SUSTAINABILITY ANALYSIS OF HIV/AIDS SERVICES IN NIGERIA

August 2009

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SUSTAINABILITY ANALYSIS OF HIV/AIDS SERVICES IN NIGERIA

ABSTRACT

To respond efficiently and effectively to Nigeria's HIV/AIDS epidemic, program planners and policymakers need strategic information and analytical tools to assist with estimating the recurrent costs and non-pecuniary resources required to deliver HIV/AIDS services. With such tools, policymakers can assess the implications of current policy decisions on the sustainability of HIV/AIDS programs over the medium term and proactively address expected resource gaps.

NACA, in conjunction with Health Systems 20/20 Project, is currently undertaking a sustainability analysis of Nigeria's response to HIV/AIDS. Using worksheets developed for this activity, data regarding epidemiology, demographics, funding levels, human resources, service delivery protocols, and service volume were collected from a sample of health facilities, health ministries, SACAs, and CSOs in 18 states across all 6 zones, as well as donors, principal recipients, and federal line ministries HIV/AIDS in the FCT. These data serve as key inputs to a simulation model of HIV/AIDS service delivery in Nigeria. Analyses are being conducted using the Microsoft Excel-based HIV/AIDS Program Sustainability Analysis Tool (HAPSAT) to estimate the financial, human, and physical resources required to deliver HIV/AIDS services in Nigeria over a five-year time horizon.

As part of this activity, several policy scenarios will be examined, each representing different levels of care, treatment, and service delivery and corresponding resource requirements. In this memorandum, we report very preliminary findings regarding financial sustainability and expected resource gaps for the purpose of discussion, data verification, and model refinement.

Results indicate that continued donor-funding commitments will be required for Years 2010-2014, as domestic revenue accounts for less than 5 percent of resources required to sustain HIV/AIDS program at current levels of service delivery. The size of the gap between the resources required and the expected level of available domestic funds for HIV/AIDS suggests that substantial innovation in health system design and health financing will be needed to mobilize domestic resources, increase operational efficiency, and ultimately reduce Nigeria's reliance on external funders of its HIV/AIDS response.

The results of data collection highlight weaknesses in processes for generating accurate, actionable strategic information regarding the financing of HIV/AIDS services. Currently, it is not possible to get a comprehensive picture of how and where resources are being expended in the HIV/AIDS response. For example, donors often reported total expenditures and budgets broken down by thematic area (treatment, care, prevention, health systems strengthening, etc), and allocations to sub-recipients and/or implementing partners. However, data was not generally provided by donors, sub-recipients, or implementing partners, to indicate how much was spent in specific service delivery points or geographical areas, or on specific activities. Thus, the geographical distribution of expenditures and service delivery outputs is not known. Likewise, the unit costs of service delivery, especially behavioral change prevention activities and support of orphans and vulnerable children, are largely unknown and cannot be calculated readily from available data. For this reason, it is not surprising that planning documents rarely describe costing methods, calculations, or assumptions to justify the amounts requested, budgeted or disbursed to support planned activities.

NACA's ability to coordinate, plan, and sustain a multi-sectoral response to HIVAIDS is hindered by the lack of comprehensive information on the flow of resources, both from domestic sources and donors, to implementing partners and specific activities. Such data would be of value to donors and implementing partners as well. The proposed Joint Funding Agreement (JFA) may help harmonize donor activities and stimulate stakeholders to participate in the development and ongoing use of a standard minimum dataset

for resource tracking. A shared system, into which all major funders and recipients report on expenditures and outputs, would be valuable for coordinating activities across geographical regions, target populations, and service delivery channels. Only with such information, can policymakers measuring efficiency and effectiveness of service delivery, identify service delivery gaps, avoid redundant activities, and ensure that policies are designed so that all Nigerians in need of HIV/AIDS services are reached. The success of such a coordinated effort will require dedication on the part of stakeholders, development of enabling information technology infrastructure, and the allocation of resources and expertise for tracking and reporting outputs at the point of service.

Strengthening organizations' capacity to develop data systems and use tools such as HAPSAT that support evidence-based, results-oriented decision-making is critical to sustaining and scaling-up a nationally-coordinated response to HIV/AIDS in Nigeria.

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ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
ART	Antiretroviral Therapy
ARV	Antiretroviral
BCC	Behavioral Change
CBO	Community-based Organization
CD4	Cluster of Differentiation 4
CDC	Centers for Disease Control
CHEW	Community Health Extension Worker
CSO	Civil Society Organization
CSS	Care and Support Services
DFID	Department for International Development (United Kingdom)
FBO	Faith-based Organization
FGN	Federal Government of Nigeria
FTE	Full-time Equivalent
GDP	Gross Domestic Product
GFATM	Global Fund for AIDS, TB, Malaria
HAPSAT	HIV/AIDS Program Sustainability Analysis Tool
HIV	Human Immunodeficiency Virus
IEC	Information, Education, Communication
JICA	Japan International Co-operation Agency
JSI	John Snow International
ILO	International Labor Organization
MAP	Multi-country HIV/AIDS Programme (World Bank)
MoH	Ministry of Health
NACA	National AIDS Control Agency
NASCP	National AIDS and STI Control Programme
NGO	Nongovernmental Organization
NHA	National Health Accounts
OI	Opportunistic Infections
OVC	Orphans and Vulnerable Children
PEP	Post-exposure Prophylaxis

PEPFAR	President's Emergency Plan for AIDS Relief
PLWHA	People Living with HIV and AIDS
PMTCT	Prevention of Mother-to-Child Transmission
STI	Sexually Transmitted Infections
TB	Tuberculosis
UNAIDS	United Nations Joint Programme for HIV/AIDS
USD	US Dollar
USAID	United States Agency for International Development
USG	United States Government
VCT	Voluntary Counseling and Testing
WHO	World Health Organization

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EXECUTIVE SUMMARY

To respond efficiently and effectively to Nigeria's HIV/AIDS epidemic, NACA, in conjunction with Health Systems 20/20 Project, conducted a sustainability analysis of Nigeria's response to HIV/AIDS. The activity involved a national data collection compiling existing strategic information at the state and national level. We developed a model Nigeria's HIV program in Microsoft Excel (using HAPSAT Version 1.5 sustainability analysis software tool), using the collected data as inputs, in order to estimate the recurrent costs and non-pecuniary resources required to sustain and scale-up HIV/AIDS services. The analysis produced estimates of the expected cost of program delivery and identified expected resource gaps in both financing and human resources. The implications of current policy decisions on the sustainability of HIV/AIDS programs over the medium term were described.

Data regarding epidemiology, demographics, funding levels, human resources, service delivery protocols, and service volume were collected from a sample of health facilities, health ministries, SACAs, and CSOs in 18 states across all 6 zones, as well as donors, principal recipients, and federal line ministries HIV/AIDS in the FCT and NACA. These data serve as key inputs to a simulation model of HIV/AIDS service delivery in Nigeria. Experts at NACA and FMoH assisted with the customization of paper-based HAPSAT data collection worksheets for the Nigerian context. The team of data collectors received a 1-day training.

In this report, three policy scenarios are examined: (1) maintaining the HIVAIDS response at its current size and scope and (2) scaling-up the level of service delivery according to published national plans and (3) scaling up to 'universal' access defined as reaching 80 percent of those needing services . The analysis of financial, human, and physical resources required to deliver HIV/AIDS services in Nigeria under each scenario considered a five-year time horizon from 2010 to 2014. Most of the published national plans do not specify targets for all of these years (e.g. the National Plan of Action for Orphans and Vulnerable Children specifies targets through 2010). For the sustainability analysis of the scale-up scenario, we extrapolated the trends in the published plans to specify service delivery targets for the years beyond the plans' time horizons.

Preliminary findings regarding financial sustainability and expected human resource gaps are described in this report for the purpose of discussion, data verification, and model refinement. Results indicate that continued donor-funding commitments will be required for years 2010 to 2014, as domestic government spending accounts for less than 5 percent of resources required to sustain HIV/AIDS program at current levels of service delivery. The size of the gap between the resources required and the expected level of available domestic funds for HIV/AIDS suggests that substantial innovation in health system design and health financing will be needed to mobilize domestic resources, increase operational efficiency, and ultimately reduce Nigeria's reliance on external funders of its HIV/AIDS response.

The key findings of the report are as follows:

- The total cost of the volume of HIV/AIDS services, if maintained at 2009 levels through 2014 is about US$650 million per year. Prevention, Care, Treatment, and Shared Costs constitutes 12 percent, 15 percent, 38 percent, and 35 percent of the total cost followed, respectively.
- Current data suggest that Nigeria is dependent on donor funding for implementing the vast majority of HIV/AIDS services. Based on the data collected for this sustainability analysis, only 8 percent of 2008 funding came from domestic sources. PEPFAR and GFATM accounted for 48 percent and 33 percent of the total budget, respectively. Policymakers and donors should pay close attention to issues of sustainability of current levels of HIV/AIDS services.

- To continue scaling up HIV/AIDS services over the next 5 years would require a dramatic increase in resources to US$1.6 billion per year by 2014. Reaching universal access by 2014 would required even greater resources—over US $1 billion in 2011 and rising steadily to over US $2 billion in 2014. Scale-up of services will require funding not only for direct provision of services, but also development of infrastructure for training and retraining of health workers. To reconcile needs with available resources, the country needs to explore resource mobilization strategies including cost-sharing mechanisms, grants, private contributions, and increasing national contributions.
- Based on the key findings of this initial sustainability analysis of Nigeria's HIV/AIDS program, the authors offer the following recommendations:
    - Financial resource mobilization strategies should focus on both national and international sources to sustain or scale up services. Donors should renew financial commitments to maintain current service levels.
    - Efforts to further scale up services should be considered only in conjunction with assessment of the medium- to long-term capacity of the health system, especially human resources.
    - HIV/AIDS program sustainability would benefit from a set of routinely collected data that can be used as inputs to sustainability analyses. Systems for capturing and reliably transmitting this financial data to the Federal Ministry of Health and National Agency for the Control of AIDS need to be developed so the cost of collecting this information is significantly reduced.
    - Donors, nongovernmental HIV/AIDS service organizations, and the private sector, should participate in sustainability analysis to share data so that the government can make accurate estimates on what needs to be sustained or scaled up.
    - As a final note, it should be emphasized that the results presented in this report may need to be updated regularly since the context in which HIV/AIDS services are being implemented is changing rapidly. For example, donor funding continues to be unpredictable, drug costs are falling, and the state-of-art for HIV/AIDS diagnosis treatment continues to evolve.

