based therapy. Given that TDF is approximately two and half times the cost of the AZT regimen, this scenario could have very severe sustainability consequences. Figure 4 shows the financial implications on funding for drugs and suggests a financing gap of US\$15 million in 2010 that will increase to US\$39 million by 2013. The same caveats about pricing under Figure 3 remain in force so these financing gaps may be considered to be 'worst case' scenarios.

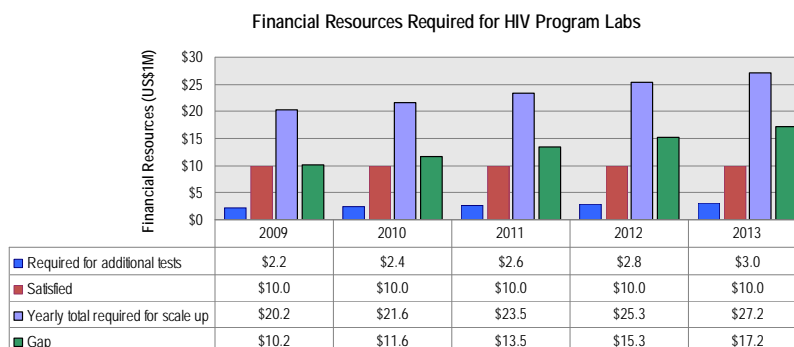
FIGURE 4: IMPACT OF D4T SWITCH ON FUNDING REQUIRED FOR ART DRUGS IF TDF IS FAVORED (SECOND REDISTRIBUTION SCENARIO)



Additional resources required for labs

As noted earlier, in addition to scaling up the number of patients on ART, in 2009 additional laboratory tests were added to the lab protocol resulting in increased lab costs. The impact of these increased costs is shown in Figure 5. It can be seen the additional lab tests added to the treatment and care protocol will add up to US\$3 million a year in terms of commodity costs. With scale-up in patient numbers and a known level of funding of US\$10 million a year for this time period, RCI will experience a large gap in financial resources available to support the lab component of its HIV program.

FIGURE 5: FINANCIAL RESOURCES REQUIRED FOR SCALED-UP LABORATORY PROTOCOLS ONLY (COMMODITY COSTS ONLY)



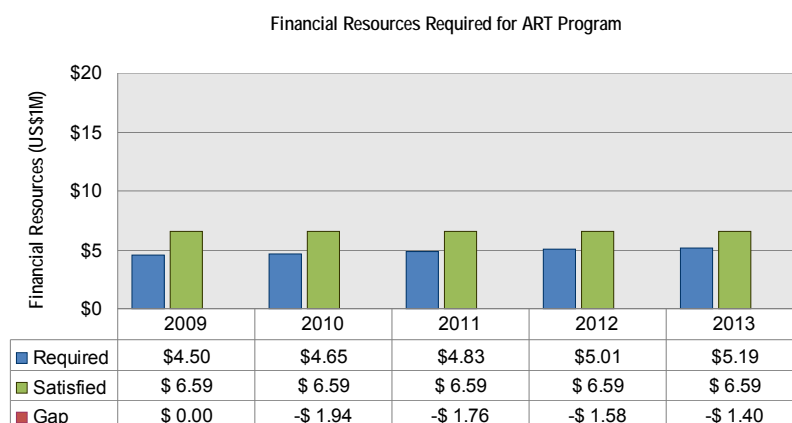
The combined effect of increased lab testing and program scale-up in terms of numbers will constitute a financial gap of approximately US\$65 million over five years if the protocol is followed. RCI faces trade-offs between the cost of adding more tests to the protocol and reaching more pre-ART patients. Of the additional costs, a substantial portion of the cost is due to the cost of pediatric viral load testing which will increase further if pediatric ART scales up to match adult ART in terms of need met as it should. However, it should be noted that a substantial portion of these costs are attributable to the monitoring of pre-ART patients, many of whom may not actually present at facilities for ongoing care until they are

ill enough to be eligible for ART. Also, it must be emphasized that in order for the scale-up in lab service delivery projected to happen, the projected shortfall in human resources must also be addressed and financed. The numbers shown in this sub-analysis are limited to lab supplies costs only and do not include any estimates of resource that may be required to train additional staff. Finally, these figures do not include any financing that may be required to obtain additional laboratory equipment in the event that the current stock of equipment is inadequate.

4.2.2 FINANCIAL SUSTAINABILITY OF PMTCT PROGRAM

At the proposed level of scale-up to the PMTCT program, RCI does not have a sustainability issue with respect to its PMTCT program as shown in Figure 6. Scale-up targets in this case include treating 12,000 women a month with ART. It is also anticipated that 100 percent of these women are to be treated from 28 weeks.

FIGURE 6: FINANCIAL SUSTAINABILITY OF PMTCT AT SCALE-UP (12,000 PER YEAR)



However, the target of 12,000 women receiving treatment per year, although higher than the 2008 coverage level, implies that only between 25 percent and 30 percent of HIV-positive pregnant women are receiving treatment and preventing transmission of HIV to their child over the projected time horizon. This is a very low coverage level and a missed opportunity to prevent thousands of HIV-positive pediatric cases because in RCI, approximately 85 percent²⁴ of women attend a facility for at least one antenatal care visit. Therefore, a scenario analysis for PMTCT is described and costed in which PMTCT coverage is raised to 80 percent of the women who need it (Section 6.4).

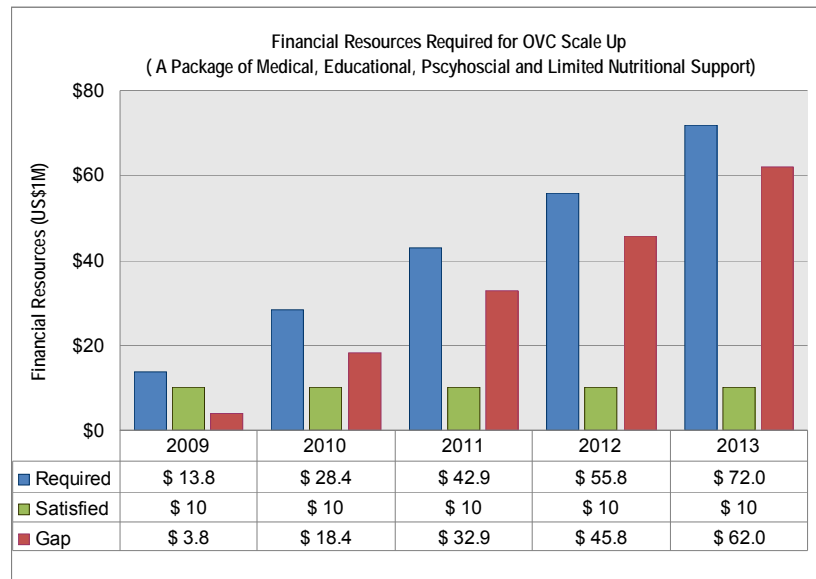
4.2.3 FINANCIAL SUSTAINABILITY OF OVC SERVICES

With approximately 850,000 OVC, RCI has a large population in need of assistance. This analysis assumed that PEPFAR will be the largest funding agent for overall OVC services although it is noted that this needs to be confirmed with NHA 2009 data when they become available. Since PEPFAR's monitoring shows that its implementing partners reached 80,000 of these OVC in 2008, there remains nearly 90 percent of this population still in need of support. As previously noted, the complexity of

²⁴ http://www.who.int/whosis/whostat/EN_WHS08_Full.pdf.

costing the heterogeneous mix of OVC services being provided currently and the lack of data on the demographic make-up of this population severely limits HAPSAT's ability to provide a detailed gap analysis in terms of each of the services. However, by determining the cost of delivering a package of OVC services using the implementing partner data that were available, the HAPSAT estimates the funding resources required to increase coverage by 10 percent annually from the current targets in the 2008-2009 HIV Strategic Plan reaching 159,460 OVC by 2013.

TABLE 14: FINANCIAL RESOURCES FOR OVC SCALE-UP OF 'PARTNER A + B PACKAGE' TO COVER 159.460 OVC BY 2013

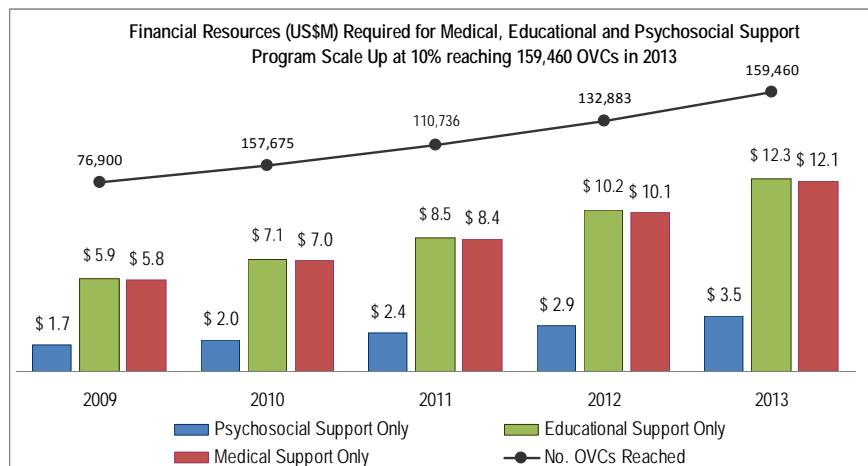


With US\$10 million available for OVC and an estimated unit cost of US\$248 to reach one OVC with a package of up to three services, only 38,760 OVC can be reached. Since PEPFAR reports reaching 70,000 OVC with care in 2008, this suggests that the cost of the package of OVC services provided by the two partners is not representative of all the OVC implementing partners. This finding was not unexpected, but as was explained in Section 3.3.2, these partners were chosen with a view to providing a basis for determining the relative resource envelope that might be required to reach more OVC with a known level of care. A further explanation would be that the 60,000 OVC who were reportedly reached by the no-longer-funded implementing partner were reached with a much lower quantity of care than Partners A and B provide to their catchment population. A final explanation for this finding is the lack of clarity around the term 'psychosocial' support.

