



Ministry of Medical Services  
Ministry of Public Health and Sanitation

# REPORT OF THE TECHNICAL WORKING GROUP ON SUSTAINABILITY FOR HIV/AIDS, KENYA



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August 2010

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The Health Systems 20/20 **cooperative agreement**, funded by the U.S. Agency for International Development (USAID) for the period 2006-2011, helps USAID-supported countries address health system barriers to the use of life-saving priority health services. Health Systems 20/20 works to strengthen health systems through integrated approaches to improving financing, governance, and operations, and building sustainable capacity of local institutions.

## **August 2010**

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## **DISCLAIMER**

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# ACRONYMS

<b>AIDS</b>	Acquired Immunodeficiency Syndrome
<b>ANC</b>	Antenatal Care
<b>ART</b>	Antiretroviral Therapy
<b>ARV</b>	Antiretroviral (drugs)
<b>BOPA</b>	Budget Outlook Paper
<b>CDC</b>	Centers for Disease Control and Prevention (US)
<b>CHAI</b>	Clinton HIV/AIDS Initiative
<b>DHMT</b>	District Health Management Team
<b>FBC</b>	Full Blood Count
<b>FTE</b>	Full-Time Equivalent
<b>HIV</b>	Human Immunodeficiency Virus
<b>HMIS</b>	Health Management Information System
<b>IMAI</b>	Integrated Management of Adult Illnesses
<b>KEMSA</b>	Kenya Medical Supplies Agency
<b>KNASP</b>	Kenya National HIV Strategic Plan
<b>M&amp;E</b>	Monitoring and Evaluation
<b>MOMS</b>	Ministry of Medical Services
<b>MOP</b>	Ministry of Planning
<b>MOPHS</b>	Ministry of Public Health and Sanitation
<b>MTCT</b>	Mother-to-Child Transmission
<b>NACC</b>	National AIDS Control Council
<b>NASCOP</b>	National AIDS/STD Control Programme
<b>NGO</b>	Nongovernmental Organization
<b>NHIF</b>	National Hospital Insurance Fund
<b>NLTP</b>	National Leprosy and TB Control Program
<b>NSA</b>	National Strategy Application
<b>OI</b>	Opportunistic Infection(s)
<b>OVC</b>	Orphans and Vulnerable Children
<b>PEPFAR</b>	President's Emergency Plan for AIDS Relief
<b>PHMT</b>	Provincial Health Management Team

<b>PLHIV</b>	People Living with HIV
<b>PMTCT</b>	Prevention of Mother to Child Transmission
<b>POC</b>	Point of Care
<b>PWP</b>	Prevention with Postives
<b>QALY</b>	Quality-Adjusted Life Year
<b>TWG</b>	Technical Working Group
<b>WHO</b>	World Health Organization

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# FOREWORD

The Kenya National HIV Strategic Plan 3 (KNASP-3), covering the period 2009/10 to 2012/13, was a collaborative effort of stakeholders in the HIV/AIDS sector to identify a vision to prevent, mitigate, and treat the epidemic. In this document, the total resource need was arrived at after a comprehensive costing exercise using different models at strategic and activity levels. This was then compared with the resources available. Based on this, we know Kenya has to find additional resources for scaling up HIV/AIDS services to reach all Kenyans in need. Of major concern is that a significant amount of these resources come from development partners (75 percent); this raises questions about the sustainability of the Kenyan HIV/AIDS program.

External financing tends to be volatile, as evidenced by the recent patchy history of Global Fund support to Kenya as well as the instances of donors withholding funds, including for HIV and AIDS, during the country's post-election violence in 2007. While the recent economic crisis has stressed the foreign aid budgets of many donor countries, the evolving nature of the epidemic demands that we begin to plan a future based on the reality of HIV as a chronic condition that requires steady, sustained funding. In order to effectively address HIV and AIDS, Kenya needs a rapid shift toward building systems that are domestically owned and consistent with the country's planning and budgeting process.

With the support of USAID through the Health Systems 20/20 project, National AIDS Control Council, and National AIDS/STD Control Programme formed a Technical Working Group on Sustainability for HIV/AIDS, or TWG, and embarked on a process of analyzing the issue with a long-term viewpoint and an emphasis on the financial aspect. This was a result of the country's realization of the need to determine its appropriate national fiscal space and the mechanism for taking the HIV fight into the future that Kenya wants (Vision 2030). Principally, it is time for Kenya to begin showing greater ownership over its HIV response by exploring ways to invest wisely through increased government of Kenya allocation, complemented by innovative domestic revenue collection and financing schemes.

It is in this context that this TWG report focuses on identifying new sources of financing treatment and care in Kenya as well as estimating the resource implications of some critical steps that must be taken to sustain or improve the quality of patient outcomes. On the former, the analysis has found plausible domestic sources that are feasible options in the short term. A measure that can offer a longer-term solution was the possibility of increasing Government of Kenya resource allocation to the health sector and hence to the HIV/AIDS program, after giving due consideration to other social sector priorities. On the latter, the report has measured the cost of de-concentrating our HIV treatment and care activities, as well as meeting important World Health Organization standards for antiretroviral treatment and prevention of mother-to-child transmission. Overall, the report provides new thinking on sustainability by showing that significant internal resources can be generated that will reduce the KNASP-3 financing gap as well as sustain critical HIV and AIDS interventions. It is my hope that policymakers will find this report useful, as they endeavour to find lasting solutions to the financing of HIV/AIDS in Kenya.

**Prof. Alloys. S. S. Orago**  
Director, National AIDS Control Council



# EXECUTIVE SUMMARY

Kenya faces significant challenges in funding its program to provide expanded HIV/AIDS services to HIV-positive individuals in need. The *Kenya National AIDS Strategic Plan 2009/10 to 2012/13*, or KNASP-3, is a comprehensive vision that outlines the resources needed and the resources available. Based on this gap analysis, 58 percent of the shortfall derives from the single area of treatment and care. A significant share of the resources used to finance the current strategy are derived externally but the government of Kenya is energized to progressively increase domestic and sustainable resources. While being mindful of such financing issues, Kenya must also continue to improve and scale up its national strategy for treatment and care, as new program information indicates new priorities. This is an important social responsibility to improve health outcomes for the people living with HIV (PLHIV) requiring treatment and care, many of whom are not currently reached with services.

This report summarizes financial and human resource estimates and provides specific recommendations for putting Kenya's HIV/AIDS program on more sustainable footing. Operational details for implementing decentralization of treatment and care services are discussed, along with the evidence and recommendations for implementing guideline changes antiretroviral treatment (ART) and prevention of mother-to-child transmission (PMTCT). The report outlines the assumptions behind the financial impact of innovative financing proposals. Through this report, we hope to provoke constructive dialogue on the ideas and recommendations emanating from the findings and help the country make a more informed policy decision on sustainable financing for HIV/AIDS.

The Technical Working Group on Sustainability for HIV/AIDS (TWG) was set up in early 2010 at the initiative of the USAID Health Systems 20/20 Project, the National AIDS Control Council, the National AIDS and STI Control Programme, and the two Kenyan Ministries of Health. The TWG's mandate was to critically review the issue of long-term sustainability for the HIV/AIDS sector, with an emphasis on financing issues over a five-year timeframe, 2010-14. The two fundamental steps of sustainability analysis are to: 1) assess resource needs and gaps for meeting established targets, improving quality, or meeting other strategic and programmatic goals, and: 2) identify and assess potential strategies for reducing any expected resource gaps. Since the KNASP-3 document had already included the basic financial gap analysis against the commonly agreed targets as of 2009 for a four-year strategy, the TWG, with broad stakeholder input and guidance from a designated Steering Committee, focused on the following tasks:

1. Estimate the resource implications of critical steps that must be taken to sustain or improve the quality of patient outcomes; and
2. Identify new domestic modes of financing treatment and care in Kenya and estimate their feasibility and financial impact.

In the context of 1) above, the progressive decentralization of highly concentrated treatment and care services as well as measured and feasible implementation of proven new international guidelines for ART and PMTCT were considered priorities. Of these, the adoption of the new guidelines for ART and PMTCT have been recently approved. For 2), the TWG brainstormed several possibilities given international experience, circulated ideas, and chose the most feasible for the Kenyan context. In this report, we present the results of the related analyses. Each section of the report begins with an abstract that provides a quick view.

Principally, this report seeks to answer the following question: how do the additional resources affect the overall funding gap; especially given new needs as per 1)? As a first step, we estimate the baseline funding gap in some specific areas of KNASP-3 to ensure we can see the impact of the additional resources needed under 1).

<b>SWG estimates for 2010-14</b>	<b>US\$ mil.</b>
KNASP-3: Estimated 5-year cost of ART*	\$1,714
KNASP-3: Estimated 5-year cost of PMTCT	\$128
<b>Total 5-year resource need for ART and PMTCT</b>	<b>\$1,841</b>
Expected 5-year funding for PMTCT and ART**	\$1,314
<b>Expected 5-year financing gap</b>	<b>\$527</b>

\* As per the KNASP-3 document, the 'ARV Therapy' area includes costs for adult first- and second-line antiretroviral drugs (ARVs), facility visits (outpatient and certain inpatient), pediatric ARVs, associated costs of laboratory tests, and sundry other non-drug costs associated directly with treatment. It does not include costs of opportunistic infection treatment for any type of PLHIV or costs of nutritional support. Costs of care and support are not included, except for home-based care for patients failing second-line treatment. It does not include the cost of training for human resources for health or other health system strengthening.

\*\* These resource estimates incorporate the expectation of a phasing out of Clinton Health Access Initiative funding for pediatric ARVs after 2010, and an end to the funds from Kenya's Round 7 Global Fund grant after 2011. It also incorporates flat PEPFAR funding of approximately US\$250.1 million per year from 2010 to 2014, for the ART and PMTCT areas (PEPFAR budget codes: HTXS, PDTX, HTXD, HLAB, MTCT) based on PEPFAR's 2010 budget for Kenya. The caveat is that using the entire budgeted amount from PEPFAR may moderately overstate the available funding, as some of these funds pay for PEPFAR staff as well as implementing partner overhead that were not estimated in the KNASP-3 resource need.

Based on the currently expected financing and the re-estimated five-year resource need, we find an overall financing gap of US\$527 million in the area of ART and PMTCT before any other changes are discussed.

In addition, the TWG calculated the impact of the changes to the program due to applying new guidelines as well as decentralization (table below).

<b>SWG estimates for 2010-14</b>	<b>US\$ mil.</b>
Additional cost due to revised 250 cells/mm <sup>3</sup> targets	\$94
Additional cost due to new ART guidelines*	\$170
Additional cost of new PMTCT guidelines	\$38
Additional cost of revised PMTCT targets	\$53
Additional cost of 'extensive' decentralization	\$10
<b>Net increase in costs</b>	<b>\$365</b>

\* Both for treatment initiation at CD4<350 cells/mm<sup>3</sup> as well as a switch from d4T to TDF

When combined with the previously estimated gap for the KNASP-3 taken to a five-year level (estimated at US\$527 million), adding in the net increase from the table above of US\$365 million leaves us with a gap in the ART and PMTCT area of US\$892 million.

The team further considered several domestic financing options for the years 2010-14. Using the surplus generated by the National Hospital Insurance Fund (NHIF) to fund outpatient ART services for its membership base would yield US\$122 million worth of financing for ART drugs after a 25 percent increase in premiums.

A modest levy of US\$2.5 for each air passenger ticket (international and domestic) along with a US\$0.05 levy on each ton of air freight would yield US\$160 million without affecting the demand for such airline services.

These are feasible options in the short term, and should be used while immediate financing gaps last. However, they are not expected to be sufficient given increasing needs in a push for universal coverage. We considered adding another sustainable and longer-term domestic financing solution.

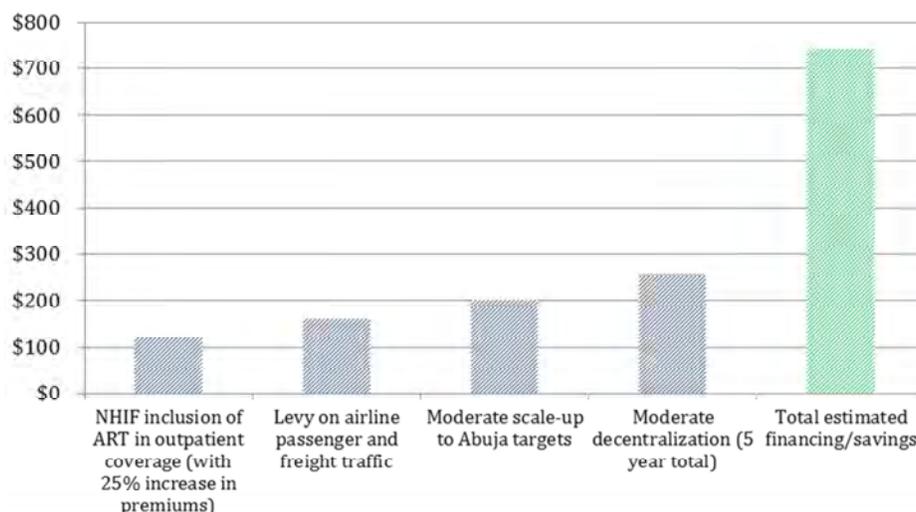
In the KNASP-3 document, the government of Kenya committed to investing US\$136 million in the HIV/AIDS program, or US\$34 million per year, over the four years 2009/10 to 2012/13. This means US\$170 million over five years. This contribution was already considered in estimating the KNASP-3 gap estimates and is therefore not seen here as additional funding. However, we were interested in the effect of increasing government contributions to health, to gradually meet the threshold set by the Abuja Declaration on the amounts available for HIV. The Abuja target for public health spending is set at 15 percent of the annual government budget. If the same proportion of the health budget is spent on HIV as is represented by US\$34 million in 2009/10 (4.73 percent per year), then against a backdrop of increasing government allocation to health generally, there should be additional funding for HIV over and above the US\$170 million allocated previously in the KNASP-3 document. With a moderate scale-up to the Abuja target, it is estimated that this additional government HIV funding would be **US\$202 million** from 2010 to 2014.

In addition to improving access to health care outside of major urban centers, decentralization can be considered as a strategy to improve the overall efficiency of health service delivery. Since the labor cost of providing health care services is typically less in lower-level facilities than in higher-level facilities, an effectively managed decentralization structure can result in significant cost savings in the health sector. The analysis presented here focuses primarily on the one-time costs for upgrading facilities to become central and satellite sites, estimating that implementing 'moderate' decentralization would have an up-front price tag of nearly US\$10 million. Few additional doctors would be needed, but newly upgraded satellite sites would require approximately 295 full-time equivalents (FTEs) for nurses and 144 FTEs for new pharmacy staff.

Although not fully addressed in this analysis, it is possible to make some hypothetical assumptions about decentralization cost savings. If, for instance, providing ART at lower-level facilities is assumed to cost two-thirds of the amount to provide the same service at higher-level facilities (the primary savings would come from labor and overhead, since the regimens and medicine prices would be comparable), it is estimated that 'moderate' decentralization could reduce the projected KNASP-3 scale-up costs for ART by approximately US\$257 million over five years, reducing the financing need from US\$1,714 million to US\$1,457 million.

The impact of all these additional funding sources is shown visually in the figure below.

## ESTIMATED ADDITIONAL FINANCING OR COST SAVINGS OVER 2010-2014 BY SCENARIO (US\$ MILLION)



\*Scenario 3 of the air levy, from Section 3 of the report

In KNASP-3, the overall financing gap for the four years from 2009/10 through 2012/13, across all program areas, was estimated to be US\$1.67 billion. The gap for the five years from 2010 through 2014 will be even larger. It was estimated that the five-year funding gap in the ART and PMTCT areas, after a preliminary forecast of resources available, would be US\$892 million (US\$527 plus US\$365 million). However, our results in this report indicate that this gap can be significantly diminished. Some short-term and feasible financing options (viz. NHIF ART provision and HIV-directed levy) would net US\$282 million over five years. In addition, a moderate scale-up to the Abuja Target would allocate an additional US\$202 million in government HIV funding over and above that allocated in KNASP-3. With moderate decentralization, the government could potentially reduce service delivery costs for ART by an estimated US\$257 million, even while scaling up coverage to meet the KNASP-3 targets. This means an additional amount of US\$741 million can be made available, more than sufficient to meet the needs of the changes to ART and PMTCT service areas.

This still leaves a substantial **net gap** in the combined ART and PMTCT program area of **US\$151 million** (US\$892 minus US\$741 million). A 2 percent tax on mobile airtime sales, which was not investigated in detail, could ostensibly contribute US\$153 million over the five years in question, potentially reducing or eliminating the net funding gap.

The original KNASP-3 pricing of ARVs was estimated to be US\$698 million higher than the revised pricing, both calculated at the CD4<250 cells/mm<sup>3</sup> threshold. This differential may be substantially explained by the KNASP-3 costing having considered drug distribution and buffer stock costs, which the TWG did not consider. Unfortunately, the actual make-up of the KNASP-3 costs for ARVs could not be unpackaged at this point. However, there may be potential savings in this area due to lower ARV prices.

It is important to note that the guideline changes as well as the decentralization of treatment and care offer long-term cost savings to Kenya because of improved outcomes for patients and hence reduced costs of managing side-effects, opportunistic infections, as well as the consequences of loss to follow-up and low adherence. While the TWG did not estimate these economically, they are an important element when considering long-term costs and benefits of adopting the new policies.

# I. INTRODUCTION

## I.1 THE SUSTAINABILITY IMPERATIVE FOR THE HIV/AIDS PROGRAM IN KENYA

What is sustainability for a national HIV/AIDS program? In consultation with stakeholders in Kenya and in other countries, we have come up with a definition that we believe is comprehensive:

*A sustainable national HIV/AIDS program is one that delivers the planned scale of services across areas, at a desired level of quality, and predictably across the plan timeframe.*

- Plans for the availability of resources
- Plans for anticipated changes to mode of delivery
- Maintains or increases quality (as desired)

It is imperative that every national program conducts an analysis of the sustainability of the national program based on the information available. What is involved in such an analysis? We define sustainability analysis as the analysis of factors promoting and preventing the ability of a national HIV program to provide quality services in the future, based on:

- Current levels (present utilization) or
- Higher levels/targets based on a national scale-up plan

*Predictability* in service delivery is paramount especially when complex program rollout is planned that incurs sunk costs, and requires complex institutional arrangements, and when the morbidity and mortality of thousands of HIV/AIDS patients is at stake. Predictability requires planning for the future and adjusting for uncertainty. With unpredictable service interruptions, quality of programs may suffer, and preventable infections may occur that increase future caseloads, and hence future resource requirements. The largest impact on the predictability of service delivery is from uncertainty in resource availability.

However, the maintenance of quality goes beyond predictability of resources. It also requires that the sustainability analysis consider how treatment, care, and prevention services can be best delivered. The team collected data from facilities in Nairobi and Nyanza on the constraints they faced in increasing the scale of resources. In other words, without easing these constraints, further scale-up of services, i.e. increase in patient load, would necessarily compromise quality. Tables 1.1 and 1.2 summarize our findings in this respect.

**TABLE 1.1 CONSTRAINTS TO INCREASING HIV-RELATED SERVICES  
(% OF FACILITIES THAT MENTION CONSTRAINT)**

Constraint	Nairobi	Nyanza
Staffing	70%	88%
Space/Infrastructure	60%	75%
Drugs	50%	50%
Test kits	20%	38%
Training	20%	25%
Lab equipment	20%	
Office supplies	20%	

**TABLE 1.2 CONSTRAINTS TO INCREASING ART PATIENT LOAD  
(% OF FACILITIES THAT MENTION CONSTRAINT)**

Constraint	Nairobi	Nyanza
Staffing	40%	67%
Space/Infrastructure	30%	67%
Drugs	30%	50%
Training	20%	
Equipment	20%	
Lab supplies		33%

Source: Sample survey of primary and secondary facilities in Nairobi and Nyanza, N=11 and 8 respectively

The tables above indicate that a variety of constraints at the facility level often dictate whether quality can be sustained when scaling up services. Ultimately the solution to these constraints may involve the outlay of additional financial resources. However, the response to such sustainability problems must also be innovative, focusing on better methods of providing HIV/AIDS services. For example, decentralization of service delivery is an imperative, looking toward the future of the management of HIV/AIDS as a chronic disease condition, which needs to be managed for large volumes at lower cost and greater ease to antiretroviral treatment (ART) patients routinely collecting medications. Decentralization leads to a reduction in concentration of services in higher-level facilities, which may also ease staffing shortages. Overall, this report looks at resource predictability, as well as factors impacting the sustainability of quality HIV/AIDS services. These issues are assessed both independently and in terms of their linkages. The discussion immediately focuses primarily on the resource issue.

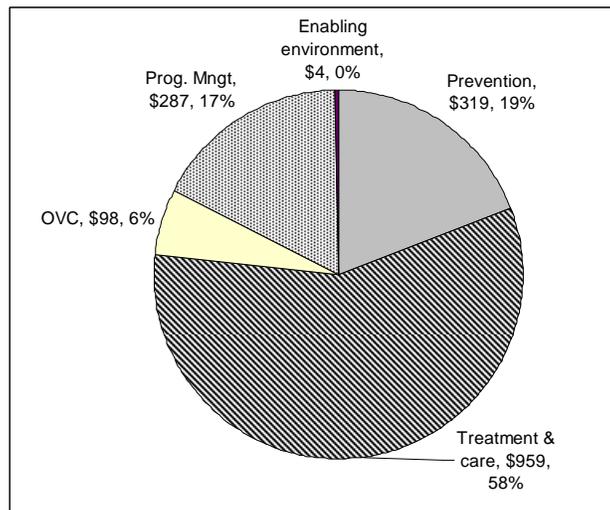
*Planning for predictable resources:* In recent years the external resources available for the HIV/AIDS program in Kenya have increased dramatically. The years 2009/10 and 2010/11 may however, reflect the peak of such external resources available to the country, unless new proposals to the Global Fund for AIDS, Tuberculosis, and Malaria are successful in 2010. However, the resource requirement will only increase every year from 2010. Unfortunately, the resources are becoming less variable, with the exit of certain large funding sources from the sector (discussed further below).

The Kenya National AIDS Strategic Plan (KNASP-3) for 2009/10 to 2012/13, which was formally launched in Nairobi in January 2010, has done some initial sustainability analysis by way of looking at the resources required and available. The strategy has four pillars and five function areas. A comprehensive costing exercise, involving several different models at strategic and activity levels, was completed in 2009, prior to the finalization of the KNASP-3. The costing exercise estimated the total need in financial terms and compared it with the financing that was expected to be available. Figure 1.1 shows the results

of this financial gap analysis, organized by function areas. The total gap for the four years is *US\$1.67 billion*.

Over 70-75 percent<sup>1</sup> of HIV funding comes from external resources, i.e., development partners, and there is growing concern that unless more domestic resources are mobilized, the program may not be sustainable. Kenya has a financing gap of *US\$959 million* over 2010-13 in HIV treatment and care alone (Figure 1.1). Consequently as part of mobilizing funds to close the gap and developing sustainable financing mechanisms, various innovative funding sources need to be explored.

**FIGURE 1.1 FINANCING GAP IN THE KNASP-3 BY FUNCTION AREAS, 2009-13 (US\$ MILLIONS)**



These issues are clearly in the mind of planners. The government of Kenya, through the National AIDS Control Council (NACC) and the National AIDS/STD Control Programme (NAS COP), considers planning for predictable and sustainable HIV/AIDS financing a top priority. A *cabinet paper* on financing for HIV/AIDS is under preparation for review in 2010/11, which this report is meant to inform with new financing ideas, while also highlighting the important actions that need to be taken to enhance quality and efficiency of services, which may in the short term require an enhanced outlay of financing resources.<sup>2</sup>

Because 58 percent of the gap is generated in the function area of treatment and care, and the programs here are more amenable to analysis in terms of quantifiable commodities and services, the search for innovative financing options should naturally begin here. However, two of the scenarios analyzed, as discussed further below, are not specifically tied to any function area and therefore will identify new resources for HIV/AIDS generally.

However, one scenario is devoted specifically to HIV/AIDS treatment. Additional resources identified for this area, which falls under Pillar One of KNASP-3, will free up certain other resources for allocation to the other three pillars or function areas. It is also important that at this time, the analysis for

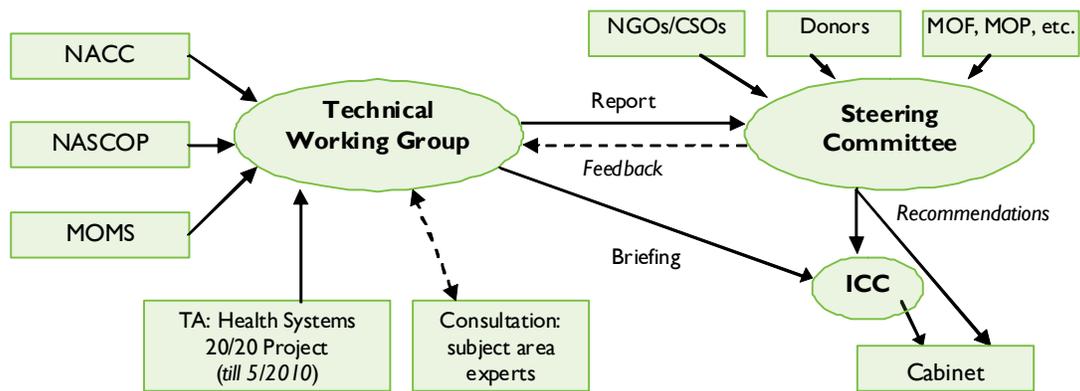
<sup>1</sup> Government of Kenya and UNAIDS. 2009. *Kenya National AIDS Spending Assessment, 2006/07 and 2007/08*.

<sup>2</sup> Such as decentralization of HIV/AIDS treatment and care from a few high-volume secondary and tertiary facilities to lower-level primary facilities to decongest services. Also, relaxing the ART eligibility threshold to follow the World Health Organization (WHO) guidelines, and making changes to the format of prevention of mother-to-child transmission (PMTCT) services.

sustaining the quality of HIV/AIDS services focuses on treatment and care. This does not lessen the need for quality prevention and community HIV/AIDS activities. However, there are certain policy options presently being considered that require analysis that fall under the treatment and care function area. Of these, the most important are the decentralization of ART and care services, and new WHO guidelines for ART and PMTCT that are available and suitable for implementation in Kenya. Both of these improvements and efficiencies target improvement in the quality of services, and are included in Pillar One. Future analyses will expand the focus to the other function areas.

Sustainability analysis requires a protracted, policy-focused approach. The imperative is that *some solutions that are actionable* must be found. For the solutions to be actionable, they must come from consultation with a variety of stakeholders, and they should account for the most salient facts concerning the problem.

**FIGURE I.2 ENSURING POLICY ACTION ON SUSTAINABILITY BY FOCUSING ON ROBUST INSTITUTIONS**



## I.2 THE TECHNICAL WORKING GROUP AND ITS MANDATE

The composition of the Technical Working Group (TWG) is as follows:

- Two representatives from NACC (NACC is also the chair of the TWG)
- Two representatives from NASCOP
- A representative from Ministry of Medical Services (MOMS)
- Four international and one local consultant from Health Systems 20/20, providing technical assistance in sustainability analysis for the HIV/AIDS program in Kenya.

In addition, the TWG in its work draws on the knowledge of individuals and groups who were involved in the costing of the KNASP-3, as well as others with expertise in innovative financing and sustainability-creating options in the future for HIV/AIDS.

Based on discussions of sustainability challenges and potential solutions during after a meeting of key HIV/AIDS stakeholders on November 18, 2009, the TWG agreed on three different scenarios that would be the highest priority for the country to consider going forward:

1. Covering outpatient HIV/AIDS treatment through the National Hospital Insurance Fund (NHIF)
2. Finding innovations for increasing domestic financing for the HIV/AIDS sector
3. Addressing the sustainability of quality HIV/AIDS treatment and care services through decentralization

The agreed-upon timeline called for a concept note outlining the scope of analysis for each of these scenarios by mid-December 2009, a preliminary draft report, and Steering Committee review and comments by late February 2010. A final report, action plan, and subsequent policy communication and dissemination activities were planned for February-April 2010.