Attempts to collect data for this analysis highlight weaknesses in processes for generating accurate, actionable strategic information regarding the financing of HIV/AIDS services. As other investigators has observed1, it is not currently possible to efficiently generate a comprehensive picture of how and where resources are being expended in the HIV/AIDS response. For example, donors often reported total expenditures and budgets broken down by thematic area (treatment, care, prevention, health systems strengthening, etc), and allocations to sub-recipients and/or implementing partners. However, data was not generally provided by donors, sub-recipients, or implementing partners, to indicate how much was spent in specific service delivery points or geographical areas, or on specific activities. Thus, the geographical distribution of expenditures and service delivery outputs is not known. Likewise, the unit costs of service delivery, especially behavioral change prevention activities and support of orphans and vulnerable children, are largely unknown and cannot be calculated readily from available data. For this reason, it is not surprising that planning documents rarely describe costing methods, calculations, or assumptions to justify the amounts requested, budgeted or disbursed to support planned activities.

NACA's ability to coordinate, plan, and sustain a multi-sectoral response to HIVAIDS is hindered by the lack of comprehensive information on the flow of resources, both from domestic sources and donors, to implementing partners and specific activities. Such data would be of value to donors and implementing partners as well. The proposed Joint Funding Agreement (JFA) may help harmonize donor activities and

[1] Canning et al. Expenditures on HIV/AIDS and their Policy Implications. in AIDS in Nigeria: A Nation on the Threshold. Ed. Olusoji Adeyi, Phyllis J. Kanki, Oluwole Odutolu, John A Idoko. Harvard University Press Cambridge 2006

stimulate stakeholders to participate in the development and ongoing use of a standard minimum dataset for resource tracking. A shared system, into which all major funders and recipients report on expenditures and outputs, would be valuable for coordinating activities across geographical regions, target populations, and service delivery channels. Only with such information, can policymakers measuring efficiency and effectiveness of service delivery, identify service delivery gaps, avoid redundant activities, and ensure that policies are designed so that all Nigerians in need of HIV/AIDS services are reached. The success of such a coordinated effort will require dedication on the part of stakeholders, development of enabling information technology infrastructure, and the allocation of resources and expertise for tracking and reporting outputs at the point of service.

Strengthening organizations' capacity to develop data systems and use tools such as HAPSAT that support evidence-based, results-oriented decision-making is critical to sustaining and scaling-up a nationally-coordinated response to HIV/AIDS in Nigeria.

1. BACKGROUND

Nigeria has experienced a remarkable scale-up of HIV/AIDS services over the past five years. More than 250, 000 Nigerians have started on antiretroviral therapy (ART). Prevention of mother-to-child transmission (PMTCT), and voluntary counseling and testing (VCT) have been expanded to more than 400 and 864 sites, respectively, throughout the country. However, the resources required to sustain the current level of HIV/AIDS services in Nigeria over the next decade have not been secured. A partnership framework is being developed with the United States Government (USG) and the level of bilateral support from the USG is expected to at least remain constant at 2009 levels in order to sustain PEPFAR-supported patients started on treatment. Future financing from other major donors, including the World Bank Multi-country AIDS Program (MAP), Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM), and DFID has been applied for and approved. Nevertheless, some uncertainty remains regarding the availability of external resources and the resources needs to sustain and expand programmes. NACA is undertaking the assessment of the sustainability of its current portfolio of HIV/AIDS activities with the purpose of generating information to support the mobilization of resources and the design of policy.

The Nigerian government and its expanded multi-sector network of partners, including faith-based organizations (FBOs), civil society organizations (CSOs), and other private and public groups, coordinated through NACA and guided by the National Strategic Framework (NSF), seek to close the human resource and technical capacity gap and build a network of health systems managers and prevention, treatment, and care providers that can efficiently utilize donor funding and domestic revenue to produce health and quality of life gains for people living with HIV and AIDS (PLWHA), orphans and vulnerable children (OVC), and the general population. This requires not only an adequate funding and human resources, but also a high level of institutional, programmatic, and financial management capacity of these organizations.

Sustainability refers to the ability of a country to support HIV/AIDS services at a desired level, scope, and scale over time. Sustainability can be broken down into three major categories: financial sustainability, organizational sustainability, and sustainability of services. Sustainability analysis seeks to assess whether delivering a package of HIV/AIDS services in the context of anticipated demographic and epidemiological trends will require more resources (financial or human) than are expected to be available.

The primary metric for evaluating the sustainability of an HIV/AIDS program is the gap between resources needed and resources available over the relevant time horizon. In addition to funding gaps, human resources and infrastructure constraints must also be addressed in order to ensure that goals of Nigeria's response to HIV/AIDS are met over the next decade.

NACA conducts sustainability analysis to jointly examining financial, human resource, and infrastructure gaps to inform strategic planning, support resource mobilization, and program design. In this report, we report on a sustainability analysis examining three alternative policy scenarios for the scale-up of Nigeria's HIV/AIDS response:

1. Maintaining current (2009) service levels
2. Scaling-up moderately in accordance with policy goals outlined in several NACA documents including the GFATM Round 8 application, the National Health Sector Strategic Plan for HIV & AIDS 2005-2009, the National AIDS Priority Plan 2007 – 2008, and the National Prevention Plan 2007 – 2009.

3. Reaching universal access by 2014. This scenario examines the resources needed to scale up to universal coverage reaching 80% of those needing HIV services.

The analysis was implemented in HAPSAT, a Microsoft Excel-based tool for conducting sustainability analysis which allows the policymaker to account for the complex interaction of HIV/AIDS program inputs, use simulation to estimate an HIV/AIDS program's output, and identify bottlenecks and slack constraints. By simulating alternative HIV/AIDS program specifications and alternative assumptions about the demographic and epidemiological context, policymakers can ensure that plans for HIV/AIDS programs are optimized for the expected resource envelope (including money, human resources, and physical capital) and gain an understanding of the sensitivity of the expected output of an HIV/AIDS program to changes in underlying assumptions and program inputs. The results of the analysis will be used to inform decisions about resource allocation across different types of HIV/AIDS services, scaling-up of HIV treatment, and development of human resource and physical infrastructure, as well as to advocate for additional funding to support HIV/AIDS services into the future. By simulating alternative resource allocations, service delivery models and productivity levels, policymakers can estimate the expected benefits of proposed innovations, identify services that are easier to sustain, quantify reliance on external funding, and plan a response to HIV/AIDS that corresponds to the expected resource envelope.

2. METHODS

2.1 HAPSAT MODEL OVERVIEW

For this activity, we used a Microsoft Excel-based tool, called HAPSAT, which was developed for modeling HIV/AIDS programs, estimating resource needs, and comparing alternative policies related to the delivery of HIV/AIDS treatment, care, prevention, and mitigation. We assessed the sustainability of Nigeria's HIV/AIDS services over a five-year time horizon from 2010-2014.

A comprehensive multi-sector response to HIV/AIDS is a complex system with many interacting parts. In HAPSAT, we modeled Nigeria's HIV/AIDS program (e.g. the national response) as a collection of interconnected HIV/AIDS services. This model captures the cascade effects of PMTCT and HCT services as generators of newly identified cases for ART and other services. Medical services explicitly modeled in HAPSAT include antiretroviral treatment (ART), prevention of mother-to-child transmission (PMTCT), HIV counseling and testing (HCT), care and support services (CSS) for PLHIV including palliative care (PC) and home-based care (HBC), prevention of medical transmission by screening blood supply and promoting injection safety (BSI), and treatment of HIV-tuberculosis co-infection (HIV-TB). Non-medical services include behavioral change communication (BCC), prevention commodities (e.g. condoms), and the support of orphans and vulnerable children (OVC).

The resources required to deliver HIV/AIDS services are broken into three categories: financial resources (donor and government funding), human resources for service delivery (e.g. community health extension workers, councilors, medical doctors and medical officers, nurses and midwives, laboratory scientists and technologists, pharmacists and pharmacy assistants, administrative officers, monitoring and evaluation officers, and managers), and physical infrastructure (buildings, vehicles, laboratory equipment, computers, communication networks, etc).

Country-specific data were collected from NACA, federal line ministries, donors, collaborating partners, and health facilities to inform HAPSAT model parameters. The baseline data encompass the general parameters that represent the context with which any program and policy design must contend. Baseline data can be differentiated into six major categories: demographic, epidemiological, financial, labor and service, medical, and cost data.

Each component service in Nigeria's HIV/AIDS program has a defined unit of service by which the program's direct output (service volume) can be measured and reported. For example, a unit of ART service is one patient-year of ART. Using country-specific data wherever possible, we estimated unit costs for units of service. When country-specific data was not available, we attempted to use regional estimates from the literature or other sources. After the HAPSAT model was calibrated to represent the current HIV/AIDS epidemic and response in Nigeria, we estimated gaps in financial resources for sustaining current service levels and for scaling up over a five-year time horizon in accordance with policy goals outlined in several NACA documents including the GFATM Round 8 application, the National AIDS Priority Plan 2007 – 2008, and the National Prevention Plan 2007 – 2009.

The HAPSAT model requires two broad categories of information: baseline data and policy specifications. Taken together this user input forms a scenario to be analyzed. The baseline data encompasses the general parameters that represent the background context against which any program and policy design must contend and take into consideration. Baseline data can be differentiated into six major categories:

- Demographic data, such as population structure, fertility rates, and mortality rates;

- Epidemiological data, such as HIV prevalence, infection, and symptom development rates, life expectancies, probabilities of transmission;
- Financial data, such as trends in donor funding and other financing sources for HIV/AIDS programs;
- Labor and service data, such as stock of health workers and volume of HIV/AIDS services delivered;
- Medical data, such as available protocols and regimens for screening, ARVs, and monitoring; and
- Cost data, such as human resource salaries, building, equipment, and consumables costs.