The data burden of reporting how many times an OVC/family is reached with psychosocial support is heavy. Currently, Partner A reported that 6,425 visits were made but not how many OVC were contacted. Partner B reports that 971 OVC received psychosocial support, with 479 directly monitored, but made no mention of the intensity of this support. These reports suggest that psychosocial support can be defined as being at least one visit but could be up to several regularly scheduled visits per OVC. Both of these definitions are probably appropriate if we assume that OVC need is likely to vary from one child/family to the next. If this assumption is correct, then the unit cost of psychosocial care is estimated to be US\$22 on average. This analysis suggests that with the currently available resources, a relatively high number of OVC can be reached (Figure 7).

Notwithstanding these limitations, the analysis projects the cost of reaching up to 159,460 OVC by 2014 which essentially doubles the size of the OVC program. Figure 7 illustrates the costs of reaching a scaled up number of OVC with each intervention, separately: psychosocial, educational, and medical. Nutritional support is addressed in a subsequent graphic.

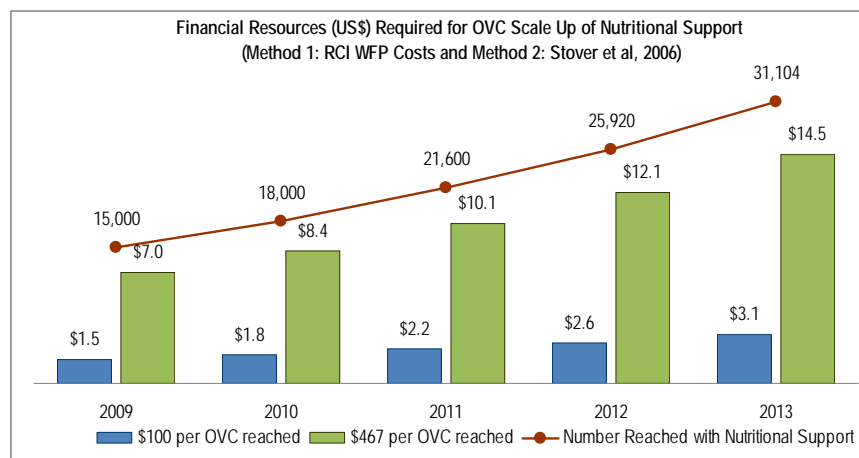
FIGURE 7: FINANCIAL RESOURCES REQUIRED FOR SCALE-UP OF OVC SUPPORT BY SERVICE



An alternative approach to scale-up using the information presented in Figure 7 and Table 9 would be to assume that several different combinations of services could be delivered. In practical terms, this could require a more streamlined and directed approach to the delivery of OVC care. Such an approach would require as a first step a detailed analysis of the costs, geographical need distribution, and if possible the cost efficiencies of the interventions currently being implemented. Following this, PEPFAR could prioritize and outline which services and what delivery numbers partners are required to produce with the caution that some OVC may require more support and therefore resources than others, different partners may have strengths in delivery certain types or care, and geographical disparities may impact both the intensity of support required and the cost of providing that (specifically consider northern region of the country.)

An example of why a more in-depth analysis of OVC costs could be useful to inform strategic planning would be the cost of nutritional support. OVC care in the area of nutritional support can vary widely, from minimal cost impact interventions such as assisting with the set-up of community gardens to the highly cost intensive interventions such as providing cooked meals. Figure 8 illustrates the differences in the financial resources required to scale up nutritional support to reach 31,104 OVC in 2013 using two different approaches. The first approach is the packaging and delivery of food commodities to OVC. This package, in RCI, includes a balanced ration of fortified maize meal, pulses, fortified vegetable oil, fortified corn soya blend, iodized salt, and sugar and is designed as a supplement to the OVC food intake and not a substitute; it costs approximately \$100. The cost of delivery could make this unit cost slightly higher but those data were not available. The second estimate is from the Stover et al. analysis, which determined that the cost of delivering a single cooked meal a day to an OVC was US\$1.48. As the figure shows, these substantially different interventions imply substantially different costs to reach the same number of OVC. This highlights the fact that the ‘intensity’ of resource use is important to determine for the planning, budgeting, and reporting of OVC activities.

FIGURE 8: FINANCIAL RESOURCES REQUIRES FOR SCALE-UP OF NUTRITIONAL SUPPORT: GIVEN ALTERNATIVE UNIT COSTS



4.2.4 FINANCIAL SUSTAINABILITY OF PREVENTION SERVICES

Given the critical importance of prevention activities in ensuring the long-term sustainability of any HIV program by reducing incidence and the number of people requiring life-long ART, it is imperative that adequate funding is available to these activities. While PEPFAR provides the bulk of support for other activities in the HIV program it is possible that there is substantial non-PEPFAR funding available for prevention, given the history of prevention activities in RCI. However, it is difficult to project non-PEPFAR resources available over the time horizon considered in this report. The NASA 2009 finds that up to US\$21 million was spent on prevention activities in 2008 from government, private, and donor sources. However, this figure does not include the US\$12.2 million that PEPFAR made available for prevention in that year. These figures suggest that there is more than enough funding available to cover the prevention activities proposed in the 2008-2009 HIV Strategic Plan, which totaled US\$9.7 million (see Annex C). However, there are important considerations to note.

First, the current analysis does not scale up prevention services because no targets were available for the time horizon. Without targets for the number of people reached and unit costs per person, the HAPSAT cannot estimate the cost of scale-up for prevention. The 2008-2009 strategy estimated funding needs or budgets for the activities mentioned (e.g., 24 films on abstinence at a cost of \$11,544), but gave only the number of each activity proposed rather than the number of people that will be reached.

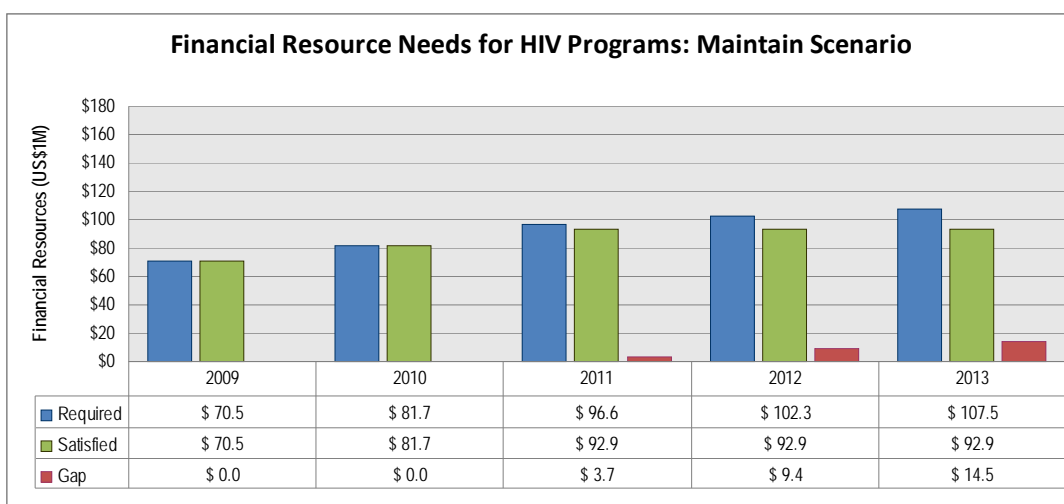
Second, the HAPSAT is a costing analysis that provides little information on impact, i.e., it is not a cost-effectiveness tool. In other words, it makes no judgment of the impact of activities beyond the numbers reached/treated/supported. Therefore, it is difficult to determine either the coverage/number of people reached with prevention activities or the impact of reaching those people. With its ART and PMTCT projections, HAPSAT is able to determine and project the coverage levels and use known parameters to determine the impact of reaching those coverage levels. HAPSAT is unable to make the same projections for prevention. Therefore, this analysis cannot determine whether the projected prevention requirement of US\$9.5 million is all that is needed for prevention, which is the critical first question before determining whether resources available are adequate.

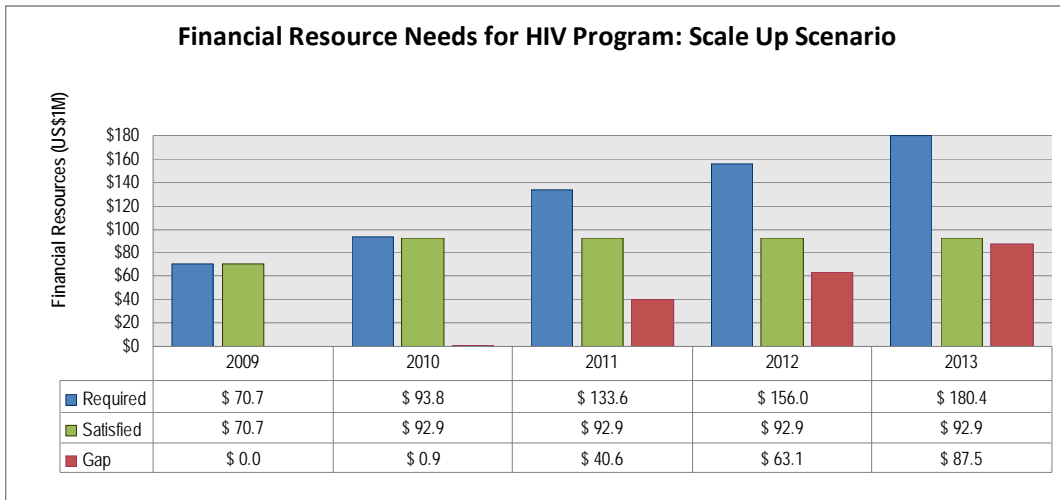
4.3 OVERALL PROGRAM FINANCIAL SUSTAINABILITY AND GAPS

This section combines the HAPSAT analysis results previously discussed by program to provide a ‘big picture’ of the sustainability issues that RCI’s HIV/AIDS program must address over the 2009-2013 period. The resources assumed to be available to the program include all the funding currently available from the government of RCI (assumed to be constant over the time horizon) and all the relevant program funding available from PEPFAR (i.e., those program costs for which need projections can be made using the HAPSAT).