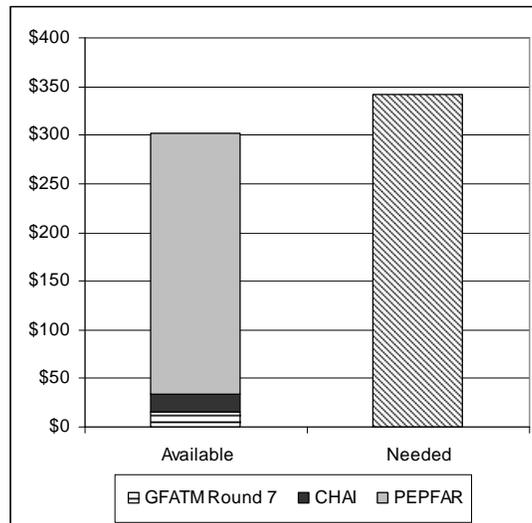
The TWG will be supported by a Steering Committee at the national level, which will have membership from across the HIV/AIDS sector. The Steering Committee will have an important role to play to ensure that the technical analysis from the TWG will be actionable:

1. Review draft report and provide consensus comments to the TWG
2. Play an advisory role. Provide initial guidance to the process.
3. Form action groups. Participate in subaction groups to look at specific areas.
4. Champion the action points from the TWG report and play an advocacy role as a group through the chair of an action committee. They should also give feedback to their relevant constituencies.

### **I.3 FINANCIAL SUSTAINABILITY OF HIV/AIDS TREATMENT AND CARE SERVICES**

The year 2010/11 represents the last year with fairly predictable sources of funding for HIV/AIDS treatment and care. The active external funders include U.S. government funding through PEPFAR, the Clinton HIV/AIDS Initiative (CHAI), and the Global Fund. Because Kenya's National Strategy Application (NSA) was not approved under the Round 9 of Global Fund funding, the only existing funding from this source that applies to HIV/AIDS treatment and care stems from Kenya's Round 7 grant. These sources are all consolidated with respect to their funding for this function area and compared with the need as estimated under KNASP-3. An overall gap of US\$41 million still appears.

**FIGURE 1.3 AVAILABLE VS. NEEDED FINANCIAL RESOURCES FOR ART AND OI TREATMENT,\* 2010/11**



Source of funding needed data: KNASP-3 Gap Analysis, 2009

Note: OI=opportunistic infection

\* Includes adult and pediatric antiretroviral drugs (ARVs), PMTCT, laboratory and diagnostic materials, opportunistic infection (OI) treatment (incl. TB), nutrition.

*Implications of the current state of funding for HIV programming:* First, there is overwhelming dependence (89 percent in 2010/11) on PEPFAR funding to deliver the essential services in this function area. This partner has been maintaining a flat overall budget in Kenya, with little variation across successive years in the proportions in spending across various program areas such as prevention, treatment and care, and strategic information. Therefore there can be no expectation that the overall funding from PEPFAR will increase, or that funds will be repurposed to address the gaps in one function area over the other. Second, CHAI will be exiting Kenya as a funder for pediatric ARVs after the present fiscal year (2010/11). This will open a gap in the resources for pediatric ART, across both drugs and diagnostics.

Overall, the resources in this function area going forward will diminish, while due to scale-up (even at the current eligibility threshold for first-line ART) the targets and hence the need will continue to increase. Additionally, the application of new treatment guidelines for PMTCT will require additional resources than were initially estimated.

Providing facility-level context to the strategic funding gaps just discussed, Table 1.3 shows summary results from our data collection on equipment availability by cadre. There is a clear indication that there is still unmet need at the level of health providers engaged in HIV/AIDS care and treatment for the essential equipment needed to perform their job function. Given our small sample size, this is only an indication of a potentially large need for the HIV/AIDS program to strengthen the conditions of service delivery.

**TABLE 1.3 AVAILABILITY OF SUFFICIENT EQUIPMENT TO PERFORM HIV-RELATED JOB FUNCTION, BY CADRE**

Cadre	Yes	No
Nurses	45%	55%
Clinical officers	55%	45%
Pharmacy technicians	25%	75%
Lab technicians	17%	83%

Source: Sample survey of primary and secondary facilities in Nairobi and Nyanza, N=11 and 8 respectively

The most important positive fact is that Kenyan policymakers are now energized to explore domestic financing solutions in this function area of KNASP-3. Our analysis of innovative financing shows that significant internal resources can be generated (see Sections 2 and 3). It is also likely that there will be future declines in the price of tenofovir and other drugs that will become the mainstays of fixed drug combinations under regimens in KNASP-3. In forthcoming scenario analyses of the costs of ART under the relaxed CD4-count eligibility criterion, the TWG will incorporate possible reductions in tenofovir pricing.

Another positive is that Kenya can resubmit the NSA (or a specific grant application) under the continuing ‘Learning Wave’ of NSAs at the Global Fund for the forthcoming Round 10 of financing. Kenya has the opportunity to apply revisions following the comments from the Technical Review Panel’s comments on its NSA proposal.

Overall, the clearest next step for Kenya is to avoid this situation of unpredictable financing by generating sustainable domestic resources, which is the driving factor behind the discussions in this report..

## **I.4 SUSTAINABILITY SCENARIOS ANALYZED BY THE TECHNICAL WORKING GROUP**

### **I.4.1 COVERING OUTPATIENT HIV/AIDS TREATMENT THROUGH THE NATIONAL HOSPITAL INSURANCE FUND**

*Driver of scenario:* A financing option that is under consideration globally is using risk-pooling, i.e., insurance, to cover some of the cost of HIV/AIDS treatment.

*Scenario objectives:* This scenario will assess the capacity of the NHIF to finance outpatient HIV/AIDS treatment. The NHIF currently covers hospitalization for HIV-related complications. The scenario will discuss what aspects of outpatient treatment related to HIV/AIDS can be covered (e.g., provision of ARVs) and what must be excluded to maximize the feasibility of the option. The scenario will estimate financial resources that can be made available and compare them to a measure of the need.

Specific result areas for this scenario include:

- Outline a financially and logistically feasible process for the NHIF to fund certain aspects of HIV/AIDS outpatient treatment for its members.
- Estimate the total amount of NHIF funding available for funding these aspects under various potential scenarios of increase (or no increase) in NHIF premiums.

- Discuss the significance of the NHIF contribution in terms of the overall HIV/AIDS treatment need in Kenya.

#### **I.4.2 INNOVATIONS FOR INCREASING DOMESTIC FINANCING FOR THE HIV/AIDS SECTOR**

(a) *Driver of scenario:* Increase in resources available for HIV/AIDS (or other priority conditions) from a special levy on airline passengers and cargo.

*Background/resource implications:* Airline levies for the purpose of funding HIV/AIDS services have been used globally, and championed by organizations such as UNITAID. Such levies could increase the amount of government funds that would be allocated to health and ultimately to HIV/AIDS.

*Scenario products:*

- Identify levels of levy that are supported by international experience in Kenya's peer group. Project the volume of passenger and cargo traffic for which the levy would apply.
- Estimate the additional revenue for HIV/AIDS that the airline levy would generate.

(b) *Driver of scenario:* Increase in general government allocation to the health sector and hence increase in availability of resources for HIV/AIDS.

*Background/resource implications:* In 2001, African governments met in Abuja to counter the accelerating rate of HIV/AIDS and TB infections. At this conference, each African State committed to allocate at least 15 percent of its annual budget to the health sector. According to National Health Accounts studies in Kenya, government expenditures on health as a percentage of total government expenditures fell from 8.0 percent in 2001/02 to 5.2 percent in 2005/06. This is also reflected on HIV/AIDS-specific spending where government spending accounted for 23.3 percent of total HIV/AIDS spending in 2001/02 but decreased to 7.3 percent in 2005/06 (though some of this effect is due to the large increase in donor funds, there was a net decrease in government spending as well).

*Scenario products:*

- Estimate the additional amounts of resources available if government allocations to health reach 15 percent of total government budget.
- Estimate the amount of this increase in financing that would go toward HIV/AIDS programs and hence on availability of resources for the program

#### **I.4.3 ADDRESSING THE SUSTAINABILITY OF QUALITY HIV/AIDS TREATMENT AND CARE SERVICES THROUGH DECENTRALIZATION**

*Driver of scenario:* Kenya has recently completed a decentralization strategy that outlines a network of central and linked satellite sites for the delivery of HIV/AIDS treatment.

*Background:* Much of Kenya's current capacity for HIV/AIDS service provision is in secondary and tertiary health facilities. The concentration of service provision has left many patients needing to seek care in more distant facilities resulting in more travel time, and hence imposing a burden on earning

members of households. This has also negatively impacted adherence and hence the outcomes of treatment.

The process of decentralization commenced in 2006 with the creation of satellite sites outside of the urban centers in order to reduce the distance clients would have to travel to reach HIV care and ART services. Each of these satellite sites is supported by a central ART site, which order and distribute ARVs to the satellites as well as conduct the resource-intensive laboratory diagnostics such as CD4 counts. Both MOMS and NASCOP are in favor of continuing decentralization and deconcentration of service provision, both of which imply costs.

The resource implications of decentralization will depend primarily on the following factors:

- a. The target number of lower-level facilities (e.g., health centers and dispensaries) to be upgraded in order to provide HIV services and the associated number of higher-level facilities that need to be upgraded in order to serve as central sites
- b. Average start-up financial unit cost (infrastructure, equipment, etc.) for upgrading lower-level facilities into satellite sites and, if necessary, for upgrading higher-level facilities into central sites
- c. Potentially, ongoing unit financial costs for maintaining decentralized HIV service provision at satellite and central facilities (maintenance, monitoring and evaluation [M&E], transportation costs for sending samples to central facilities for analysis, etc.)
- d. Average additional human resource need by worker cadre for lower-level facilities to be upgraded to satellite sites and the training costs for such health workers

*Scenario products:* The decentralization analysis will consider three scenarios: limited, moderate, and extensive decentralization. The feasibility analysis will help determine the operationalization of the decentralization strategy proposed by NASCOP, by identifying the specific target numbers of facilities to be converted to satellite sites. The scenarios were developed through consultation with NASCOP officials, with the moderate scenario as an anchor point. For each decentralization scenario, our analysis will provide estimates of the financial and human resource implications.

#### **I.4.4 IMPACT OF ADDRESSING NEW GUIDELINES FOR ART AND FOR PMTCT SERVICES**

*Driver of scenario:* The WHO has recommended that ART initiation begin at a cell count below 350 cells/mm<sup>3</sup> rather than the present 250 cells/mm<sup>3</sup>. Also, there is a move toward replacing stavudine-based first-line regimens with tenofovir-based regimens. Separately, there have been recent recommendations for changes to the guidelines for PMTCT services, which address expanded treatment options for the mother (for prophylaxis), infant (prophylaxis and postnatal ART), and combination ART (for mother's own health if eligible).

*Analysis objectives:* This section assesses the additional resource impact of these guidelines. The relaxation of the ART eligibility criteria is likely to expand the definition of population in need of ART and hence will require some upward revision of the proposed ART coverage targets. Switching to tenofovir also imposes additional costs. The changes to the PMTCT guidelines, given the current coverage targets, will be more resource intensive per client. The scenario will calculate the change in resource requirements compared with the estimates for KNASP-3 in US\$ terms.

## I.5 DATA COLLECTION

The members of the TWG comprehensively reviewed secondary data sources including inputs, outputs, and assumptions from the Kenya AIDS Indicator Survey (KAIS) 2007, the Kenya National HIV and AIDS Estimates (2007), and the KNASP-3 national commodities quantification exercises that were recently conducted in Kenya.

A desk review of other literature was also conducted and the remaining data gaps will be addressed through a targeted data collection at the facility level. Financial, labor intensity, and service delivery data were collected from both primary and secondary sources (Table I.4). Structured survey instruments were adapted to the Kenyan context and selected health facilities surveyed. Informational interviews with relevant officers from the NACC, NASCOP, donors, and implementing partners were conducted to gather expert opinion to inform modeling assumptions and to resolve discrepancies in collected data.

**TABLE I.4 LIST OF FACILITIES SAMPLED FOR SUSTAINABILITY ANALYSIS, KENYA**

Kibera Health Centre	Nairobi West	Kari Dispensary	Nairobi West
Kangemi Health Centre	Nairobi West	Ngong Road Health Centre	Nairobi West
Kayole II Health Centre	Nairobi East	Homa Bay District Hospital	Homa Bay, Nyanza
Loco Health Centre	Nairobi West	Magina Health Centre	Ndhiwa, Nyanza
Mbagathi District Hospital	Nairobi West	Pala Health Centre	Ndhiwa, Nyanza
Mukuru Kwa Reuben	Nairobi East	Chulaimbo Rural Health Centre	Kisumu West, Nyanza
Riruta Health Centre	Nairobi West	Kodiage Health Centre	Kisumu East, Nyanza
Waithaka Health Centre	Nairobi West	Nyanza Provincial General Hospital	Kisumu, Nyanza
Kiambu District Hospital	Kiambu, Nairobi		

In addition, the team gathered data from a group of sites specializing in servicing the needs of orphans and vulnerable children (OVC). The focus of this exercise was to better understand the costs of servicing OVC, the distribution of HIV-affected OVC among the general population at these facilities, and the issues affecting sustainability for such services. The data from these sites will be analyzed to inform certain scenarios on refocusing the funding of OVC through the HIV/AIDS programs. These scenarios will be considered in a future addendum to this report.

## 2. FEASIBILITY STUDY OF COVERING OUTPATIENT HIV/AIDS TREATMENT THROUGH THE NATIONAL HOSPITAL INSURANCE FUND

Authors: S. Muchiri, A. Dutta

**Abstract:** *Issues:* Kenya has a financing gap of US\$959 million in the period 2010-13 in HIV treatment and care, of which US\$547 million is for ART. Kenya is highly donor dependent in this area. There is potential to use the National Hospital Insurance Fund (NHIF) to finance antiretroviral treatment (ART). Currently, the NHIF does not cover outpatient services, including ART or outpatient treatment of opportunistic infection (OI); it passes these costs to government and donors.

*Description:* After administrative costs, most of the premium revenue collected by the NHIF is used to finance general inpatient care. However, the NHIF surplus (proposed 10 percent of revenue) could be used to finance outpatient first-line antiretroviral drugs (ARVs) and outpatient OI treatment without reducing the ability to pay for regular benefits. Surplus levels could be maintained even against increasing general claims with efficiencies in administrative costs. Certain parts of the traditional ART package, such as laboratory costs and second-line ART would not be covered, and would require referral to other forms of financing, such as subsidized or free provision.

*Lessons Learned:* The team set the NHIF a financing challenge of funding 25 percent of the overall need for first-line ARVs and outpatient OI treatment in Kenya at the ART-eligibility threshold of  $CD4 < 250$  cells/mm<sup>3</sup>. This target was generated by considering the following: The projected NHIF membership growth from 3 million to 6.3 million between 2010 and 2015 represents on average 23 percent of the working age population in Kenya. NHIF coverage was assumed to apply to ART need in urban areas, where most members reside. Urban areas have 22 percent of the total population but 30 percent of HIV positives (Government of Kenya 2007). Prevalence among employed men and women was also higher than among the unemployed. Therefore, NHIF was assumed to cater to higher than its average share of the working age population, i.e., 25 percent of the total need for first-line ARVs and outpatient OI treatment.

*Results:* A modest 25 percent increase in NHIF premiums was able to fully meet the financing challenge. Higher premium increases would be able to finance the excluded services from within the general HIV/AIDS treatment package. Given rising incomes, raising NHIF premiums non-regressively is a possibility. The government is considering options to increase resources for the HIV/AIDS sector with a cabinet paper. The government should consider NHIF financing as an option.

## 2.1 BACKGROUND

**The case for alternative financing for HIV/AIDS treatment:** Currently, most of the HIV/AIDS treatment in Kenya, especially with antiretroviral drugs (ARVs), is funded through external sources. This came about as the original emergency response to the HIV/AIDS epidemic unfolded, given the need to rapidly provide treatment to HIV-positive individuals with advanced stages of the disease to prevent mortality and morbidity. As the various institutional structures managing the response to the epidemic have matured in Kenya, broad-basing the financing mechanism for HIV/AIDS treatment can be explored, especially integrating these services into the general health care structures. This is required to reduce donor dependency, increase sustainability, and foster more intense local ownership.

The costs of drugs for first-line ART used to be prohibitive, but costs have recently decreased. However, the average annual cost of first-line ART per person, when computed at a cohort level, is still close to US\$200 (not inclusive of laboratory costs at initiation or related to clinical monitoring), which makes it difficult to finance through out-of-pocket mechanisms for middle-class patients. Kenya, just as other countries, has decided to switch from a previous mainstay of the fixed-drug combination, stavudine, toward a more effective, less toxic, but more expensive drug: tenofovir. This will increase the weighted average cost per person for first-line ART in a cohort in the future. Such cost considerations also rule out the possibility of financing ART through the modest per-capita contributions into a community-based health insurance (CBHI) framework as have become popular in other parts of sub-Saharan Africa.

The lack of financing options outside of the free drugs provided through the national program has led to the overall funding gaps discussed in Section I. As Kenya plans to scale-up the delivery of ART to cover a larger percentage of the population eligible for the service, it is imperative to find financing alternatives.

**Insurance as a financing option for ART:** Voluntary private health insurance exists in Kenya and can be accessed by individuals with incomes high enough for the premiums involved, or those whose employers organize a group insurance scheme. Many of these private insurers provide differentiated schemes, where some plans include cover for HIV/AIDS-related complications requiring inpatient treatment, such as from OIs. According to informed opinion (to be confirmed with a dedicated survey), almost none covers the routine ARV drugs for eligible HIV-positive patients<sup>3</sup>. In any case, such private health insurance schemes would cover a small proportion of the population.

Hybrid partnership models that engage the private health insurance market in providing HIV/AIDS coverage to lower-income groups have been tried in a few places. In Namibia, private, not-for-profit 'medical aid' insurers provided coverage prior to 2006 to formal sector employees at higher- or middle-income levels. Even though premiums ranged from US\$684 to US\$3,420 (at 2004 prices), there were restrictions in the ability to access ART. Spending limits imposed in the plan meant that at some point in the year, most individuals had to pay for ARVs out of pocket or seek care in the donor-funded public sector (Schellekens et al. 2009).

In Namibia, a 'risk equalization fund', with some donor subsidy, was established in 2006, which encouraged the 'medical aid' insurers to step into the lower-income market and also offer expanded coverage for HIV/AIDS. Under this scheme, lower-income individuals were able to buy a general health insurance plan with an annual premium of US\$284 per person per year (2006 prices), of which 19 percent was donor subsidized for the first three years of fund operation. Existing plan members, i.e., the middle- and higher-income individuals, could purchase enhanced HIV/AIDS coverage from their existing

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<sup>3</sup> See for example, the employer-based health insurance offering from the third largest Kenyan life insurance company, CIC Insurance, and its 'Plan B' scheme: [www.cic.co.ke/template/t02.php?menuId=22](http://www.cic.co.ke/template/t02.php?menuId=22)

premium contributions, at a cost of US\$35.52 (2006 prices), which would extend spending limits up to US\$15,000 – sufficient to cover HIV/AIDS drugs, laboratory tests, and other treatment (Schellekens et al. 2009).

In Namibia, the insurers had faced a problem of a small risk pool (existing high-/middle-income members) possibly taking on an unknown new pool of uninsured lower-income individuals with potentially higher HIV risk. The risk equalization pool was able to solve some of this problem. The subsidization of the lower-income pool by donors, and the ability to get the existing members to allocate a portion of their premiums to a dedicated HIV/AIDS plan with better coverage and quality meant both groups would be attracted to enroll, thus increasing the size of the pool. The activities of the risk equalization fund led to an enrollment of up to 12 percent of the Namibian health insurance market within 20 months of the launch of the products. However, the ability to enroll even lower-income individuals would require greater levels of subsidy for longer periods of time. Also, any improvements in the quality or coverage of highly subsidized government health services would ‘crowd out’ the medical aid insurers from the HIV/AIDS market. This would then shift the burden of larger funding responsibility back to the public sector and raise questions of sustainability.

The Namibia case, though interesting, is distinct from the Kenyan problem. Given that purchasing power adjusted GDP per capita is four times higher in Namibia, the premiums can be set at higher levels there.<sup>4</sup> Also, insurance structures equivalent to those in Namibia do not exist in Kenya. Without a subsidy and general political and institutional demand, it seems unlikely that private insurers in Kenya will ‘deepen’ their HIV/AIDS coverage for existing members (e.g., covering ART). For there to be any case for a publically financed subsidy, the membership pools of such private insurers must ‘broaden’ to include substantial numbers of low-income individuals. This is hardly the case at the moment in Kenya. It also does not appear that the size of the subsidy needed to encourage private insurers in Kenya to include such lower-income individuals, or for lower-income individuals to opt for private insurance (depending on where the subsidy is targeted) can be afforded for the numbers to be meaningful – given Kenya’s population compared with that of Namibia.

The Namibia example still provides some insights that can guide us in seeking a Kenyan risk-pooling or insurance financing option for HIV/AIDS treatment:

- Given an inability to raise premiums to the Namibian levels, the overall membership must be large enough such that the contributions can sustain, in an actuarial sense, the risk or need for HIV/AIDS treatment in the unknown HIV-positive group within the pool.
- If donor or public bailouts for the risk pool are to be avoided, then the claims amount related to HIV/AIDS treatment covered will have to be less variable. As it is, the HIV treatment need/risk in the membership will be uncertain. Therefore, the ‘depth’ of the HIV/AIDS treatment coverage will have to be modest, with a well-defined spending projection based on generally well-understood costs (e.g., ART only, with its reasonably well-understood spread of various regimen distributions in a cohort).

**The social health insurance option in Kenya:** The National Social Health Insurance Fund (NSHIF) plan was passed by Parliament in 2004, but sent back by the president with comments, including that there be a more gradual phase-in period. Since then the NSHIF concept has been altered and a future social health insurance (SHI) option might require new institutions, as discussed in a Ministry of Public Health and Sanitation (MOPHS)/Ministry of Medical Services (MOMS) joint concept note ‘*Social*

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<sup>4</sup> Namibia: US\$6,400 (PPP) compared with Kenya: US\$1,600 (PPP) in 2009. Source: CIA Factbook, <https://www.cia.gov/library/publications/the-world-factbook/>

*Protection in Health: The Financing Policy and Strategy for Kenya* (Government of Kenya 2009b). However, several of the ideas inherent in this document related to new payor/collection agencies, and how to approach the premium costs for low-income and indigent populations will require extensive discussions. Any new SHI option would not likely be ready to take over the HIV/AIDS treatment challenge in a timeframe that matches the scale-up under KNASP-3, and therefore would not be significant in the way the Sustainability TWG hopes.

In contrast, the NHIF is an established entity. The NHIF was established in 1966 as a parastatal to provide formal sector employees with medical cover for inpatient services. It is currently regulated under the NHIF Act No. 9 of 1998. Its membership has remained somewhat stagnant at the 2 million mark (discussed in more detail below). The NHIF has gone through a period of heavy investments in infrastructure recently, including a new headquarters building. However, it is expected to be entering a period of consolidation in revenue growth, efficiency in administrative costs, and willingness to innovate. In terms of its size, and given the timing, the NHIF fits at least one of the criteria outlined earlier for a risk pool. The other criteria will have to do with how to design a feasible option for HIV/AIDS treatment coverage with the NHIF.

**NHIF membership:** Today the NHIF has a membership of 2 million (1.8 million from the formal sector and 200,000 from the informal sector) with about 8 million dependents. About 74 percent of NHIF members reside in urban areas and have better access to health facilities (Government of Kenya 2007). The 23 branches of the NHIF have the mandate to recruit members from the employers in their area as well as allow informal sector individuals to join by depositing the right forms. Marketing of the NHIF option has not been very robust, nor have NHIF branches traditionally used tax lists to identify potential employers and hence potential members (Hsiao and Shaw 2007). However, this is expected to change in the future. Growth in membership will further help fulfill the requirement that there be a broad-based and large membership to consider as a risk-pool for HIV/AIDS treatment. The membership is expected to grow annually by 9 percent and 15 percent, for the formal and informal sector respectively (see Table 2.1).

**TABLE 2.1 NUMBERS OF POTENTIAL CONTRIBUTORS TO THE NATIONAL HOSPITAL INSURANCE FUND**

	2010/11	2011/12	2012/13	2013/14	2014/15
No. of formal sector contributors	2,292,301	2,502,212	2,731,344	2,981,459	3,254,477
No. of informal sector contributors	756,694	1,074,505	1,525,797	2,166,632	3,076,618
Total contributors	3,048,995	3,576,717	4,257,142	5,148,091	6,331,095

**The NHIF structure:** The NHIF members currently pay between US\$ 0.4 and US\$ 4.2 depending on one's income range (see Annex to this section). This is low compared with Namibia even after adjusting for differences in GDP per capita. These premiums have not been reviewed since 1990 despite overall growth in real wages and the nominal wage bill (see Table A.2.1 in the Annex to this section). Although stakeholders in the health sector realize the NHIF potential, lack of institutional reforms has limited its capacity to be a major agency for financing health. Recent initiatives to re-engineer the NHIF are geared to addressing the institutional weaknesses. In order to fully deliver on its mandate, the NHIF is currently undertaking a pilot that will assist in extending coverage to outpatient services, including HIV services.

**Benefit package:** The amendments to the NHIF Act in the 1980s allowed NHIF to bring on board informal sector and expand coverage to outpatient care, although this is yet to fully materialize. The

NHIF currently covers inpatient services<sup>5</sup> for its members through a chain of 458 accredited public and private health facilities. The NHIF reimburses these facilities, mostly hospitals, based on agreed rebate levels or contracted rates. The patient meets any costs above the allowable rate by NHIF. Although there are no exclusions in the NHIF, ART, which is provided through outpatient services, is not currently covered by NHIF. This exposes the members who require ART to a high financial burden. In essence, the NHIF passes these costs for its members requiring such treatment to other financiers, namely the government and donors.

**Revenues:** According to 2005/06 National Health Accounts for Kenya, the NHIF manages 3.7 percent of health sector expenditures and has in the past accumulated a healthy surplus after accounting for administrative costs and health care claims, and periodic review of rebates. The surpluses have been partly due low reimbursement levels and under-billing from the public sector facilities. Revenues are projected to grow at 12 percent, reaching Ksh 9.1 billion by 2013/14 (see Table 2.2). The NHIF has introduced reforms to make itself more efficient and target more resources to benefits. These reforms are expected to reduce expenditures on administration from the current 39 percent to 20 percent by 2014, thereby freeing more funds toward payment of benefits.

Table 2.2 extrapolates the growth in NHIF revenues at the current premium levels (premium amounts are listed in the Annex to this section) given the projected growth in membership. Based on the stated aims for administrative costs, there is a schedule of decrease for these as a percentage of revenues. The estimates allow for an increase in claims as a percent of revenues, from 65 percent to 70 percent. Given these adjustments, a total surplus of *US\$56.43 million* is expected to be available for the five years from 2010 until 2015.

**TABLE 2.2 NHIF REVENUES AND SURPLUS AT THE CURRENT LEVELS OF PREMIUMS**

At current NHIF premiums	2010/11	2011/12	2012/13	2013/14	2014/15
Revenues (Kshs million)	6,573	7,362	8,246	9,235	10,343
Average annual payment per contributor (Ksh)	3,228	3,228	3,228	3,228	3,228
Claims as a percent of revenues	65%	70%	70%	70%	70%
Administration as a percent of revenues	25%	20%	20%	20%	20%
Surplus as a percentage of revenues	10%	10%	10%	10%	10%
Total claims amount (US\$ million)	\$56.97	\$68.71	\$76.96	\$86.19	\$96.53
Surplus (Kshs million)	657	736	825	923	1,034
Surplus (US\$ million)	\$8.76	\$9.82	\$10.99	\$12.31	\$13.79

## 2.2 SETTING A FINANCING CHALLENGE FOR THE NHIF IN FUNDING HIV/AIDS TREATMENT

What role can the NHIF play in financing HIV/AIDS treatment? For severely ill HIV/AIDS patients requiring hospitalization who are NHIF members, inpatient hospital care can be recompensed as per the existing benefits package. No new provision is required for this treatment, which usually covers opportunistic infection episodes as well as the morbidity of full AIDS. However, the routine collection of ARVs by eligible patients from an outpatient HIV/AIDS clinic in an hospital or other facility is not covered. Till outpatient care is fully covered by the NHIF (a pilot is currently underway), neither are outpatient visits for treatment related to OIs. Therefore, this analysis explores how these costs for ARVs and outpatient OI treatment can be covered.

<sup>5</sup> For a maximum of 180 days per year per member.

The potential for NHIF coverage should be seen against the rise in the number of adults aged 15 or more who will need first-line ART. This will reach 697,377 in 2014/15, of which the desired coverage that year under KNASP-3 is planned to be 94 percent, or 657,855.

For the four years 2010-13, the KNASP-3 costing group projected a gap in funding for adult and pediatric ART that included ARVs, laboratory tests and monitoring, hospital visits, and other patient costs (exclusive of nutrition, psychological/palliative care, or home-based care) of US\$ 547 million. In addition, the group declared a funding gap of US\$ 25 million for the treatment of OIs (inclusive of TB treatment, OI drugs, pharmacy visits, and OI prevention kits).