The demographic and epidemiological categories define the parameters of potential users of HIV/AIDS services, including HIV-positive OVC, and those receiving other CSS including HBC, nutritional support, palliative care, and hospice services. The financial data detail trends in donor funding for HIV/AIDS programs and services and outline current and potential funding possibilities. Labor and service data take into consideration the current capacity of the health workforce and service delivery. The medical data and cost data categories in large part describe the infrastructure that will be used to deliver HIV/AIDS services to the population, with a particular focus on costs of individual components.

For each programmatic area of Nigeria's HIV/AIDS response, units of service were defined to measure the program's direct output (service volume). For example, a unit of service for ART is one patient-year of treatment (Table 1).

TABLE 1

HIV/AIDS Program Component	Units of Service
VCT	1 person pre-test counseled, 1 person tested, 1 person post-test counseled
PMTCT	1 pregnant woman counseled, 1 pregnant woman tested, 1 infected pregnant woman treated with ARV prophylaxis
ART*	1 person-year of 1st line treatment, 1 person-year of 2nd line treatment, 1 person-year of pediatric treatment
CSS-HIV*	1 person-year of treatment for OI, palliative care, psychosocial support, and nutritional supplementation.
TB/HIV*	1 TB case tested for HIV, 1 HIV case tested for TB, 1 HIV/TB case treated with DOTS, 1 HIV+ person receiving a course of isoniazid prophylaxis
CSS-OVC**	1 person-year of school fees, psychosocial support, nutritional supplementation, and housing.
Prevention**	1 condom distributed, 1 high-risk person reached by targeted ABC activites, 1 listener-minute of mass media (e.g. radio), 1 worker reached by workplace HIV/AIDS program, 1 person receiving PEP, 1 health worker trained in PEP, BSI, safe medical injection, or universal precautions for health care settings.

Note: DOTS=Direct Observation Therapy Short-course; ABC=Abstinence, Be Faithful, Condoms; PEP=Post-exposure Prophylaxis; BSI=Blood Safety

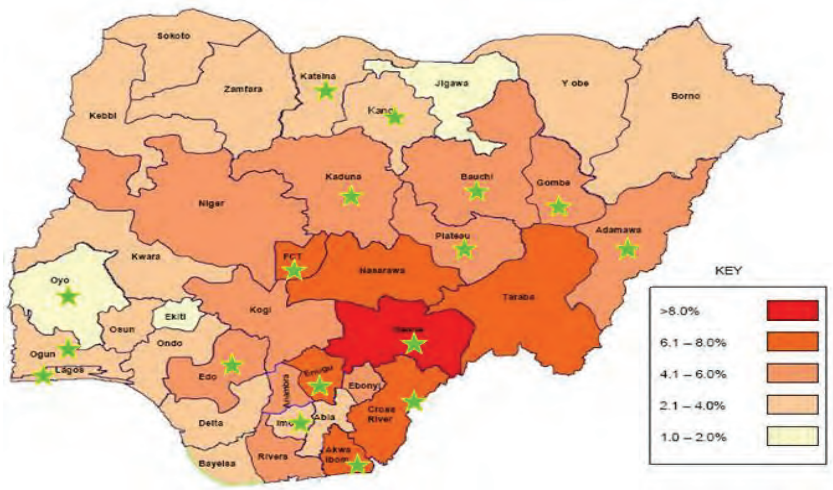
*The costs for HIV care are outpatient only, and do not include hospitalization for AIDS-related complications.

**Data on the current volume and Nigeria-specific costs and labor requirements of these services were not available for this study, but they can be included in future sustainability analyses using the current version of the HAPSAT model if country-specific input data is available.

2.2 DATA COLLECTION

A review of reports and other documents produced by NACA, the Ministry of Health, other line ministries, international donors, and implementing partners was complemented by direct data collection from service delivery points and CSOs in 18 states, covering all 6 zones and the FCT (Figure 1). The specific states visited are shown in Table 2. They represent 54 percent of Nigeria's population and an estimated 58 percent of Nigeria's HIV cases. In each state, approximately 6 service delivery points were visited, as well as the SACA and State MoH office. In most states, a CSO delivering OVC care was visited. In at least 1 state per zone a private facility was visited. In some cases, a LACA was also visited. In total, data was gathered from approximately 100 service delivery points.

FIGURE 1. GEOGRAPHICAL DISTRIBUTION OF DATA COLLECTION SITES



Green stars mark location of data collection sites

TABLE 2. DATA COLLECTION SAMPLE FOR SUSTAINABILITY ANALYSIS

Zone	State Name	State Population	Percent of Full Pop	HIV Age 15-49	SDPs	GON Offices	Other
Northeast	Adamawa	3,168,101	2.3%	4.2%	L1:,L2:,L3:	SACA, SMH	1 CSO,1 FP
Southsouth	Akwa-Ibom	3,920,208	2.8%	8.0%	L1:,L2:,L3:	SACA, SMH	1 CSO
Northeast	Bauchi	4,676,465	3.3%	3.4%	L1:,L2:,L3:	SACA, SMH	1 CSO
North Central	Benue	4,219,244	3.0%	10.0%	L1:,L2:,L3:	SACA, SMH	1 CSO
Southsouth	Cross-River	2,888,966	2.1%	6.1%	L1:,L2:,L3:	SACA, SMH	1 CSO
Southsouth	Edo	3,218,332	2.3%	4.6%	L1:,L2:,L3:	SACA, SMH	1 CSO
Southeast	Enugu	3,257,298	2.3%	6.5%	L1:,L2:,L3:	SACA, SMH	1 CSO
North Central	FCT Abuja	1,405,201	1.0%	6.3%	L1:,L2:,L3:	SACA, SMH	1 CSO
Northeast	Gombe	2,353,879	1.7%	4.9%	L1:,L2:,L3:	SACA, SMH	1 CSO
Southeast	Imo	3,934,899	2.8%	3.9%	L1:,L2:,L3:	SACA, SMH	1 CSO
Northwest	Kaduna	6,066,562	4.3%	5.6%	L1:,L2:,L3:	SACA, SMH	1 CSO
Northwest	Kano	9,383,682	6.7%	3.4%	L1:,L2:,L3:	SACA, SMH	1 CSO
Northwest	Katsina	5,792,578	4.1%	2.7%	L1:,L2:,L3:	SACA, SMH	1 CSO
Southwest	Lagos	9,013,534	6.4%	3.3%	L1:,L2:,L3:	SACA, SMH	1 CSO
Southwest	Ogun	3,728,128	2.7%	3.6%	L1:,L2:,L3:	SACA, SMH	1 CSO
Southwest	Oyo	5,591,589	4.0%	1.8%	L1:,L2:,L3:	SACA, SMH	1 CSO
North Central	Plateau	3,178,712	2.3%	4.9%	L1:,L2:,L3:	SACA, SMH	1 CSO

2.3 DATA

2.3.1 POPULATION, ECONOMICS, AND GEOGRAPHY

Nigeria has an estimated population of 146,000 living in 774 local governmental areas in 36 states and the Federal Capital Territory, in 6 geopolitical zones.

2.3.2 HIV EPIDEMIOLOGY

HIV prevalence was recently estimated using a population-based survey. In addition, NASCP conducted antenatal surveillance (Table 3). Based on this new data, approximately 3 million Nigerians are HIV-infected. Of these, about 220,000 are pediatric cases (UNAIDS 2008). The most recent population-based survey and antenatal surveillance results found a prevalence of 3.6 percent among those 15-49 and 4.6 percent among women in antenatal clinics. These results have not yet been analyzed to generate prevalence estimated for individual states, but a 2005 study of HIV at antenatal sites reported large variation in prevalence from high of 10% in Benue to a low of 1.6% in Ekita.

TABLE 3: HIV ESTIMATES AND PROJECTIONS

HIV Estimates and Projections	2008	2010	2012
HIV population			
Total	2,952,000	3,132,000	3,352,000
Males	1,228,400	1,300,000	1,387,000
Females	1,724,000	1,833,000	1,965,000
Prevalence (15-49)	3.6	3.6	3.67
Annual HIV+ births			
Total	56,681	54,380	52,113
Percent	1	0.95	0.9
Cumulative AIDS deaths			
Total	2,988,000	3,540,000	4,089,000
Males	1,375,000	1,617,000	1,858,000
Females	1,612,000	1,922,000	2,231,000
Annual AIDS deaths (yearly)			
Total	280,000	276,000	274,000
Males	123,000	121,000	120,000
Females	157,000	155,000	154,000
ART Program			
Total requiring ART (Adults)	740,000	811,000	907,000
Total requiring ART (<15yrs)	92,000	101,000	104,000
All requiring ART	833,000	912,000	1,011,000
New HIV infections			
Adult new infections	323,000	341,986	363,911
Childhood new infections	57,000	54,000	52,000
Total number of children (<15yrs) orphaned due to HIV/AIDS			
Total AIDS orphans	2,229,883	2,419,984	2,527,102
Maternal AIDS Orphans	1,810,703	1,942,000	1,998,751
Paternal AIDS Orphans	1,401,481	1,521,736	1,592,226
Dual orphans	1,199,833	1,273,590	1,296,765

Source: 2008 Antenatal Surveillance Report, FMoH, NASCP

2.3.3 CURRENT LEVELS OF SERVICE DELIVERY

Nigeria's HIV/AIDS response is comprised of activities in several thematic areas. In the HAPSAT software these categories are referred to as services. They include the clinical services (diagnosis, treatment, prevention of mother-to-child transmission, palliative care, home based care, HIV-TB services, treatment of OIs), prevention services (awareness and behavioral change, promotion of safe sex, blood safety, post-exposure prophylaxis, universal precautions), mitigation (care and support of orphans and vulnerable children), and systems strengthening (laboratory infrastructure, strategic information and planning, information systems). Naturally, there is some logical overlap between service components. For instance, some orphans may receive clinical services including ART and some awareness programs may include counseling and testing component. To avoid double counting, all clinical services are grouped together even if they occur in the context of another program. To parallel reporting in the NNRIMS, counseling and testing of pregnant women is counted as part of the PMTCT service rather than as part of HCT services.