Given the current estimates of known funding (i.e., PEPFAR and government of RCI), RCI can provide the current (2009) level of services (ART, PMTCT, CSS, OVC, and prevention) over the 2009-2013 with financial gap of US\$3.7 million projected to occur in 2011 that will widen to US\$14.5 million by 2013. These results are shown in the top panel of Figure 9. The bottom panel of that figure shows the sustainability issues that will arise for RCI if it extends current scale-up plans (for 2009-2011) to 2013. A small financial gap occurs almost immediately in this scenario, US\$1 million in 2010, rising to US\$87 million by 2013.

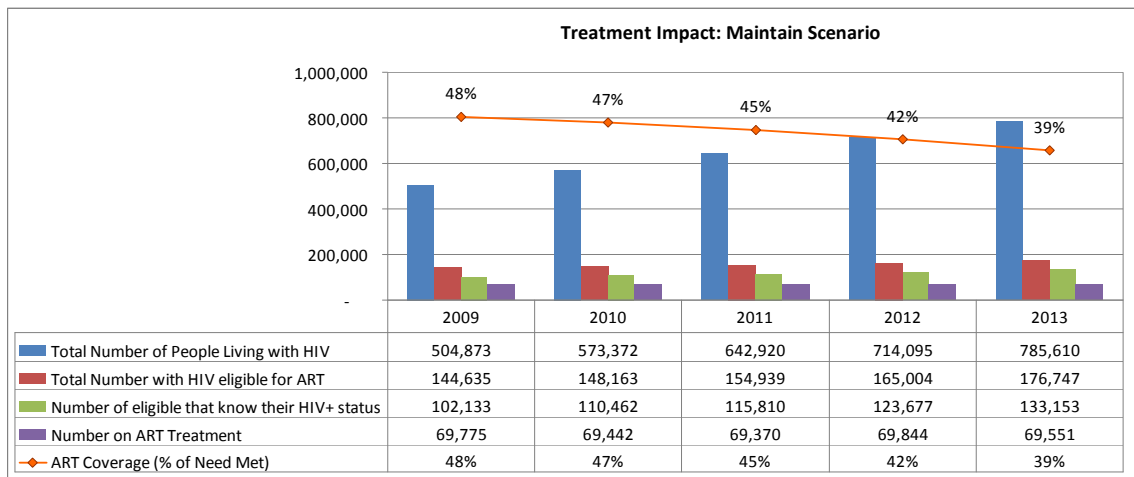
FIGURE 9: RESOURCES REQUIRED FOR MAINTAINING AND SCALING UP RCI’S HIV PROGRAM

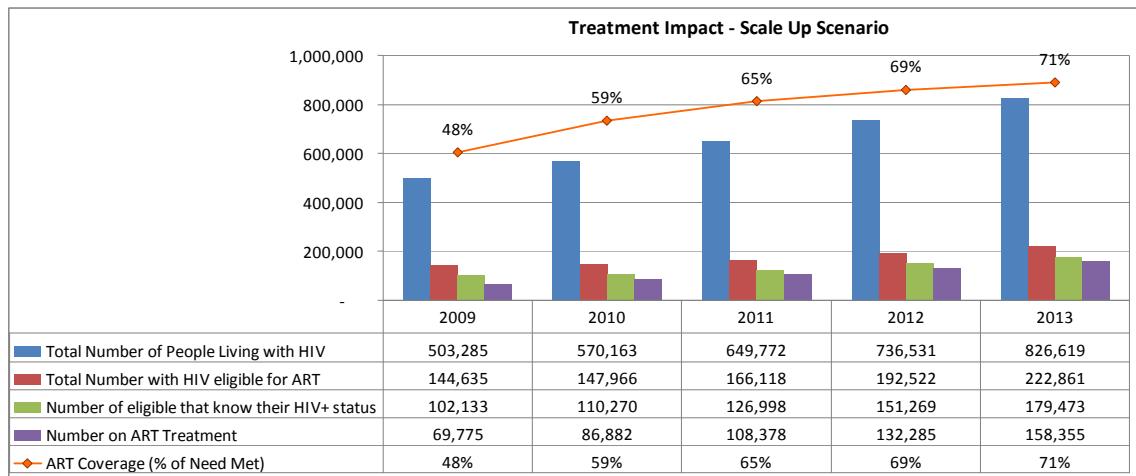




Maintaining the current level of service in terms of the number of people treated with ART and PMTCT is not an acceptable solution for RCI in the long run. Given the incidence of HIV and need to cover the HIV-positive population with services scale up is essential because simply maintaining service levels means that a lower percentage of people in need will be reached over time. The top panel of Figure 10 shows financial resource needs maintaining the current number of treatment slots. The bottom panel shows the potential financial impact of the current scale-up program.

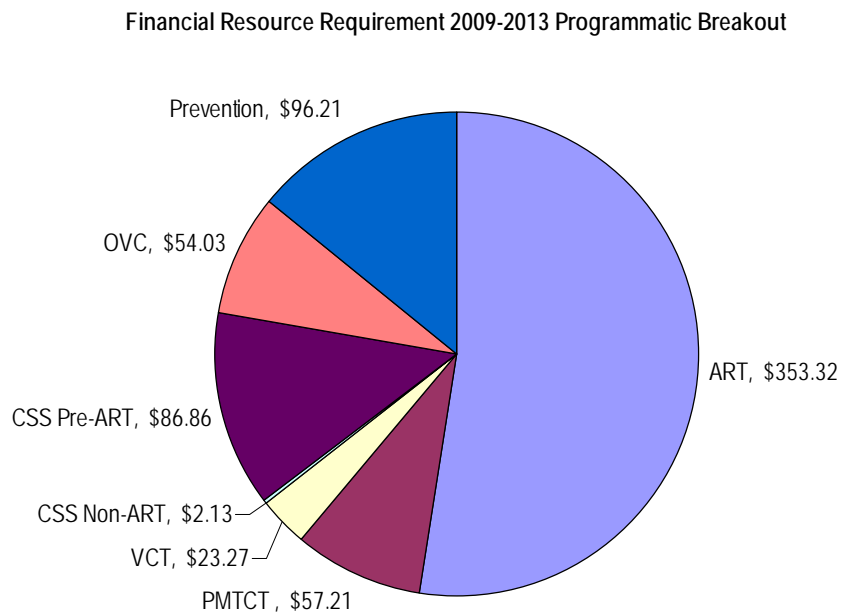
FIGURE 10: PROGRAMMATIC IMPACT OF MAINTAIN SCENARIO (TOP PANEL) VS. SCALE-UP SCENARIO (BOTTOM PANEL)





Maintaining the current level of service with the resources currently projected to be available over the next five years will be difficult given the proposed changes to the ART services (lab and drug regimen changes), which increase the unit cost of treating each ART patient. Scale-up at the current rate will also not be feasible with increasing financing requirements for ART putting substantial pressure on other aspects of the HIV program. Figure 11 shows the programmatic split of resource needs and the large proportion of resources that are required for the ART program alone – well over 50 percent of the resources required for HIV programming.

FIGURE 11: RCI HIV PROGRAM SCALE-UP SCENARIO: PROGRAMMATIC SPLIT FOR 2009-2013



5. PROJECTING HUMAN RESOURCES FOR HEALTH NEEDS FOR HIV/AIDS

Availability of health workers is a major constraint for many sub-Saharan countries due to both limited production of medical professionals and severe attrition of the already limited supply to higher-paying developed countries. The situation is no different in RCI where the data collected in 2009 strongly suggest that the rate at which new workers join the health care work force in the public sectors is lower than the attrition rate, estimated by the MSPH to be 10 percent. To illustrate the impact of attrition, data collected from the MSPH estimates that there are 6,973 nurses in RCI with an additional 209 being anticipated to join public service each year. However, with an attrition rate of 10 percent, this implies that for every three leaving the service only one is/can be recruited. In fact, HAPSAT projects that there will be fewer doctors, nurses, laboratory, and pharmacy staff in public service in 2013 than there are currently in 2009, a finding of great concern.

HAPSAT gives all human resource estimates and projections in terms of ‘full-time equivalents’ or FTEs:

An FTE staff member for a given service (e.g., ART) is a health professional who spends all his/her working time allocated for patient visits to provide that service. Since FTE is measured in terms of time, one FTE supplied by a single full-time employee is the same as the combined FTE of two part-time workers who work 50 percent each.

For example, a doctor has 220 working days per year and is assumed to spend 6.5 hours each working day attending to patients. If a doctor spends, on average, 24 minutes per ART patient visit and each ART patient makes four visits to the doctor a year, then one doctor FTE for ART can see 894 patients per year.

However FTE calculations do not account for the unequal distribution of health workers across the country. It is known that in the northern region in particular, there remain limited numbers of facilities and staff as government administration is rebuilt in those regions. Therefore, it is likely that more clinical, laboratory, and pharmacy staff are required than are projected in this analysis. The current analysis should be supplemented with additional human resource data regarding the distribution of health workers and patient populations across facilities in order to paint a more accurate picture of how many additional resources are required and where they would need to be located geographically.

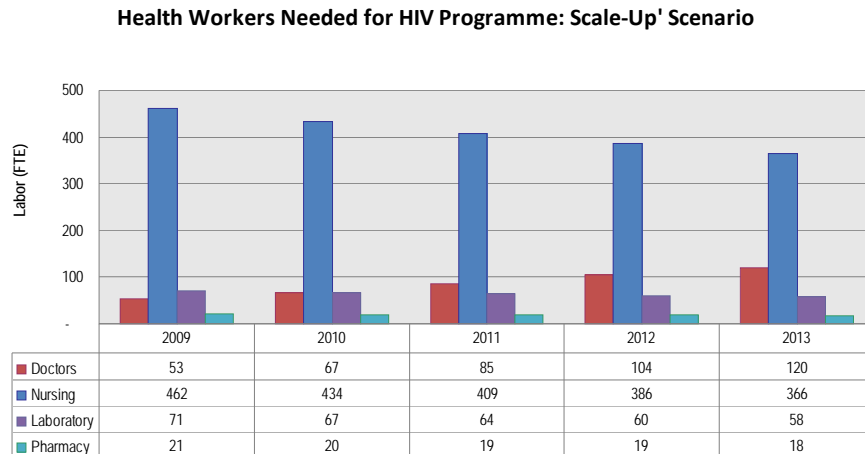
A further complication to this environment and limitation to the projections produced by the HAPSAT is the fact that even among the staff who are available ‘on paper’ to provide services, a significant number of them are moonlighting as private clinical providers, frequently at the expense of their public sector clinics, further lowering the actual quantify of labor available to provide ART services in the public sector.