Even though these gaps relate to more comprehensive definitions of ART and OI treatment than those considered here, they indicate that there will be significant shortages in resources. Though the need is great, this analysis assumes an initially limited role for NHIF in financing ART, such that the proposed financing is feasible and easily understood. The role for the NHIF proposed here is as a potential funder of *certain aspects of adult ART and outpatient OI treatment, for certain proportions of the population in need.*

For this analysis, the population in need is defined as the Kenyan population *in need of first-line ART.* However, caution is needed when considering the need for outpatient OI treatment. The need for OI treatment occurs in HIV-positive individuals before they become eligible for ART, especially if ART eligibility is set at being below a CD4 count of 250 cells/mm<sup>3</sup>. With the relaxation of CD4 eligibility to below 350 cells/mm<sup>3</sup>, as is being proposed in Kenya, the numbers of individuals with OI treatment need who are *non-eligible* for ART should decrease. In other words, using CD4 eligibility of <350 cells/mm<sup>3</sup> for the analysis means that most of the patients who will need outpatient OI treatment should be included if ART eligibility is the criterion for NHIF coverage. Therefore, the following conceptual equation is proposed:

$$\text{Potential NHIF contribution} = \text{First-line ARV drugs and outpatient OI treatment} \times \text{Proportion of total ART-eligible population in Kenya}$$

**Excluded costs:** The definition of included services for the financing challenge posed to the NHIF excludes certain items from the menu of costs included under ART by the KNASP-3 costing group. These are laboratory costs as well as labor charges, e.g., for consultation or prescription, and any other user fees. The definition also excludes second-line ARVs for about 5 percent of the cohort (this percentage grows in the future as more patients fail current first-line regimens). These exclusions are considered temporary and can be included in the future once the system for financing first-line ARVs and outpatient OI treatment is fairly well-settled.

Drug costs in the included categories are the bulk of the financial resources required for HIV/AIDS treatment, even if second-line drugs are expensive on a per patient-year basis. Also, separating and tracking the laboratory costs of the individual NHIF members from the broader group of patients in high-volume clinical settings represents an excessive administrative burden. The discussion at the end of this section considers how the excluded costs can be considered in the future.

Table 2.3 shows the total financial cost of ARVs and outpatient OI treatment for the population considered in need of treatment in Kenya, based on the estimates in the nationally agreed projection (Government of Kenya 2009c). Unfortunately, this estimate for adults needing first-line ART was based on a CD4 eligibility threshold of 250 cells/mm<sup>3</sup> and therefore may underestimate the total need. However, in estimating the costs of first-line ARVs, the analysis uses a recent projection of the split between continuing and new patients at a 350 cells/mm<sup>3</sup> eligibility rule, as well as the projection of

regimen uptake among new patients based on a move away from stavudine to tenofovir. The weighted cost per patient-year of outpatient OI treatment was about US\$18.2, as based on the KNASP-3 commodity quantification (Government of Kenya 2009d; see Annex for details on these calculations). The total costs for the five years of this projection were US\$ 481.7 million.

**TABLE 2.3 PROJECTED COSTS OF OUTPATIENT ARVS AND OI TREATMENT FOR ALL KENYANS IN NEED**

	2010/11	2011/12	2012/13	2013/14	2014/15
No. of adults who need first-line ART*	504,338	549,760	598,284	648,621	697,377
Weighted average per year per patient cost of first-line ARVs (US\$)**	\$131.7	\$149.7	\$144.7	\$145	\$145
Total cost of first-line ARVs (US\$ mil.)	\$66.41	\$82.31	\$90.31	\$94.46	\$101.56
Cost of outpatient OI treatment (US\$ mil.)***	\$9.2	\$10	\$10.91	\$11.83	\$12.71
Total cost for cohort (US\$ mil.)	\$75.60	\$92.33	\$101.22	\$106.28	\$114.27

\* Kenya 2007 HIV and AIDS estimates (Government of Kenya 2009b)

\*\* NASCOP ART Group estimates (January 2010) (see Annex Table A.2.4)

\*\*\* Based on unit costs in the KNASP-3 commodity quantification (see Annex I, Table A.2.6)

**What proportion of the ART-eligible population should be financed by the NHIF?** Urban areas have 22 percent of the total population but 30 percent of HIV positives (Government of Kenya 2009a). Prevalence among employed men was 3.4 times that in the unemployed (1.6 times for women). It is assumed that NHIF coverage will apply to urban ART need, where most members reside. The urban ART need is not exactly known.

This issue can be circumvented by comparing the NHIF membership to the working age population. The projected NHIF membership of 3 million adults (Table 2.1) represented on average 23 percent of the working age population in Kenya across the years 2010 to 2015. Therefore, the NHIF funding *challenge of financing* was set at **25 percent of the overall ARVs and outpatient OI treatment need** as defined in Table 2.3. This target acknowledges that according to Kenya AIDS Indicators Survey 2007, there is higher prevalence among the formal and informal employed, such as those who become NHIF members. In another sense, it is expected that 25 percent of the adult ART-eligible (by a threshold of 250 cells/mm<sup>3</sup>) over 2010-15 could be discovered to be existing or future NHIF members given the expansion profile in Table 2.1.

**TABLE 2.4 NHIF MEMBERSHIP AS A PROPORTION OF THE WORKING AGE POPULATION IN KENYA**

	2010/11	2011/12	2012/13	2013/14	2014/15
Population aged 20-64 years*	18,493,600	19,039,200	19,584,800	20,130,400	20,676,000
NHIF membership as % of pop.	16%	19%	22%	25%	31%

\*Based on UN Population Division 'medium' estimate.

Table 2.5 shows the actual numbers of individuals that the NHIF would need to provide with the defined services to meet the funding challenge set above. These are calculated by multiplying the overall need in Table 2.3 by 25 percent for each year.

**TABLE 2.5 THE NHIF FINANCING CHALLENGE FOR FIRST-LINE ARVS AND OUTPATIENT OI TREATMENT**

<b>First-line ARVs and outpatient OI treatment</b>	<b>2010/11</b>	<b>2011/12</b>	<b>2012/13</b>	<b>2013/14</b>	<b>2014/15</b>
Total members who will be covered	126,085	137,440	149,571	162,155	174,344
Total cost (US\$, mil.)	\$18.9	\$23.1	\$25.3	\$26.6	\$28.6

The total cost of financing the defined services for the targeted numbers of members would be US\$ 122.4 million, almost exactly 25 percent of the need in Table 2.3.

## 2.3 STRATEGIES FOR MEETING THE NHIF FINANCING CHALLENGE

The calculation of the NHIF surplus in Table 2.1 was motivated by a strategy that posited these funds can be used for the exceptional use of financing the HIV/AIDS treatment challenge. As the NHIF consolidates and reduces its administrative costs, and there are no new major investment needs foreseen, this surplus is available to be put to use in meeting a national priority. The need to finance the gap in HIV/AIDS treatment is one such national priority. The use of the surplus also leaves intact the main corpus of NHIF revenues to meet the general claims from its members for inpatient care, and potentially, outpatient care. For meeting the future outpatient care claims, some amount of increase in the premiums – stagnant since the 1990s – will have to be contemplated. Therefore, in considering NHIF funding for the HIV/AIDS treatment financing challenge, all scenarios assume an increase in NHIF premiums. Table 2.6 shows three scenarios of modest increase in NHIF premiums, from 10 percent to 25 percent. Calculation of the NHIF surplus here assumes the same pattern in claims as a proportion of revenue, and reduction of administrative costs as Table 2.2 above.

**TABLE 2.6 NHIF SURPLUS UNDER THREE SCENARIOS OF INCREASE IN PREMIUMS (US\$ MIL)**

<b>Increase in premiums</b>	<b>2010/11</b>	<b>2011/12</b>	<b>2012/13</b>	<b>2013/14</b>	<b>2014/15</b>	<b>Total</b>	<b>As % of financing challenge</b>
10% increase	\$14.61	\$17.13	\$20.37	\$24.62	\$30.27	\$107.0	87%
20% increase	\$15.94	\$18.69	\$22.22	\$26.86	\$33.02	\$116.7	95%
25% increase	\$16.61	\$19.46	\$23.15	\$27.98	\$34.39	\$121.6	99%

As Table 2.6 indicates, the NHIF financing challenge for HIV/AIDS treatment can be easily met from its surplus with a 25 percent increase in premiums. How realistic is this increase in premiums? A Ksh 10,000 per annum income in 2004 would have grown to Ksh 10,720 in real terms based on the accumulation of annual increase in real wages, i.e., a 7.2 percent overall increase. In nominal terms, the increase would be even more significant: 53.6 percent. Real incomes have grown in recent years in Kenya, and the membership of the NHIF has definitely enjoyed more of this increase compared with other income classes. Therefore, a 25 percent increase in premiums should be affordable. Also, given that the raised revenues would allow an improvement in general benefits under the NHIF such as outpatient care, and would serve a social purpose of cross-subsidizing the HIV-positive NHIF members who require first-line ARVs and OI treatment, NHIF members have reason to support increased premiums.

## 2.4 DISCUSSION

This scenario included a financing challenge and a particular funding strategy for the NHIF. The scenario results show that the NHIF can be a significant funder of first-line ARV and outpatient OI treatment need overall in Kenya, and entirely fund this need for its members. This will require an increase in premiums, but the level of increase is modest at 25 percent to entirely finance the challenge. Even greater increase is tenable, which will allow greater 'depth' in the proposed coverage (inclusion of certain services currently excluded from within a package of HIV/AIDS treatment). Discussions on increasing the NHIF premiums are ongoing with the Fund's stakeholders. While there is a general agreement on the need to increase the premiums, this is dependent on how fast NHIF can reduce the proportion of its revenue going to administration.

With a modest increase in premiums, NHIF can reduce the financing pressure on the treatment and care pillar of the KNASP-3. Donor dependency can be reduced to the tune of 25 percent of the overall need, as can potentially an even larger amount of the budget for the planned scale-up under KNASP-3. If the figures in Table 2.3 are replaced with the projected scale-up targets for first-line ART under KNASP-3, then the proposed NHIF financing strategy of relying on surpluses with a 25 percent increase in premiums would fund at least a quarter of that total need as well.<sup>6</sup> However, if the ART eligibility criteria are relaxed to below 350 cells/mm<sup>3</sup>, the total need per year will increase. The NHIF contribution can still be kept at a quarter of the overall need by increasing the premiums by more than 25 percent. Increasing the premiums by larger amounts will also allow the coverage of second-line treatment for the proportion of the overall need catered to by the NHIF.

Further policy and feasibility analysis is required to model how the NHIF will establish payment mechanisms for the first-line ARVs and OI treatment it funds. As discussed in Section 4, Kenya is contemplating devolving ART prescription and collection increasingly to lower levels of the health system: satellite sites at the health center and dispensary level. Facilities prescribing the first-line ARVs and the OI treatment drugs would have to be accredited as providers by the NHIF and the sites would have to align their financial reporting mechanisms to match NHIF needs, in order to rule out fraud, etc. Though the plan for devolving to lower facilities is at first glance a challenge in this respect, Section 4 shows that the planned 'hub-and-spoke' network will require drugs to be purchased for the satellite sites by certain 'central sites,' most of which are hospitals. Such facilities will already have accreditation and links with the NHIF.

The proposal for NHIF financing for a certain aspect of HIV/AIDS treatment, namely first-line ARVs and outpatient treatment for OIs, is feasible within the short-term without requiring major institutional rearrangement or creation. The proposed depth of coverage in HIV treatment is appropriate to the current needs in the country and follows the priorities set in the KNASP-3. Even though the costs of HIV/AIDS treatment are high compared with the levels of premiums that can be set relative to other countries with risk-pooling solutions for HIV/AIDS, the option of the NHIF making a contribution in Kenya is feasible. If implemented, this will help set the stage for such risk-pooling mechanisms taking an increasing role in financing the HIV/AIDS program in Kenya. That raises the prospect of enhanced sustainability and local ownership in the future.

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<sup>6</sup> The targets for first-line ART need in the KNASP-3 commodity quantification range from 87% to 96% of the estimated annual need for first-line ART (Government of Kenya 2009c) for the years 2010-15. Therefore, the scenario estimated in this section also approximates the potential NHIF contribution to the KNASP-3 targets.

## 2.5 REFERENCES

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## ANNEX. ADDITIONAL DETAILS FOR SECTION 2

**TABLE A.2.1 REAL WAGE AND NOMINAL WAGE GROWTH IN KENYA 2004-2010**

	2004	2005	2006	2007	2008	2009	2010
Overall growth in real wages	0.89%	1.1%	1.3%	1.4%	1.6%	1.6%	1.7%
Nominal wage bill growth	12.59%	12.04%	4.82%	4.99%	5.17%	5.19%	5.21%

**TABLE A.2.2 NHIF ENROLLEE MONTHLY CONTRIBUTIONS, BY INCOME GROUP**

Income range (KShs)	NHIF contributions KShs/month
1,000	30
1,000 to 1,499	30
1,500 to 1,999	40
2,000 to 2,999	60
3,000 to 3,999	80
3,999 to 5,999	80
6,000 to 7,999	140
8,000 to 14,999	230
15,000 to 19,999	320
20,000 to 24,999	320
25,000 to 29,999	320
Over 30,000	320

**TABLE A.2.3 PERCENTAGE SPLITS OF CONTINUING VS. NEW PATIENTS AT TWO ELIGIBILITY THRESHOLDS FOR FIRST-LINE ART\***

2010-11	<250 cells/mm <sup>3</sup>	<350 cells/mm <sup>3</sup>
Continuing %	84%	74%
New %	16%	26%
<b>2011-12</b>		
Continuing %	85%	82%
New %	15%	18%
<b>2012-13</b>		
Continuing %	95%	91%
New %	5%	9%
<b>2013-14</b>		
Continuing %	95%	95%
New %	5%	5%
<b>2014-15</b>		
Continuing %	95%	95%
New %	5%	5%

\* NASCOP ART Group projections – January 2010

**TABLE A.2.4 FIRST-LINE REGIMEN SPLITS AND DISTRIBUTION BETWEEN CONTINUING AND NEW PATIENTS, 2010-2014, ALL KENYA**

<b>2010</b>	Total on regimen	% of old patients on regimen	% of new patients on regimen	Cost per patient/year	No. of new patients on regimen	No. of old pts on regimen		Adults in need of first-line ART	Cost (US \$ mil)	Weighted avg. cost/year
D4T/3TC/NVP	120,074	32.3%	0.0%	\$75.60	0	120,074	2010/11	504,338	\$66.4	\$131.7
D4T/3TC/EFV	64,655	17.4%	0.0%	\$111.38	0	64,655	Old*	371,689		
AZT/3TC/NVP	62,309	13.2%	10.0%	\$151.20	13,265	49,044	New*	132,649		
AZT/3TC/EFV	39,673	7.1%	10.0%	\$162.04	13,265	26,409				
TDF/3TC/NVP	125,539	19.5%	40.0%	\$150.26	53,060	72,479				
TDF/3TC/EFV	92,087	10.5%	40.0%	\$167.38	53,060	39,027				
<b>2011</b>										
D4T/3TC/NVP	22,408	5.0%	0.0%	\$75.60	0	22,408	2011/12	549,760	\$82.3	\$149.7
D4T/3TC/EFV	22,408	5.0%	0.0%	\$111.38	0	22,408	Old*	452,690		
AZT/3TC/NVP	55,202	10.1%	10.0%	\$151.20	9,707	45,495	New*	97,070		
AZT/3TC/EFV	55,202	10.1%	10.0%	\$162.04	9,707	45,495				
TDF/3TC/NVP	197,270	35.0%	40.0%	\$150.26	38,828	158,441				
TDF/3TC/EFV	197,270	35.0%	40.0%	\$158.08	38,828	158,441				
<b>2012</b>										
D4T/3TC/NVP	14,237	2.5%	0.0%	\$75.60	0	14,237	2012/13	598,284	\$90.3	\$144.7
D4T/3TC/EFV	14,237	2.5%	0.0%	\$111.38	0	14,237	Old*	569,482		
AZT/3TC/NVP	48,168	7.5%	10.0%	\$151.20	5,457	42,711	New*	54,565		
AZT/3TC/EFV	48,168	7.5%	10.0%	\$162.04	5,457	42,711				
TDF/3TC/NVP	249,619	40.0%	40.0%	\$141.91	21,826	227,793				
TDF/3TC/EFV	249,619	40.0%	40.0%	\$148.78	21,826	227,793				

	Total on regimen	% of old patients on regimen	% of new patients on regimen	Cost per patient/year	No. of new patients on regimen	No. of old pts on regimen		Adults in need of first-line ART	Cost (US \$ mil)	Weighted avg. cost/year
<b>2013</b>										
D4T/3TC/NVP	7,741	1.3%	0.0%	\$75.60	0	7,741	2013/14	648,621	\$94.5	\$145.0
D4T/3TC/EFV	7,741	1.3%	0.0%	\$111.38	0	7,741	Old*	619,299		
AZT/3TC/NVP	26,426	3.8%	10.0%	\$151.20	3,202	23,224	New*	32,023		
AZT/3TC/EFV	26,426	3.8%	10.0%	\$162.04	3,202	23,224				
TDF/3TC/NVP	291,494	45.0%	40.0%	\$141.91	12,809	278,685				
TDF/3TC/EFV	291,494	45.0%	40.0%	\$148.78	12,809	278,685				
<b>2014</b>										
D4T/3TC/NVP	8,323	1.3%	0.0%	\$75.60	0	8,323	2014/15	697,377	\$101.6	\$145.0
D4T/3TC/EFV	8,323	1.3%	0.0%	\$111.38	0	8,323	Old*	665,851		
AZT/3TC/NVP	28,412	3.8%	10.0%	\$151.20	3,443	24,969	New*	34,430		
AZT/3TC/EFV	28,412	3.8%	10.0%	\$162.04	3,443	24,969				
TDF/3TC/NVP	313,405	45.0%	40.0%	\$141.91	13,772	299,633				
TDF/3TC/EFV	313,405	45.0%	40.0%	\$148.78	13,772	299,633				
							Five Year TOTAL		\$435	

\* Based on Table A.3, eligibility threshold of <350 cells/mm<sup>3</sup>

**TABLE A.2.5 FIRST-LINE REGIMEN SPLITS AND DISTRIBUTION BETWEEN CONTINUING AND NEW PATIENTS, 2010-2014, NHIF COVERAGE**

<b>2010</b>	Total on regimen	% of old patients on regimen	% of new patients on regimen	Cost per patient/year	No. of new patients on regimen	No. of old pts on regimen		Adults in need of first-line ART	Cost (US \$ mil)	Weighted avg. cost/year
D4T/3TC/NVP	30,019	32.3%	0.0%	\$75.60	0	30,019	2010/11	126,085	\$16.6	\$131.7
D4T/3TC/EFV	16,164	17.4%	0.0%	\$111.38	0	16,164	Old*	92,922		
AZT/3TC/NVP	15,577	13.2%	10.0%	\$151.20	3,316	12,261	New*	33,162		
AZT/3TC/EFV	9,918	7.1%	10.0%	\$162.04	3,316	6,602				
TDF/3TC/NVP	31,385	19.5%	40.0%	\$150.26	13,265	18,120				
TDF/3TC/EFV	23,022	10.5%	40.0%	\$167.38	13,265	9,757				
<b>2011</b>										
D4T/3TC/NVP	5,602	5.0%	0.0%	\$75.60	0	5,602	2011/12	137,440	\$20.6	\$149.7
D4T/3TC/EFV	5,602	5.0%	0.0%	\$111.38	0	5,602	Old*	113,172		
AZT/3TC/NVP	13,801	10.1%	10.0%	\$151.20	2,427	11,374	New*	24,268		
AZT/3TC/EFV	13,801	10.1%	10.0%	\$162.04	2,427	11,374				
TDF/3TC/NVP	49,317	35.0%	40.0%	\$150.26	9,707	39,610				
TDF/3TC/EFV	49,317	35.0%	40.0%	\$158.08	9,707	39,610				
<b>2012</b>										
D4T/3TC/NVP	3,559	2.5%	0.0%	\$75.60	0	3,559	2012/13	149,571	\$22.6	\$144.7
D4T/3TC/EFV	3,559	2.5%	0.0%	\$111.38	0	3,559	Old*	142,370		
AZT/3TC/NVP	12,042	7.5%	10.0%	\$151.20	1,364	10,678	New*	13,641		
AZT/3TC/EFV	12,042	7.5%	10.0%	\$162.04	1,364	10,678				
TDF/3TC/NVP	62,405	40.0%	40.0%	\$141.91	5,457	56,948				
TDF/3TC/EFV	62,405	40.0%	40.0%	\$148.78	5,457	56,948				

	Total on regimen	% of old patients on regimen	% of new patients on regimen	Cost per patient/year	No. of new patients on regimen	No. of old pts on regimen		Adults in need of first-line ART	Cost (US \$ mil)	Weighted avg. cost/year
<b>2013</b>										
D4T/3TC/NVP	1,935	1.3%	0.0%	\$75.60	0	1,935	2013/14	162,155	\$23.6	\$145.0
D4T/3TC/EFV	1,935	1.3%	0.0%	\$111.38	0	1,935	Old*	154,825		
AZT/3TC/NVP	6,607	3.8%	10.0%	\$151.20	801	5,806	New*	8,006		
AZT/3TC/EFV	6,607	3.8%	10.0%	\$162.04	801	5,806				
TDF/3TC/NVP	72,873	45.0%	40.0%	\$141.91	3,202	69,671				
TDF/3TC/EFV	72,873	45.0%	40.0%	\$148.78	3,202	69,671				
<b>2014</b>										
D4T/3TC/NVP	2,081	1.3%	0.0%	\$75.60	0	2,081	2014/15	174,344	\$25.4	\$145.0
D4T/3TC/EFV	2,081	1.3%	0.0%	\$111.38	0	2,081	Old*	166,463		
AZT/3TC/NVP	7,103	3.8%	10.0%	\$151.20	861	6,242	New*	8,608		
AZT/3TC/EFV	7,103	3.8%	10.0%	\$162.04	861	6,242				
TDF/3TC/NVP	78,351	45.0%	40.0%	\$141.91	3,443	74,908				
TDF/3TC/EFV	78,351	45.0%	40.0%	\$148.78	3,443	74,908		Five Year TOTAL	\$109	

\* Based on Table A.3, eligibility threshold of <350 cells/mm<sup>3</sup>

**TABLE A.2.6 DISTRIBUTION OF COMMON OPPORTUNISTIC INFECTIONS AND UNIT COST PER PATIENT PER YEAR\*, FY2010/11**

Details for FY2010/11	Individuals with condition	Unit cost per patient (all episodes/year)	Total cost**
Oral candidiasis	5%	\$6.4	\$160,975
Herpes zoster	10%	\$7.0	\$355,184
Cryptococcal meningitis	10%	\$138.9	\$7,005,437
Chronic diarrhoea	5%	\$0.7	\$16,763
Peripheral neuropathy	5%	\$9.3	\$233,905
Herpes simplex	40%	\$7.0	\$1,420,736
Vaginal candidiasis	5%	\$0.1	\$2,045
			<b>\$9,195,044</b>

\* Source: KNASP-III commodity quantification.

\*\* Based on total patients in need of ART=504,338. Weighted unit cost = \$9,195,044/504,388=\$18.

### 3. INNOVATIVE DOMESTIC FINANCING FOR THE HIV/AIDS SECTOR IN KENYA: POTENTIAL CONTRIBUTIONS OF AIRLINE LEVIES AND AN INCREASE IN HEALTH BUDGET ALLOCATIONS

*Authors:* D. Young, A. Dutta, T. Maina, R. Ombam

*Abstract:* *Issues:* Kenya is highly dependent on external sources to finance HIV/AIDS expenditures. Given the burden of disease generated by HIV/AIDS, domestic financing from the Kenyan government budget for the disease appears low. For sustainability and increased local stewardship of HIV/AIDS resources, domestically generated HIV/AIDS resources should increase, for which innovative sources are needed. This analysis estimates the potential contribution to HIV/AIDS funding from new levies as well as scenarios of increase in general government health spending.

*Description:* Two main proposals are considered. First, a levy on airline traffic, as used in Europe and Africa to finance HIV/AIDS (UNITAID 2008a). Given the price elasticity of air traffic demand, a small levy on air tickets/cargo will not affect volumes. Projected air traffic for 2010-2015 is based on trends in historical traffic from 2004 to 2008. Domestic and international passenger/cargo movements could not be segregated in the data. Sensitivity analysis was conducted on various rates of the levy. Second, the analysis estimates the impact of Kenya meeting the Abuja Declaration target of spending 15 percent of the government budget on health. Recently, this figure was 6.9 percent in Kenya. Potential increases in HIV/AIDS resources were estimated from the revised health financing envelope, and based on an estimated level of 4.7 percent of the health budget to be spent on HIV/AIDS (KNASP-3).

*Lessons Learned:* This analysis evaluates various rates for the airline levy and benchmarked to the median of the international range. A levy of \$2.50 per leg of domestic and international flights, and a flat \$0.05/ton levy on cargo would mobilize about US\$160 million over five years for HIV/AIDS or other priority conditions. If the government adopted a moderate scale-up path for the proportion allocated to health in its general budget over the years to meet the Abuja target of 15 percent by 2014/15, an additional US\$202 million (over and above the US\$170 million at status-quo levels) can be allocated for HIV/AIDS, keeping constant the proportion spent on HIV/AIDS vs. other health needs. Other innovative financing options can also be explored. The thought experiment of a modest 2 percent tax on airtime sales for the main mobile operator would net US\$153 million over the period 2010-14.

*Next Steps:* The Kenyan government is considering options to increase resources for the HIV/AIDS sector with a cabinet paper. Both the main proposals here can be considered and will help increase the sustainability of the HIV/AIDS program. Other financing innovations are also possible and should be investigated.

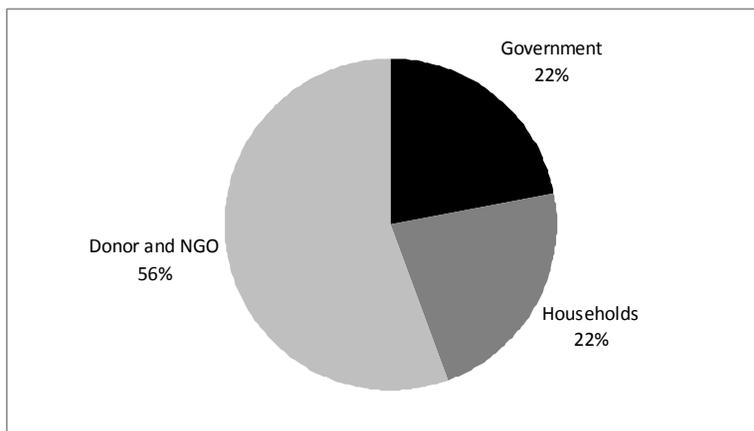
### 3.1 BACKGROUND

Kenya is highly dependent on external sources to finance HIV/AIDS programming. In 2005/06, the National AIDS Spending Assessment (NASA) estimated that 75 percent of HIV/AIDS expenditures were funded by donors (UNAIDS, 2007). These external sources of funding pose challenges to the sustainability of HIV/AIDS programs. They are unpredictable and are unlikely to be maintained at their currently high levels especially as Kenya transitions to be a lower-middle-income country (World Bank income groupings). Also, project-based donor resources tend to have short to medium funding cycles that are difficult to reconcile with longer-term financing needs, such as for HIV/AIDS.

In addition to a reliance on external funding, domestic financing comes mainly from out-of-pocket expenditures, which exceed government investments in HIV/AIDS by over threefold (Government of Kenya 2009).

These two factors limit local ownership and government stewardship of the health sector. The 2005/06 National Health Accounts estimated that the government of Kenya managed only 22 percent of all HIV/AIDS monies, while donors and NGOs manage over half of all funds. This may make it difficult for the government to play a coordination and stewardship role.

**FIGURE 3.1 MANAGEMENT OF HIV/AIDS EXPENDITURES IN KENYA, 2005/06**



Source: Government of Kenya (2009)

For the purposes of increasing the sustainability of HIV/AIDS programming in Kenya, increased domestic financing sources are needed. Two separate proposals were analyzed in this section: (1) a levy on airline traffic, as used in Europe and Africa to finance HIV/AIDS (UNITAID), and (2) a general increase in government health spending in accord with the Abuja Declaration.

Both proposals were evaluated to determine the potential for raising additional revenue over a five-year period. The airline levy was evaluated for the calendar years 2010 to 2014. The general increase on government health spending proposal was analyzed for fiscal 2010/11 to 2014/15.

## 3.2 PROPOSAL I: LEVY ON AIRLINE TRAFFIC

### 3.2.1 BACKGROUND

Since its inception in September 2006, the UNITAID air levy has raised approximately US\$1 billion to combat HIV/AIDS, malaria, and TB. The UNITAID airline levy is designed to provide a sustainable and predictable funding mechanism that allows for longer-term projects to succeed (UNITAID 2009). France was the first country to introduce a solidarity tax on airline tickets. Currently, seven countries (Chile, Cote d'Ivoire, France, Republic of Korea, Madagascar, Mauritius, and Niger) apply this levy. Additionally Jordan, Kenya, and Burkina Faso have pledged their intention of introducing it in the near future (UNITAID 2008b).