Diagnosis: HIV counseling and testing

There are 864 sites where HIV counseling and testing (HCT) is available. Approximately 14% of the general population at risk for HIV has had an HIV test (NARHS+), although in a given year only about 1 million tests were performed, representing about 1.5% of the population age 15-49. Nearly 30% of people most at risk (MARPs) have had an HIV test.

Anti-Retroviral Treatment

According to epidemiological modeling, an estimated 740,000 Nigerians are clinically eligible for ART (Table 2), although a majority of these persons do not know they are infected. Nigeria has 269 service delivery points where ART is provided (PEPFAR Indicator 11.1, April 2008). According to NACA's registry of service delivery points, 73 percent of these sites are public, 18 percent are private, and 9 percent are operated by FBOs, NGOs, or some other type of organization. It is estimated that approximately 200,000 Nigerians were receiving ART in April 2008 (PEPFAR Indicator 11.4, April 2008). By March 2009, this number had increased to 269,000, and new patients are being added at a rate of approximately 4500 per month. Patients who are identified as HIV-infected but not eligible for ART receive "Pre-ART" care to maintain their health and monitor the status of their infection.

Prevention of Mother-To-Child Transmission

There are over 430 service delivery points where PMTCT is provided. Each year, over 5 million Nigerian women are pregnant. Of these, about 20 percent receive HIV counseling and testing and receive their results. Approximately 13,000 pregnant women in Nigeria were treated at delivery to prevent vertical transmission in 2007 out of an estimated 200,000 pregnancies among HIV-positive women.

Palliative Care: basic health care and support

Palliative care includes the care of PLWHA who are clinically eligible, including those on ART, not on ART or who have exhausted available antiretroviral treatment options. Palliative care includes:

- Medical care
    - Pain and symptom management
    - OI treatment and prevention
- Socio-economic supports
    - Stigma and discrimination reduction
    - Income generating activities

TB-HIV

Nearly half of Nigeria's TB patients are HIV infected. HIV-TB services focus on the testing of new HIV patients for TB and testing new TB patients for HIV. Identification of co-infected patients is important for optimizing HIV treatment regimens and controlling the spread of TB. There are over 144 TB/HIV implementing sites in 18 states. These sites have registered 26,500 TB patients, of which 17,800 were tested for HIV, and 16.6% tested positive.

Awareness and Behavioral Change Communication

Prevention messages and Family Life curriculum for schoolchildren and HIV education and awareness activities for youth not in school, as well as youth clubs, and mass media awareness campaigns are all part of the BCC strategy. Recently, NACA completed a National Prevention Plan for 2007-2009 which outlines hundred of activities aimed at behavioral change.

Condoms and Other Prevention

Nearly 180,000,000 condoms were distributed in 2007 through workplace programs, community mobilization and awareness events, health clinics, and though the private market.

Blood Safety, Injection Safety, Universal Precautions, and Post-exposure Prophylaxis

There are 17 NBTS centres in the country where blood is collected from voluntary non-remunerated donors and screened for the 4 mandatory Transfusion Transmissible Infections (TTIs)- HIV1&2, Heapatitis B, Hepatitis C and Syphilis. The prevalence of TTIs amongst blood donors in 2008 are 2.6% for HIV (<0.1% amongst regular blood donors) 9.7% Hepatitis B, 2.5% Hepatitis C and 0.3% Syphilis. The NBTS has started the hospital linkages programme. The goal is to ensure that safe blood is made available at all times in hospitals. Presently, the NBTS is designing a grassroots approach to reach the local level with its services.

Orphans and Vulnerable Children

An orphan is a person under 18 years old who has at least one deceased parent. By this definition, Nigeria may have as many as 7.3 million orphans, over 10% of all children (Source: FMWASD, 2008 Situation Assessment and Analysis on Orphans and Vulnerable Children (OVC) in Nigeria). An additional 10.2 million children who are not orphans are considered to have a vulnerable situation such as living in a household where an adult caregiver is critically ill for at least 3 months, or having to work for money, having been sexually abused, or not enrolled in school. Thus, as many as 17.5 million children (24.5 percent of children) in Nigeria are OVC.

An estimated one-quarter of orphans are AIDS orphans (i.e. the cause of parent's death was AIDS). Nearly half a million AIDS orphans have lost both parents ("double orphans"). HIV prevalence among OVC is not known, but the 2005 sero-prevalence sentinel report estimated that there are about 75,000 children born each year HIV-infected and approximately 100,000 children under 15 currently eligible for ART (National HIV/AIDS Sero-prevalence Survey Report, 2005). Currently, this growing vulnerable population is in need of a portfolio of support services including nutrition, housing, education, psychosocial support, and legal services.

The national OVC plan of action set forth by the FMWASD is not limited to AIDS orphans, although NPA monitoring data is reported through the NNRIMS system coordinated by NACA. The NPA plans for the scale up of OVC services from about 1% of OVC in 2006 to about 10% of OVC in 2010. The cost of the plan (excluding activities funded through other budget lines) was estimated to be $146 million in 2006 and scale up to $511 million in 2010. About one-third of the budget was allocated to educational support, one-quarter to health care, and one-third to household care. Only 3.4% was allocated to organization, monitoring and evaluation.

Drug Supply Chain and Laboratory Infrastructure

Drugs for ART provision in FMOH clinics are procured and distributed through the Central Medical Stores, operated by Supply Chain Management Systems. The operating cost of the supply chain is US$350,000, exclusive of salaries.

Laboratory infrastructure is also undergoing strengthening initiatives:

- Medical laboratory scientist trained across the country on the use of the approved national testing algorithm from both public and private laboratories
- Provision and training of CD4 cyflow operators from 55 tertiary & secondary sites across the country.
- Kit evaluation
- EID activity in collaboration with Clinton Foundation
- Provision and installation of 5 PCR machine in the country awaiting its activation
- Provision of additional 40 CD4 machine to be distributed to 40 assessed sites across the country.

Strategic Information, Policy Analysis, and System Strengthening

Donors have investing in HMIS, M&E, and capacity building to improve the generation of strategic information for planning, monitoring performance and developing policy, NACA, SACAs, line ministries, and service delivery points. Recent developments include:

- Health Sector M&E Frame work – Yet to be disseminated
- Harmonized diagnosis, treatment, PMTCT and TB/HIV tools developed and well circulated (though the level of use is still limited by development partners)
- Use of two databases (DHIS and LHPMIP) for collection of strategic information
- Existence of HIV/AIDS surveillance mechanisms in the general population and among the high risk groups
- Ongoing capacity building in relevant areas of the health sector response (though limited)

2.4 CURRENT FINANCING OF HIV/AIDS SERVICES

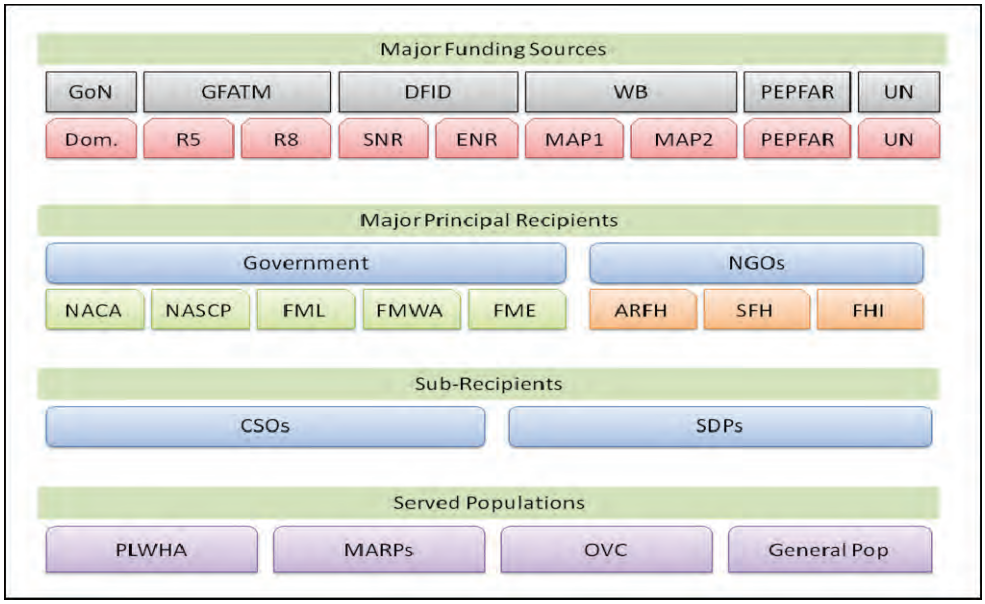
2.4.1 SOURCE AND FLOW OF FUNDS

Funds for Nigeria's response to HIVAIDS have come from domestic public financing, domestic private sector, the United Kingdom's Department for International Development (DFID), the United States' President's Emergency Plan for AIDS Relief (PEPFAR), The Global Fund for AIDS, TB, and Malaria (GFATM), World Bank (WB), and the United Nations (UN) organizations (Figure 2). Funding flows from its original sources through principal recipients including NACA and government line ministries, and the major non-governmental organizations (NGOs) such as the Association for Reproductive and Family Health (ARFH), Society for Family Health (SFH), and Family Health International (FHI). Principal recipients may expend funds to directly provide services to target populations. They also fund activities of sub-recipients NGO and for-profit partners, as well as CSO umbrella organizations, and service delivery points (SDPs) such as hospitals, clinics, laboratories, and testing centers. In turn, target populations are reached by CSO prevention and mitigation activities and at service delivery points where care and treatment is available.

Nigeria's decentralized government structure complicates the tracking of funding flows. Not all funds flowing into individual states and LGAs pass through the national level. Both government and donor

funds for the HIVAIDS response can bypass the national level. Likewise, information does not flow readily up from LGA to state to federal level, presenting an ongoing challenge for data collectors/managers, policymakers at NACA, and for donors planning to use their funds in a way that complements extant activities.