Finally it must be noted that the estimated number of health workers required depends on the assumed frequency and duration of visits as well as what type of tests are ordered during those visits. Practice patterns may vary significantly across facilities depending on the technical capacity of health workers, patient volumes, and available equipment and financial resources. This analysis assumes that scale-up

activities will occur with the same protocol as observed across the facilities used in this analysis. In addition, this analysis makes no assumptions as to the quality of the services currently provided or the adequacy of the interaction (time spent) between provider and patient. The current estimates are based on HIV-related labor input data reported from the facilities visited. The facilities were chosen for convenience and are not representative of clinical HIV care across the country.

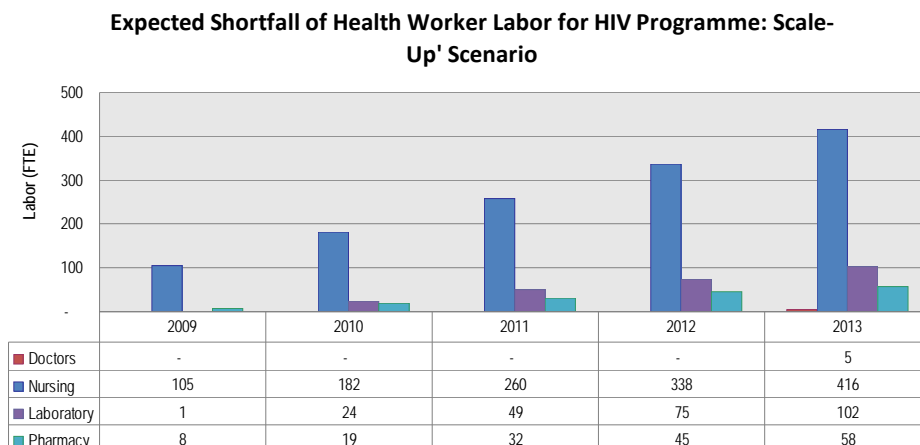
Figure 12 presents the estimated labor requirements that HAPSAT projects will be needed as the HIV program is scaled up. It can be seen that a large number of additional doctor and nursing FTEs will be required to implement scale-up activities. Nursing in this analysis is a combination of registered nurses and nurse-midwives. The additional laboratory activities anticipated over the next few years will also require additional FTEs. Finally pharmacy needs will also increase.

FIGURE 12: ESTIMATED ADDITIONAL LABOR REQUIRED TO SCALE UP HIV CLINICAL SERVICES



In Figure 13, the projected human resources shortfall is presented. It has been assumed that of the total stock of human resources for health, only 5 percent of that stock is available to work on HIV. HAPSAT projects that there will be enough doctors to undertake HIV services until 2013. However, the caveat regarding geographical distribution should be kept in mind and therefore some shortages may be experienced sooner or may even be occurring currently in certain regions. Given the substantial need for nursing skill, it is not surprising that the largest shortfall is in nursing labor. While shortages in laboratory and pharmacy skills are projected, they appear to be relatively small gaps until 2013 at which point the gap begins to exceed the projected number of staff joining the public service in each of these skill categories.

FIGURE 13: SHORTFALL EXPECTED IN HIV CLINICAL SERVICE LABOR OVER 2009-2013



In terms of actual costs, HAPSAT estimates that total labor costs for the treatment and care of PLHIV and PMTCT will be just under US\$5.7 million over the five-year period in the scale-up scenario (see Annex E). This figure is well within the current estimate of US\$25 million of government support available for HIV according to the NASA 2008.

6. SCENARIO ANALYSIS OF POLICY OPTIONS TO IMPROVE SUSTAINABILITY ISSUES

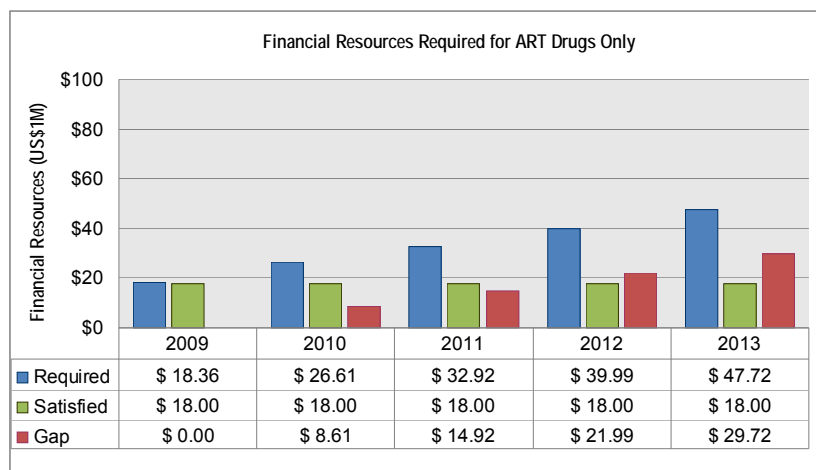
The preliminary results from the HAPSAT analysis were shown to stakeholders at a scenario development workshop. The two scenarios presented were the maintain and scale-up scenarios. The scale-up scenario was simply the maintain scenario scaled up in terms of the numbers of people on treatment but did not include changes to the drug regimens or any prevention or OVC projections. The stakeholders were then asked to come up with proposed solutions to address the financial gap that these scenarios showed. Each of these solutions can be thought of as a potential scenario to be costed by the HAPSAT, although in some cases it may be appropriate to combine scenarios in order for the analysis to be a realistic projection of the future.

6.1 REDUCTION IN THE NUMBER OF FIRST-LINE REGIMENS IN USE

RCI is notable in the number of first-line regimens in use among its HIV-positive patients. Estimates of over 40 combinations of ART drugs have been reported, although the quantification analysis is restricted to the 10 most common regimens. A lower number of regimens would be of benefit for several reasons. Firstly, if higher-priced regimens that provide little or no additional benefit over the cheaper regimens are eliminated, this would lower overall drug costs. Secondly, by including more expensive, newer drugs as first-line drugs, RCI is effectively reducing the range of options of second-line regimen options available to those who fail first-line treatment.

However, as previously discussed in this report, RCI has also decided to discontinue the use of regimens containing d4T. Since five of the most commonly used regimens reported in the quantification analysis contain d4T, this switch from d4T inadvertently also reduces the number of first-line regimens by 50 percent. However, this reduction does not in fact reduce costs for RCI. In fact, depending upon the choice of regimen to which d4T patients are switched, there will be a moderate to substantial increase in ART costs and therefore funding requirements as the following figures illustrate (these changes were described in Sections 3.4.1 and 4.2.1). If d4T's use is sharply reduced, the average cost of a first-line regimen increases to US\$ 270 if patients are switched to AZT. This results in a moderate increase financial requirements of up to US\$ 8 million by 2013. In a 'worst case' scenario where more patients than anticipated are switched to a TDF regimen to avoid AZT toxicity, then the average cost of a first-line regimen increases substantially to US\$344 per patient per year resulting in the resource gaps shown below.

FIGURE 14: FINANCIAL GAP IN FUNDING REQUIRED FOR ART DRUG PROCUREMENT ACCOUNTING FOR REDUCED NUMBER OF FIRST-LINE REGIMENS



6.2 REDUCED SCALE-UP TARGETS

An obvious cost control measure is to reduce RCI’s currently ambitious scale-up targets. Current targets will result in the ART program growing to nearly three times its current size. The present gap analysis suggests that there is very little room in the current funding allocation to ART to enable this scale of growth even in the near term given the concurrent proposed change in drug regimens options.

6.3 CO-TRIMOXAZOLE PROPHYLAXIS: INCREASED COVERAGE

All the scenarios presented include scaled-up coverage with co-trimoxazole for both adult and pediatric HIV-positive patients who are classified as being pre-ART, ART-eligible but non-receiving, and patients on ART. The total drug cost of treating a patient with co-trimoxazole for a year is US\$7.30, which is relatively low. Therefore, it was not deemed necessary to model the cost of the HIV/AIDS program with and without this cost included. However, limitations to covering all those in need of prophylaxis should be noted as follows:

- In order to receive co-trimoxazole, patients must be identified and referred to clinical care and this is not the case for a significant number of HIV-positive patients.
- Co-trimoxazole prophylaxis studies on HIV-positive patients in RCI show the drug’s use to be associated with fewer opportunistic infections, fewer malaria episodes, lower viral loads, and higher CD4 counts. However, the exact rate at which progression is slowed is undetermined and therefore difficult to model. One estimate available for RCI shows that prophylaxis can slow down progression by up to 5.4 months. While this can postpone the need for ARVs for the first cohort on prophylaxis and result in some savings, this impact is merely a lag effect as the same cohort will require ARV within year so the savings at best will only be realized in the first year/cohort.

6.4 PMTCT: PRIORITIZATION

While no single intervention was deemed to be of ‘low priority’ at the stakeholder meeting such that its funding could be ‘reprogrammed’ to a high priority intervention, the importance of PMTCT was

acknowledged. PMTCT is generally acknowledged as one of the most cost-effective forms of prevention since it is possible to identify one case of HIV positive for potential ARV treatment, prevent one case of HIV infection (the infant) and possibly protect a spouse (husband) if the women is counseled and/or put on ART. Therefore, it was deemed important for PMTCT to continue to scale up at the current rate while it was thought that the scale-up rate for ART may be ambitious given the financial gaps emerging in 2010 according to the HAPSAT.

Table 15 shows the coverage of HIV-positive pregnancies when the current target of 12,000 women per year receiving PMTCT is met. It can be seen that less than 30 percent of known HIV + pregnant women are reached, representing a large missed opportunity to prevent HIV in newborns. By treating up to 80 percent of known pregnancies, assuming that 40 percent of untreated pregnancies result in an HIV-positive child, approximately 28,000 new cases of HIV could be averted.