In general, the air levy is applied to all passenger flights originating from countries that impose it. The levy rate is normally adjusted for the destination and type of ticket class (UNITAID 2008a). Table 3.1 and Table 3.2 show examples of airline levy rates for Niger and France. In general, all levies represent a small fraction of the cost of travel and are not expected to negatively influence passenger traffic volumes.

**TABLE 3.1. EXAMPLE OF AIRLINE LEVY RATES FOR NIGER**

	Domestic/Regional	International
Economy class	US\$1.20	US\$4.70
Business and first class	US\$6.00	US\$24.00

**TABLE 3.2. EXAMPLE OF AIRLINE LEVY RATES FOR FRANCE**

	Domestic/Regional	International
Economy class	€1 (US\$1.37)	€4 (US\$5.47)
Business and first class	€10 (US\$10.67)	€40 (US\$54.67)

### 3.2.2 METHODOLOGY

The revenue raised by a proposed airline levy was estimated at various rates over a five-year period (2010-14). The estimate was generated using the following formulas:  $v$  = traffic volume;  $l$  = levy rate; and  $a$  = administrative percentage.

$$\text{Total revenue} = \sum_{y=2010}^{2014} (v_y \times l) \times (1 - a)$$

$y$  = year

$v$  = air traffic volume

$l$  = levy rate

$a$  = administrative percentage

*Air Traffic Volumes for Kenya:* Passenger and freight volumes were obtained from the Kenya airport authority for the years 2004-08. The data represented directional travel. If an airline operates services from A to B and from B to A, A-B and B-A are listed separately. Passenger and cargo traffic data are listed in Table 3.3.

**TABLE 3.3. HISTORICAL KENYAN AIR TRAFFIC (IN THOUSANDS)**

	2004	2005	2006	2007	2008
<b>Passenger Traffic</b>					
Arrival	2,625	2,948	3,141	3,490	3,141
Departures	2,631	1,993	2,142	2,472	2,132
Total passenger traffic	5,256	4,941	5,283	5,962	5,273
<b>Cargo Traffic (tons)</b>					
Landed	59,500	52,640	65,888	73,137	69,345
Loaded	181,852	219,736	212,568	233,124	250,995
Total cargo traffic	241,352	272,376	278,456	306,261	320,340

Passenger and cargo traffic volumes were projected for the years 2010-14. From 2004 to 2007, Kenya's passenger air traffic increased dramatically, by 29 percent over the four-year period. However, due to the worldwide economic downturn and civil violence, passenger air traffic decreased 2 percent from 2007 to 2008. Currently, Kenya's economy is recovering and Business Monitor International forecasts GDP growth in 2010 to be 4.4 percent compared with a 2009 forecast of 2.5 percent (International Business Monitor 2010). Thus, it may be reasonable to assume that air-traffic volumes will rapidly regain their previous levels. For this analysis, it was assumed that in 2009, half of the previous losses in traffic volume would be regained. Further it was assumed that from 2010 to 2014 passenger air traffic would increase by 3.1 percent, the International Civil Aviation Organization's projected growth rate for passenger air travel in Africa (International Civil Aviation Organization 2008). This may be a conservative estimate because Kenya's passenger traffic had increased by an average of 11 percent prior to 2008.

**TABLE 3.4. PROJECTED PASSENGER TRAFFIC, 2010-14**

	2010	2011	2012	2013	2014
Total passenger traffic	5,791,539	5,971,077	6,156,180	6,347,022	6,543,780

From, 2004 to 2008, Kenya's air cargo traffic increased by 33 percent. Business Monitor International projects that this rapid growth will continue with an annual growth rate of 7.5 percent (International Business Monitor 2010). This annual growth rate was used to project air cargo traffic for 2010-14.

**TABLE 3.5. PROJECTED CARGO TRAFFIC (IN TONS), 2010-14**

	2010	2011	2012	2013	2014
Total cargo traffic	370,193,143	397,957,629	427,804,451	459,889,785	494,381,519

Small airline levies between US\$1 and US\$5 per embankment represent a relatively small proportion of the total cost of air travel. Because there are few available substitutes for air travel, it is reasonable to assume that that air travel is fairly inelastic and small taxes are unlikely to decrease traffic volume. For the purpose of this exercise, airline levies are assumed to have no effect on the volume of both passenger and freight traffic.

**Levy rate:** Various rates for the airline levy were evaluated and benchmarked to the median of the international range. Levy rates per enplanement were set at 50-cent increments starting at US\$1.00 and ending with a maximum of US\$5.00. Levy rates were not adjusted for the ticketed destination or class so the levy rate should be treated as a weighted average of a set of proposed air levies. A set a levy

rates that take into account destination (domestic vs. international) and fare class (economy vs. business and first class) would help maximize the potential revenue of the levy while ensuring that traffic volumes are not negatively affected.

**Administrative costs:** The Kenya Revenue Authority will most likely administer the proposed airline levy. In 2007/08 the administrative rate for the Kenya Revenue Authority was approximately 2 percent. For this analysis, 2 percent overhead was deducted from the revenue generated in order to provide a more accurate estimate of the amount of new resources that would be available.

### 3.2.3 RESULTS: LEVY ON AIRLINE TRAFFIC

**Scenario 1** - Levy on outbound passenger traffic: Currently countries that have implemented airline levies have only taxed outbound flights. This levy is usually applied in a similar fashion to airport taxes. It is estimated that a US\$1.00 levy would raise US\$12.37 million; a US\$2.50 levy would raise US\$30.93 million; and a US\$5.00 levy would raise US\$61.86 million over a five-year period (2010-14).

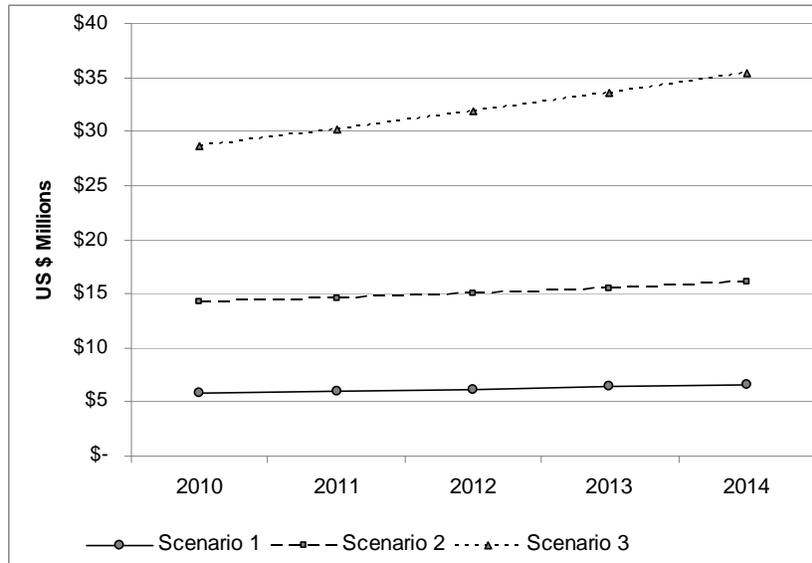
**Scenario 2** - Levy on both outbound and inbound passenger traffic: Alternatively, Kenya can propose to levy both outbound and inbound passenger traffic. This levy can raise revenue from the growing tourism industry as well as from international business travelers. It can be implemented as a landing levy that is added to general airport landing taxes. It is estimated that a US\$1.00 levy would raise \$30.19 million; a US\$2.50 levy would raise US\$75.48 million; and a US\$5.00 levy would raise US\$150.97 million over a five-year period (2010-14).

**Scenario 3** - Levy on all passenger and freight traffic (excluding flights in transit): Though it is not currently part of any air levy plan, taxing freight traffic in Kenya could be explored. A recent report on freight transport projected that air freight in Kenya will achieve an annual growth of 7.5 percent (International Business Monitor 2010). Levy rates per ton were tried at \$0.01 increments, starting a US\$0.02/ton and finishing at US\$0.10/ton.

Unlike passenger traffic, air freight volume did not experience a decrease in 2008. Thus, air freight volume for 2009–2043 was projected using an annual growth rate of 7.5 percent. It is estimated that a combined US\$2.50 levy per passenger enplanement and a US\$0.05 per ton of cargo levy would generate US\$159.77 million over the five years.

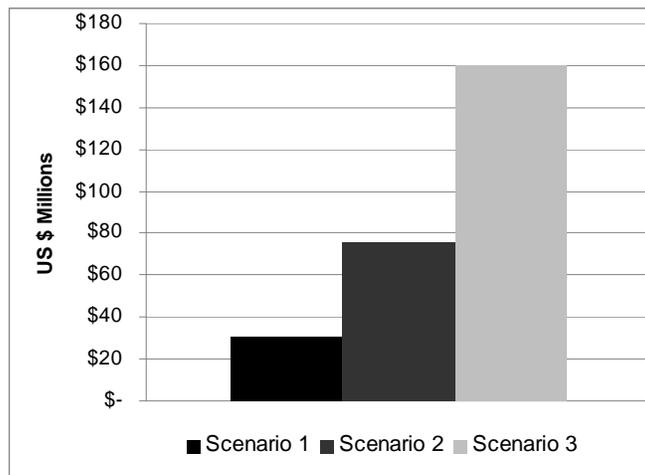
**A comparison of the three scenarios:** Figure 3.2 compares the possible revenue streams of the previous three scenarios assuming a median passenger levy of US\$2.50 per enplanement and a cargo levy of US\$0.05 per ton. While this combination of levies have not been proposed in any countries yet, Scenario 3, which includes taxing both passenger and freight traffic, has the most potential for revenue growth. Though passenger traffic is likely to grow at a steady pace due to a developing tourism industry, air freight is projected to grow at a faster rate. One of the key reasons for this may be the booming horticulture industry in Kenya, which accounts for 23 percent of total export earnings and relies exclusively on air transportation (Library of Congress Federal Research Division 2007). Figure 3.2 shows how the scenarios compare in terms of the increase in annual revenue.

**FIGURE 3.2 COMPARISON OF REVENUES GENERATED UNDER THREE AIRLINE TRAFFIC LEVY SCENARIOS**



Over the five years 2010-14, all three scenarios are expected to raise significant amounts of revenue. Figure 3.3 illustrates the total revenue for the three different scenarios over the period. Scenario 1 is expected to raise US \$30.93 million; Scenario 2, US\$75.48 million; and Scenario 3, US\$159.77 million.

**FIGURE 3.3 ESTIMATED TOTAL REVENUE ACROSS THE THREE SCENARIOS, 2010-2014**

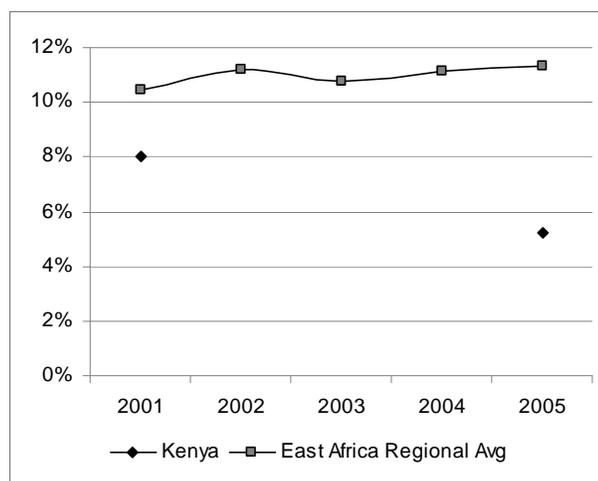


### 3.3 PROPOSAL 2: INCREASE IN GOVERNMENT HEALTH SPENDING AS PER ABUJA DECLARATION

#### 3.3.1 BACKGROUND

*Low levels of government financial commitment to health:* In April 2001, African leaders meeting in Abuja made a commitment to spend 15 percent of their annual budget on health. However, most African countries have not met this target. As per the National Health Accounts 2006/07 study, Kenya spent 5.2 percent of its government budget on health. In 2001/02, the National Health Accounts estimated that health spending was 8 percent of the budget. Figure 3.4 below compares Kenya's health allocations with the average for the East African Region. Kenya's spending is lower than its peer group. More recent estimates suggest that the situation has changed, with Kenya spending **6.9 percent** of the total government budget on health. However, this still represents a gap to be filled to reach the prior 2001/02 levels.

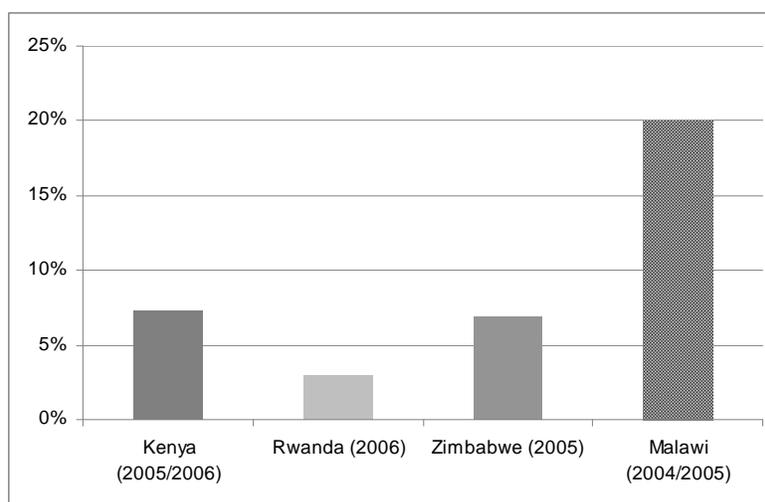
**FIGURE 3.4 HEALTH SPENDING AS A PERCENTAGE OF TOTAL GOVERNMENT EXPENDITURES**



Source: WHO, Kenya National Health Accounts 2001/02 and 2005/06

*Greater government allocation to health is desirable:* Additional government allocations to health would represent a more sustainable and fungible funding source when compared with donor funding. Figure 3.5 shows how Kenya compares on government financing for HIV/AIDS vs. other countries in the region.

**FIGURE 3.5 PERCENTAGE OF HIV/AIDS EXPENDITURES THAT ARE FINANCED BY THE GOVERNMENT**



Source: National Health Accounts for Kenya, Rwanda, Zimbabwe, and Malawi

This is fiscally possible, since as Kenya’s GDP grows, government resources should increase accordingly. According to the 2008/09 Budget Outlook Paper (BOPA), the government of Kenya estimates that the KSh 570.8 billion of available revenue would increase to KSh 783.2 by 2012/13.

*Proposed government intervention:* In response to the health needs, including from the HIV/AIDS sector, the government of Kenya should consider meeting the Abuja Declaration target of spending 15 percent of its budget on health. In order to determine the effect of increased health allocations on the resource envelope for HIV/AIDS, an analysis of the impact on HIV/AIDS funding of various scale-up pathways to the Abuja target was conducted.

### 3.3.2 METHODOLOGY

The government-funded resource envelope for health was calculated for 2010/11-2014/15 at various levels of allocation to the health sector. As the primary basis for government spending, the 2009/10 BOPA was used to project government revenues for 2009/10 to 2012/13. As per the BOPA, government revenues were estimated to increase at an average rate of 12.4 percent a year (Table 3.6). This was used to forecast the available government resources for 2013/14. The average 2009 exchange rate of US\$0.01339 per KSh was used to convert from Kenyan shillings to U.S. dollars.

**TABLE 3.6. ESTIMATED GOVERNMENT OF KENYA GENERAL REVENUES**

	2010/11	2011/12	2012/13	2013/14*	2014/15*
Estimated revenues (Ksh billions)	842.6	908.9	979.6	1,045.7	1,113.2

\* Author forecast

It was assumed that the proportional resource allocations to diseases and other headings from within the health budget would not change from their current levels. The KNASP-3 document indicates that US\$34 million would be allocated by the government for HIV/AIDS per year from 2009/10 to 2012/13. This is calculated as a proportion of the overall health budget for 2009/10 of approximately US\$718 million, which yields an allocation ratio of 4.74 percent of the health budget for HIV/AIDS. This ratio was

then fixed, and used to determine the amount of health resources that would be spent on HIV/AIDS programs as the health budget varied

### 3.3.3 HIV/AIDS RESOURCES UNDER DIFFERENT GOVERNMENT ALLOCATIONS TO HEALTH

**Scenario 1 – Immediately meeting the Abuja Target:** In 2009, the government of Kenya spent 6.9 percent of its total budget on health. Kenya will need to more than double its allocations to the health sector to reach the Abuja target of 15 percent. In a very ambitious scenario, Kenya will immediately reach the Abuja Declaration target spending and maintain it for the five years from 2009/10 to 2013/14. This will then increase the available HIV/AIDS envelope by US\$395 million, using the fixed allocation rate of 4.74 percent discussed above. Table 3.7 shows the amount of HIV/AIDS resources available at this 15 percent allocation to health level, compared with the current KNASP-3 based allocation to HIV/AIDS.

**TABLE 3.7. HIV/AIDS FUNDING AVAILABLE WITH CURRENT ALLOCATION AND AT ABUJA TARGET LEVEL FOR HEALTH SPENDING (US\$ MIL.)**

	2010/11	2011/12	2012/13	2013/14	2014/15	Total
Current*	\$34	\$34	\$34	\$34	\$34**	\$170
Abuja Target***	\$80	\$86	\$93	\$100	\$106	\$465

\* Based on the KNASP-3 proposed allocation for HIV/AIDS

\*\*Assumed that KNASP-3 allocation for HIV/AIDS would continue into this year at same level.

\*\*\* Based on maintaining the Abuja Target of 15% spending on health from the government budget per year.

**Scenario 2 – Moderate scale-up to meet the Abuja Target by 2014/15:** It is unlikely that the government will be able to meet the Abuja Target in the next year, but the government can incrementally scale up to meet the target over the next five years. If the government of Kenya gradually increased its allocation to health over the next five years to reach 15 percent in 2014/15, it would increase the HIV/AIDS envelope by US\$202 million over and above the KNASP-3 allocation. Table 3.8 shows the amount of HIV/AIDS resources available at various allocation levels over the five-year period.

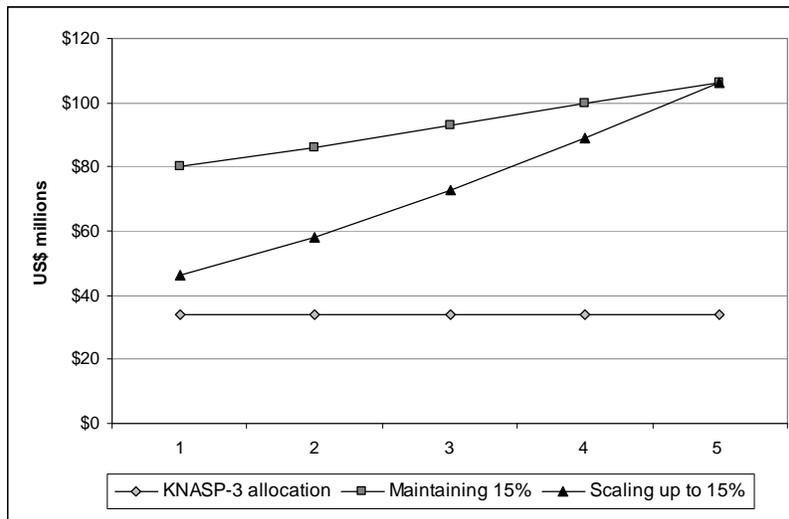
**TABLE 3.8. HIV/AIDS FUNDING AVAILABLE IN A MODERATE SCALE UP TO ABUJA TARGET LEVEL FOR HEALTH SPENDING (US\$ MIL.)**

2010/11 (8.5%)*	2011/12 (10.1%)*	2012/13 (11.8%)*	2013/14 (13.4%)*	2014/15 (15%)*	Five-year Total
\$46	\$58	\$73	\$89	\$106	\$372

\*Allocation to the health sector from the general budget

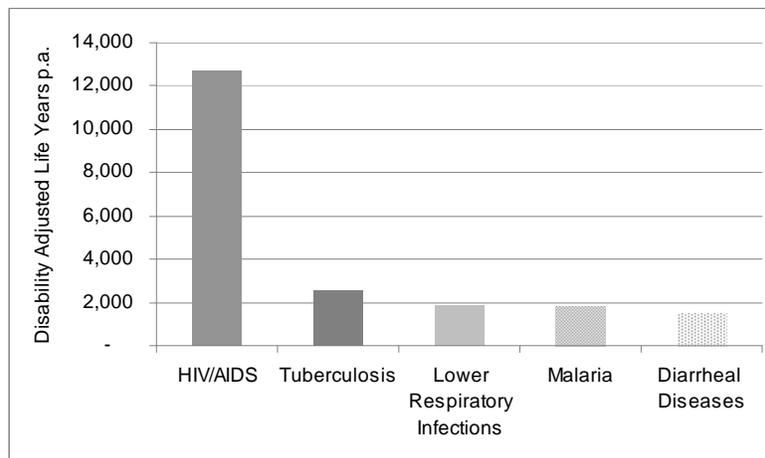
**Comparison of the two scenarios:** Both increases in government allocations to health would increase the government resources for HIV/AIDS substantially. Though it may be difficult to immediately meet the Abuja Target, it may be realistic to gradually increase the government allocation health. Figure 3.7 shows how funds available for HIV/AIDS would change over time for the two scenarios of government allocation to health.

**FIGURE 3.6 ESTIMATED AMOUNT OF GOVERNMENT RESOURCES AVAILABLE FOR HIV/AIDS PER YEAR**



*Increasing government allocations to HIV/AIDS:* In addition to the low government commitment to the health sector, HIV/AIDS represents a relatively small portion of government health budget, about 5 percent according to this analysis. In conjunction with increased government allocations to health, the government of Kenya may need to consider raising health allocations to HIV/AIDS. According to the WHO Statistical Information System (WHOSIS) database, HIV/AIDS accounted for the greatest disease burden in Kenya in 2004, as measured by disability-adjusted life years (DALYs): HIV/AIDS represented 30 percent of all-cause DALYs. This is more than the combined disease burden of tuberculosis, lower respiratory infections, malaria, and diarrheal diseases combined.

**FIGURE 3.7 TOP FIVE CONTRIBUTORS TO KENYA'S DISEASE BURDEN IN DALY**



Source: WHO WHOSIS Database

Separately, primary data collection at the facility level in Kenya (described in Section I) suggests that of all inpatient and outpatient services delivered in the sampled facilities in Nairobi and Nyanza, an average of 19 percent is due to HIV/AIDS-related conditions or clinical need. Though the HIV/AIDS prevalence

has declined in the past few years, it remains the leading causes of morbidity and mortality; and government funding to the disease could be increased from an equity point of view

### 3.4 DISCUSSION

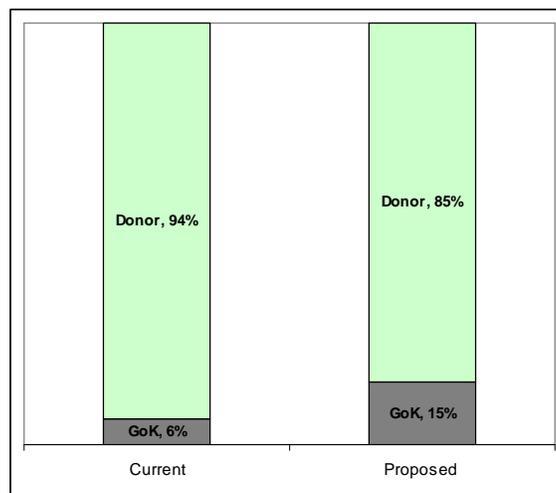
Both proposals, the airline levy and increased government allocations to health, will raise more domestic resources for HIV/AIDS programs. Increased domestic resources can lead to a more sustainable and long-term funding solution to the HIV/AIDS epidemic.

**Airline levy:** The airline levy can be implemented very quickly in Kenya. The required administrative capacity should already exist through the Kenya Revenue Authority and the Kenya Civil Aviation Authority. Further, due to the relatively low levy rates, there may be less political opposition compared with other schemes to raise additional domestic capital. The airline levy presents a good opportunity to rapidly raise the domestic resources available for HIV/AIDS. A more detailed implementation plan will need to be drafted.

**Increased government health allocations:** Increasing government allocations to health will require significant political will. In Kenya there is broad interest in raising government allocations as may be feasible given the fiscal situation, and this will also raise the amount of government resources available for HIV/AIDS programs. Currently the cabinet is considering a white paper on increasing domestic resources for HIV/AIDS.

Increases in government resources for HIV/AIDS programming would also improve the stewardship role of the government and increase the sustainability of HIV/AIDS financing. Excluding private sources of money, donors currently account for 94 percent of HIV/AIDS financing (Figure 3.8). If the government of Kenya implements a levy on airline traffic and increases health allocation to meet the Abuja targets in 2014, it would more than double the domestic public resources available for HIV/AIDS and reduce donor financing to 85 percent of the total. While this still represents a large portion of the overall financing, it is a marked improvement from the current scenario.

**FIGURE 3.8 CHANGE IN SOURCES OF HIV/AIDS FINANCING**



**Other sources of domestic funding:** Though only two proposals were explored in this paper, Kenya should consider other mechanisms to raise domestic resources. This can include excise taxes on alcohol, tobacco, petroleum products, vehicles, and cell phone airtime. These taxes can potentially fund a significant amount of HIV/AIDS programs.

For example, a quick back-of-the-envelope estimate, using publicly available *Safaricom* data, indicates that a modest 2 percent tax on the receipts from the sale of cell phone voice minutes could mobilize US\$153 million over a five-year period (2010-14). A projection of future revenue from voice was estimated using *Safaricom* voice revenues from 2006 to 2009. According to their 2009 annual report, *Safaricom* currently owns 79 percent of the market share. This figure was used to inflate *Safaricom* revenues to represent the broader mobile telephone market. An additional US\$76 million can be mobilized for every 1 percent increase in the tax, assuming that the taxes do not depress revenues from mobile voice services.

Alternatively, other proposals can also include employer contribution to insurance schemes, both private and public. One approach utilizing National Hospital Insurance Fund resources was explored in Section 2. More studies should be done to assess the impact of these financing schemes. The two proposals can start a new foundation for country-owned financing that will result in sustainable and country-led solutions to the HIV/AIDS epidemic.