FIGURE 2. FLOW OF FUNDS FOR NIGERIA'S RESPONSE TO HIVAIDS



GoN = Federal Government of Nigeria, GFATM = Global Fund for AIDS, TB, and Malaria, DFID= Department for International Development (Uk), WB = World Bank, PEPFAR = President's Emergency Plan for AIDS Relief (US), UN= United Nations, Dom = domestic, R5 = Round 5, R8 = Round 8, SNR= Strengthening Nigeria's Response, ENR = Enhancing Nigeria's Response, MAP1 = Multi-country HIVAIDS Program I, MAP2 = Multi-country HIVAIDS Program II, NACA = National Agency for the Control of AIDS , NASCP= National AIDS Control and Prevention Program, FML= Federal Ministry of Labour, FMWA= Federal Ministry of Women's Affairs and Social Development, FME= Federal Ministry of Education, ARFH= Association for Reproductive and Family Health, SFH= Society for Family Health, FHI= Family Health International, CSO=,SDP=,PLWHA= people living with HIV/AIDS, MARP=most at-risk persons, OVC= orphans and vulnerable children, Pop = population

2.4.1.1 FEDERAL GOVERNMENT OF NIGERIA

The total disbursement for HIV/AIDS activities by Ministries, Departments and Agencies of the Federal Government of Nigeria from the 2006-2009 is shown in Table 4 below. The largest response to HIV/AIDS has been from the Federal Ministry of Health and NACA. NACA is the national government agency responsible for coordinating the government's multi-sector response to HIVAIDS. The national and state governments also employ public sector health workers and these workers' salaries are paid primarily from domestically-sourced internal revenue. The salary support for health workers delivering HIVAIDS treatment and care are included in Table 4. Domestic funding of HIV/AIDS activity has been highly variable over the past 4 years, and diminished substantially in 2009.

TABLE 4. DOMESTICALLY SOURCED FUNDS DISBURSED FOR HIV/AIDS TO FEDERAL LINE MINISTRIES AND GOVERNMENT AGENCIES

Ministry/Parastatal	2006	2007	2008	2009
FMWA/SD	$391,230	$817,000	$1,409,100	$1,191
Ministry of Agriculture	$5,635,000	$374,827	$55,510	
Ministry of Education	$3,755,541	$1,749,052	$625,935	$106,562
FMoH	$38,237,500	$17,385,760	$55,623,249	$7,593,388
NDLEA	$162,441			
Fed. Min. of Communication	$5,796			
FMHUD	$40,250	$24,510		
Ministry of Environment	$40,250			
Ministry of Transport	$24,150			
Ministry of Defence		$122,550		$28,465
Ministry of Youth and Development		$359,480	$213,500	
Ministry of Interior			$119,560	$204,600
Ministry of Mines & Solid Minerals				$27,280
Ministry of Labour/Productivity				$56,742
State House	$193,200			
Bureau for Public Service	$5,554,500			
National Natural Medicine Development Agency	$49,642		$68,320	$47,740
National Human Rights			$42,700	$47,740
National Population Council			$145,180	$136,400
NACA	$11,833,500	$18,762,118	$11,826,304	$6,849,816
Total	$65,923,000	$41,229,296	$74,143,164	$16,289,699

Exchange Rate US Dollars to Naira: 2006, 124.22; 2007, 122.40; 2008, 117.10; 2009, 146.63

NACA is also a principal recipient of funds from World Bank and GFATM. NACA received $13.76 million in 2007 and $16.233 million in 2008 from GFATM Round 5 funds. NACA has six sub-recipients (FHI, Hygeia, FMH-NASCP, SFH, NIBUCAA, and the FML. Table 5 shows the GFATM Round 5 funds received and disbursed in 2007. Of the funds received in 2007, $5.6 million were used to support health worker training ($1.07 million), infrastructure ($507,446), ARV ($2.7 million), STI and OI drugs ($753,322) as well as laboratory reagents ($638,385). In 2007, NACA also disbursed ₦73.7 million of MAP funds from World Bank across federal line ministries, including ₦22.9 million to the Ministry of Health. NACA was also responsible for the disbursement of MAP funds through the HIV/AIDS Action Fund (HAF) to CSOs during the 2002-2007 period. However, both of these funding sources have expired.

TABLE 5. GFATM ROUND 5 FUNDS RECEIVED BY NACA AND SUB-RECIPIENTS

Recipient	2007
NACA	$9,088,945
Sub-recipients	
Family Health International	$2,557,201
Hygeia Foundation	$504,948
MoH HIV/AIDS Division (NASCP)	$1,101,572
Society for Family Health	$627,948
NIBUCAA	$241,362
Federal Ministry of Labour	$122,664
Total	$14,256,824

Source: http://www.theglobalfund.org/programs/country/?countryid=NGA

The state governments in Nigeria also make substantial financial contributions to the HIV/AIDS response. Comprehensive data is not available on the level of support by state, though it is generally believed to vary considerably across states.

State Level: Case Study – Plateau State

In Plateau state, the state agency for the control of HIVAIDS, known as PLACA, mobilized about US$6 million over three years 2005-2007. A World Bank credit was the source of 94% of these funds. The Bill & Melinda Gates Foundation-funded AIDS Prevention Initiative in Nigeria (APIN) was the source of 3% of the funds. The remaining 3% of funds were domestically sourced through state and local governments and public private partnerships (Table 6). Other SACAs visited during the data collection did not provide similar financial data.

TABLE 6. PLATEAU STATE AGENCY FOR THE CONTROL OF AIDS BUDGET

PLACA Budget Source of Funds	Naira	USD	Percent
World Bank Credit	619,883,000	$5,390,287	94%
Counterpart	10,000,000	$86,957	2%
State Ministries	2,082,000	$18,104	0%
State Boards and Parastatals	7,023,000	$61,070	1%
LGA councils	3,960,000	$34,435	1%
AIDS Prevention Initiative in Nigeria	18,000,000	$156,522	3%
Public Private Partnership Fund	567,000	$4,930	0%
Total	661,515,000	$5,752,304	100%

SOURCE: PLACA Annual Report 2008

2.4.1.2 DONORS AND MAJOR IMPLEMENTING PARTNERS

PEPFAR[2]

Under PEPFAR, Nigeria received more than $70.9 million in Fiscal Year (FY) 2004, more than $110.2 million in FY2005, approximately $163.6 million in FY2006, and 304.9 million in FY2007 to support comprehensive HIV/AIDS prevention, treatment and care programs. PEPFAR is providing $447.6 million in FY2008. PEPFAR will provide $440.6 million in FY2009. The following organizations have implemented projects funded by PEPFAR in FY 07: AbtAssociates ($500,000), Africare ($ 625,000), American Public Health Laboratories ($ 350,000), American Society of Clinical Pathology ($ 400,000), Catholic Relief Services ($ 20,948,750), Centre for Development and Population Activities ($ 2,480,375), Christian Aid ($ 175,665), Clinical and Laboratory Standards Institute ($ 200,000), Columbia University Mailman School of Public Health ($ 15,075,702), Family Health International ($ 45,929,572), Federal Ministry of Health, Nigeria ($ 3,500,000), Food for the Hungry ($ 443,656), Harvard University School of Public Health ($ 44,140,720), Hope Worldwide South Africa ($ 470,272), International Foundation for Education and Self-Help ($ 620,530), John Snow Inc. ($ 1,966,103), Management Sciences for Health ($ 4,350,000), New York AIDS Institute ($ 300,000), Partnership for Supply Chain Management ($ 19,015,316), Population Council ($ 825,000), Safe Blood for Africa Foundation ($ 944,500), Society for Family Health-Nigeria ($ 2,306,246), The American Society for Microbiology ($ 499,996), The Futures Group International ($ 3,310,000), University of Maryland ($ 50,987,475), University of North Carolina ($ 1,475,000), USAID ($ 6,728,000), CDC ($ 5,636,835), Winrock International ($ 1,699,000), WHO ($

[2] http://www.pepfar.gov/press/countries/profiles/116242.htm

800,000). Funding for FY 09 will be distributed thus: $ 66,167,251 will go for prevention, $ 90,777,372 will go for care, $ 236,611,989 will go for treatment and $ 47,055,441 will go for other priorities.

GFATM[3]

The total funding requested for Round 8 is $ 178,030,052. The approved maximum is $ 75,055,363. The principal recipients of GF funding are: Association for Reproductive and Family Health (ARFH), Christian Health Association of Nigeria, National Action Committee on AIDS of the Federal Government of Nigeria, National Agency for the control of AIDS, Society for Family Health, The Yakubu Gowon Center for National Unity and International Cooperation. The project implemented in Round 5 with GF funding was called "Scale-up of Comprehensive HIV and AIDS Treatment, Care and Support in Nigeria - To expand access to HIV testing and counseling Services to cover all 37 States of the country."

World Bank[4,5]

The objective of the HIV/AIDS Program Development Project is to assist Nigeria in reducing the spread, and mitigate the impact, of HIV infection by strengthening its multi-sectoral response to the epidemic through implementing a comprehensive program that includes the creation of an enabling environment for a large-scale response, and laying the foundation for scaling up HIV/AIDS prevention, care, and treatment services at the federal, state, and local levels. This project supports the government's HIV/AIDS Emergency Action Program (HEAP), which is planned to be implemented during the next three years; it also provides further support for two years after that, to assist the development and start of the implementation of a long-term strategy to fight against HIV/AIDS. The project fits within the Multi-Country HIV/AIDS Program for the Africa Region (See report no. 20727).There are two project components. The first builds capacity by enabling newly-established agencies (NACA and SACA) to: evaluate action plans submitted by the line ministries and nongovernmental organizations; monitor and evaluate HEAP implementation and HIV/AIDS conditions in the country; and enable these agencies to act as information clearinghouses. The second component finances the plans approved by the AIDS agencies; and helps with preparing programs of actions and planning. The third component funds proposals from NGOs, community-based organizations, and the private sector. The total project cost is $ 96.28 million. The implementing agencies are the NACA and key line ministries. An additional $ 50 million has been approved to combat AIDS by supporting the HIV/AIDS Programme Development Project and introducing changes in the project and accompanying amendments to the project's legal documents. The additional financing will help finance the costs associated with the scaling up of the project from 14 to 35 states (the scaling up occurred in 2005 in conjunction with the mid-term project restructuring).