TABLE 15: COVERAGE OF PMTCT WITH 12,000 WOMEN PER YEAR TARGET FOR PMTCT

	2009	2010	2011	2012	2013
Number of pregnancies	878,279	912,056	948,095	985,694	1,024,688
Number of pregnancies HIV tested	734,877	758,943	785,290	812,770	841,185
% of all pregnancies HIV tested	84%	84%	84%	84%	84%
Number of known HIV-positive pregnancies	36,514	39,103	44,926	51,707	59,048
Number of known HIV-positive pregnancies treated	29,211	30,890	34,430	39,362	44,703
% of known HIV-positive pregnancies PMTCT treated	33%	31%	28%	24%	21%
Number of infections prevented at 80% coverage	8,227	8,378	9,097	10,212	11,435

Figure 15 illustrates the number of cases of vertical transmission that could be prevented if PMTCT coverage were to be increased to 80 percent.

FIGURE 15: VERTICAL TRANSMISSIONS AVOIDED AT 80% COVERAGE AND AT 12,000 TREATED/YEAR

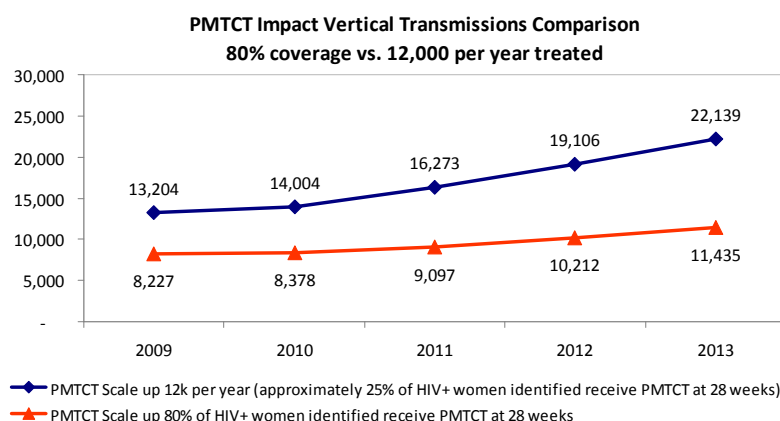
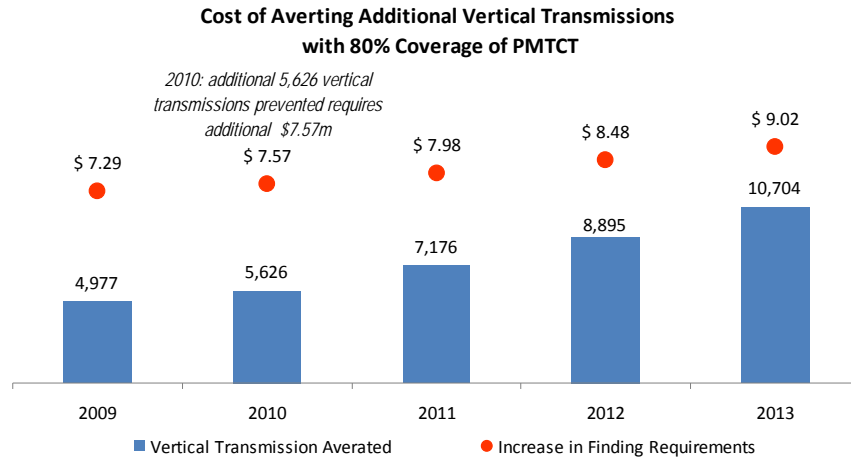


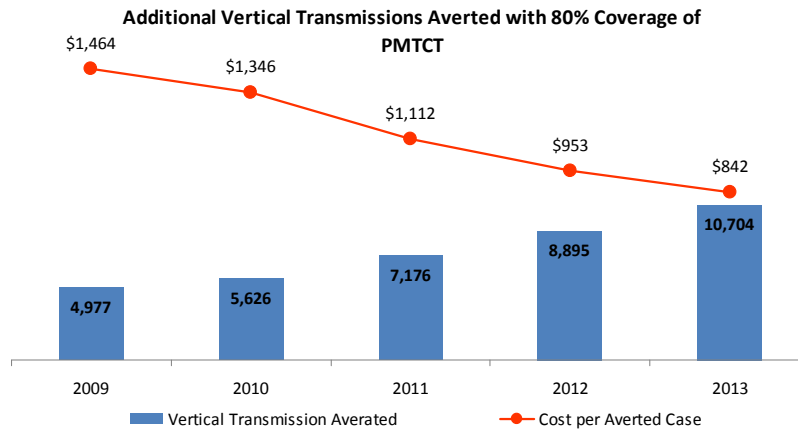
Figure 16 shows the additional vertical transmission that could be averted and the additional financial resources required if PMTCT coverage were increased to 80 percent. This represents a financial gap of US\$31 over the period of 2009-2013. These treatment figures assume that the same number of women tested yearly as the current scale-up scenario.

FIGURE 16: COSTS AND NUMBER OF ADDITIONAL VERTICAL TRANSMISSIONS AVERTED AT 80% PMTCT COVERAGE



The cost per case of HIV positive averted by PMTCT falls as scale-up continues. This is partly explained by the fact that women already identified as being HIV positive do not need further testing prior to receiving prophylaxis at childbirth.

FIGURE 17: AS PMTCT IS SCALED UP THE COST PER AVERTED CASE FALLS



7. RECOMMENDATIONS

This HAPSAT analysis reported here contains several important findings that the Health Systems 20/20 team has reviewed and used to suggest several courses of action that the government of RCI and its donor partners can undertake in the short term to address the sustainability issues of its HIV program. These conclusions are based upon the scale-up targets currently being used for planning in RCI, and the standards and protocols for care currently being implemented in RCI.

1. **Scale-up strategy re-evaluation:** RCI's current scale-up strategy is not sustainable beyond 2011. The HAPSAT limited the funding envelope used in this analysis to RCI and USG/PEPFAR funding and therefore may have underestimated the available financing between 2009 and 2013. However, given that PEPFAR funding is the most predictable funding stream and accounts for 70 percent of the available resources when no further MAP or GF funding is guaranteed, this limitation can be considered appropriate and the findings contained in this analysis strongly indicate a sustainability crisis if additional patients continue to be recruited into the ART program prior to the securing of further funding. The limitation has shown program-specific sustainability analyses but has made no assumptions about the fungibility or 're-programmability' of the available resources. If resources are fungible then continued scale-up will put at risk funding for other important programs, prevention being the one of particular concern given its critical role in ensuring future sustainability.
2. **ART drug regimen strategy development:** RCI needs to ensure that it has a sound drug regimen strategy. This strategy must go further than a treatment protocol that lists which class of patient should receive which drug regimen. The strategy must include a clear and implementable plan for educating doctors, nurses, pharmacists, and dispensers about the importance of adhering to the national protocol and the consequences of haphazard drug prescription will have on failure rates, treatment options, and the capacity of the HIV program to sustain its patient load. In an environment where drugs are not paid for at the point of dispensing, it is natural for doctors/patients not to consider costs when making treatment decisions. However, given the huge potential cost implications if the anecdotal evidence regarding the use of TDF-based regimens proves accurate, failure to contain cost in this one area of the HIV/AIDS program could have a detrimental impact on the entire program. In addition, RCI could benefit from a comprehensive HIV Treatment Information System with data clerks that enter not only outpatient visits but also co-ordinate with dispensaries to track the regimens/combinations in use, the regimens that patients are failing, and most importantly the rate of treatment program drop-out. The limited capacity to follow up with patients means that there is little evidence available regarding the level of treatment adherence or, more specifically, that the drop-out rate is unknown. This has implications for the numbers of people that can be put on treatment; this number may be higher than we currently believe if drop-out rates are high. While a seemingly fortunate occurrence, these drop-outs will return to the system when they get sick enough at which point the previous treatment regimen may be of limited use and a more expensive regimen may be required. Therefore a tracking system and the building of follow-up capacity may be an investment with high returns if it can reduce drop-outs and provide real-time information about prescribing patterns.

3. **Pediatric ART:** Currently there is very low coverage of pediatric HIV. The HAPSAT doesn't cost pediatric ART directly as it does not differentiate between adult and pediatric ART cases. This is a limitation of the tool (currently being addressed) that is particularly acute in this analysis because a priori it is known that there were at least 57,000 pediatric HIV-positive cases in 2007 and assuming their need is equal to the adult parameter, i.e., 35 percent, then this implies that at least 19,950 children need treatment. The 2009 quantification estimates of current use suggest that only 2,790 children are on treatment, just 13 percent of those in need. A possible link to HIV-positive children could be made through the PMTCT program, where HIV-positive mothers are identified and, with follow-up, could be encouraged to bring the children that they already have in for testing and care. Other children may be identified through the OVC programs that also reach children who have or had HIV-positive parents.
4. **Laboratory services effectiveness monitoring:** RCI has recently (2008) embarked on a new and more expensive laboratory protocol for its ART patients. While the HAPSAT team is not in a position to determine the appropriateness of this line of action, the team strongly advises that a benefit analysis be conducted within a year of the new protocol's implementation to determine whether it is possible that the laboratory protocol could be scaled back while geographical reach is increased. While cost is a factor in this recommendation, it should also be noted that RCI is already limited in its human resource capacity in this area with the HAPSAT analysis projecting a shortage of laboratory personnel by 2012 under the maintain scenario and a shortage occurring as early as 2010 under the scale-up scenario, when just 22,000 additional patients enter the treatment program.
5. **OVC costing:** RCI has a substantial OVC population many of which are likely to be in need of immediate assistance. A full and detailed costing study would be useful to determine exactly what 'packages' of services are currently being delivered to OVC and how much each OVC package costs. Such an analysis could serve several functions. Given that many partners, including government ministries, provide OVC services, the entire OVC program would benefit from being able to determine which children are receiving which services, where there is duplication of effort and where certain services are not available. The current monitoring of OVC measures the number of children reached rather than the number of services each child in each age group receives making duplication an issue and leaving program managers unable to determine where there may be gaps in service provision. In addition, these data would allow the PNOEV to plan and cost a streamlined and reasonably standardized OVC program where many partners using many funding sources can provide services in a similar and compatible manner such that more children are reached with all the services they need and duplication of effort is minimized.
6. **Strengthening local systems:** This is needed in particular to strengthen and broaden OVC care. Part of the activities currently undertaken by implementing partners involving the linking of OVC and their families with providers of educational or health support are an obvious area that the government may be able to take over with direct (salary) support through the Ministry of Family, Women and Social Affairs.
7. **Prevention focused on women and young girls:** While it is generally acknowledged that prevention is key to long-run sustainability and therefore important, less discussed is which types of prevention activities and which segments of the population might be more critical than others. RCI is experiencing an epidemic that is having a tragic effect on women and young girls. Prevention strategies specifically directed at these groups, particularly young girls, need to be developed rather than the more 'generic' youth-focused BCC and IEC interventions. In

conjunction with these activities, the scale-up of PMTCT must be a major focus, with an emphasis on integrating it with pediatric case detection and increasing ART recruitment for those in need of treatment.