### 3.5 REFERENCES

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## ANNEX. ADDITIONAL DETAILS FOR SECTION 3

### PANEL A.3.I VARIOUS SCENARIOS OF LEVIES ON AIRLINE TRAFFIC – PASSENGER AND FREIGHT (CARGO)

#### Scenario 1: Tax on outbound passenger traffic

Estimated Tax (USD)		2009	2010	2011	2012	2013	2014
\$	1.00	\$ 2,255,911.00	\$ 2,325,844.24	\$ 2,397,945.41	\$ 2,472,281.72	\$ 2,548,922.45	\$ 2,627,939.05
\$	1.50	\$ 3,383,866.50	\$ 3,488,766.36	\$ 3,596,918.12	\$ 3,708,422.58	\$ 3,823,383.68	\$ 3,941,908.57
\$	2.00	\$ 4,511,822.00	\$ 4,651,688.48	\$ 4,795,890.82	\$ 4,944,563.44	\$ 5,097,844.91	\$ 5,255,878.10
\$	2.50	\$ 5,639,777.50	\$ 5,814,610.60	\$ 5,994,863.53	\$ 6,180,704.30	\$ 6,372,306.13	\$ 6,569,847.62
\$	3.00	\$ 6,767,733.00	\$ 6,977,532.72	\$ 7,193,836.24	\$ 7,416,845.16	\$ 7,646,767.36	\$ 7,883,817.15
\$	3.50	\$ 7,895,688.50	\$ 8,140,454.84	\$ 8,392,808.94	\$ 8,652,986.02	\$ 8,921,228.59	\$ 9,197,786.67
\$	4.00	\$ 9,023,644.00	\$ 9,303,376.96	\$ 9,591,781.65	\$ 9,889,126.88	\$ 10,195,689.81	\$ 10,511,756.20
\$	4.50	\$ 10,151,599.50	\$ 10,466,299.08	\$ 10,790,754.36	\$ 11,125,267.74	\$ 11,470,151.04	\$ 11,825,725.72
\$	5.00	\$ 11,279,555.00	\$ 11,629,221.21	\$ 11,989,727.06	\$ 12,361,408.60	\$ 12,744,612.27	\$ 13,139,695.25

#### Scenario 2: Tax on both outbound and inbound passenger traffic

Estimated Tax (USD)		2009	2010	2011	2012	2013	2014
\$	1.00	\$ 5,505,052.00	\$ 5,675,708.61	\$ 5,851,655.58	\$ 6,033,056.90	\$ 6,220,081.67	\$ 6,412,904.20
\$	1.50	\$ 8,257,578.00	\$ 8,513,562.92	\$ 8,777,483.37	\$ 9,049,585.35	\$ 9,330,122.50	\$ 9,619,356.30
\$	2.00	\$ 11,010,104.00	\$ 11,351,417.22	\$ 11,703,311.16	\$ 12,066,113.80	\$ 12,440,163.33	\$ 12,825,808.40
\$	2.50	\$ 13,762,630.00	\$ 14,189,271.53	\$ 14,629,138.95	\$ 15,082,642.25	\$ 15,550,204.16	\$ 16,032,260.49
\$	3.00	\$ 16,515,156.00	\$ 17,027,125.84	\$ 17,554,966.74	\$ 18,099,170.71	\$ 18,660,245.00	\$ 19,238,712.59
\$	3.50	\$ 19,267,682.00	\$ 19,864,980.14	\$ 20,480,794.53	\$ 21,115,699.16	\$ 21,770,285.83	\$ 22,445,164.69
\$	4.00	\$ 22,020,208.00	\$ 22,702,834.45	\$ 23,406,622.32	\$ 24,132,227.61	\$ 24,880,326.66	\$ 25,651,616.79
\$	4.50	\$ 24,772,734.00	\$ 25,540,688.75	\$ 26,332,450.11	\$ 27,148,756.06	\$ 27,990,367.50	\$ 28,858,068.89
\$	5.00	\$ 27,525,260.00	\$ 28,378,543.06	\$ 29,258,277.89	\$ 30,165,284.51	\$ 31,100,408.33	\$ 32,064,520.99

#### Scenario 3. Tax on all passenger and freight traffic (excluding transfers)

Estimated Tax (USD)		2009	2010	2011	2012	2013	2014
\$1.00/0.02		\$ 8,879,836.01	\$ 9,303,601.42	\$ 9,751,640.35	\$ 10,225,540.53	\$ 10,727,001.56	\$ 11,257,843.09
\$1.50/\$0.03		\$ 15,007,146.01	\$ 15,769,348.53	\$ 16,577,452.90	\$ 17,434,552.60	\$ 18,343,962.29	\$ 19,309,234.08
\$2.00/\$0.04		\$ 21,134,456.02	\$ 22,235,095.65	\$ 23,403,265.46	\$ 24,643,564.68	\$ 25,960,923.02	\$ 27,360,625.06
\$2.50/\$0.05		\$ 27,261,766.03	\$ 28,700,842.76	\$ 30,229,078.02	\$ 31,852,576.76	\$ 33,577,883.76	\$ 35,412,016.05
\$3.00/\$0.06		\$ 33,389,076.04	\$ 35,166,589.87	\$ 37,054,890.58	\$ 39,061,588.83	\$ 41,194,844.49	\$ 43,463,407.04
\$3.50/\$0.07		\$ 39,516,386.04	\$ 41,632,336.99	\$ 43,880,703.13	\$ 46,270,600.91	\$ 48,811,805.22	\$ 51,514,798.03
\$4.00/\$0.08		\$ 45,643,696.05	\$ 48,098,084.10	\$ 50,706,515.69	\$ 53,479,612.99	\$ 56,428,765.95	\$ 59,566,189.02
\$4.50/\$0.09		\$ 51,771,006.06	\$ 54,563,831.21	\$ 57,532,328.25	\$ 60,688,625.06	\$ 64,045,726.68	\$ 67,617,580.01
\$5.00/\$0.10		\$ 57,898,316.06	\$ 61,029,578.33	\$ 64,358,140.81	\$ 67,897,637.14	\$ 71,662,687.41	\$ 75,668,971.00

**TABLE A.3.2 PROJECTED GOVERNMENT ALLOCATIONS TO HEALTH AS A PERCENTAGE OF TOTAL GOVERNMENT EXPENDITURES**

Percentage allocation	Projected government allocation to health (US\$)				
	2010/11	2011/12	2012/13	2013/14	2014/15
5%	\$104,000,130	\$112,824,140	\$121,701,710	\$131,168,440	\$140,019,230
6%	\$208,000,260	\$225,648,280	\$243,403,420	\$262,336,880	\$280,038,460
7%	\$312,000,390	\$338,472,420	\$365,105,130	\$393,505,320	\$420,057,690
8%	\$416,000,520	\$451,296,560	\$486,806,840	\$524,673,760	\$560,076,920
9%	\$520,000,650	\$564,120,700	\$608,508,550	\$655,842,200	\$700,096,150
10%	\$624,000,780	\$676,944,840	\$730,210,260	\$787,010,640	\$840,115,380
11%	\$728,000,910	\$789,768,980	\$851,911,970	\$918,179,080	\$980,134,610
12%	\$832,001,040	\$902,593,120	\$973,613,680	\$1,049,347,520	\$1,120,153,840
13%	\$936,001,170	\$1,015,417,260	\$1,095,315,390	\$1,180,515,960	\$1,260,173,070
14%	\$1,040,001,300	\$1,128,241,400	\$1,217,017,100	\$1,311,684,400	\$1,400,192,300
15%	\$1,144,001,430	\$1,241,065,540	\$1,338,718,810	\$1,442,852,840	\$1,540,211,530

## 4. HUMAN AND FINANCIAL RESOURCE REQUIREMENTS FOR DECENTRALIZATION OF HIV TREATMENT AND CARE IN KENYA

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Abstract: *Issues:* During emergency response, HIV services expanded in Kenya through secondary facilities. Concentration in hospitals resulted in longer wait and travel times, and negatively impacted antiretroviral treatment (ART) adherence. In moving to sustainable chronic care, Kenya aims for equity and access to quality HIV services through decentralization.

*Description:* Kenya's decentralization plan calls for decongesting hospital-based HIV service delivery by extending ART prescription and monitoring to 'satellite' primary facilities. A higher-level 'central' facility would support approximately five satellites. Central sites initiate ART through doctor visits and lab work, and can perform six-monthly CD4 counts. Satellite sites would absorb some of the care load. At the end of 2008, nearly 80 percent of ART and HIV care services were provided in hospitals nationwide. From this point, this feasibility study estimates the costs of three scenarios of decentralization.

Under a 'moderate' decentralization scenario, hospitals provide approximately 51 percent of HIV care and 53 percent of ART services nationwide. Each province started from its December 2008 level of decongestion. The moderate scenario best fit the 44 percent annual increase in ART (as per predicted monthly enrollment in the KNASP-3 quantification) and a predicted 17 percent increase in care over 2009. This calibration ensures that the decentralization model will be policy-relevant.

The number of new satellite sites required would be approximately 478, supported by about 14 new central sites, at a 5:1 ratio of satellites to central sites. Such decentralization would create capacity to shift management of approximately 135,733 care and 99,157 ART recipients to satellite facilities. The estimated cost is Ksh 703,000,000 (US\$9.5 million) for new equipment and training of staff to establish new central and satellite sites. Few additional doctors (~2 full-time-equivalents, or FTEs) would be needed. However, moderate expansion of satellite services requires approximately 295 new nursing and 144 new pharmacy FTE staff.

*Lessons Learned:* Kenya has at least 2,750 government primary health facilities, of which only a third need be satellites under moderate decentralization. The average unit cost of decentralization will be approximately Ksh 1,462,000 (US\$19,800) per satellite site and Ksh 210,000 (US\$2,800) per central site.

*Next Steps:* Extension of a hub-and-spoke decentralization model seems feasible in Kenya. Government and partners need to prepare for the costs involved.

## 4.1 BACKGROUND: WHY DECENTRALIZE?

The provision of HIV/AIDS services, ART in particular, has expanded rapidly in recent years, increasing access to these services for thousands of Kenyans. From 15 public service delivery points (SDPs) in 2003, ART services were provided at 700 sites by December 2008, and the numbers continue to grow. This expansion, however, has been highly concentrated in tertiary health care facilities such as provincial, district, and sub-district hospitals, resulting in longer waiting lines and overworked staff at these facilities while limiting access to critical HIV services for Kenyans in rural areas (Government of Kenya 2008).

In the context of the health system as a whole, this imbalance creates problems of both equity and quality. Many Kenyans in need of HIV services live sufficiently far away from hospitals that regular visits would impose a significant time and cost burden. As a result, HIV-positive individuals in these areas may not seek testing or care. Those who begin ART may find it difficult to maintain treatment if they cannot return for subsequent visits every month. To the extent that distance limits health care providers' ability to ensure patient adherence to ART regimens, concentrated ART service provision may contribute to increase default rates and subsequent increases in drug resistance. This not only exacerbates the equity issue by worsening outcomes for patients who live in rural areas, but also threatens to compromise the efficacy of ART for all HIV-positive patients.

In order to address these challenges, the Kenyan government has begun to implement a policy to decentralize HIV services to health centers and dispensaries. Through a hub-and-spoke system of higher-level 'central' sites supporting a number of 'satellite' sites, the policy aims to achieve universal access to HIV services while minimizing additional financial and human resource costs. Effective decentralization will also increase continuity of care by providing people in need with services closer to home that they can access regularly. This is increasingly important as improved therapies accelerate the transition of HIV/AIDS from a terminal illness to a chronic condition requiring long-term care (Government of Kenya 2008).

Kenya's own experience with decentralization as well as the initiatives of other countries in the region offer an opportunity to glean lessons and insights to guide the current effort to decentralize HIV service delivery. Although it is beyond the scope of this analysis to fully investigate these decentralization efforts, some key themes and lessons are outlined in Table 4.1 (additional details are provided in the Annex to this section). Of note, Kenya's decentralization model is administratively similar to that of Uganda, which suggests that studying the latter country's experiences may help Kenya take early action to avoid running into the same roadblocks, such as a shortage of adequately trained staff at lower-level health facilities (Medecins Sans Frontieres 2008). In contrast, Kenya's model is quite different from Tanzania's, which relies substantially on international partners to manage HIV care and treatment (Family Health International 2007). The transfer of sufficient legal authority to districts appears to be a key success factor in Kenya's TB decentralization (World Health Organization 2009) while the lack thereof undermined Kenya's efforts to decentralize HIV services between 2000 and 2007 (World Bank 2008).

**TABLE 4.1: KEY THEMES OF REGIONAL DECENTRALIZATION EFFORTS**

<b>Decentralization Effort</b>	<b>Dates</b>	<b>Key Themes/Lessons</b>	<b>Source</b>
Kenya, <i>HIV/AIDS</i>	2000-2007	Failure due to limited political support, insufficient development of management capacity, authority, and financial autonomy at the district level	World Bank, 2008
Tanzania, <i>HIV/AIDS</i>	2005-	'Regionalization' plan that assigns development partners regions of the country in which to support HIV services in order to increase overall system efficiency	Family Health International 2007
Uganda, <i>HIV/AIDS</i>	1986-	Long-term development of four-tiered service delivery system: comprehensive HIV care by district hospitals, follow-up ART by dispensaries, basic care by clinics, and outreach by community organizations	Medecins Sans Frontieres 2008; Pan African Conference of Ministers 2006
Mozambique, <i>HIV/AIDS</i>	2003-	Health centers as main SDP; integration of HIV care and treatment within existing primary care services at health facilities	International Center for AIDS Care and Treatment Programs 2007
Kenya, <i>Tuberculosis</i>	1980-2010	30-year, three-phase process with high level of political support, shift of legal authority to district level, training of health personnel, and private sector partnerships; seen as a model for successful decentralization	World Health Organization 2009

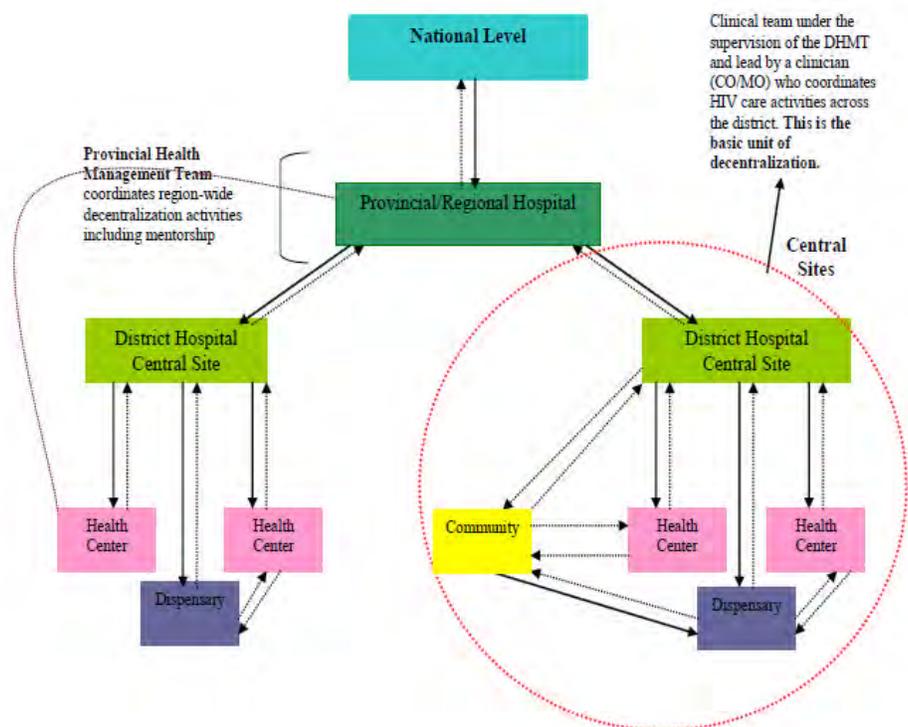
## 4.2 IMPLEMENTING KENYA'S HIV SERVICE DECENTRALIZATION

According to the HIV Decentralization Guidelines, “decentralization involves sharing the responsibility of providing HIV prevention, care, and treatment services and the resources available within a geographical region among all available levels of health care facilities as well as with the community” (Government of Kenya 2008, 9). Realization of this goal requires both political and operational changes.

On the political side, the policy will require a substantial shift of authority from the central government to districts in order to ‘build a sense of program ownership’ at the district level. As evidenced by the experience of the World Bank’s DARE project from 2000 to 2007, expanding district responsibilities without clarifying changes in legal authority and without adequate training for district-level personnel is unlikely to succeed. Effective decentralization will also require a high level of coordination within and between each level of the health system (World Bank 2008).

At the national level, National AIDS/STD Control Programme (NASCO) will be the primary entity responsible for leading all aspects of this decentralization effort. Technically, NASCO is responsible for tracking disease patterns to determine where services are most needed, setting national targets for service coverage and scale-up, and developing, implementing, monitoring, and evaluating the national strategic plan for HIV care and treatment. NASCO is also tasked with developing the financial policy for HIV service delivery and mobilizing resources for implementation. On the political side, NASCO plays the coordinating role for the various stakeholders involved and will guide the transition of authority from the central government to the provincial, district, and facility levels.

**FIGURE 4.1: DIAGRAM OF KENYA'S CENTRAL-SATELLITE DECENTRALIZATION MODEL**



Source: HIV Decentralization Guidelines, p.14 (Government of Kenya 2008)

Operationally, the Kenya decentralization model calls for a network of ‘central’ and ‘satellite’ health facilities, based on the National Health Sector Strategic Plan II (2005-2010). In this concept, ART clinical services will be extended to health center and dispensary ‘satellites’ with the support of a ‘central’ facility that currently provides ART services (see Figure 4.1 above). A central site is defined as a facility that provides comprehensive HIV care and treatment services to a large population and typically includes provincial, district, and high-volume subdistrict hospitals, as well as some faith-based or private hospitals. These central sites would maintain responsibility for handling complicated patient cases, either by treating a referred patient on-site or by sending a clinician to a satellite site to provide a consultation. In order to reduce the management burden on NASCOP and the Kenya Medical Supplies Agency (KEMSA), central sites under this system also take on responsibility for ordering antiretroviral medicines (ARVs) and commodities from KEMSA for their central-satellite network (Government of Kenya 2008).

Satellite sites will typically consist of small health centers, dispensaries, small subdistrict hospitals and, in some cases, small private or faith-based facilities. These sites may or may not already provide some basic HIV services. Facilities designated to become satellite sites will be upgraded to provide, at a minimum, the ‘basic care package’ for HIV but may also provide additional ART services, treatment for opportunistic infections (OI), and more extensive patient follow-up, based on existing capacity and availability of support from central sites. Most dispensary satellite sites will provide only the ‘basic care package,’ while many of the health center satellites will provide some of these additional services.

Provincial Health Management Teams (PHMTs) and District Health Management Teams (DHMTs) will support NASCOP at the provincial and district levels, respectively. PHMTs will identify potential central and satellite sites and manage facility accreditation to ensure that each site is adequately equipped and

staffed. The PHMTs will also supervise health worker mentorship and training in collaboration with each of the DHMTs within the province and will maintain the Health Management Information System (HMIS) and coordinate monitoring and evaluation (M&E) activities at the provincial level. The DHMTs serve a similar function to PHMTs but have more direct interaction with the facilities and communities within their district. The DHMTs are also charged with identifying and satisfying human resource needs at each facility.

Central site facilities will help coordinate the logistics of decentralization in the district. This includes providing staff to train, mentor, and supervise health workers at the satellite sites they support as well as managing the supply chain for commodities for their central-satellite network. Central sites will work with each of their linked satellite sites to develop strategies for integrating or mainstreaming HIV service delivery as much as possible with existing health care services at the facility. As the fundamental unit of decentralization, satellite sites will become the primary delivery point for expanded HIV service provision throughout the country. In addition to providing high quality health care services, the satellite sites will report to central sites on various service delivery statistics collected by the HMIS, their usage of supplies and equipment, and their need for ART medicines and commodities.

Within this network, the communities themselves play a vital role in expanding the provision of HIV services nationwide. In particular, community members can help fill the gap in human resources at public health facilities, which are estimated to have roughly half of the number of health workers required to meet local patient needs. Although this analysis does not estimate costs associated with community involvement in the delivery of HIV services (since this consist primarily of volunteer labor), communities are a critical element of Kenya's HIV decentralization model. Actively engaging communities in HIV service delivery is expected to enhance service quality and outcomes, outreach and adherence rates, and the overall responsiveness of health policy to population needs and concerns.

### 4.3 DECENTRALIZATION COSTING METHODOLOGY

This analysis explores three decentralization scenarios for the delivery of HIV/AIDS services through lower levels of the health system; and the financial and human resource implications associated with each. In addition, the KNASP-3 use of a 350 cells/mm<sup>3</sup> eligibility criterion for initiation of ART will be used in this scenario. Specifically for the decentralization aspect, in response to Kenya's HIV/AIDS epidemic, the National AIDS Control Council (NACC) and NASCOP initially focused resources in facilities with capacity to provide comprehensive care and treatment. As a result, much of Kenya's current capacity for HIV/AIDS service provision is in secondary and tertiary health facilities. Estimates from this analysis show that 50 facilities (8 percent of all HIV/AIDS associated facilities) provided 45 percent of the care and support services, and 56 percent of ART at the end of 2008 (National AIDS/STD Control Programme 2009). The concentration of service provision has left many patients by-passing lower-level facilities to seek care in more distant facilities resulting in more travel time, and hence imposing a burden on earning members of households.

The process of decentralization commenced in 2006 with the creation of satellite sites outside of the urban centers in order to reduce the distance clients would have to travel to reach HIV care and ART services. Each of these satellite sites is supported by a central ART site, which order and distribute ARVs to the satellites as well as conduct the resource-intensive laboratory diagnostics such as CD4 counts (Government of Kenya 2008). Both the Ministry of Medical Services and NASCOP are in favor of continuing decentralization and deconcentration of service provision, both of which imply costs.

This decentralization analysis considers three scenarios: limited, moderate, and extensive decentralization. The moderate scenario reflects NASCOP's policy targets and the extensive and limited scenarios outline decentralization plans that are more and less ambitious, respectively, using the moderate scenario as an anchor point. The specific target numbers of facilities to be upgraded for each scenario were developed based on concentration levels of service provision from NASCOP's December 2008<sup>7</sup> report of patient volumes in facilities providing ART and/or HIV care in each province (National AIDS/STD Control Programme 2009). Estimates of the service concentration in hospitals relative to health centers and dispensaries became the baseline or 'original' scenario for each province. In consultation with NASCOP officials, decentralization targets were developed for ART and care services in each province for each scenario. These targets were specified in terms of the percentage distribution of total ART and care patient volume by facility type (see Annex Table A.4.8).

For each scenario, the resource implications of decentralization will depend primarily on the following factors:

- a) The target number of lower-level facilities (e.g., health centers and dispensaries) to be upgraded in order to provide HIV services and the associated number of higher-level facilities that need to be upgraded in order to serve as central sites.
- b) Average start-up financial unit cost (equipment, training, etc.) for upgrading lower-level facilities into satellite sites and for upgrading higher-level facilities into central sites.
- c) Average additional human resource need by worker cadre for lower-level facilities to be upgraded to satellite sites and for higher-level facilities to be upgraded to central sites.
- d) Average ongoing unit financial costs for maintaining decentralized HIV service provision at satellite and central facilities (maintenance, M&E, transportation costs for sending samples to central facilities for analysis, etc.).

This analysis includes items a) through c) above to estimate the one-time costs to upgrade facilities to become central and satellite sites at specified levels of decentralization. It is beyond the scope of this analysis to estimate the ongoing costs to maintain a decentralized HIV service delivery system in Kenya, although such projections will be critical to NASCOP's efforts to ensure sustainability of the decentralization model.

A significant portion, but not all, of the information necessary to determine these resource implications is located in documents available through NACC, NASCOP, and other government structures, as well as secondary reports. Where information is not currently available, the team consulted with relevant government of Kenya health officials and experts, particularly within NASCOP.

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<sup>7</sup> Although data were available through July 2009, the month of December 2008 was chosen because it was the last month before the introduction of the HMIS, which is still being rolled out and currently contains incomplete facility and service information.

A list of the sources of information for the financial and human resource cost calculations is provided below:

Information	Data Source
1. Equipment costs	NASCOP* (See equipment costs lists in Annex)
2. FTEs (doctors, nurses, pharmacists)	Primary data collection from health facilities
3. Training costs	Consultation with NASCOP, Kenya technical team, health facility staff

\* Provided data included a list of required equipment and supplies and the associated quantities and prices for each for 'high-volume' and 'low-volume' ART sites. For details, see 'Equipment Costs' lists in the Annex.

### 4.3.1 DISTRIBUTION OF CARE AND TREATMENT ACCORDING TO FACILITY LEVEL

- The scale-up scenarios (limited, moderate, and extensive) are different for each province. Each province has a different starting point in terms of patients in care and on ART. Therefore, the decentralization scenarios and the percentage splits between central and satellite sites will also vary by province
- It is assumed that only hospitals (central sites) have the capability to provide ART initiation and baseline treatment. Newly created satellite sites will take on ART patients but still require an associated central site for initiation, baseline treatment, and to treat referral patients.
- Each central site can provide support to approximately five satellite sites. This number was based on two case studies in the HIV Decentralization Guidelines (5:1 ratio of satellites to central sites in the case study of “Decentralization of ART in Kitui”; 7:1 satellite-central site ratio in the case study of “Suba District, Nyanza Province”) and the average number of satellites served by central sites (5.7) in NASCOP’s July 2009 report of ART sites (Government of Kenya 2008; National AIDS/STD Control Programme 2009). This number will vary regionally and the number of satellites a given central site can support may increase over time, but it is assumed that each central site should have the capacity to support at least five satellites. If sufficient management capacity exists at central sites to support more than five satellites, decentralization unit costs for central sites will decrease.
- Scale-up targets for each province are based on the number of satellite sites that would be required to shift that percentage of ART and HIV care patients from hospitals to health centers and dispensaries, assuming the number of central sites remains constant. The number of central sites needed was then determined by dividing the number of needed additional satellite sites by five (to maintain the 5:1 ratio of satellite to central sites).
- The number of patients per facility does not change with decentralization.

#### OTHER ASSUMPTIONS:

- Because the HIV Decentralization Guidelines suggest that the expansion of the hub-and-spoke HIV service delivery network should target would-be central and satellite sites that have a pre-existing administrative/management/logistical support system in place, additional logistical costs of maintaining decentralized service delivery (e.g., transportation costs for training, supervision, transfer of lab samples) were excluded from this analysis. This assumption should be re-assessed once specific facilities are selected for upgrade to expand the central-satellite network.
- The estimates presented here are the one-time costs upgrading facilities to become central and satellite sites as part of decentralization.

### 4.3.2 HUMAN RESOURCE REQUIREMENT CALCULATIONS

For satellite sites, the human resource requirements for nurses and pharmacists were calculated by multiplying the average number of anticipated ART patients per facility in each province by the estimated human resource need (in FTEs, by worker cadre for care and ART services) per patient-year. The estimates of the marginal human resource needs per patient year were calculated using primary data collected from a questionnaire administered to HIV unit supervisors at health facilities in the Nairobi and Nyanza provinces.

It was assumed that facilities designated to become central sites would: a) already be providing ART services; b) not increase their volume of continuing/maintaining HIV/AIDS patients, and c) require increased staff time for patients initiating care and treatment, who would then visit a satellite site for follow-up. Based on these assumptions, FTEs were calculated for the time doctors and nurses spend providing care for initiation/baseline visits but not for continuing maintenance visits. Also, pharmacist FTEs were not included because their overall workload was not expected to increase significantly.

For example, to estimate the need for nurses for ART provision at a central site in Nairobi province:

$$\begin{array}{r} \text{Avg. \# initiating ART patients/hospital providing ART in Nairobi province} \\ \times \\ \text{Avg. FTE of nurses providing care for ART initiation visits per patient-year} \\ = \\ \text{Avg. needed nurse FTEs for ART initiation at central sites in Nairobi province} \end{array}$$

The percentage of initiating ART patients relative to total ART patient volume was estimated for each year based on NASCOP estimated ratios of new vs. continuing patients for 2010-13 (see Annex Table A.4.2 for annual estimates).

The total estimated health worker FTE needs were calculated by multiplying the needed FTEs per central/satellite site (for each applicable worker cadre) by the projected number of needed central/satellite sites in each scenario.

To continue with the example of nurse FTEs needed for ART at central sites in Nairobi province:

$$\begin{array}{r} \text{Avg. needed nurse FTEs for ART at central sites in Nairobi province} \\ \times \\ \text{Projected number of central sites needed in limited/moderate/extensive scenario} \\ = \end{array}$$

*Total nurse FTEs needed for ART at central sites in Nairobi province for the limited/moderate/extensive scenario*

The total needed FTEs per cadre for ART in each province were added together to generate the scenario total for the entire country. The same method was used for calculating FTE requirements for HIV care.

The worker cadres included in the analysis vary by service type and facility type. For ART services in satellite sites, FTE needs were only calculated for nurses and pharmacists, as it was assumed that these sites would not typically have doctors. For care services in satellite sites, only nurses were included as non-ART patients would not require substantial additional pharmacy services. For ART provided at central sites, doctors and nurses were included, as it was assumed that existing pharmacy staff would be sufficient. The incremental FTE need for nurses, pharmacists, and doctors per additional satellite and

central site was calculated by subtracting the existing available FTEs from the total needed FTEs per cadre at each facility type, based on the projections from each scenario.

### 4.3.3 EQUIPMENT COST CALCULATIONS

The estimated equipment costs for upgrading health centers and dispensaries to become satellite sites were calculated by multiplying the number of new satellite sites by the cost of a “low-volume ART site,” as defined by NASCOP.

It is assumed that new satellite sites did not previously provide ART and so would need to acquire all the necessary equipment to start ART.

The estimated equipment costs of upgrading facilities to become central sites were calculated by multiplying the number of new central sites in a given scenario by the cost of a “high-volume” ART site. It is assumed that new central sites will be recruited from the list of secondary facilities that currently do not have extensive ART, and hence will need all the necessary equipment for a high-volume ART site. In cases where designated central sites already provide ART services, the cost of additional needed equipment will go down.

It is assumed that satellite sites that already provide ART do not need any new equipment. Therefore, only new satellite sites have associated equipment costs (‘Low-volume ART’ equipment costs). The same is true for central sites – only new central sites have associated equipment costs (‘High-volume ART’ equipment costs). Please see Annex for detailed equipment costs.