United Nations[6]

Major challenges/activities for FY2009: Human Resource Capacity, Alignment and Harmonization, Monitoring and Evaluation, Health Systems Strengthening, Coordination at state and LGA levels. UNDP has two major projects on HIV/AIDS in Nigeria: the Joint Donor Basket Fund to Support Nigeriaâ€™s Country Coordinating Mechanism for Global Fund Grants ($ 48,935), and the Strategic Planning and Implementation to address HIV and AIDS in Nigeria ($ 54,742). Within UNAIDS, UNFPA takes a leadership role in condom programming and prevention among young people and women, two groups

[3] http://www.theglobalfund.org/programs/country/?countryid=NGA&lang=en

[4]http://web.worldbank.org/external/projects/main?pagePK=64283627&piPK=73230&theSitePK=368896&menuPK=368928&Projectid=P070291

[5]http://web.worldbank.org/external/projects/main?pagePK=64283627&piPK=73230&theSitePK=368896&menuPK=368928&Projectid=P105097

[6] http://www.unaids.org/en/CountryResponses/Countries/nigeria.asp
http://www.undp.org/hiv/pa_africa.htm
http://www.unfpa.org/hiv/index.htm
http://www.unicef.org/nigeria/

who are increasingly at risk of infection. It also reaches out to other vulnerable populations. Linking HIV responses with sexual and reproductive health care is the overarching strategy for reaching more people cost-effectively and moving towards the goal of universal access to prevention, treatment, care and support by 2010. The priorities of UNICEF in combating AIDS in Nigeria are: Primary prevention among young people, Prevention of Mother-to-child Transmission, Paediatric AIDS and Protection of orphans and vulnerable children.

Society for Family Health

SFH received funds from 3 major donors, PEPFAR, GFATM, and DFID. In 2007 SFH received about $18.2 million $5.1 million from PEPFAR, $4.3 million from GFATM, and $8.8 million from DFID. In 2008, SFH received $2.1 million from GFATM and $8.8 million from DFID, but no funds from PEPFAR. SFH disbursed portions of these funds to sub recipients PPFN, FHI, NIMR, GEDE Foundation, Action AIDS, and Pathfinder. In both 2007 and 2008, SFH disbursed $3.3 million to subrecipients ($395,800 to PPFN, $668,000 to FHI, $262,500 to NIMR, $189,000 to GEDE Foundation, $786,520 to Action AIDS, and $1 million to Pathfinder). SFH reports that in 2007, it spent $457,500 on equipment for HCT and $840,000 on supplies for HCT. SFH also reports spending $4 million on prevention commodities.

ARFH[7]

The Association for Reproductive and Family Health (ARFH) is a not-for-profit, non-governmental organization established in 1989 in response to the health and social needs of the disadvantaged groups in rural and urban communities. ARFH activities have been funded by UNFPA, PEPFAR (HSPH/APIN, Enhanse-USAID), GFATM, and Clinton Foundation, among others. ARFH's activities related to HIV are focused on prevention activities and counseling and testing. In addition to operating a clinic and laboratory, ARFH activities include community mobilization, capacity building of other NGOs and CSOs, and workplace programmes.

FHI[8]

The Global HIV/AIDS Initiative Nigeria (GHAIN) is the largest comprehensive HIV/AIDS project ever implemented in a single developing country. Begun in 2004 and funded by the US President's Emergency Plan for AIDS Relief through USAID, the five-year GHAIN project is strengthening and expanding a wide range of HIV/AIDS services to support the Federal Government of Nigeria's response to the epidemic. Funded by the U.K. Department for International Development, the Strengthening Nigeria's Response to HIV/AIDS (SNR) Program aims to reduce the impact of HIV and AIDS in Nigeria by increasing the capacity of the public and private sectors and civil society organizations to respond to HIV and AIDS at the national, state and local levels.

Civil Society Organizations

There are more than 1,300 CSOs working on HIV/AIDS in Nigeria. Most are members of one of six umbrella networks: Civil Society for HIV/AIDS in Nigeria (CiSHAN), Nigerian AIDS Research Network (NARN), Interfaith Coalition, Society for Women and AIDS in Africa, Nigerian chapter, (SWAAN), National Youth Network on HIV/AIDS (NYNETHA), Media Arts and Entertainment (MAE) and Network of People Living With HIV/AIDS in Nigeria (NEPWHAN).

2.4.2 CURRENT HUMAN RESOURCES FOR HIV/AIDS

According to a recent report9, Nigeria has one of the largest stocks of human resources in Africa. In 2005, Nigeria had about 35,000 doctors and 210,000 nurses, 6350 pharmacists, and 115,800 community health workers. Nigeria's medical schools produce about 2000 doctors, 5500 nurses, and 800

[7] http://arfh-ng.org/

[8] http://www.fhi.org/en/CountryProfiles/Nigeria/nigeriaprograms.htm

[9] Chankova S, et al. A Situation Assessment of Human Resources in the Public Health Sector in Nigeria. 2006 Abt Associates.

pharmacists per year. Still, only a portion of these health workers are employed in the public sector and only a portion of their time is available for HIVAIDS care and treatment. Slightly more than half of doctors and nurses work in public sector health centers and hospitals. However, in the case of doctors, labor hours are often split between public and private sectors. Nigeria's public sector facilities lose about 2.3 percent of its doctors, 1.4 percent of nurses, 2.2 percent of pharmacists and 1.3 percent of laboratory staff each year to attrition. National recruitment and attrition rates mask significant variability in health worker supply across zones. For example, there are an estimated 7 doctors per 100,000 population in North East zone compared to 21 doctors per 100,000 population in South West zone. Nigerians face a wide range of health problems in addition to HIV/AIDS. Table 7 shows the projected stock of public sector health workers 2007 to 2014.

Policymakers allocating resources within the health sector must consider HIVAIDS in the context of other health priorities. In order to deliver new HIVAIDS services, health workers have had to increase their effort and efficiency, and necessarily have had to reduce the delivery of services for other health problems. Accordingly, the current load on the health workforce generated by the scale-up of HIV/AIDS services has the potential to threaten access to and quality of other health services. The impact of HIVAIDS service delivery on the availability of other health services is beyond the scope of the current analysis. However, in the analysis, the health worker resource envelope was measured in full-time equivalents, applying an assumption that only 25% of health worker labor hours was available for HIVAIDS service delivery. Although, this assumption is based on information from the convenient sample of health facilities that participated in the data collection, there is a significant amount of both variability and uncertainty in the estimate of the portion of health worker time available for HIVAIDS service delivery.

In addition to the quantity of labor time required, delivering high-quality HIV/AIDS services also requires HIV-specific training. Although the production of new health workers is clearly an important factor governing the capacity of the health system to deliver HIVAIDS services, the costs of educating health workers (pre-service training) is not included in the sustainability analysis and the flow of new health workers is an exogenous input to the model. However, in-service training costs are included in the model as a percentage of expenditures on service delivery. In-service training is required on an ongoing basis because technologies for HIV/AIDS care are evolving rapidly and treatment standards and guidelines are frequently updated. The cost of these training programs can be viewed as a direct cost of HIVAIDS service delivery.

TABLE 7. SUPPLY OF HEALTH WORKERS IN NIGERIA

Health Worker Cadre	Workers 2005*	Annual Recruits	Annual Attrition Rate	Net Change	Projected Number of Workers						
					2007	2008	2009	2010	2011	2012	2013
Doctors	17,815	1,372	2.34%	5.36%	20,836	21,720	22,584	23,427	24,251	25,055	21,397
Medical interns (house officers)	2,357	2,357	100%	0.00%	2,357	2,357	2,357	2,357	2,357	2,357	2,178
Registered Nurse	37,602	429	1.43%	-0.29%	37,276	37,171	37,069	36,967	36,867	36,769	31,603
Nurse Midwives	84,250	960	1.43%	-0.29%	83,519	83,285	83,055	82,828	82,604	82,383	70,625
Laboratory scientists	5,522	189	1.26%	2.16%	5,888	6,002	5,927	5,852	5,778	5,705	5,200
Laboratory workers /radiographers	12,894	441	1.26%	2.16%	13,748	14,015	14,280	14,541	14,799	15,053	13,553
Pharmacists	3,749	133	2.16%	1.40%	3,909	3,958	4,006	4,053	4,099	4,143	3,744
Pharmacy technicians and assistants	8,940	318	2.16%	1.40%	9,321	9,438	9,552	9,664	9,774	9,881	8,943
Administrators	6,678	138	1.76%	0.31%	6,741	6,761	6,780	6,799	6,818	6,836	6,163
Medical record officer (Data managers)	12,828	266	1.76%	0.31%	12,949	12,987	13,024	13,060	13,096	13,132	11,839
Public health (nursing) officers	7,202	149	1.76%	0.31%	7,270	7,291	7,312	7,332	7,353	7,373	5,171
Environmental health officers	8,006	166	1.76%	0.31%	8,081	8,105	8,128	8,151	8,174	8,196	6,537
Community health officers	11,515	239	1.76%	0.31%	11,623	11,657	11,691	11,724	11,756	11,788	8,251
Community health extension workers (J-CHEW)	59,853	1,945	1.44%	1.81%	63,162	64,198	65,219	66,225	67,216	68,194	68,194