8. **Strong commitment to GF applications:** Alternative funding sources are critical to the future sustainability of the RCI program. The HAPSAT analysis itself can support this application process and has been used in Nigeria to assist with the design of the World Bank MAP2 funding agreement and in Zambia for a successful GF application. Obviously, in addition to costing analyses, a coherent evidenced-based HIV strategy may not be adequate for GF support and costing the strategy as it is developed rather than after the fact (as is currently being planned in Nigeria) will likely increase the attractiveness of an application.
9. **Nursing labor shortages will be particularly acute:** The HAPSAT analysis suggests that the nursing labor shortage is by far the most critical human resource sustainability given the current reliance of the clinical aspects of the program on nurses, particularly for the bulk of clinical visits that are follow-up visits requiring doctor time only if there are complications. In addition, a scale-up of PMTCT will require an expansion of services typically supplied by nurse-midwives. Attrition that is not balanced by adequate recruitment numbers contributes to this gap, which will occur even without scale-up of ART and PMTCT. Laboratory services are also under pressure but to a much lower extent than nursing labor. Support is already being provided to the nursing colleges to build capacity but perhaps a closer look at tuition support to potential students themselves may help with the critical issue of increasing the output of nurses.

In conclusion, given the current estimates of known funding (i.e., PEPFAR and government of RCI), RCI can provide the current (2009) level of services (ART, PMTCT, CSS, OVC, and prevention) over the 2009-2013 period with financial gap of US\$3.7 million projected to occur in 2011 that will widen to US\$14.5 million by 2013. Maintaining the current level of service in terms of the number of people treated with ART and PMTCT is not an acceptable solution for RCI because, in the long run, given the incidence of the HIV, coverage of the HIV-positive population with services, i.e., meeting the need for services, will fall substantially over this time horizon. Scale-up at the current rate will also not be feasible; increasing financing requirements for ART will put substantial pressure on other aspects of the HIV program. This analysis has provided costing information that it is hoped will prove useful for policy development and resource allocation, and it has pointed out several important areas for further analysis and clarification in terms of activity costs and benefits, for example, OVC and prevention services, that can strengthen strategies to reduce the resource gaps that have been estimated and discussed in this report.

ANNEX A: KEY EPIDEMIOLOGICAL ASSUMPTIONS

Percent of births with mother-to-child (MTC) HIV transmission w/o treatment	39.0%	Volmink J, Siegfried N, Merwe L, Brocklehurst P. 2009. Antiretrovirals for reducing the risk of mother-to-child transmission of HIV infection. <i>Cochrane Database of Systematic Reviews</i> 2.
Percent of births with MTC HIV transmission with Treatment	10.0%	Volmink J, Siegfried N, Merwe L, Brocklehurst P. 2009. Antiretrovirals for reducing the risk of mother-to-child transmission of HIV infection. <i>Cochrane Database of Systematic Reviews</i> 2.
HIV progression (% moving from not eligible to eligible)	12.5%	Ghys PD, Zaba B, Prins M. 2007. Survival and mortality of people infected with HIV in low and middle income countries: results from the extended ALPHA network. <i>AIDS</i> 2007 21 (suppl 6):S1–S4. Isingo R, Zaba B, Marston M, et al. 2007. Survival after HIV infection in the pre-antiretroviral therapy era in a rural Tanzanian cohort. <i>AIDS</i> 2007 21 (suppl 6):S5–S13. Lutaloa T, Grayb RH, Wawerb M, et al. 2007. Survival of HIV-infected treatment-naive individuals with documented dates of seroconversion in Rakai, Uganda. <i>AIDS</i> 2007 21 (suppl 6):S15–S19.
Average # of years before 1st line treatment fails	7	Ledergerger B, Egger M, et al. 1999. Clinical progression and virological failure on highly active antiretroviral therapy in HIV-I patients: a prospective cohort study. <i>Lancet</i> 353:863-68. Antiretroviral Therapy in Lower Income Countries (ART-LINC) Collaboration and ART Cohort Collaboration (ART-CC) groups. 2006. Mortality of HIV-I-infected patients in the first year of antiretroviral therapy: comparison between low-income and high-income countries. <i>Lancet</i> 367: 817–24.
Average # of years before 2nd line treatment fails	7	Sterne JAC, Hernan MA, et al. 2005. Long term effectiveness of potent antiretroviral therapy in preventing AIDS and death: a prospective cohort study. <i>Lancet</i> 366:378-84.
Relative risk of HIV test seeking for HIV-positive asymptomatic vs. HIV-	3	Calibrated assumption
Relative risk of HIV test seeking for HIV-positive symptomatic vs. HIV-	25.91	Calibrated assumption
HIV prevalence (age <15)	0.69%	PNPEC/UNAIDS Report, 2008
HIV prevalence (age 15-49)	3.9%	PNPEC/UNAIDS Report, 2008
HIV prevalence (age >49)	2.7%	PNPEC/UNAIDS Report, 2008
Relative prevalence of HIV - childbearing women vs. overall	1.25	PNPEC/UNAIDS Report, 2008
HIV incidence (age 15-49)	0.56%	PNPEC/UNAIDS Report, 2008
Total number of PLHIV		PNPEC/UNAIDS Report, 2008
Cumulative percent change in HIV incidence	0%	Assumed by HAPSAT
TB Incidence per 100,000 pop.	393	PNDS, December 2008
Percent of TB cases that are HIV-positive	39%	PNDS, December 2008

ANNEX B: INPUTS FOR DETERMINING UNIT COSTS FOR ART

The following tables provide information on the data that were used to determine the unit costs for ART, PMTCT, and CT services.

TABLE B-1: DRUG REGIMEN COSTS

1st Line Regimen	Annual Cost
d4T + 3TC + NVP	\$ 88
AZT + 3TC + IDVr	\$ 164
AZT + 3TC + ABV	\$ 726
AZT + 3TC + EFV	\$ 226
AZT + 3TC + LPV-r	\$ 956
AZT + 3TC + NVP	\$ 146
d4T + 3TC + ABC	\$ 854
d4T + 3TC + EFV	\$ 230
d4T + 3TC + IDV-r	\$ 146
d4T + 3TC + LPV-r	\$ 788
TDF+ FTC + EFV	\$ 613
TDF + FTC + LPV/r	\$ 438
2nd Line Regimen	
TDF + FTC + LPV/r	\$ 1,146
ABC + DDI + LPV/r	\$ 854
ABC + 3TC + LPV/r	\$ 504
ABC + DDI + NFV	\$ 650
PMTCT Regimen	
NVP	\$ 0
AZT	\$ 11
Cotrimoxazole	\$ 7

TABLE B-2: LABOR COST INPUTS BY SERVICE

Program Area	Hours of Labor per Unit of Service					
	ART	PMTCT	CT	TB/HIV	Pre-ART Care	Palliative Care
Unit of Service	Patient-Year	Treated Pregnancy	Person Tested	DOTS Patient	Patient-Year	Patient-Year
Doctors	0.75	-	-	0.30	0.30	0.30
Registered nurse	0.90	0.80	0.45	-	0.30	0.30
Nurse midwives	-	-	-	-	-	-
Laboratory scientists/ technicians	0.60	-	0.10	1.00	0.3	0.3
Pharmacists/ technicians	0.30	-	-	-	0.1	0.1
ASC	0.15	-	-	-	-	0.30
Total Cost per Unit of Service	\$10.27	\$ 13.07	\$ 3.83	\$81.60	\$25.19	\$28.24

TABLE B-3: DRUG REGIMEN DISTRIBUTIONS 2009-2010

Regimen	2009	2010	Notes
d4T + 3TC + NVP	38.7%	14.1%	Decrease due to d4T switch
AZT + 3TC + IDVr	1.8%	0.0%	
AZT + 3TC + ABV	1.8%	0.3%	
AZT + 3TC + EFV	19.4%	3.8%	
AZT + 3TC + LPV-r	2.7%	7.6%	
AZT + 3TC + NVP	11.3%	58.0%	Increase due to d4T switch
d4T + 3TC + ABC	1.7%	0.0%	To be phased out during d4T switch
d4T + 3TC + EFV	19.0%	0.0%	To be phased out during d4T switch
d4T + 3TC + IDV-r	1.2%	0.0%	To be phased out during d4T switch
d4T + 3TC + LPV-r	1.7%	0.0%	To be phased out during d4T switch
TDF+ FTC + EFV	0.7%	12.2%	Increase due to d4T switch
TDF + FTC + LPV/r	0.0%	3.4%	
Total	100.0%	99.4%	

ANNEX C. PREVENTION ACTIVITIES FROM 2008-2009 HIV STRATEGIC PLAN

The following activities were proposed in the 2008-2009 HIV Strategic Plan. Only the total figures shown below are used in the HAPSAT as a guide to resources needed for prevention activities over the sustainability analysis time horizon. No scale-up of activities is assumed.