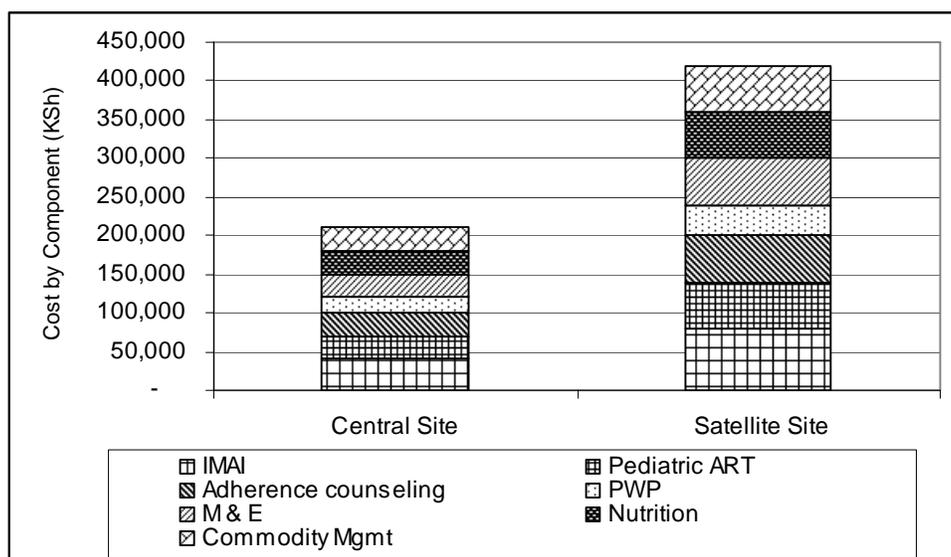
### 4.3.4 TRAINING COST CALCULATIONS

Total training cost estimates for new satellite sites were calculated based on the assumptions that: a) in order to upgrade a health facility, satellite site staff will need one initial and one follow-up training session for each new service for which they would be responsible;<sup>8</sup> b) the average cost of a training session will not vary significantly based on the number of staff being trained (since most new satellites will not require training for more than a small group of health staff); c) the average training session at a new satellite site will include the following components: Integrated Management of Adult Illnesses (IMAI), Pediatric ART, Adherence Counseling, Prevention with Positives (PwP), M&E, Nutrition and Commodity management; d) nurses will attend all components of the training while pharmacists will attend only the M&E and commodity management components. Figure 4.2 shows training costs.

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<sup>8</sup> Note that this does not include periodic refresher courses, which would be considered as part of the costs of maintaining decentralized service provision and thus beyond the scope of this analysis.

**FIGURE 4.2: TRAINING COSTS**



Satellite site training costs were calculated by multiplying the cost of two training sessions by the number of new satellite sites. Total training cost estimates for new central sites were calculated by multiplying the cost of one training session by the number of new central sites. It is assumed that new satellite sites will require two training sessions, while new central sites will require only one because the typical central site facility will already provide these services.

## 4.4 RESULTS

Three decentralization scenarios were considered: limited, moderate, and extensive decentralization. The total number of patients at the time of data collection (roughly 583,000 under care and 216,000 on ART) were allocated in the following way: for care, approximately 24 percent were treated in health centers and dispensaries and 76 percent were treated in hospitals; for ART, approximately 21 percent were treated at health centers and dispensaries and 79 percent were treated at hospitals (Table 4.2).

**TABLE 4.2 TOTAL NUMBER OF PATIENTS SERVED UNDER DECENTRALIZATION SCENARIOS**

# patients	Original	Limited	Moderate	Extensive
Care	551,521	639,404	689,373	887,755
ART	203,798	256,434	313,433	424,301

Source: Author calculations

*Limited scenario:* In the limited scenario, 26 percent of ART patients would be shifted to health centers and dispensaries. That means that out of a total of 256,434 patients, 120,524 (47 percent) could receive ART at health centers and dispensaries, with 135,910 patients (53 percent) continuing to receive ART at hospitals. In this scenario, 18 percent (99,274) of a total of 639,404 care patients could shift to health centers and dispensaries from hospitals. This would require 148 new satellite sites and no new central sites, at a cost of Ksh 184.11 million, or US\$2.49 million.

*Moderate scenario:* In the moderate scenario, there would be sufficient capacity for 41 percent of ART patients to be shifted from hospitals to health centers and dispensaries. That means that out of 313,433 patients, 194,329 (62 percent) could receive ART at health centers and dispensaries, with 119,104 (38 percent) continuing to receive ART at hospitals. This scenario would also allow for 27 percent of care patients to shift to health centers and dispensaries from hospitals. That means that out of 689,373 patients, 351,580 (51 percent) could receive care at health centers and dispensaries, with 337,793 patients continuing to receive care at hospitals. In this scenario 478 new satellite sites and 14 new central sites would have to be opened, at an estimated cost of Ksh 702.52 million, or US\$9.49 million.

*Extensive scenario:* Finally, in the extensive scenario, 58 percent of ART patients could be shifted from hospitals to health centers and dispensaries. That means that out of 424,301 patients, 335,198 (79 percent) could receive ART at health centers and dispensaries, while 89,103 (21 percent) would continue receiving ART at hospitals. An estimated 54 percent of care patients could shift to health centers and dispensaries from hospitals. That means that out of 887,755 patients, 692,449 (78 percent) could receive care at health centers and dispensaries, while 195,306 would continue receiving care at hospitals. In this scenario 993 new satellite sites and 79 new central sites would have to be opened, at a cost of Ksh 1.143 billion, or US\$15.5 million.

**FIGURE 4.3 HIV SERVICE DECENTRALIZATION SCENARIOS: SUMMARY INDICATORS**

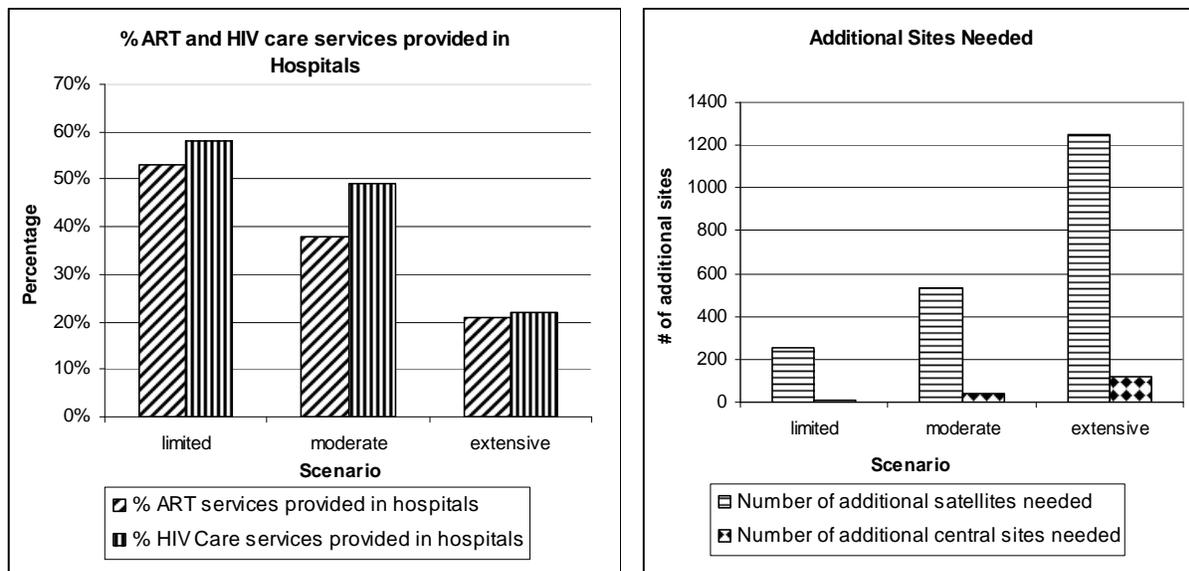
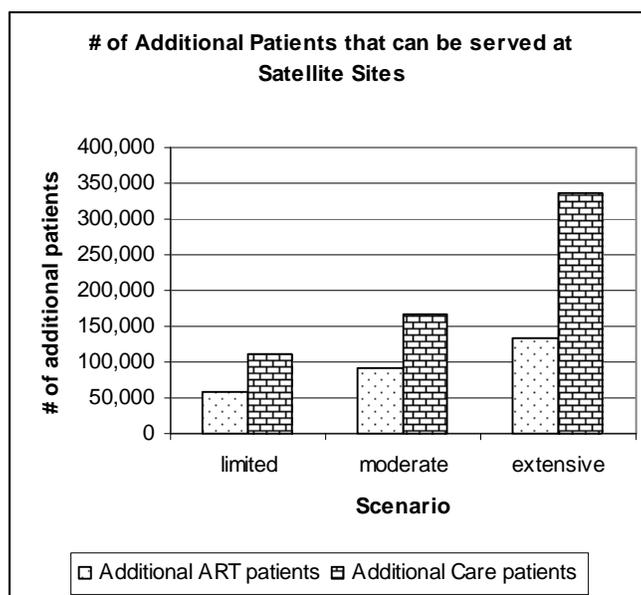


Figure 4.4 refers to the additional volume of patients that will be served at the satellite site level (health center or dispensary) nationally between the original, non-decentralized case and any of the decentralization scenarios. For example, originally in Kenya, the satellite level served 30 percent of the province's ART load. Under the limited scenario, this would increase to 47 percent. The 17 percentage point increase represents an incremental volume of 39,614 patients served at the satellite level.

**FIGURE 4.4 HIV SERVICE DECENTRALIZATION SCENARIO SUMMARY INDICATORS**



Please see details in Annex 3

**Human Resource Requirements:** Based on the methodology in Section 4.3.2, the total FTE requirements were calculated across both levels and all scenarios. These results are presented in Table 4.3.

**TABLE 4.3 HIV SERVICE DECENTRALIZATION SCENARIO HUMAN RESOURCE REQUIREMENTS**

Cadre, service, and level	Limited	Moderate	Extensive
Additional nurse FTEs - Central sites, ART	0	4	16
Additional nurse FTEs - Central sites, care	0	20	65
Additional nurse FTEs - Satellite sites, ART	34	149	208
Additional nurse FTEs required - Satellite sites, care	81	146	601
Total additional nurses required (FTEs)	115	320	890
Total additional pharmacy FTEs - Satellite sites, ART	33	144	200
Total additional doctor FTEs - Central sites, ART	0	2	10

**Total financial costs:** By combining the costs of equipment for new satellite sites and the costs of training for both new satellite sites and central sites. The training costs are based on sessions required at each new central and satellite site for the subject areas defined in the Annex to this section. A zero cost shows that no equipment or training will be required at that level at the scenario.

**TABLE 4.4 HIV SERVICE DECENTRALIZATION SCENARIO COST ESTIMATES (US\$ MIL. EXCEPT UNIT COSTS)**

Cost item	Limited	Moderate	Extensive
Equipment cost - Central sites	\$0	\$0	\$0
Training cost - Central sites	\$0	\$0.04	\$0.22
Total cost - Central sites	\$0	\$0.04	\$0.22
Equipment cost - Satellite sites	\$1.65	\$6.74	\$9.59
Training cost - Satellite sites	\$0.84	\$2.71	\$5.63
Total cost - Satellite sites	\$2.49	\$9.45	\$15.22
<b>Total cost (US \$ millions)</b>	<b>\$2.49</b>	<b>\$9.49</b>	<b>\$15.44</b>
(US\$)			
Upgrade unit cost - Central sites	\$0	\$2,838	\$2,838
Upgrade unit cost - Satellite sites	\$16,840	\$19,758	\$15,335

## 4.5 DISCUSSION

As Kenya continues to decentralize HIV service delivery, additional resources will be required to upgrade facilities, hire additional health workers – especially nurses and pharmacy staff – and increase training of existing workers. Reasonable estimates of the financial and human resource unit costs of extending the hub-and-spoke network will be critical to effective planning, budgeting, and implementation of Kenya’s decentralization policy. This feasibility analysis provides such estimates three potential scenarios for HIV service decentralization – limited, moderate, and extensive.

Each scenario was developed to accommodate a different policy orientation and/or level of available funding for decentralization. The ‘moderate’ scenario was intended to most closely match a policy target that would be ‘ambitious, yet feasible’ within a short-to-medium (e.g. three to five year) time frame, while the ‘extensive’ scenario models the maximum desired level of decentralization. The ‘limited’ scenario outlines what might be considered a positive, yet decidedly smaller, step in the right direction.

The focus of this analysis is to estimate the one-time costs to upgrade health centers and dispensaries that currently provide minimal or no HIV services into satellite sites capable of providing at least the basic HIV care package HIV (see Section 4.2) and the costs of upgrading hospitals that currently provide both HIV care and ART services into central sites so that they can serve as referral sites for lower-level facilities.

The limited scenario, at an estimated cost of Ksh 184.11 million (US\$2.5 million), is by far the least expensive option, although this only represents a shift of 17 percent of care patients and 17 percent of ART patients from higher-level to lower-level facilities. Of note, it is expected that implementation of this scenario would not require creating any new central sites. Facilities upgraded to become satellite sites would be linked to existing central sites.

The moderate scenario most closely matches with the projections for ART scale-up nationwide outlined in the Kenya National HIV/AIDS Strategic Plan 3 (KNASP 3). Under the moderate scenario, ART service delivery would increase by 44 percent, which is consistent with the scale-up target set in KNASP III. For care, the moderate scenario predicts a 17 percent increase in service delivery, compared with the KNASP III target of a 15 percent increase. At an estimated cost of Ksh 702.52 million (US\$9.5 million), this is the recommended decentralization scenario.

Intended to represent the maximum desired level of decentralization, the extensive scenario serves as a reference point for the financial and human resource costs required for the other two scenarios. At an estimated cost of Ksh 1.14 billion (US\$15.5 million), this 'full decentralization' scenario would provide a 56 percent greater shift in ART patient volume from higher- to lower-level facilities and 52 percent for care relative to the limited scenario at slightly over six times the cost. Relative to the moderate scenario, this would provide a 13 percent greater shift in patient volume from hospitals to lower-level facilities for ART and 30 percent for care at roughly 1.5 times the cost.

#### **4.5.1 SERVICE UTILIZATION**

It is anticipated that decentralization will influence patient utilization of HIV services in two primary ways. First, as defined by the scenarios, the concentration of HIV service delivery will be redistributed to some degree from hospitals to health centers and dispensaries. Some patients who currently travel to hospitals for services will opt to visit their local health center or dispensary instead for their routine visits and ART medicines. Second, the overall level of HIV service utilization will likely increase. Decentralization should increase service utilization rates among those who live far away from facilities that currently provide these services.

The shift of HIV service concentration from higher- to lower-level facilities should help alleviate the current problems of overburdened hospital staff and long waiting times. The extent to which this is the case, however, will also depend on the overall increase in utilization.

#### **4.5.2 SERVICE QUALITY**

If implemented effectively, decentralization has significant potential to improve the quality of HIV services patients receive. It is expected that the availability of basic HIV services and ART medicines close to one's home will increase adherence to ART regimens and reduce cases lost to follow-up. This should decrease the likelihood of patients developing resistance to ART medicines, which in turn will make it easier for physicians to treat patients effectively with existing drug regimens. Reduction in travel distance and waiting times for patients is expected to increase patient satisfaction with services while decreased workload may allow health staff to spend a few extra minutes on consultation and management of each patient.

This anticipated increase in quality of HIV services, however, is predicated upon effective management and coordination of the hub-and-spoke service delivery system. Quality may suffer if, for instance, health workers at satellite sites are not provided with adequate training and supervision from experienced central site staff or if the referral mechanism from satellites to central sites for initiating patients and complicated cases is not well established.

#### **4.5.3 POLITICAL SUPPORT AND MANAGEMENT STRUCTURE**

A related challenge that will likely be a pivotal factor in the success or failure of the implementation of Kenya's decentralization plan will be the political support for the effort and the legal and regulatory framework of decentralization. As was observed from the World Bank's attempt to decentralize HIV service provision in Kenya through the DARE project (2000-07), shifting responsibility to lower levels of the health system for increasing treatment and care without transferring the necessary resources and authority will yield poor results (World Bank 2008). At best, this will slow down and decrease the efficiency of the decentralization process. More likely, this would further increase the workload on

already overburdened hospital staff and result in reduced quality of all health services provided by the affected facilities, HIV-related or otherwise.

#### 4.5.4 SERVICE DELIVERY EFFICIENCY AND COST SAVINGS

In addition to improving access to health care outside of major urban centers, decentralization can be considered as a strategy to improve efficiency of health service delivery. Because the labor cost of providing health care services is typically less in lower-level facilities than in higher-level facilities, an effectively managed decentralization structure can result in significant cost savings in the health sector

Although the analysis presented here focuses primarily on the one-time costs for upgrading facilities to become central and satellite sites, it is possible to make some hypothetical assumptions about decentralization cost savings. In order to do this, it is necessary to quantify the cost difference in providing those services at lower-level facilities (e.g., health centers and dispensaries) relative to higher-level facilities (e.g., hospitals).

The following general equation is used to model the projected costs of a decentralized HIV service delivery system in Kenya. In order to simplify the calculation, this equation assumes that the entire decentralization upgrade process occurs in one year (Year 0), such that the satellite sites would be fully functioning SDPs starting in Year 1 of the analysis.

*Estimated ART decentralization cost savings*

$$\begin{aligned} &= \quad \mathbf{a)} \text{ Estimated cost of KNASP-3 proposed ART scale-up from 2010-2014, based on current average service delivery costs} \\ &\quad \mathbf{b)} \text{ Estimated cost of KNASP-3 proposed ART scale-up from 2010-2014, based on average service delivery costs under a decentralized system} \\ - &\quad \mathbf{c)} \text{ One-time upgrade costs for central and satellite sites} \\ &\quad \mathbf{d)} \text{ Maintenance costs for central and satellite sites (across the five years)} \end{aligned}$$

For the above hypothetical equation, it is assumed that **a)** is the estimated cost of ART scale-up of US\$1,714 million, as outlined in the KNASP-3. Variable **b)** assumes the same scale-up targets as the KNASP-3 but also includes the projected shift in ART service volume from higher- to lower-level facilities, as outlined in the 'moderate' decentralization scenario. For the purposes of this hypothetical calculation, it is assumed that providing ART at lower-level facilities costs two-thirds of the amount to provide the same service at higher-level facilities (the primary savings would come from labor and overhead, because the regimens and medicine prices would be comparable). The one-time upgrade cost **c)** is set at US\$9.5 million, as estimated for the 'moderate' decentralization scenario. The annual maintenance costs for central and satellite sites **d)** are assumed to be one-tenth of the upgrade costs for each type, to be paid each year between 2010 and 2014.

Based on the above assumptions, it is estimated that ‘moderate’ decentralization could reduce the projected KNASP-3 scale-up costs for ART by approximately **US\$257 million** over the five years from 2010 to 2014.<sup>9</sup>

#### 4.5.5 ADDITIONAL CONSIDERATIONS

It is important to note that there may be other valid approaches to conducting this analysis. As with any cost modeling exercise, the underlying assumptions behind the calculations guide the interpretation of results. Because this analysis is designed to inform NASCOP’s operational planning for HIV service decentralization, it does not factor in economic costs such as the financial and time costs to patients who currently have to travel long distances to receive HIV services. Although these economic cost considerations do not need to be quantified for the purposes of implementing decentralized HIV service delivery, they should not be overlooked in policy discussions. Case in point, the anticipated reduction in travel time and cost for patients to receive quality HIV services is one of the key goals of Kenya’s decentralization model.

Similarly, this analysis does not take into account the transportation or human resource costs for designated central site staff to provide training and supervision to health professionals at satellite sites, although it does estimate the training cost for central site and satellite site staff themselves. More detailed analysis of the logistical costs and staff time associated with training, central-satellite coordination, and other management activities will become increasingly important as Kenya considers widespread expansion of various forms point-of-care (POC) technology, such as the POC device for estimating the supply chain and human resource needs for CD4 testing that is currently being piloted by the Clinton Foundation and the Kenya Medical Research Institute (KEMRI) in Western Kenya. Although such POC devices may have large up-front capital costs, they have substantial potential for longer-term time and cost savings, provided that they complement – rather than compete with – existing procedures in facilities.

Importantly, infrastructure costs are not included in this analysis as it is assumed that the decentralization plan will target health centers and dispensaries that already have adequate physical space to provide the basic package of HIV services.

Although this analysis has focused exclusively on the national HIV program, it is unlikely that the decentralization of HIV services will occur independently of programs targeting other diseases within the health sector. As highlighted in the ‘Option 5’ analysis developed to inform implementation of the KNASP-III, Kenya is moving away from vertical health interventions and toward integrated approaches to service delivery, particularly in the area of prevention. Despite the political and logistical hurdles that would need to be cleared to effectively implement an integrated prevention program, the potential benefits in terms of improved health outcomes and cost savings make this a desirable option for Kenya. According to the ‘Option 5’ paper, integration of the primary prevention interventions outlined in Kenya’s national strategic plans for HIV/AIDS, malaria, and the health sector as a whole could save up to \$479 million in health spending between 2010 and 2013. In the context of this decentralization analysis, an integrated prevention campaign would likely increase up-front coordination and logistical costs

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<sup>9</sup> It is important to note that this estimate does not account for recruitment costs associated with identifying and starting people on ART. Given the high unmet need for HIV services in Kenya, particularly in rural areas, it may be reasonable to assume that newly established central and satellite sites would initially be able to scale up service delivery without substantial outreach and recruitment costs. However, at some point the marginal cost of enrolling an additional person on ART will increase, reducing the overall estimated cost savings from decentralization over 2010-14.

(relative to focusing solely on HIV) but would eventually decrease the per person unit cost of providing HIV testing, condoms, cotrimoxazole (for PMTCT), and ART referral from an estimated total of approximately US\$19 to approximately US\$10.

#### 4.5.6 CONCLUSION

Based on review of existing literature, Kenya's decentralization plan, and the analysis conducted here, extension of a hub-and-spoke decentralization model seems feasible in Kenya. As the Kenya develops an operational plan for continuing the next phase of decentralization, the government and partners need to prepare for the costs involved. Implementation of the 'moderate' decentralization scenario is recommended. If conducted effectively, HIV service decentralization is expected improve quality in service delivery and clinical outcomes as well as to increase the overall sustainability of HIV service delivery in Kenya. In addition to the costs and human resource requirements, critical considerations include the need for adequate political support and increased district-level and facility-level authority to accompany operational decentralization.

#### 4.6 REFERENCES

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## ANNEX: ADDITIONAL DETAILS FOR SECTION 4

**TABLE A.4.1 CURRENT AND TARGETED HIV SERVICE VOLUMES, BY PROVINCE, SERVICE TYPE AND FACILITY TYPE**

(HC: Health Center, D: Dispensary)

Coverage area	Service	Facility	Current	Decentralization Targets		
				Limited	Moderate	Extensive
Central Province	ART	Hospitals	90%	85%	65%	30%
		HC&D	10%	15%	35%	70%
	Care	Hospitals	90%	85%	80%	30%
		HC&D	10%	15%	20%	70%
Coast Province	ART	Hospitals	67%	55%	40%	20%
		HC&D	33%	45%	60%	80%
	Care	Hospitals	64%	55%	50%	20%
		HC&D	36%	45%	50%	80%
Eastern Province	ART	Hospitals	93%	85%	65%	30%
		HC&D	7%	15%	35%	70%
	Care	Hospitals	93%	85%	80%	30%
		HC&D	7%	15%	20%	70%
Nairobi Province	ART	Hospitals	60%	35%	25%	20%
		HC&D	40%	65%	75%	80%
	Care	Hospitals	57%	40%	30%	20%
		HC&D	43%	60%	70%	80%
Northeastern Province	ART	Hospitals	100%	85%	60%	30%
		HC&D	0%	15%	40%	70%
	Care	Hospitals	100%	85%	65%	30%
		HC&D	0%	15%	35%	70%
Nyanza Province	ART	Hospitals	88%	65%	50%	20%
		HC&D	12%	35%	50%	80%
	Care	Hospitals	80%	70%	60%	20%
		HC&D	20%	30%	40%	80%
Rift Valley Province	ART	Hospitals	84%	70%	50%	20%
		HC&D	16%	30%	50%	80%
	Care	Hospitals	86%	80%	70%	30%
		HC&D	14%	20%	30%	70%
Western	ART	Hospitals	84%	65%	40%	20%
		HC&D	16%	35%	60%	80%
	Care	Hospitals	83%	75%	65%	25%
		HC&D	17%	25%	35%	75%
Total*	ART	Hospitals	79%	53%	38%	21%
		HC&D	21%	47%	62%	79%
	Care	Hospitals	76%	58%	49%	22%
		HC&D	24%	42%	51%	78%

\*Totals for target service volumes were calculated using a weighted average of each provincial target (e.g., Central Province has ~6% of HIV care patients in Health Centers & Dispensaries while Coast Province has ~20% of HIV care patients in Health Centers & Dispensaries so their respective service volume targets will be factored into the associated total at a ratio of 6 to 20, along with the service targets from other provinces).

**TABLE A.4.2 EQUIPMENT COSTS – HIGH VOLUME ART SITES**

Item	Unit no	Unit cost Ksh	Total cost Ksh
<b>Equipment</b>			
Diagnostic set	2	6600	13,200
Stethoscope-adult	4	600	2,400
Stethoscope-Pediatric	4	1000	4,000
Sphygmomanometer (BP Machine)	2	1800	3,600
Waste bin with cover	3	450	1,350
Examination lamp, mobile	2	36,770	73,540
Infant weighing scale	2	4500	9,000
Screen, Bed	2	106,230	212,460
Spot light	2	1900	3,800
Examination couch	2	38000	76,000
Table with drawers	5	12000	60,000
Drug Cupboard	1	10,000	10,000
Chairs	15	2500	37,500
Bed Complete With Mattress	2	12,000	24,000
benches	2	600	1,200
Filing cabinet	2	15,000	30,000
Lockable cabinets	2	15,000	30,000
Mobile phone	1	5000	5,000
<b>Laboratory</b>			
Binocular microscope	1	33,071	33,071
Hematology machine	1	292,276	292,276
Centrifuge	1	65,000	65,000
<b>Pharmacy</b>			
Dispensing trays	1	25000	25,000.00
Pill boxes			-
<b>Trainings</b>			
IMAI	3	40000	120,000
Pediatric ART	3	30000	90,000
Adherence counseling	2	30000	60,000
PWP	2	20000	40,000
M&E	2	30000	60,000
Nutrition	2	30000	60,000
Commodity management	2	30000	60,000
<b>Total</b>			<b>1,502,397</b>

**TABLE A.4.3 EQUIPMENT COSTS – LOW VOLUME ART SITES**

Item	Unit No	Unit Cost Ksh	Total Cost Ksh
<b>Equipment</b>			
Diagnostic set	1	6600	6600
Stethoscope-adult	1	600	600
Stethoscope-Pediatric	1	1000	1,000
Sphygmomanometer (BP Machine)	1	1800	3,600
Waste bin with cover	4	450	1,800
Examination lamp, mobile	1	36,770	36,770
Infant weighing scale	2	4500	9,000
Screen, Bed	1	106,230	106,230
Spot light	1	1900	1,900
Examination couch	1	38,000	38,000
Table with drawers	4	12,000	48,000
Drug Cupboard	1	10,000	10,000
Chairs	10	2500	25,000
Bed Complete With Mattress	1	12,000	12,000
benches	2	600	600
Filing cabinet	1	15,000	15,000
Lockable cabinets	1	15,000	15,000
Mobile phone	1	5000	5,000
<b>Laboratory</b>			
Binocular microscope	1	33,071	33,071
Hematology machine	1	292,276	292,276
Centrifuge	1	65,000	65,000
<b>Pharmacy</b>			
Dispensing trays	1	25,000	25,000
<b>Trainings</b>			
IMAI	2	40,000	80,000
Pediatric ART	2	30,000	60,000
Adherence counseling	2	30,000	60,000
PWP	2	20,000	40,000
M&E	2	30,000	60,000
Nutrition	2	30,000	60,000
Commodity management	2	30,000	60,000
<b>Total</b>			<b>1,074,637</b>

### A.3.1 DECENTRALIZATION EFFORTS IN KENYA AND THE REGION

The decentralization of HIV services is not a new concept in Kenya and some progress has been made already, although a variety of challenges have constrained efforts to date. In 2000, the World Bank approved the US\$50 million Decentralized Reproductive Health and HIV/AIDS (DARE) Project, which aimed to integrate the delivery of maternal/child health and HIV/AIDS services in government-run

facilities as a means of reducing HIV incidence nationwide.<sup>10</sup> The project was terminated in 2007 as a result of ‘unsatisfactory outcomes’ due to insufficient capacity for the management of HIV service delivery at the district level. The inability of districts to manage the decentralized system was attributed largely to minimal political will and an underdeveloped ‘institutional framework’ for increasing the authority and financial autonomy of districts.<sup>11</sup>

**Tanzania:** Neighboring Tanzania is also in the process of implementing an HIV service decentralization policy within the health sector as part of its National Care and Treatment Plan. In 2005, the Tanzanian Ministry of Health developed a ‘regionalization’ plan that assigned development partners specific areas of the country in which to support HIV treatment and care services.<sup>12</sup> The aim of this initiative was to improve the effectiveness and efficiency of care by reducing the administrative burden on facilities that formerly had to coordinate their efforts with multiple partners.<sup>13</sup> Similarly to Kenya, Tanzania’s decentralization policy called for the strengthening of the service delivery capacity of health centers so as to provide comprehensive HIV/AIDS care closer to home for patients outside of major urban centers.