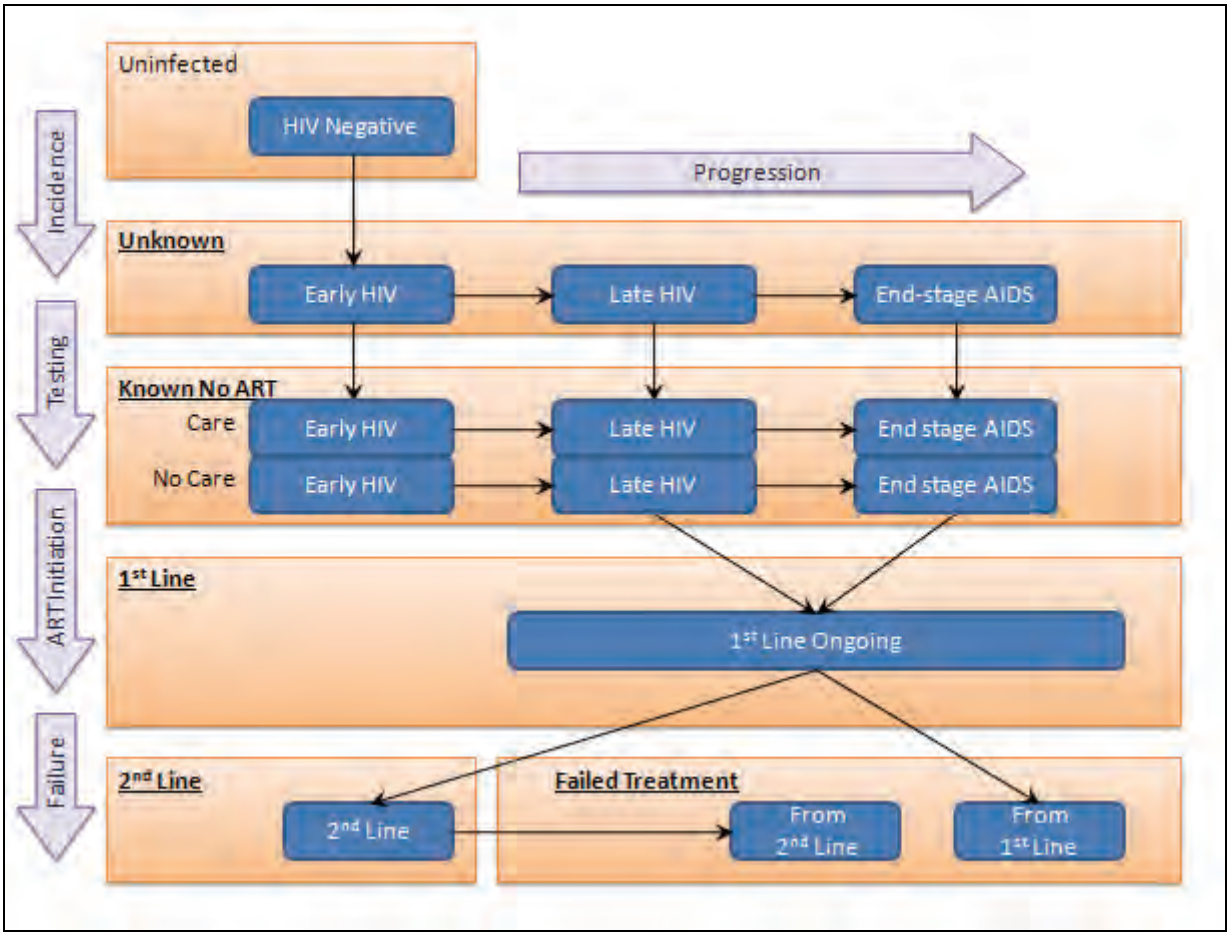
Source: Chankova S, et al. A Situation Assessment of Human Resources in the Public Health Sector in Nigeria. 2006 Abt Associates. *2007 – 2013 estimates calculated by applying recruitment and attrition trends from 2005 estimates.

3. MODEL INPUTS AND ASSUMPTIONS

3.1 MODEL STRUCTURE

In the HAPSAT model, the population is distributed across several HIV-relevant health states, as shown in Figure 3. To analyze policies, a population is simulated over a 5 year time horizon. During the simulation, the individuals in the population transition between health states: infections occur and progress; some individuals get tested and learn their HIV status; and known HIV cases enter care and treatment provided these services are available. These transitions are governed by model parameters. HIV incidence parameters are calibrated to match expected trends in Nigeria. Core progression and treatment effectiveness parameters are set to model defaults that can be modified to reflect country-specific situations.

FIGURE 3. HAPSAT MODEL STRUCTURE: HEALTH STATES AND POPULATION FLOWS



3.2 CALIBRATION TO EPIDEMIOLOGICAL INDICATORS

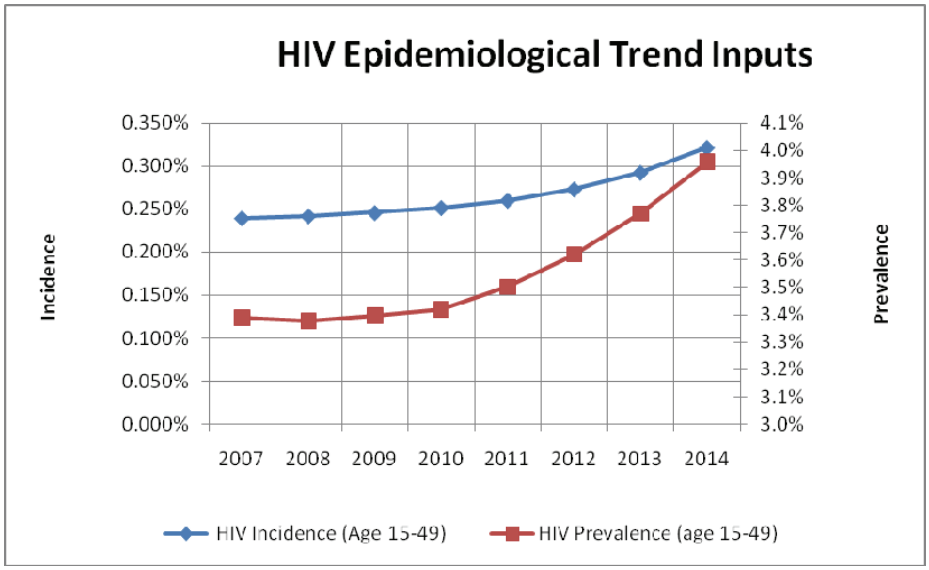
The HAPSAT model was calibrated to reflect expected HIV epidemiological trends compiled from various sources including the 2008 Antenatal surveillance Report and UNAIDS projections. To achieve reasonable calibration results that reflect recent historical trends, the model contains a 2-year 'burn-in' period which precedes the analytical time horizon. Thus, the model's time horizon begins in 2007, but the period of analysis is 2010-2014.

TABLE 8 CALIBRATION TO EPIDEMIOLOGICAL TRENDS

Indicator	ANC 2008	HAPSAT 2008 (Basecase)	ANC 2010	HAPSAT 2010 (Basecase)
Total Number of People Living with HIV	2,952,000	2,950,205	3,132,000	3,108,151
Number AIDS deaths	280,000	297,115	276,000	319,977
Number of New infections	323,000	334,439	341,986	368,389
Number of HIV+ births	56,681	56,235	54,380	57,275
Total Number with HIV eligible for ART	833,000	822,552	912,000	883,759

Table 8 compares the recent FMoH projections based on analysis of antenatal surveillance data to the basecase assumptions in the HAPSAT model. Model fitting was carried out through iterative adjustment to several model parameters including those governing progression rate from infection to ART eligibility and HIV incidence. In the basecase, the average time to progress from infection to eligibility was 7.5 years. HIV incidence was rising over the time from 238 per 100,000 in 2007 to 350 per 100,000 in 2013 (Figure 4). The calibration criteria prioritize finding a good fit with historical data through 2008, so that decision-makers could be confident that HAPSAT's underlying epidemiological assumptions produce results consistent with observed short-term trends in Nigeria. Projections for 'out-years' (e.g. Year 2010 in Table 8) may reasonably differ since the model used to make projections from antenatal surveillance data may have different assumptions about trends in the scale-up of treatment and prevention.

FIGURE 4. HIV INCIDENCE AND PREVALENCE TRENDS IN HAPSAT MODEL UNDER 'MAINTAIN' SCENARIO



3.3 HIV PROGRESSION AND SURVIVAL

The model parameters governing disease progression and treatment effectiveness are shown in Table 9.

TABLE 9. HAPSAT EPIDEMIOLOGICAL MODEL PARAMETERS

Parameter	Value
Percent of Births with MTC HIV transmission w/o Treatment	25.0%
Percent of Births with MTC HIV transmission with Treatment	10.0%
HIV progression (% moving from not eligible to eligible) per year	13.3%
% of untreated HIV eligibles who die per year	50%
Average # of Years before 1st line treatment fails	9
% of 1st line ART patients whose treatment fails, per year	11.1%
Average # of Years before 2nd line treatment fails	8
% of 2nd line ART patients whose treatment fails, per year	12.5%
Relative Risk of HIV test seeking for HIV+ asymptomatic vs. HIV-	5.5
Relative Risk of HIV test seeking for HIV+ symptomatic vs. HIV-	30