"AB" Activities - Youth			
Mass campaigns 9-18 (re sex before age 18)	234	511,661,460	\$1,023,323
Sensitization meetings on abstinence	12776	118,295,000	\$236,590
Health clubs	13 strengthened, 137 in place	38,200,000	\$76,400
Peer educators (BCC and Life Skills)	1660	181,184,000	\$362,368
Stakeholder sensitization meetings re abstinence	198	44,202,000	\$88,404
Conferences on HIV AIDS sensitization 12-18	10	15,000,000	\$30,000
Life skills curriculum primary	3321	2,000,000,000	\$4,000,000
Total		2,971,861,381	\$5,817,085
"AB" Activities - Non-Youth			
Radio messages on abstinence	4560	19,530,000	\$39,060
Films on abstinence	24	5,772,000	\$11,544
Counseling centers	4	9,560,000	\$19,120
Home visits		1,915,000	\$3,830
Conferences on abstinence	5	3,600,000	\$7,200
Campaigns	1224	834,050,222	\$1,668,100
Sensitization meetings on importance of fidelity	14644	92,579,368	\$185,159
Radio messages on fidelity	4560	97,400,000	\$194,800
Radio programs on fidelity	314	56,787,200	\$113,574
Conference on fidelity	71	15,000,000	\$30,000
Total		7,079,894,532	\$2,272,388
Non "AB" Interventions/Risk Reduction Activities			
Sensitization meetings for truck drivers	1000	125,000,000	\$250,000
Train peer educators on sensitization of early marriage among young women	30	4,000,000	\$8,000
Sensitization campaigns on infection risks re cultural practices	181 campaigns; 1000000 people	181,252,450	\$362,505
Radio and TV ads on reducing risk of HIV transmission (cultural)	112320 (radio) 8640 (TV)	168,000,000	\$336,000
Sensitization (French and local language) via radio (cultural)	3958	12,105,000	\$24,210
Radio proceedings to promote cultural practices that	21	450,000	\$900

reduce risk			
Village committees to fight HIV/AIDS	60	3,000,000	\$6,000
Literacy projects with HIV themes	16	27,000,000	\$54,000
Reproduce BCC strategy	20000	50,000,000	\$100,000
Sensitization meetings on risk of infection w/ cultural practices	8886 meetings (888600 people affected)	115,500,000	\$231,000
Sensitize meetings w/ key stakeholders to change norms/behavior	27	12083000	\$24,166
Conferences on facts vs. cultural practice	16	3560000	\$7,120
Total		14,798,442,612	\$1,403,901

Non-"AB" interventions/Risk reduction activities (other)			
Prevention through the use/distribution of condoms (male)		2546364683	\$5,092,729
Prevention through the use of condoms (female)		17500000	\$35,000
Prevention and care of STI		1016694500	\$2,033,389
Prevention of accidental exposure to blood and other biological liquids		1234000000	\$2,468,000
Responsible behavior among PLHIV to reduce spread/transmission		59415000	\$118,830
Total		4,873,974,183	\$9,747,948

ANNEX D. HAPSAT PROJECTIONS, BY SCENARIO

Table D-I provides detail regarding the HAPSAT projections that are discussed in Section **Error!**
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TABLE D-I: SCALE-UP SCENARIO

Financial Resources Required to Achieve Policy Goals					
Service	2009	2010	2011	2012	2013
CT					
Labor	\$ 0.60	\$ 0.62	\$ 0.64	\$ 0.67	\$ 0.69
Drugs & supplies	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Laboratory	\$ 1.87	\$ 1.93	\$ 2.01	\$ 2.08	\$ 2.16
General overhead	\$ 0.74	\$ 0.77	\$ 0.79	\$ 0.82	\$ 0.85
Training	\$ 0.12	\$ 0.13	\$ 0.13	\$ 0.14	\$ 0.14
IP & D overhead	\$ 1.00	\$ 1.03	\$ 1.07	\$ 1.11	\$ 1.15
Total	\$ 4.32	\$ 4.48	\$ 4.65	\$ 4.82	\$ 5.00
PMTCT					
Labor	\$ 0.94	\$ 0.97	\$ 1.00	\$ 1.03	\$ 1.07
Drugs & supplies	\$ 0.13	\$ 0.13	\$ 0.14	\$ 0.13	\$ 0.13
Laboratory	\$ 5.04	\$ 5.21	\$ 5.38	\$ 5.56	\$ 5.74
General overhead	\$ 1.83	\$ 1.89	\$ 1.95	\$ 2.02	\$ 2.08
Training	\$ 0.31	\$ 0.32	\$ 0.33	\$ 0.34	\$ 0.35
IP & D overhead	\$ 2.48	\$ 2.55	\$ 2.64	\$ 2.72	\$ 2.81
Total	\$ 10.73	\$ 11.07	\$ 11.44	\$ 11.80	\$ 12.18
ART					
Labor	\$ 0.72	\$ 0.89	\$ 1.11	\$ 1.36	\$ 1.63
Drugs & supplies	\$ 18.36	\$ 26.61	\$ 32.92	\$ 39.99	\$ 47.72
Laboratory	\$ 3.77	\$ 4.69	\$ 5.85	\$ 7.14	\$ 8.55
General overhead	\$ 6.85	\$ 9.66	\$ 11.97	\$ 14.55	\$ 17.37
Training	\$ 1.14	\$ 1.61	\$ 1.99	\$ 2.42	\$ 2.89
IP & D overhead	\$ 9.25	\$ 13.04	\$ 16.16	\$ 19.64	\$ 23.45
Total	\$ 40.10	\$ 56.51	\$ 70.01	\$ 85.10	\$ 101.61
CSS-PreART					
Labor	\$ 0.49	\$ 0.80	\$ 1.10	\$ 1.41	\$ 1.71
Drugs & supplies	\$ 0.47	\$ 0.78	\$ 1.07	\$ 1.36	\$ 1.66
Laboratory	\$ 3.43	\$ 5.62	\$ 7.75	\$ 9.86	\$ 11.98
General overhead	\$ 1.32	\$ 2.16	\$ 2.98	\$ 3.79	\$ 4.61
Training	\$ 0.22	\$ 0.36	\$ 0.50	\$ 0.63	\$ 0.77
IP & D overhead	\$ 1.78	\$ 2.91	\$ 4.02	\$ 5.12	\$ 6.22
Total	\$ 7.70	\$ 12.63	\$ 17.42	\$ 22.17	\$ 26.94

Financial Resources Required to Achieve Policy Goals					
Service	2009	2010	2011	2012	2013
CSS-NonART					
Labor	\$ 0.12	\$ 0.09	\$ 0.07	\$ 0.07	\$ 0.08
Drugs & supplies	\$ 0.22	\$ 0.16	\$ 0.13	\$ 0.13	\$ 0.15
Laboratory	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
General overhead	\$ 0.10	\$ 0.07	\$ 0.06	\$ 0.06	\$ 0.07
Training	\$ 0.02	\$ 0.01	\$ 0.01	\$ 0.01	\$ 0.01
IP & D overhead	\$ 0.14	\$ 0.10	\$ 0.08	\$ 0.08	\$ 0.09
Total	\$ 0.60	\$ 0.44	\$ 0.35	\$ 0.35	\$ 0.39
Treatment, Care and Support of PLHIV					
Labor	\$ 2.86	\$ 3.37	\$ 3.93	\$ 4.53	\$ 5.17
Drugs & supplies	\$ 19.19	\$ 27.69	\$ 34.26	\$ 41.61	\$ 49.66
Laboratory	\$ 14.11	\$ 17.45	\$ 20.99	\$ 24.64	\$ 28.43
General overhead	\$ 10.85	\$ 14.55	\$ 17.75	\$ 21.24	\$ 24.98
Training	\$ 1.81	\$ 2.43	\$ 2.96	\$ 3.54	\$ 4.16
IP & D overhead	\$ 14.64	\$ 19.64	\$ 23.97	\$ 28.67	\$ 33.72
Total	\$ 63.46	\$ 85.12	\$ 103.86	\$ 124.24	\$ 146.12
OVC					
Medical support	\$1.52	\$1.82	\$2.19	\$2.63	\$3.15
Educational support	\$3.30	\$3.96	\$4.75	\$5.70	\$6.84
Psychosocial support	\$0.44	\$0.53	\$0.63	\$0.76	\$0.91
<i>Legal protection</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<i>Housing</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<i>Economic strengthening</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Nutritional support	\$2.00	\$2.40	\$2.88	\$3.46	\$4.15
General overhead	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Training	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
IP & D overhead	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total	\$ 7.26	\$ 8.71	\$ 10.45	\$ 12.55	\$ 15.05
ABC & Other Prevention					
<i>Peer outreach to female CSWs</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<i>Peer outreach to male CSWs</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<i>Men who have sex with men</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Community mobilization	\$2.39	\$2.39	\$2.39	\$2.39	\$2.39
Youth-friendly services	\$5.82	\$5.82	\$5.82	\$5.82	\$5.82
Workplace programs	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40
Condom provision	\$5.13	\$5.13	\$5.13	\$5.13	\$5.13
<i>STI management</i>	\$2.03	\$2.03	\$2.03	\$2.03	\$2.03
<i>Mass media</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<i>Blood safety</i>	\$2.47	\$2.47	\$2.47	\$2.47	\$2.47
<i>Post-exposure prophylaxis</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<i>Safe medical injection</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<i>Universal precautions</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<i>Male circumcision</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
General overhead	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Training	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Financial Resources Required to Achieve Policy Goals					
Service	2009	2010	2011	2012	2013
IP & D overhead	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total	\$ 19.24	\$ 19.24	\$ 19.24	\$ 19.24	\$ 19.24
Grand Total ALL					
Total	\$ 80.21	\$ 103.33	\$ 123.80	\$ 146.28	\$ 170.67

Table D-2 provides detail regarding the HAPSAT projections that are discussed in Section **Error! Reference source not found.** of this report.