**Uganda:** Uganda’s strong health system of the 1960s deteriorated significantly in the 1970s and 1980s as a result of the Idi Amin dictatorship, economic decline, and structural adjustment policies.<sup>14</sup> As part of Uganda’s effort to revamp health system, the government began a decentralization effort in 1986 by shifting authority for health service delivery to the district-level local councils or “Resistance Councils,” as they were known at the time.<sup>15</sup> Reinforced by the 1995 Constitution and the 1997 Local Government Act, Uganda’s decentralization policy developed a four-tier service delivery system of district hospitals, dispensaries, clinics, and community-based organizations.<sup>16</sup> The district hospital is the primary facility providing comprehensive HIV services, with dispensaries providing follow-up care and dispensing of ART drugs for continuing patients. Clinics provide basic care and support services for people living with HIV (PLHIV), while community-based organizations are primarily responsible for community outreach, education activities, and social support for PLHIV.<sup>17</sup>

**Mozambique:** In 2003, Mozambique’s Ministry of Health also commenced a decentralization effort to reduce HIV patient volume at overburdened central facilities and increase service provision at lower levels of the health system.<sup>18</sup> As part of this effort, the ministry conducted a comprehensive assessment of health centers targeted to begin providing HIV services, including an estimation of the specific infrastructure, staffing, and training needs at each site. Because health centers are the main delivery

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<sup>10</sup> The World Bank. 2008. *Decentralized Reproductive Health and HIV/AIDS Project. Implementation Completion and Results Report*. Report No: ICR0000605. Washington DC. May 13 2008. Available from: <http://go.worldbank.org/AC7V5XZIF0>

<sup>11</sup> Ibid.

<sup>12</sup> Family Health International. 2007. Linking communities with health facilities to care for people living with HIV/AIDS. *Tumaini Magazine*. (June) Dar es Salaam, Tanzania. Available from: [www.fhi.org/NR/rdonlyres/evdq3mavrkw0z2cwehwlpwpyjvzj2hc32tsyqnsrjhylwgqbj2jk6deg3txygtnjyqoi2fngqa2j/Tumaini final1.pdf](http://www.fhi.org/NR/rdonlyres/evdq3mavrkw0z2cwehwlpwpyjvzj2hc32tsyqnsrjhylwgqbj2jk6deg3txygtnjyqoi2fngqa2j/Tumaini%20final1.pdf)

<sup>13</sup> Ibid.

<sup>14</sup> Pan African Conference of Ministers. 2006. “Strengthening competencies for participatory planning and budgeting for effective local delivery of services”. Pan African Conference of Ministers for Local Government: Leadership capacity building for decentralized governance and poverty reduction in Africa. Manthabiseng Convention Center, Maseru, Kingdom of Lesotho. Available from: <http://unpan1.un.org/intradoc/groups/public/documents/un/unpan023881.pdf>

<sup>15</sup> Ibid.

<sup>16</sup> Ibid.

<sup>17</sup> Ibid.

<sup>18</sup> International Center for AIDS Care and Treatment Programs (ICAP). 2007. “Decentralization brings HIV services to rural Mozambique.” New York City: Mailman School of Public Health, Columbia University. Available from: <http://www.columbia-icap.org/news/icapnews/OctoberENews.html>

point for primary health care, the Ministry of Health sought to fully integrate HIV services with already existing primary care services at each facility.<sup>19</sup>

**Decentralization of TB treatment in Kenya:** Decentralization of other health services in Kenya may also offer useful insights for this analysis. In particular, the evolution of TB treatment and care over the past 30 years can serve as a model for successful decentralization. According to the WHO, TB decentralization in Kenya can be divided into three distinct phases: the first started with the creation of the National Leprosy and TB Control program (NLTP) in 1980 and lasted until around 1998; the second coincided with the implementation of the 1st National Health Strategic Plan (1999-2004); the third has coincided with the implementation of the 2nd National Health Strategic Plan (2005-10).<sup>20</sup>

In the first period, the NLTP began to shift responsibility for TB service provision to the district level through the ‘District Focus for Rural Development’ plan; it also provided extensive personnel training. With the 1st National Strategic Plan, the Ministry of Health began to enable districts to manage the procurement and distribution of TB drugs and supplies as well (with several exceptions) and implemented a ‘training of trainers’ model to continue enhancing district-level management and service delivery capacity. During this period, TB patient access to treatment and care increased at more health centers and dispensaries, as well as at some private providers as a result of private sector partnerships.<sup>21</sup>

The 2nd National Strategic Plan pushed decentralization even further to the local level, emphasizing community engagement through District Health Management Boards. A continued focus on strengthening human resource capacity and building public-private partnerships was accompanied by a push to improve facility infrastructure and extend services to hard-to-reach populations. Also during this period, the NLTP (which was converted to a division within the Ministry of Health in 2007) sought to collaborate with the national HIV program to provide better and more integrated services for TB/HIV co-infection.<sup>22</sup>

**TABLE A.4.4 NASCOP ESTIMATED PERCENTAGES OF NEW ART PATIENTS RELATIVE TO OVERALL ART PATIENT VOLUME, BY YEAR, 2010-13**

Year	New ART patient percentage
2010	27%
2011	21%
2012	18%
2013	15%

The new ART patient percentage was calculated based on estimates provided by NASCOP of new vs. continuing patients on regimens. Percentages were calculated separately for first- and second-line patients, and were then weighted based on the proportion of new patients in the first- and second-line categories to generate the overall weighted average ‘new ART patient percentage’ per year for all ART patients.

<sup>19</sup> Ibid.

<sup>20</sup> World Health Organization. 2009. *A brief history of TB control in Kenya*. Geneva: World Health Organization. Available from: [http://whqlibdoc.who.int/publications/2009/9789241596923\\_eng.pdf](http://whqlibdoc.who.int/publications/2009/9789241596923_eng.pdf)

<sup>21</sup> Ibid.

<sup>22</sup> Ibid

**TABLE A.4.5 HIV SERVICE DECENTRALIZATION SCENARIO SUMMARY INDICATORS**

<b>Indicator</b>	<b>Limited</b>	<b>Moderate</b>	<b>Extensive</b>
% ART services provided in hospitals	53%	38%	21%
% HIV care services provided in hospitals	58%	49%	22%
Number of additional satellites needed	257	536	1,246
Number of additional central sites needed	10	37	119
Number of additional ART patients that can be served at satellite sites	58,744	92,552	132,512
Number of additional care patients that can be served at satellite sites	111,967	166,493	337,341



## 5. ADDITIONAL FINANCING NEEDED TO IMPLEMENT NEW GUIDELINES FOR ART AND PMTCT

*Authors:* A. Dutta and I. Mukui, et al. (NASCOP ART Technical Group)

*Abstract:* Background: The WHO has recently recommended changes to the initiation threshold and starting regimen guidelines for adult antiretroviral treatment (ART), and in the nature of the intervention in prevention of mother-to-child transmission (PMTCT). There is a decision to adopt these in Kenya. However, these imply costs for Kenya that affect the resources for reaching universal coverage. We investigated the incremental cost of the guidelines changes, while also reviewing the patient targets over 2010-14. As a base, we considered the costs and targets in the Kenya National AIDS Strategic Plan-3 (KNASP-3) completed earlier in 2009.

*Methods:* We used the Activity-Based Costing tool (ABC) from the KNASP-3 resource estimation as the 'base' tool for costing the business-as-usual situation, with its own pricing for antiretroviral drugs (ARVs) and non-drug costs. Pediatric ART costs were left unchanged from the base in all estimates. Separately, we used a customized tool to calculate the ART drug and laboratory costs under early initiation and for a switch from d4T-based to TDF-based regimens, with updated ARV pricing. For PMTCT, we used the ABC tool for the base scenario as well as all non-drug costs (including laboratory), while separately costing the PMTCT drug costs under the new guidelines. For both ART and PMTCT, we considered targets based on updated epidemiological information as another change from the baseline.

*Results:* With the new prices for ARVs, continuing with late ART initiation at  $CD4 < 250$  cells/mm<sup>3</sup> and starting regimens incorporating d4T would be a 'no change' situation. Against this, the additional cost of early initiation at  $CD4 < 350$  cells/mm<sup>3</sup> and a TDF switch is US\$169.5 million. Just implementing early initiation would cost an additional US\$134.8 million; while the TDF switch would cost US\$28.2 million.

With the original PMTCT patient volumes as in KNASP-3, the new guidelines would cost US\$37.7 million more above the base. Approximately 89 percent of this is driven by changes to the pharmaceutical intervention. Almost 80 percent of the added cost could be recovered if the unit cost of the PMTCT facility visits as used in KNASP-3 were reduced by one-third. If revised NASCOP targets for PMTCT were used with the new WHO guidelines, then there is an additional cost of US\$91.1 million on the base. Of this, 62 percent is driven by increase in the cost of pharmaceuticals, with the rest driven by an increase in the number of patients accessing services.

*Recommendations:* Choosing the rate of implementation of the new guidelines will depend on resources available. The TDF switch is cost effective based on other studies, and the incremental cost is not significant given reduced ARV prices, therefore this can be prioritized. The scale-up of PMTCT access for needy patients can also be prioritized, allowing for 100 percent of women in need to receive prophylaxis and highly active ART (HAART) (if eligible) for their own health. How the other elements of the guideline changes for ART and PMTCT will be implemented will depend on additional resource availability. However, in this report we have identified several additional sources of financing for HIV that can be considered.

## 5.1 BACKGROUND

This analysis considers the resource requirements for two types of guideline changes recommended by the WHO within the overall domain of treatment and prevention for HIV/AIDS that have recently been accepted for implementation in Kenya. First, the costs of changes to the guidelines for adult ART are assessed, focusing specifically on early initiation of ART, and switching from stavudine (d4T)-based regimens for first-line treatment to tenofovir (TDF)-based regimens, with zidovudine (AZT)-based regimens continuing as before. Second, the analysis considers changes in the guidelines for the PMTCT, especially in terms of using ARVs for prophylaxis in pregnant HIV-positive mothers antepartum, as well as changes to drugs prescribed for treatment for mothers and infants intrapartum and postpartum. These guideline changes and the evidence for them are described in brief below, before turning to the Kenyan situation. Results of a recent review of the eligible patient population sizes for ART and PMTCT in Kenya conducted by NASCOP are considered as required in defining targets, and are discussed along with other aspects of the costing methodology. The costs of the guideline changes and changes to targets are compared separately from the estimated costs of continuing as per prior norms in Kenya. This comparison allows an estimate of the additional cost of implementing the changes for ART and PMTCT compared with continuing as before.

These additional costs are important to consider as Kenya moves into implementing the changes, as there is an inherent tradeoff involved. While the evidence – discussed below – for the new guidelines indicates there are improvements in patient outcomes, they will come at an additional cost. In a resource constrained environment, these additional costs will mean a reduction in the financing available for expansion of the related services to patients currently in need but not served. Therefore, this will affect Kenya’s ability to move closer to universal coverage.

### 5.1.1 THE CASE FOR IMPLEMENTING NEW GUIDELINES FOR ADULT HIV/AIDS TREATMENT

In November 2009, the WHO published “*Rapid Advice – Antiretroviral Therapy for HIV Infection in Adults and Adolescents*” (WHO 2009a). It made five recommendations, the first two of which are examined in this section. Both were recommended strongly based on the evidence. These cover ‘when to start’ and ‘what to start,’ and are summarized in Table 5.1.

**TABLE 5.1 WHO RECOMMENDATIONS FOR WHEN TO START AND WHAT TO START IN ART**

When to start	What to start
1. Start if CD4 count $\leq$ 350 cells/mm <sup>3</sup>	Start one of the following in ART-naïve patients eligible for treatment: AZT+3TC+EFV, AZT+3TC+NVP, TDF+3TC/FTC+EFV, TDF+3TC/FTC+NVP
2. Start if HIV+ and WHO clinical stage 3 or 4, irrespective of CD4 count	
3. CD4 testing required to decide if WHO clinical stage 1 or 2	

**Early initiation:** In its comments on the revised when to start criteria, the WHO panel said it placed “high value on avoiding death, disease progression and HIV transmission over and above cost and feasibility.” In an associated document, WHO notes that the benefits of earlier starting using the CD4 count threshold – based on modeling and observational data – is that there is reduced transmission risk (including mother-to-child) as well as a decreased risk of TB (WHO 2009c). If ART coverage is more than 85 percent, then over 2010-15 the average country making the change would see a reduction in mortality of 20 percent, based on this document.

The caveats identified relate to the trade-off previously mentioned. The WHO panel was concerned that starting patients earlier would add financial and programmatic (implementation) burden on countries as the number of eligible patients increase and hence cause inequity in ART access if there is a displacement of sicker patients. In their estimate, ART costs would increase by 57 percent over 2010-15, if ART coverage is greater than 85 percent. Additionally, CD4-based initiation would be difficult to do if point-of-care CD4 technologies are not widespread (WHO 2009c).

In making a choice to implement the new guidelines, policymakers may also require economic evidence. In a review of various studies in resource-limited countries, results were summarized for relative cost-effectiveness when initiating patients with CD4 counts in the range 200-350 cells/mm<sup>3</sup> vs. initiation at CD4 counts below 200 cells/mm<sup>3</sup>. Review authors (Loubière et al. 2010) state that according to most of these studies, ART generally tends to “become less cost effective... as CD4 cell counts at ART initiation increase.” A standard for judging if a choice is ‘very cost-effective’ is if the incremental cost-effectiveness ratio (ICER) for every additional life year gained (these life years can be quality adjusted) is lower than the GDP per capita. It is ‘cost-effective’ if the ICER is less than three times per capita GDP (World Health Organization 2010). By this criterion, initiating at 350 cells/mm<sup>3</sup> will be cost effective, but not very cost effective, in the poorest countries.

In a related study, in South Africa (Badri et al. 2006), initiating ART at CD4 cell counts between 200 and 350 cells/mm<sup>3</sup> is very cost-effective, a standard one might require given competing claims on resources. Table 5.2 summarizes the results of some studies in question against Kenyan GDP per capita (at current prices). All of the three studies in Table 5.2 intend to illuminate such choices in resource-limited settings, so it is relevant to consider them. Because the cost-effectiveness studies used drug prices current at the time, it is correct to compare to the GDP per capita of the same year as the study.

**TABLE 5.2 COST-EFFECTIVENESS OF EARLY INITIATION EXTRAPOLATED TO THE KENYAN SITUATION**

Incremental cost-effectiveness ratio	Source	Kenya GDP per capita*
US\$720 per Quality-adjusted Life Year (QALY) gained (compared with starting at CD4 < 200 cells/mm <sup>3</sup> )	Badri et al. (2006) (South Africa)	US\$612 (2006)
US\$620 per Life Year gained (compared with starting at CD4 < 250 cells/mm <sup>3</sup> )	Freedberg et al. (2007) (India)	US\$718 (2007)
US\$1300 per Life Year gained (compared with starting at CD4 < 250 cells/mm <sup>3</sup> )	Walensky et al. (2009) (South Africa)	US\$783 (2008)

Source: World Bank (2009)

\* At prices current to the year.

As per the results in Table 5.2, one of the modeling studies (shaded) shows the option to be very cost-effective in the Kenyan context. However, this table should be interpreted with caution as the studies were not specifically run with Kenyan data, especially clinical outcomes. A Kenya-specific study, with Kenyan prices, might show a different result. Note that the study by Freedberg et al. (2007) in Table 5.2 compared early initiation at CD4 < 350 cells/mm<sup>3</sup> with initiation at 250 cells/mm<sup>3</sup>, which is the current threshold in Kenya. Since 2007, ARV prices have continued to decline. This reduces costs and hence possibly the ICER. However, note the Walensky et al. study (2008) shows a high ICER.

**Tenofovir switch:** The WHO comments that the recommended regimens (Table 5.1) have “a better overall toxicity profile than d4T based regimens,” and countries should move away from d4T toward AZT- or TDF-based regimens in a manner and speed consistent with their resources and

implementation capacity. The choice of TDF is costly compared with d4T. However, management of toxicity in patients due to d4T is itself costly in terms of health worker time and, because of the related adverse events, patient quality of life may suffer, which can in itself be related to poor adherence to regimens and hence to treatment failure, etc. (linked eventually to patient survival).

The specific economic implications of replacing d4T with TDF in a triple drug first-line ART combination vs. the outcome improvements (especially on toxicity) have been investigated in a few studies. In a study focused on South Africa, the authors compared d4T-3TC-EFV with TDF-3TC-EFV for a simulated patient cohort over 24 months, and found that at the then cost of TDF 300mg of \$17 per month (price as per procurement in Zambia), the incremental cost of switching to the TDF regimen was \$128 per patient per year and the ICER was \$9007 per QALY (cost-effective but not very cost-effective). The authors found that if TDF were priced at \$6.17 per patient month (a 64 percent reduction), the switch would be cost neutral; and at a price of \$12.94/month, the switch would be 'very cost-effective' in terms of ICER.

It is important to note that as per the latest Clinton Health Access Initiative price list, TDF 300mg was priced at \$8.25 for a month's supply; but TDF-3TC-EFV is itself now available as a fixed dose combination (FDC) from one generic manufacturer, with a monthly cost of \$16.7 per month (Clinton Health Access Initiative 2010). This implies significant future savings compared with the study noted above, and suggests that TDF may become even more cost-effective compared with d4T at the moment. Pending wider availability, the FDC was not used for pricing in this section.

In a different type of study, using data from a cohort in India, the authors modeled the effectiveness of using TDF as a first-line backbone over the patient lifetime, and found that it increased life expectancy by 10.3 months compared with d4T or AZT. Compared to 'no ART,' TDF-based regimens were the most cost effective, more so than d4T and AZT. The ICER for a TDF backbone regimen against 'no ART', adjusted for the renal toxicity (see Table 5.3), was about US\$1,000 per QALY, which makes it 'very cost effective' for India. Applying these insights to Kenya is subject to the same caveats discussed before.

**TABLE 5.3 TOXICITY EVENTS RELATED TO D4T AND TDF\***

<b>Event (proportion of all related cases, e.g., all lipodystrophy)</b>	<b>Severity</b>	<b>Drug</b>
Severe peripheral neuropathy (~26%), severe symptomatic hyperlactatemia (~10%), death from lactic acidosis (~2.3%)	Severe	d4T
Moderate peripheral neuropathy (~22%), non-acute lipodystrophy/lipoatrophy (~100%), nonfatal lactic acidosis (~3%)	Moderate	d4T
Severe renal toxicity (~20%)	Severe	TDF
Non-severe renal toxicity (~80%)	Moderate	TDF

\* Source: Rosen et al. 2008

### 5.1.2 THE CASE FOR IMPLEMENTING NEW GUIDELINES FOR PMTCT

In November 2009, the WHO also published "*Rapid Advice: Use of Antiretroviral Drugs for Treating Pregnant Women and Preventing HIV Infection in Infants*" (WHO 2009b) related to PMTCT. This document focused on changes in two areas:

- I. When to start and which ART to give to pregnant women living with HIV who are eligible for ART based on CD4 (<350 cells/mm<sup>3</sup>) and clinical criteria; and

- When to start and what ARV prophylaxis to give to pregnant women who do not need ART for their own health, but need ARVs to reduce the risk of mother-to-child transmission (MTCT).

The revision to the guidelines as identified by the WHO writers relates to the benefits of starting ARV prophylaxis for PMTCT earlier during pregnancy. Evidence quoted shows that if extended ARV prophylaxis is provided to mothers and infants, it would substantially decrease the risk of HIV transmission through breastfeeding. The impact, as per the WHO, would be to “reduce mother-to-child transmission (MTCT) risk to less than 5 percent in breastfeeding populations (from a background risk of 35 percent) and in non-breastfeeding populations (from a background risk of 25 percent).” Table 5.4 summarizes the major changes for the prophylaxis of MTCT for mothers who do not require HAART for their own health (WHO 2010).

**TABLE 5.4 WHO RECOMMENDATIONS FOR PMTCT RELATED PROPHYLAXIS\* – 2006 VS. 2009**

Prophylaxis recommended	Antepartum (before labor)	Intrapartum (during labor)	Postpartum mother (after birth)	Postpartum breastfeeding infant	Postpartum non-breastfeeding infant
2009 option A	AZT after 14 weeks	Single dose NVP at onset; AZT+3TC	AZT+3TC for seven days	Daily NVP until 1 week after breastfeeding has finished	Daily AZT or NVP until 6 weeks of age
2009 option B	Triple ARVs** after 14 weeks	Triple ARVs**	Triple ARVs** till 1 week after breastfeeding finishes	Daily NVP until 6 weeks of age	Daily AZT or NVP until 6 weeks of age
2006 ~ “dual therapy”	AZT after 28 weeks	Single dose NVP at onset; AZT+3TC	AZT+3TC for seven days	Single dose NVP; AZT for seven days	

\* This table relates to HIV-positive mothers not requiring ART for their own health

\*\* Choices for regimens include AZT+3TC+LPV/r, AZT+3TC+ABC, AZT+3TC+EFV, TDF+XTC+EFV

For mothers receiving ART for their own health, the recommended regimens are the same as for the adult ART recommendations discussed in Table 5.1 (AZT- or TDF-based). Treatment would begin as soon as the eligibility is confirmed, regardless of the gestational stage, and would continue through all stages of the pregnancy (similar to option B in Table 5.4). For the infants born to such mothers, the options for postpartum prophylaxis would be the same as in Table 5.4.

There have not been any published reviews of the cost-effectiveness of the new PMTCT guidelines, especially for prophylaxis. The cost-effectiveness of ART for mothers eligible for reasons of their own health is considered generally governed by the studies discussed further above. A recent, unpublished study for the prophylaxis recommendations suggests that option A in Table 5.4 would be ‘very cost-effective’ for most sub-Saharan countries compared with scaled-up dual therapy (i.e., AZT for mothers from 14 weeks); and scaled-up dual therapy itself – just for mothers and not including infant postpartum NVP – would be very cost-effective compared with just following the 2006 guidelines (Auld 2010). Several clinical studies, including some with Kenyan sites, have indicated that combined ARV prophylaxis for HIV-positive mothers and their babies resulted in a significant reduction in transmission where prophylaxis was used at longer durations than older guidelines (de Vincenzi et al 2009). These results overall indicate a basis for implementing the new PMTCT guidelines.

## 5.2 FINANCING NEEDS FOR IMPLEMENTING THE NEW ADULT ART GUIDELINES

### 5.2.1 METHODOLOGY

**Our approach:** Building on the framework of the KNASP-3 costing for ART, this analysis applied revised targets for adults based on a starting criterion of 250 cells/mm<sup>3</sup> CD4, while extending the timeframe to 2013/14 in order to enable a five-year costing as in the rest of this document. All the assumptions on regimens and unit costs were kept the same as in the original KNASP-3 costing model. Separately, a custom-built tool was used to calculate the five-year costs of drugs and laboratory tests for adult ART given changes to the eligibility criterion to 350 cells/mm<sup>3</sup> (affecting patient targets) and to starting regimens (first-line drugs). Some modifications were made to the expected second-line regimen choices used in the KNASP-3 costing based on updated information. For the other items (non-drug and non-laboratory), the unit costs are the same as in the KNASP-3 (e.g., for pediatric ART). These two separate estimates of total five-year costs were compared with calculate the additional cost due specifically to implementing the new adult ART guidelines.

**Estimating targets based on a 250 cells/mm<sup>3</sup> criterion:** The targets indicated in the KNASP-3 document are indicated to be based on a CD4<350 cells/mm<sup>3</sup> criterion. The estimation of these targets was based on assumptions made in the absence of clear estimates for numbers in need of ART. Following availability of new data and modeling estimates in 2010, the NASCOP ART group confirmed these targets to be based on a criterion of CD4<250 cells/mm<sup>3</sup> and not CD4<350 cells/mm<sup>3</sup>. Table 5.5 shows the targets for use in this costing.

**TABLE 5.5 REVISED FIVE-YEAR TARGETS WITH AN ART ELIGIBILITY CRITERION OF 250 CELLS/MM<sup>3</sup>**

Patient groups covered	Number of patients (mid-year)				
	2009/10	2010/11	2011/12	2012/13	2013/14
Existing adults on first-line ART	314,560	341,978	408,878	479,509	503,761
New adults on first-line ART	27,418	66,901	70,631	24,252	23,852
Existing adults on second-line ART	5,440	18,022	31,702	48,057	67,237
New adults on second-line ART	12,582	13,679	16,355	19,180	20,150
Adults in care not on ART	279,733	306,893	323,646	293,796	263,546
<i>Number of HIV+ in care, total</i>	<i>639,842</i>	<i>747,834</i>	<i>851,846</i>	<i>865,755</i>	<i>879,890</i>
Existing pediatric patients on ART*	28,861	38,457	49,244	60,063	62,268**
New pediatric patients on ART*	9,599	10,799	10,800	8,400	7,466**

\* These categories were left unchanged from values found in ABC costing model.

\*\* The ABC costing model did not include values for pediatrics for 2013/14. These were estimated.

The KNASP-3 financial calculations had been compiled in the MS Excel-based ABC framework known as the ASAP HIV/AIDS Costing Tool (World Bank 2008). Therefore, the August 25, 2009, version of the tool was used for the reference costing estimates in this sub-section. Targets in Table 5.5 were entered into this ABC costing tool, and an allowance of 2 percent of the existing second-line volume was made for patients failing second-line therapy.

**Estimating targets based on a 350 cells/mm<sup>3</sup> criterion:** The NASCOP ART group also estimated 'rationalized' targets at a 350 cells/mm<sup>3</sup> starting criterion for use in a custom-built tool for drug and laboratory costs. The rationalization of targets was based on a feasible scale-up rate given that the number of eligible patients had gone up dramatically after the change in starting criterion. Even after the

rationalization, the coverage has increased significantly compared with Table 5.5. Detailed explanation for the rationalization of targets is provided in the Annex to this section. Because the overall number of patients in care or for pediatric ART were not changed, these are not shown in Table 5.6. This tool also incorporated the switch to TDF-based regimens in place of d4T for new patients initiating treatment plus deduction in the use of d4T-based regimens for continuing patients over the five-year period.

**TABLE 5.6 FIVE-YEAR TARGETS WITH AN ART ELIGIBILITY CRITERION OF 350 CELLS/MM<sup>3</sup>**

Patient groups covered	Number of patients (mid-year)				
	2009/10	2010/11	2011/12	2012/13	2013/14
Existing adults on first-line ART	314,560	341,978	464,023	563,523	620,076
New adults on first-line ART	27,418	122,045	99,500	56,553	32,204
Existing adults on second-line ART	5,440	18,022	35,977	56,477	82,762
New adults on second-line ART	12,582	17,955	20,500	26,285	25,274
Adults in care not on ART	279,733	247,473	231,127	161,787	117,919

Table 5.7 outlines the two scenarios costed: A and B. Detailed regimen distribution for all patients on first-line under Scenario A are presented in the Annex. It can be seen that this scenario includes significant d4T dependence. The starting regimens for new patients and the regimens for existing first-line patients under Scenario B (NASCOP ART group assumptions) were previously referenced in Section 2 of this document, and are described in Annex Table A.2.4. Overall, patient cohorts for 2009/10 are adjusted to be half the expected number, as the date of this report means most of this fiscal year is already over.

**TABLE 5.7 SCENARIOS FOR ART COSTING**

Scenario A		Scenario B	
Starting criterion	250 cells/mm <sup>3</sup>	Starting criterion	350 cells/mm <sup>3</sup>
Adult first-line regimens	d4T-, AZT-, TDF-based regimens	Adult first-line regimens	AZT-, TDF-based regimens
Unit costs for adult ART drugs and laboratory	KNASP-3 version of ABC costing tool	Unit costs for adult ART drugs and laboratory	Custom NASCOP ART costing tool
Unit costs for non-drug, non-lab ART costs		Unit costs for non-drug, non-lab ART costs	KNASP-3 version of ABC costing tool
Costs for pediatric ARVs		Costs for pediatric ARVs	

For the non-drug, non-laboratory costs under both scenarios, which were calculated in the ABC costing tool, the included items were counseling visits, ART visits, inpatient day in secondary hospital, pharmacy visit, and a patient travel allowance. In Scenario A, in the ABC tool, the patients failing a line of treatment added viral load testing, whereas most continuing patients on a line of ART had ALT (Alanine Transaminase [liver function]), CD4, creatinine, and FBC (full blood count) tests on the recommended schedule. Patients failing the second-line ART had access to a home-based care program, for which home-based care kits were also procured. Scenario B uses the published Clinton HIV/AIDS Initiative (CHAI) drug prices (as of August 2009) for the costing, adjusted by an increase of 5 percent for shipping and handling. Note that list prices have declined further since August 2009.

## 5.2.2 RESULTS

The cost categories used here distinguish between the different tools used in the scenarios described in Table 5.7 above. To reiterate, Scenario A is based on the starting criterion of CD4 at 250 cells/mm<sup>3</sup> with the targets as per Table 5.5, as well as the previously recommended first-line regimen backbones including d4T in KNASP-3. The patient targets under Scenario A were substantially lower than the ‘rationalized’ figures for Scenario B, and the latter is based on a starting criterion of CD4 at 350 cells/mm<sup>3</sup> as well as switching in favor of the more expensive TDF from d4T.

However, Table 5.8 clearly shows that the total cost of Scenario B is substantially lower than Scenario A, with the most significant cost differentials emerging in the drugs and laboratory costs for adult ART. The total costs of Scenario A, US\$1.93 billion, are 50 percent higher, i.e., 1.5 times, those of Scenario B.

**TABLE 5.8 COMPARISON OF ART COSTS ACROSS TWO COSTING SCENARIOS (US\$ MIL.)**

<b>Scenario A</b>	<b>2009/10</b>	<b>2010/11</b>	<b>2011/12</b>	<b>2012/13</b>	<b>2013/14</b>	<b>TOTAL</b>
Adult first-line drugs and laboratory	\$64.7	\$161.0	\$201.6	\$213.4	\$223.4	\$864.1
Adult second-line drugs and laboratory	\$12.0	\$42.5	\$64.3	\$89.8	\$116.6	\$325.2
Adult first-line non-drug/lab costs	\$23.0	\$57.8	\$67.1	\$66.4	\$69.6	\$283.9
Adult second-line non-drug/lab costs	\$1.4	\$4.2	\$6.0	\$8.1	\$10.1	\$29.7
All other treatment costs*	\$19.2	\$66.7	\$74.0	\$72.5	\$72.4	\$304.7
<i>Total</i>	<i>\$120.3</i>	<i>\$332.2</i>	<i>\$413.0</i>	<i>\$450.1</i>	<i>\$492.0</i>	<i>\$1,807.7</i>
<b>Scenario B</b>	<b>2009/10</b>	<b>2010/11</b>	<b>2011/12</b>	<b>2012/13</b>	<b>2013/14</b>	<b>TOTAL</b>
Adult first-line drugs and laboratory	\$24.7	\$67.3	\$92.1	\$98.4	\$103.9	\$386.3
Adult second-line drugs and laboratory	\$6.2	\$23.2	\$35.2	\$50.7	\$66.2	\$181.5
Adult first-line non-drug/lab costs	\$45.99	\$69.38	\$80.25	\$83.95	\$86.28	\$365.8
Adult second-line non-drug/lab costs	\$2.82	\$5.00	\$7.16	\$10.16	\$12.46	\$37.6
All other treatment costs*	\$38.4	\$64.5	\$70.5	\$67.6	\$67.0	\$307.9
<i>Total</i>	<i>\$118.0</i>	<i>\$229.4</i>	<i>\$285.2</i>	<i>\$310.7</i>	<i>\$335.8</i>	<i>\$1,279.1</i>

\* Including pediatric ART

As a validation of the methodology, the analysis includes a third estimate, Scenario C, using the targets at CD4<250 cells/mm<sup>3</sup> from Table 5.5 and the same costing tool as used for Scenario B. In other words, the analysis uses the revised drug and laboratory unit costs. It was expected that the costs for this estimate would be lower than those of Scenario B. Table 5.9 as well as Annex Table A.5.1 reports these results. The total cost for Scenario C was about US\$1.14 billion, lower than Scenario B, as expected.

The main reasons for the counterintuitive results in Table 5.8 are the unit costs for drugs used in the KNASP-3 costing. As Annex Table A.5.3 shows, the unit drug costs used in the revised NASCOP ART Group costing are on average only 36 percent of those of those used in the KNASP-3 ABC costing model. The KNASP-3 unit costs allowed for buffer and also some costs such as distribution. While the NASCOP tool allows for a 5 percent logistics charge on the list price of the drug, it does not include the costs of distribution or buffer stocks.

Also computed are two ‘flavors’ of a ‘Scenario D’ which use the old first-line guidelines from the KNASP-3 (i.e., with d4T-based starting regimens). One of these scenarios used the revised targets with a CD4<250 cells/mm<sup>3</sup> criterion, and the other used the targets with a CD4<350 cells/mm<sup>3</sup> criterion.

These were computed in the NASCOP ART group costing tool. The specific effects of different changes are compared further below (see Figure 5.1).

**TABLE 5.9 SUMMARY OF RESULTS FOR COSTING OF ART**

	ARV pricing	Start CD4 cells/mm <sup>3</sup>	First-line backbones	US\$ millions per year					
				2010	2011	2012	2013	2014	Total
1. Scenario A	KNASP3	250	d4T,TDF,AZT	\$120	\$332	\$413	\$450	\$492	\$1,808
2. Scenario B	NASCOP	350	TDF,AZT	\$118	\$229	\$285	\$311	\$336	\$1,279
3. Scenario C	2010	250	TDF,AZT	\$118	\$207	\$255	\$268	\$290	\$1,138
4. Scenario D-350		350	d4T,TDF,AZT	\$115	\$222	\$274	\$303	\$330	\$1,244
5. Scenario D-250		250	d4T,TDF,AZT	\$115	\$202	\$246	\$262	\$285	\$1,110

Returning to the original question, Scenario D-250 can be subtracted from Scenario B to see the pure effect of changing both the ART guidelines – starting criteria and regimens. This effect is equivalent to US\$169.5 million.

Comparing Scenario D-250 and Scenario C allows one to see the pure effects of changing just the recommended first-line ART regimens (the ‘tenofovir switch’). This effect is US\$28.2 million. Similarly, the cost of making the early initiation change only, without changing the starting threshold, is US\$134.8 million (Scenario D-350 minus D-250).

While these analyses can cover the additional cost of the guideline changes, they do not capture the potentially large net benefits from reduced costs of managing side effects of d4T-related toxicity (see Table 5.3) and the general treatment benefits of early initiation, such as reduced opportunistic infection episodes in ART patients. As previously suggested in the introduction, there is evidence to show that these changes can be cost effective. The purpose of this section has been to elucidate the financial implications of carrying through with the implementation of these changes at different target levels of coverage.

## 5.3 FINANCING NEEDS FOR IMPLEMENTING THE NEW PMTCT GUIDELINES

### 5.3.1 METHODOLOGY

**Our approach:** The approach here is similar to that for the new ART guidelines in the previous subsection. The costs for PMTCT interventions were calculated with the new guidelines and without. For both types of guidelines, costs were calculated with the service delivery targets from the KNASP-3 as well as with new, revised targets formulated in 2010 by NASCOP. The estimates were compared with identify the cost of the new guidelines.

**KNASP-3 targets for PMTCT:** The targets for the KNASP-3 costing of PMTCT were taken from the ABC tool, and the costs in the tool mirrored the summary values in the main KNASP-3 document. As per the KNASP-3, these costs totaled US\$97 million for the four years 2009/10 to 2012/13. In keeping with a five-year forecasting viewpoint, the targets were extended to the year 2013/14. These ‘KNASP-3’ targets and details of the interventions are provided in Table 5.10. Background details of the assumptions are shown in the Annex.

**TABLE 5.10 KNASP-3 BASED TARGETS FOR PMTCT**

	2010	2011	2012	2013	2014*
<i>HIV+ mothers (est.)</i>	103,108	102,347	101,878	100,874	103,693
<i>% women receiving PMTCT</i>	62.3%	72%	77.3%	82.6%	85%
<i>PMTCT intervention</i>	64,270	73,670	78,704	83,351	85,680
<i>Of HIV+ mothers, PMTCT prophylaxis</i>					
<i>sd NVP only (%)</i>	50%	30%	10%	0%	0%
<i>Short-Course**</i>	40%	50%	60%	70%	70%
<i>Prophylaxis (infants)***</i>					
<i>sd NVP only at birth (%)</i>	15%	10%	5%	0%	0%
<i>NVP+AZT only (%)</i>	55%	45%	35%	30%	30%
<i>NVP+AZT+3TC (%)</i>	30%	45%	60%	70%	70%
<i>Of HIV+ mothers, HAART for mothers own health (30% maximum)</i>					
<i>Percentage considered</i>	10%	20%	30%	30%	30%
<i>Of those receiving HAART:</i>					
<i>AZT+3TC+NVP %</i>	95%	95%	95%	95%	95%
<i>AZT+3TC+EFV %</i>	2.5%	2.5%	2.5%	2.5%	2.5%
<i>AZT+3TC+LPV/r %</i>	2.5%	2.5%	2.5%	2.5%	2.5%

\* KNASP-3 lacked this year. These values were assumed.

\*\* This is based on PMTCT guidelines in Kenya as of 2009: it includes AZT 300mg twice a day (week 28-40); then NVP 200mg + AZT 600mg once during labor; 1 tab of AZT/3TC (300/150mg) twice a day for a week postpartum.

\*\*\*Calculations will assume 100% live births.

**Revised NASCOP targets for PMTCT:** The main changes to the figures in Table 5.10 were a revised estimation of the expected HIV prevalence rate in pregnant women based on the KAIS 2007 data and a revision of the target percentage for women receiving PMTCT interventions. These data and the calculation of the estimated HIV prevalence rate in pregnant women are described in the Annex. It was assumed that all HIV-positive pregnant women would receive either prophylaxis, or if they were eligible, they would receive HAART for their own health. The rate of early infant diagnosis was kept the same as in the KNASP-3 estimates. The mix of HAART drugs for mothers receiving this for their own health was kept the same as before. The resulting targeting mix is described in Table 5.11.

**TABLE 5.11 REVISED NASCOP TARGETS FOR PMTCT**

	2010	2011	2012	2013	2014*
HIV+ mothers (est.)	142,748	146,291	149,916	153,638	157,463
% women receiving PMTCT	100%	100%	100%	100%	100%
<i>Of HIV+ mothers, PMTCT prophylaxis only</i>					
New guidelines 'option A'	60%	60%	60%	60%	60%
<i>Of HIV+ mothers, HAART for mothers own health (estimate)</i>					
Percentage considered	40%	40%	40%	40%	40%
Of those receiving HAART:					
AZT+3TC+NVP %	95%	95%	95%	95%	95%
AZT+3TC+EFV %	2.5%	2.5%	2.5%	2.5%	2.5%
AZT+3TC+LPV/r %	2.5%	2.5%	2.5%	2.5%	2.5%
Infants born to mothers receiving prophylaxis	Assumed 100% live births; all receive the prophylaxis as per new guidelines (Table 5.4) and breastfeeding status				
Infants born to mothers receiving HAART	Assumed 100% live births; all receive the prophylaxis as per new guidelines** and breastfeeding status				

\* Assumed figures as year was missing in KNASP-3 – rate of growth matches 2012 to 2013

\*\* Infant breastfeeding: sd NVP 2mg/kg daily for 12 months (till cessation of breastfeeding); infant not breastfeeding: AZT 4mg/kg or sd NVP 2mg/kg till 6 wks

The analysis estimated the costs of the three scenarios derived from the different targets and the different guidelines. Table 5.12 describes these scenarios.

**TABLE 5.12 SCENARIOS FOR PMTCT COSTING**

Scenario	P3	P2	P1
Targets	KNASP-3 ABC tool	KNASP-3 ABC tool	NASCOP revised
PMTCT prophylaxis and HAART drugs	Old guidelines	<u>New guidelines</u>	<u>New guidelines</u>
Unit costs for drugs	KNASP-3 ABC tool	Average prices*	Average prices*
Unit costs for non-drug services, incl. lab tests	and prices	KNASP-3 ABC tool	KNASP-3 ABC tool

\* Average of last available CHAI (August 2009) prices and KNASP-3 prices.

In women receiving HAART for their own health, the treatment will continue over their lifetime. However, for purposes of this costing, following the methodology in the KNASP-3 costing, this analysis includes as PMTCT-related the costs of HAART from the point of presenting at the antenatal care (ANC) clinic and establishing eligibility to pregnancy and immediately after. Several other assumptions were made for the PMTCT costing, related to duration of breastfeeding, breastfeeding prevalence in Kenya, etc. These are summarized in the Annex.

For the non-drug costs including laboratory tests for HIV under all three scenarios, which were calculated in the ABC costing tool, the included items were counseling visits, rapid and serological tests for HIV, and early infant diagnosis. Scenario P2-P3 uses the average of the KNASP-3 pricing and last available published CHAI drug prices (as of August 2009), adjusted by an increase of 5 percent for shipping and handling. Note that list prices for PMTCT formulations have declined slightly since August 2009 as per the April 2010 CHAI pricelist (Clinton Health Access Initiative 2010).

### 5.3.2 RESULTS

Table 5.13 summarizes the results of the costing. The reconstructed four-year cost for Scenario P3, over 2009/10 to 2012/13, is derived from unit costs in the KNASP-3 ABC costing tool. This adds up to US\$97 million, the same as reported in the KNASP-3 document. Therefore, the analysis confirmed that the approach for the old guidelines for PMTCT drugs, as well as non-drug and laboratory tests costs, is the same as for KNASP-3.

The total five-year costs under the three scenarios are as follows:

- Scenario **P3** is the cheapest, with a total cost of **US\$127.9 million**
- Scenario **P2** is more expensive at **US\$165.6 million**, 29 percent more than P3
- Scenario **P1** is the most expensive at **US\$219.0 million**, 32 percent more than P2

**TABLE 5.13 COMPARISON OF PMTCT COSTS ACROSS SCENARIOS (US\$ MIL.)**

Scenario	Cost type	2010	2011	2012	2013	2014	5-year total
P1	Drug costs	\$14.0	\$14.4	\$14.7	\$15.1	\$15.5	\$73.6
	Non-drug + lab costs	\$23.9	\$26.4	\$29.0	\$30.7	\$35.4	\$145.4
P2	Drug costs	\$10.1	\$10.0	\$10.0	\$9.9	\$10.2	\$50.2
	Non-drug + lab costs	\$19.8	\$21.3	\$23.0	\$24.0	\$27.3	\$115.3
P3	Drug costs	\$1.5	\$2.6	\$3.8	\$4.3	\$4.5	\$16.7
	Non-drug + lab costs	\$18.8	\$20.4	\$22.1	\$23.3	\$26.6	\$111.2

Comparing scenarios P3 and P2 leads to a good approximation of the additional costs of the new WHO guidelines. Note that it does involve a change to the targets as well since the new guidelines ask for all women to receive some form of PMTCT prophylaxis or HAART for own health. Originally, the KNASP-3 costing did not provide for PMTCT for every HIV-positive pregnant mother. This additional cost (P2 minus P3) is **US\$37.7 million** over five years.

The additional cost of following the NASCOP targets based on the higher KAIS 2007 HIV prevalence and incorporating the new WHO guidelines can be estimated by comparing P3 and P1. This additional cost (P1 minus P3) is **US\$91.1 million** over the five years.

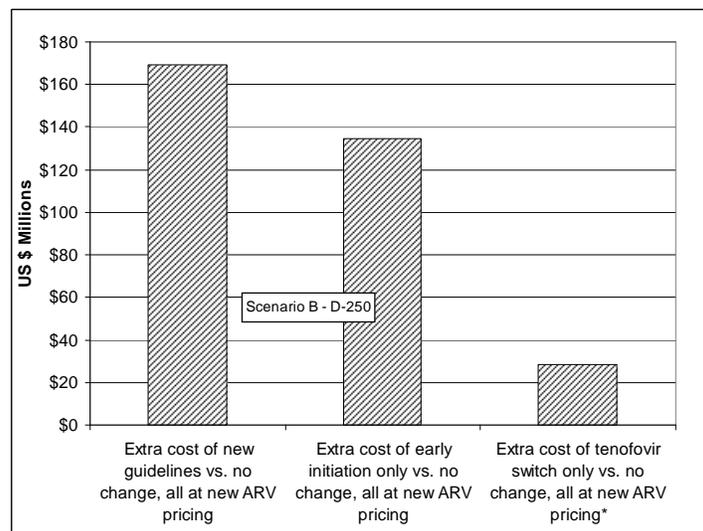
### 5.4 DISCUSSION

**Costs of changes to ART:** For adult ART, it is difficult to compare the re-estimated costs with the updated targets at CD4<250 cells/mm<sup>3</sup> with the costs estimated in the KNASP-3. This is mostly because the unit costs used in KNASP-3 'ABC' costing tool included costs for distribution and buffer stocks based on assumptions that could not be fully unpacked at this point, making exact comparisons difficult. Comparing the costing of the revised CD4<250 cells/mm<sup>3</sup> targets in the ABC tool (Scenario A) vs. the same targets in the customized NASCOP tool (Scenario D-250), there is a difference of US\$698 million between 2010 and 2014 (Figure 5.1 below, also Table 5.9). While it is possible that this difference is accounted fully by the additional distribution and buffer-related estimates in the original KNASP-3 costing (with no difference in basic drug prices), it is also possible that there are savings to be made in the basic list prices of the drugs as they have declined in the international market since August 2009.

The comparison that can be made starts with the assumption that with updated prices for ARVs, continuing with initiation at CD4<250 cells/mm<sup>3</sup> and a starting first-line regimen mix that incorporates d4T would be tantamount to 'no change.' With this understanding, the additional cost of implementing early initiation at a CD4 count threshold below 350 cells/mm<sup>3</sup> and a TDF switch is US\$169.5 million (Scenario B minus D-250 in Table 5.9).

Similarly, compared with no change, but with new ARV pricing, just implementing early initiation would cost an additional US\$134.8 million (Scenario D-350 minus D-250). Also, just implementing the TDF switch would cost US\$28.2 million (Scenario C minus D-250).

**FIGURE 5.1 COMPARISON OF EXTRA COSTS DUE TO ADOPTION OF NEW GUIDELINES FOR ART**



While Kenya has taken a decision to implement the ART-related guideline changes, the speed of implementation will depend on resource availability. This report has outlined several additional sources of financing for the HIV sector in this report (see Sections 2 and 3). The cost-effectiveness studies conducted elsewhere suggest that early initiation could be very cost-effective in the Kenyan context. However, it has the largest incremental cost associated with the change. The TDF switch is also cost-effective for Kenya, and the incremental cost is not significant from a starting point of the reduced ARV prices. Therefore, prioritizing the full implementation of the TDF switch at this point is recommended.

*Costs of changes to PMTCT interventions:* The largest driver of PMTCT cost in the KNASP-3 is not the pharmaceutical, which is affected by the new WHO guidelines, but the cost of non-drug services (PMTCT visits) and laboratory tests. Of these latter costs, the PMTCT visits are on average 78 percent of the total. These costs include the value of health worker labor as well as consumables. The calculations are based on the KNASP-3 unit cost per visit of KSh740 or US\$9.87 at KNASP-3 exchange rates. If this cost of the visit were to be reduced by one-thirds, then the savings under each of the three scenarios estimated in this section (P3-P1) would be respectively US\$29 (P3), \$30 (P2), and \$37 (P1) million.

Regardless of whether such cost savings can be affected, there are substantial cost implications of implementing the new WHO guidelines. We consider the costs as in the KNASP-3 extended to a five-year timeframe as the base for increments.

Keeping the original PMTCT patient volumes as in KNASP-3, just implementing the WHO new guidelines would cost an additional US\$37.7 million on the base. Approximately 89 percent of this increase is driven by changes to PMTCT drug costs, which derive from the new WHO guidelines (as note previously, the new guidelines also increase coverage). Note that 80 percent of this additional cost could be recovered in a budgetary sense if the unit cost used for the PMTCT facility visits were reduced by one-thirds.

If revised NASCOP targets for PMTCT were used with the new WHO guidelines, where the targets derive in part from revised HIV prevalence data in the Kenya AIDS Indicator Survey 2007 (Government of Kenya 2009), then there is an additional cost of US\$91.1 million on the base. Of this, 62 percent is driven by increase in the cost of pharmaceuticals, with the rest driven by an increase in the number of patients accessing services. Nearly 32 percent of this additional cost of US\$84.7 million is recoverable from a one-third reduction in the PMTCT visit cost in a budgetary sense.

Given the substantial additional cost for implementing the revised NASCOP targets alongside the new WHO guidelines, Kenya will need to review priorities in this context. Certainly, if substantial underserved PMTCT patients exist who need to access some form of prophylaxis, changing this should be prioritized (i.e., adopt higher scale of PMTCT targets). It is important to note that this strategy will avoid substantial number of infections in infants and hence result in reduced costs in this context over the long run for Kenya. Overall, we recommend that evidence-based scale-up of PMTCT access for needy patients should be prioritized, allowing for 100 percent of women in need to get ARV prophylaxis or HAART for their own health. For these patients, changing the nature of the drug intervention as per the new guidelines can also be prioritized, given additional resources. In effect, the pace at which these activities are scaled-up will depend on available financing.

## 5.5 REFERENCES

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## ANNEX: ADDITIONAL DETAILS FOR SECTION 5

**TABLE A.5.1 REGIMEN DISTRIBUTION FOR NEW AND CONTINUING FIRST-LINE PATIENTS IN KNASP-3 ABC COSTING MODEL**

Regimen	2009/10	2010/11	2011/12	2012/13	2013/14
d4t/3TC/NVP	54.0%	47.5%	38.6%	36.2%	36.2%
d4t/3TC/EFV	13.9%	13.0%	10.1%	9.5%	9.5%
AZT/3TC/NVP	6.9%	14.3%	11.8%	11.4%	11.4%
AZT/3TC/EFV	14.1%	12.4%	7.0%	6.8%	6.8%
TDF/3TC/NVP	8.2%	7.7%	24.3%	27.1%	27.1%
TDF/3TC/EFV	2.9%	5.1%	8.2%	9.0%	9.0%

**TABLE A.5.2 “SCENARIO C” COSTS – STARTING CRITERION OF CD4<250 CELLS/MM<sup>3</sup>, US\$ MILLIONS**

	2009/10	2010/11	2011/12	2012/13	2013/14	TOTAL
Adult first-line drugs and laboratory	\$24.7	\$57.8	\$78.3	\$79.9	\$84.0	\$324.6
Adult second-line drugs and laboratory	\$6.2	\$20.4	\$29.9	\$41.2	\$53.5	\$151.3
Adult first-line non-drug and non-lab costs	\$46.0	\$57.8	\$67.1	\$66.4	\$69.6	\$306.9
Adult second-line non-drug and non-lab costs	\$2.8	\$4.2	\$6.0	\$8.1	\$10.1	\$31.1
Other costs	\$38.4	\$66.7	\$74.0	\$72.5	\$72.4	\$323.9
Total	\$118.0	\$207.0	\$255.3	\$268.0	\$289.5	\$1,137.8

**TABLE A.5.3 COMPARISON OF COST PER PATIENT YEAR OF ART REGIMENS IN TWO COSTING TOOLS**

Regimens used in both ART costing approaches				Ratio: B / A
Regimen	Annual cost in KNASP-3 'ABC' costing model		Annual cost, NASCOP custom costing tool	
	Cost KSh	Cost US\$ (A)	Cost in US\$ (B)	
d4t/3TC/NVP	13,645	\$181.9	\$75.60	42%
d4t/3TC/EFV	29,857	\$398.1	\$111.38	28%
AZT/3TC/NVP	23,584	\$314.5	\$151.20	48%
AZT/3TC/EFV	39,250	\$523.3	\$162.04	31%
TDF/3TC/NVP	32,429	\$432.4	\$150.26	35%
TDF/3TC/EFV	47,897	\$638.6	\$167.38	26%
ABC/ddI/LPV/r	164,605	\$2,194.7	\$903.04 (ddI 250)	43%
			\$991.24 (ddI 400)	
TDF/ABC/LPV/r	140,408	\$1,872.1	\$758.87	41%
TDF/3TC/LPV/r	140,607	\$1,874.8	\$557.59	30%
Second-line regimens used only in KNASP-3 'ABC' costing tool				
AZT/ddI/LPV/r	153,500	\$2,046.7	N/A	
Second-line regimens used only in NASCOP custom costing tool				
AZT/3TC/LPV/r			\$595.60	
AZT/ABC/LPV/r			\$840.04	
ddI250/3TC/LPV/r			\$693.00	
ddI400/3TC/LPV/r			\$781.20	

Regimens in grey are second line.

**TABLE A.5.4 RATIONALIZATION OF ART TARGETS FOR VARIOUS CD4-BASED STARTING CRITERIA**

Initial calculations					
	2009/10	2010/11	2011/12	2012/13	2013/14
1. No. of patients in need of ARVs (CD4<250)	512,048	559,774	610,603	663,246	714,307
2. Target: No. on ART (CD4<250)	360,000	440,580	527,566	570,998	615,000
2.a. Percent coverage	70%	79%	86%	86%	86%
3. No. of patients in need of ARVs (<350)	694,024	738,350	771,810	807,860	844,795
3.a. Percent coverage based on similar coverage as for CD4<250	70%	79%	86%	86%	86%
4. Target: No. on ART (CD4<350) (calculated using 3. and 3.a)	360,000	581,131	666,850	695,498	727,347
Annual scale-up in patient numbers		221,131	85,719	28,648	31,849
Rationalized targets: Used by NASCOP ART group for estimates					
	2009-10	2010-11	2011-12	2012-13	2013-14
No. of patients in need of ARVs (CD4<250)	512,048	559,774	610,603	663,246	714,307
Target: No. on ART (CD4<250)	360,000	440,580	527,566	570,998	615,000
Percent coverage	70%	79%	86%	86%	86%
No. of patients in need of ARVs (<350)	694,024	738,350	771,810	807,860	844,795
Target: No. on ART (CD4<350) (rationalized)	360,000	500,000	620,000	702,838	760,316
Percent coverage (rationalized)	52%	68%	80%	87%	90%
Annual scale-up in patient numbers		140,000	120,000	82,838	57,478

**TABLE A.5.5 KNASP-3 TARGETING ASSUMPTIONS FOR PMTCT**

Indicator	2010	2011	2012	2013	2014*
Number of women attending ANC services	1,300,000	1,323,000	1,360,000	1,398,000	1,437,062
HIV prevalence % (as per KNASP-3 ABC model)	7.9%	7.7%	7.5%	7.2%	7.2%
Pregnant women attending ANC tested for HIV	1,300,000	1,323,000	1,360,000	1,398,000	1,437,062
Number of HIV positive pregnant women	103,108	102,347	101,878	100,874	103,693
HIV+ women treated with ARVs (%)	62.3%	72.0%	77.3%	82.6%	85.0%
HIV Positive women treated with ARV	64,270	73,670	78,704	83,351	88,139
Rapid test - Abbott (percent of people)	100%	100%	100%	100%	100%
Rapid test - Bioline (percent of people)	10%	10%	10%	10%	10%
Serological test - Unigold (percent of people)	2%	2%	2%	2%	2%
Counseling visits (per HIV positive person)	2	2	2	2	2
Counseling visits (per HIV negative person)	1	1	1	1	1
Number of PMTCT counseling visits (calculated)	1,403,108	1,425,347	1,461,878	1,498,874	1,540,755
Early infant diagnosis patients	36,356	47,669	59,109	66,535	74,894
EID as % of HIV+ pregnancies	35%	47%	58%	66%	72%

\* Assumed figures as year was missing in KNASP-3 – rate of growth matches 2012 to 2013.

**TABLE A.5.6 HIV PREVALENCE AMONG PREGNANT WOMEN IN NEW NASCOP ESTIMATE**

Female age group	HIV prevalence*	% of all pregnancies (assume weights)	Result: 9.54% weight-adjusted HIV prevalence in pregnant women in 2010
15-19	3.5%	5%	
20-24	7.4%	30%	
25-29	10.2%	45%	
30-34	13.3%	15%	
35-39	11.2%	5%	

\* Source: Kenya AIDS Indicator Survey 2007 (Government of Kenya, 2009)

**TABLE A.19 ADDITIONAL ASSUMPTIONS FOR THE PMTCT COSTING**

Duration of a normal pregnancy	40		
Duration of breastfeeding in Kenyan women	12 months (NASCOP guidance)		
Average weight of infant during prophylaxis period	4 kilograms		
Percentage of infants in Kenya breastfed exclusively (<6mo. age)	85% (NASCOP assumption)		
Average duration of HAART for mother's own health, based on differing dates of presentation	36.6 weeks, as related to PMTCT costs (thereafter transfer to adult ART)		
Drugs	KNASP-3 cost/unit	CHAI cost/unit	Avg. cost/unit
AZT 300 mg Tab	\$0.15	\$0.13	\$0.15
Sd NVP 200 Tab	\$0.05	\$0.06	\$0.06
AZT 600 mg	\$0.29	\$0.27	\$0.29
3TC 150 mg/ AZT 300mg Tab	\$0.16	\$0.16	\$0.17
NVP 2mg/kg	\$0.02	\$0.02	\$0.02
AZT 4 mg/kg	\$0.04	\$0.04	\$0.04
AZT+3TC+NVP FDC tab	\$0.23	\$0.21	\$0.23
AZT+3TC FDC +EVF (600mg) tab	\$0.55	\$0.45	\$0.53
AZT+3TC FDC +LPV/r (200/50mg) tab	\$0.50	\$0.34	\$0.44