TABLE D-2. MAINTAIN SCENARIO

Financial Resources Required to Achieve Policy Goals					
Service	2009	2010	2011	2012	2013
CT					
Labor	\$ 0.60	\$ 0.62	\$ 0.64	\$ 0.67	\$ 0.69
Drugs & supplies	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Laboratory	\$ 1.87	\$ 1.93	\$ 2.01	\$ 2.08	\$ 2.16
General overhead	\$ 0.74	\$ 0.77	\$ 0.79	\$ 0.82	\$ 0.85
Training	\$ 0.12	\$ 0.13	\$ 0.13	\$ 0.14	\$ 0.14
IP & D overhead	\$ 1.00	\$ 1.03	\$ 1.07	\$ 1.11	\$ 1.15
Total	\$ 4.32	\$ 4.48	\$ 4.65	\$ 4.82	\$ 5.00
PMTCT					
Labor	\$ 0.90	\$ 0.93	\$ 0.96	\$ 1.00	\$ 1.03
Drugs & supplies	\$ 0.04	\$ 0.04	\$ 0.04	\$ 0.04	\$ 0.04
Laboratory	\$ 4.94	\$ 5.10	\$ 5.27	\$ 5.44	\$ 5.63
General overhead	\$ 1.76	\$ 1.82	\$ 1.88	\$ 1.94	\$ 2.01
Training	\$ 0.29	\$ 0.30	\$ 0.31	\$ 0.32	\$ 0.33
IP & D overhead	\$ 2.38	\$ 2.46	\$ 2.54	\$ 2.62	\$ 2.71
Total	\$ 10.32	\$ 10.65	\$ 11.01	\$ 11.36	\$ 11.76
ART					
Labor	\$ 0.72	\$ 0.71	\$ 0.71	\$ 0.72	\$ 0.71
Drugs & supplies	\$ 18.36	\$ 21.49	\$ 21.43	\$ 21.54	\$ 21.42
Laboratory	\$ 3.77	\$ 3.75	\$ 3.75	\$ 3.77	\$ 3.76
General overhead	\$ 6.85	\$ 7.79	\$ 7.77	\$ 7.81	\$ 7.77
Training	\$ 1.14	\$ 1.30	\$ 1.29	\$ 1.30	\$ 1.29
IP & D overhead	\$ 9.25	\$ 10.51	\$ 10.49	\$ 10.54	\$ 10.49
Total	\$ 40.10	\$ 45.55	\$ 45.44	\$ 45.67	\$ 45.44
CSS-PreART					
Labor	\$ 0.50	\$ 0.82	\$ 1.14	\$ 1.44	\$ 1.73
Drugs & supplies	\$ 0.48	\$ 0.80	\$ 1.10	\$ 1.40	\$ 1.68
Laboratory	\$ 3.51	\$ 5.77	\$ 7.96	\$ 10.09	\$ 12.16
General overhead	\$ 1.35	\$ 2.22	\$ 3.06	\$ 3.88	\$ 4.67
Training	\$ 0.22	\$ 0.37	\$ 0.51	\$ 0.65	\$ 0.78
IP & D overhead	\$ 1.82	\$ 2.99	\$ 4.13	\$ 5.23	\$ 6.31
Total	\$ 7.88	\$ 12.96	\$ 17.90	\$ 22.68	\$ 27.34

Financial Resources Required to Achieve Policy Goals					
Service	2009	2010	2011	2012	2013
CSS-NonART					
Labor	\$ 0.12	\$ 0.15	\$ 0.17	\$ 0.20	\$ 0.23
Drugs & supplies	\$ 0.22	\$ 0.28	\$ 0.32	\$ 0.37	\$ 0.44
Laboratory	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
General overhead	\$ 0.10	\$ 0.13	\$ 0.15	\$ 0.17	\$ 0.20
Training	\$ 0.02	\$ 0.02	\$ 0.02	\$ 0.03	\$ 0.03
IP & D overhead	\$ 0.14	\$ 0.18	\$ 0.20	\$ 0.23	\$ 0.27
Total	\$ 0.60	\$ 0.76	\$ 0.86	\$ 1.00	\$ 1.18
Treatment, Care and Support of PLHIV					
Labor	\$ 2.84	\$ 3.24	\$ 3.62	\$ 4.02	\$ 4.40
Drugs & supplies	\$ 19.11	\$ 22.61	\$ 22.89	\$ 23.34	\$ 23.58
Laboratory	\$ 14.08	\$ 16.55	\$ 18.98	\$ 21.38	\$ 23.71
General overhead	\$ 10.81	\$ 12.72	\$ 13.65	\$ 14.62	\$ 15.51
Training	\$ 1.80	\$ 2.12	\$ 2.28	\$ 2.44	\$ 2.58
IP & D overhead	\$ 14.59	\$ 17.17	\$ 18.43	\$ 19.74	\$ 20.93
Total	\$ 63.23	\$ 74.42	\$ 79.85	\$ 85.54	\$ 90.71
OVC					
Medical support	\$1.52	\$1.52	\$1.52	\$1.52	\$1.52
Educational support	\$3.30	\$3.30	\$3.30	\$3.30	\$3.30
Psychosocial support	\$0.44	\$0.44	\$0.44	\$0.44	\$0.44
Legal protection	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Housing	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Economic strengthening	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Nutritional support	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00
General overhead	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Training	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
IP & D overhead	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total	\$ 7.26	\$ 7.26	\$ 7.26	\$ 7.26	\$ 7.26
ABC & Other Prevention					
<i>Peer outreach to female CSWs</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<i>Peer outreach to male CSWs</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<i>Men who have sex with men</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Community mobilization	\$2.39	\$2.39	\$2.39	\$2.39	\$2.39
Youth-friendly services	\$5.82	\$5.82	\$5.82	\$5.82	\$5.82
Workplace programs	\$1.40	\$1.40	\$1.40	\$1.40	\$1.40
Condom provision	\$5.13	\$5.13	\$5.13	\$5.13	\$5.13
STI management	\$2.03	\$2.03	\$2.03	\$2.03	\$2.03
Mass media	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Blood safety	\$2.47	\$2.47	\$2.47	\$2.47	\$2.47
Post-exposure prophylaxis	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Safe medical injection	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Universal precautions	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Male circumcision	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
General overhead	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Training	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Financial Resources Required to Achieve Policy Goals					
Service	2009	2010	2011	2012	2013
IP & D overhead	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total	\$ 19.24	\$ 19.24	\$ 19.24	\$ 19.24	\$ 19.24
Grand Total ALL					
Total	\$ 79.98	\$ 91.17	\$ 96.61	\$ 102.29	\$ 107.47

ANNEX E. SUMMARY COSTING DETAILS FOR THE SCALE-UP SCENARIO, 2009-2013

Financial Resources Required to Achieve Policy Goals of the Scale-up Scenario (US \$millions)

TOTAL COSTS						
	2009	2010	2011	2012	2013	Total
Prevention	\$25.4	\$25.5	\$25.8	\$26.0	\$26.2	\$80.1
PMTCT (drugs ,lab, labor)	\$6.1	\$6.3	\$6.5	\$6.7	\$6.9	\$32.6
BCC-ABC	\$19.2	\$19.2	\$19.2	\$19.2	\$19.2	\$47.5
Care	\$14.5	\$18.7	\$23.2	\$28.1	\$33.5	\$118.0
CT (lab, labor)	\$2.5	\$2.6	\$2.6	\$2.7	\$2.8	\$13.3
Palliative care (drugs, lab, labor)	\$0.3	\$0.2	\$0.2	\$0.2	\$0.2	\$1.2
Pre-ART care (drugs, lab, labor)	\$4.4	\$7.2	\$9.9	\$12.6	\$15.4	\$49.5
TB-HIV (drugs, lab, labor)	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
OVC	\$7.3	\$8.7	\$10.5	\$12.5	\$15.1	\$54.0
Treatment (ART)	\$22.8	\$32.2	\$39.9	\$48.5	\$57.9	\$201.3
Drugs	\$18.4	\$26.6	\$32.9	\$40.0	\$47.7	\$165.6
Laboratory tests	\$3.8	\$4.7	\$5.9	\$7.1	\$8.6	\$30.0
Labor (incl. clinical, lab, pharmacy,)	\$0.7	\$0.9	\$1.1	\$1.4	\$1.6	\$5.7
Shared costs across program areas	\$27.3	\$36.6	\$44.7	\$53.4	\$62.9	\$224.9
Training	\$1.8	\$2.4	\$3.0	\$3.5	\$4.2	\$14.9
Facility/Program overhead	\$10.8	\$14.6	\$17.8	\$21.2	\$25.0	\$89.4
Central-level costs	\$14.6	\$19.6	\$24.0	\$28.7	\$33.7	\$120.6
Grand Total	\$90.0	\$113.1	\$133.6	\$156.0	\$180.4	\$624.3
Expected Resources	\$92.9	\$92.9	\$92.9	\$92.9	\$92.9	\$464.7
Predicted Shortfall ('Gap')	(\$3.0)*	\$20.1	\$40.6	\$63.1	\$87.5	\$159.6

ANNEX F. PARTICIPANTS IN SCENARIO-BUILDING WORKSHOP, JULY 23, 2009

Name	Organization
Dr Coulibaly Dakan	UNICEF
Gue Brigitte	MFFAS
P. Tra	PATH
Dr Rie Nathalie	PSP-CI
Atta Rosalie	DIPE
Makougoum Christelle Flore	AIBEF
Dr Kraffa Blaise	DFR
Kouame Hortance	DRH
Dr Sam Abbenyi	SCMS
Gnago Douayere Appolinaire	PNOEV
Oble Fatowmata	PNOEV
Koffi Bandama	MEMPD/DGP/DP
Dosso M	MESRS
Kone Mamadou	PNPEC
Kacou Amoin Elise	ENSEA
Koscelnik Valerie	PEPFAR
Sibailly TS	PEPFAR
Ouattara Kiyali	SSDS/JHPEIGO
Alexandre Guebo	EGPAF
Brand Bertrand	COSI
Sassan KMN	SSDS/JHPEIGO
Alexandre Ekra	CDC

BIBLIOGRAPHY

[Bibliography style: has a hanging indent.] here are some sample entries. Note that 3 em dashes are used
an entry has the same author(s) as the previous entry.

Last name Beitz, J, H Srimuangboon, A Lion-Coleman, R Transgrud, J Hutchings, M Weldin. 2003. *Youth-Friendly Pharmacy Program Implementation Kit: Guidelines and Tools for Implementing a Youth-Friendly Reproductive Health Pharmacy Program*. Seattle, WA: PATH.