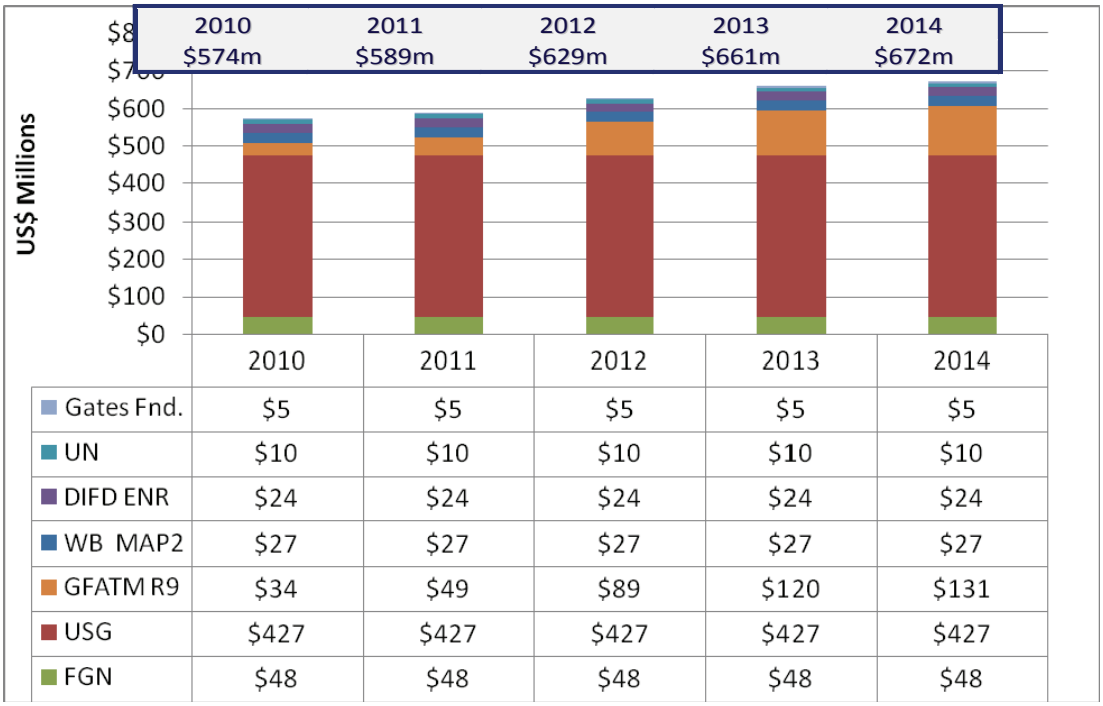
3.4 FINANCIAL RESOURCES

Figure 5 show the expected value of funding streams from the Federal Government of Nigeria and from major bilateral and multilaterals. The analysis assumes that PEPFAR (USG) would sustain funding through 2014 at the amount they obligated in 2009. PEPFAR is the largest contributor of financial resources for HIV programs. In 2007, PEPFAR supported 83 percent of ART provision. Looking forward, PEPFAR's share may increase, since previous GFATM grants have expired and subsequent rounds have not been awarded. The DFID ENR program funding has been committed for 2009 to 2013. However, UN and Gates funding are based on the assumption of the continuation of historical trends. Table 10 shows the resource envelope under alternative funding situations. In particular this table shows the impact of not receiving funding from particular external sources which were uncertain at the time of writing this report.

For the scenarios presented in this report, it is assumed that domestic revenue equal to the average of the past 4 years of spending will be available in year of the time horizon. That is, we assumed US $47.7 million would be spent annually by FGN on HIV/AIDS programmes from 2010-2014. Data was not provided on state budgets for HIV/AIDS activities. No resource tracking analyses have been conducted recently in Nigeria (e.g. National Health Accounts or National AIDS Spending Assessment).

Many donor sourced funds are 'earmarked' for particular programmatic areas. However, in this analysis, it was assumed that all financial resources were completely fungible across all program areas. The analysis will identify overall shortfalls, but it is possible that the analysis will fail to identify resource shortfalls within specific program areas.

FIGURE 5. FUNDING SOURCES FOR HIV/AIDS PROGRAMME*



	2010	2011	2012	2013	2014
Gates Fnd.	$5	$5	$5	$5	$5
UN	$10	$10	$10	$10	$10
DIFD ENR	$24	$24	$24	$24	$24
WB MAP2	$27	$27	$27	$27	$27
GFATM R9	$34	$49	$89	$120	$131
USG	$427	$427	$427	$427	$427
FGN	$48	$48	$48	$48	$48

*PEPFAR has not been reauthorized yet past 2008 so estimates are based on historical levels. GFATM Round 9 and World Bank MAP 2 not awarded yet.

TABLE 10. ALTERNATIVE FUNDING SITUATIONS

Situations	2010	2011	2012	2013	2014
All Sources	$575 M	$589 M	$629 M	$661 M	$672 M
Without GFATM or MAP2	$514 M	$514 M	$514 M	$514 M	$514 M
Without MAP2	$548 M	$562 M	$602 M	$634 M	$645 M
Without GFATM	$541 M	$541 M	$541 M	$541 M	$541 M
FGN only	$48 M	$48 M	$48 M	$48 M	$48 M

3.5 SERVICE DELIVERY UNIT COSTS

Table 11 shows the unit costs for each type of service that are computed using a micro-costing approach in which the unit costs of service are calculated by summing together the "ingredients" that make up that unit of service. For example, the cost of 1 adult patient-year of ART is made up of the cost of individual medications in a regimen, the labor costs of health workers, the cost of the laboratory tests, and overhead including in-service training, and M&E.

TABLE 11. UNIT COSTS FOR EACH TYPE OF SERVICE

Service	Unit of Service	Unit Cost*	Notes
ART	1 patient-year of treatment	$811-$827	HAPSAT
PMTCT	1 pregnant women tested	$45-49	HAPSAT
	1 pregnant women treated at delivery	$330-$472	HAPSAT
VCT	1 person tested	$42-$43	HAPSAT
	1 case identified	$270-$295	HAPSAT
TB-HIV	1 HIV-TB case treated with DOTS (including TB screening of HIV patients)	$377-$393	HAPSAT
CSS: PLWHA	Pre-ART Monitoring (Laboratory & Clinic Visits)	$116-$121	HAPSAT
	Palliative Care per patient-year	$12-$13	HAPSAT
Prevention	Cost per sex worker targeted	$78.00	RNM
	Cost per male condom distributed	$0.20	RNM
	Cost per person reached by community outreach	$4.00	RNM
	Cost per teacher trained in primary school education	$50.00	FME
	Cost of Non-School Youth Friendly Services per youth	$10.00	RNM
	Cost per person in employment reached (peer education)	$7.00	RNM
	Cost per male condom distributed	$0.10	RNM
	Cost per STI treated in clinics	$8.34	RNM
	Cost of Media Buy per TV Spot per Month	$130.43	RNM
	Cost of Media Buy per Radio Spot per Month	$43.48	RNM
	Cost of IEC poster	$0.04	FME
	Cost of published documents (e.g. guidelines and plans)	$2.50-$4.00	FME
	Cost of screening a unit of blood for HIV	$20.00	RNM
	Cost per PEP kit	$100.00	RNM
	Additional cost for AD syringes	$0.00	RNM
	Annual cost per hospital bed for Universal Precautions	$306.00	RNM
	Cost per circumcision	$65.00	RNM
OVC Care Package	Health (User Fee for Natl Health Ins Scheme)	$30	NPA-OVC
	Pre-Primary Education; per OVC per year	$127	NPA-OVC
	Primary Education; per OVC per year	$96	NPA-OVC
	Secondary Education; per OVC per year	$300	NPA-OVC
	Vocational Education; per OVC	$231	NPA-OVC
	Clothing 2 pairs per year; per OVC per year	$23	NPA-OVC
	Sandals	$16	NPA-OVC
	Blankets/ Bedding	$15	NPA-OVC
	Nutritional gardening program; per household	$57	NPA-OVC
	Business grant; per out-of-school OVC or OVC caregiver	$445	NPA-OVC
	Micro loan; per out-of-school OVC or OVC caregiver	$400	NPA-OVC

*Range of 5-year period. RNM = Resource Needs Model NPA-OPV= National Plan of Action for Orphans and Vulnerable Children; FME, HIVAIDS Programs Annual Implementation Progress Report 2007

Unit costs for the clinical programmatic areas are constructed from ingredients in the following categories: drugs, laboratory, labor, training, facility or program overhead, central-level shared costs. Table 12 show the cost of ARV drugs. Table 13 show the laboratory costs by test.

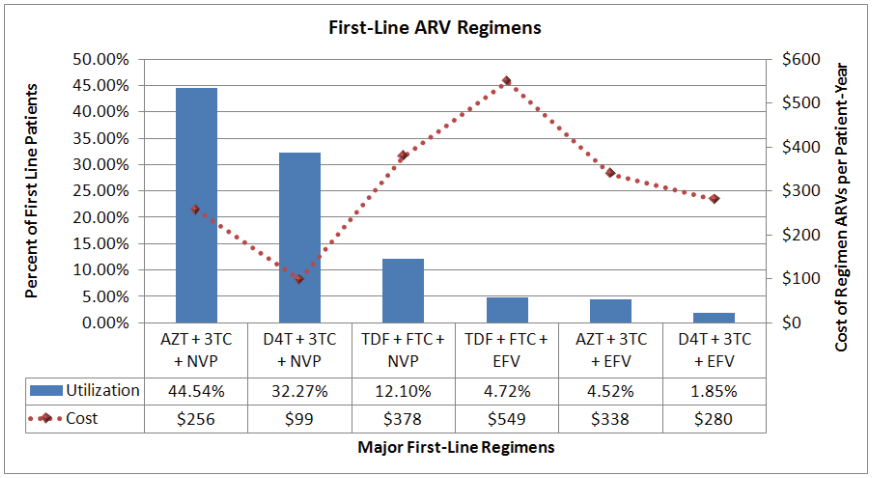
TABLE 12. COST OF ARV MEDICATIONS

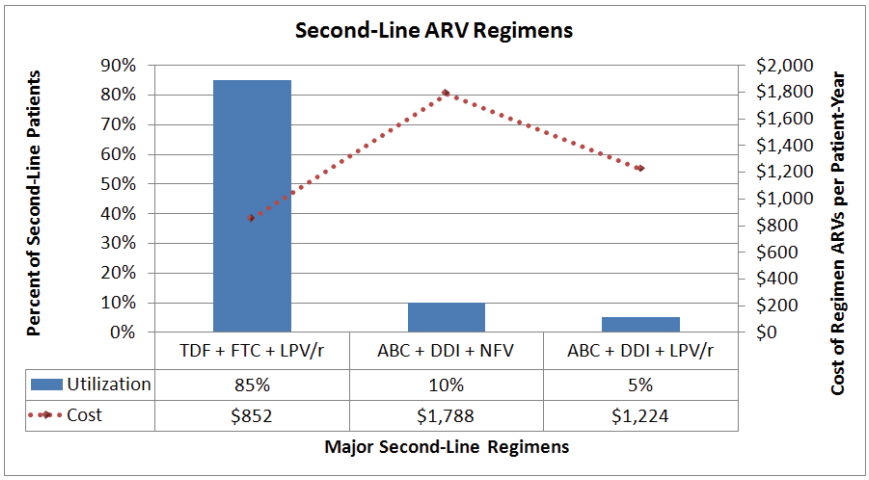
Notes	Unit	Units per Day	YearlyCost
Lamivudine 150mg	tab	2	$ 49.93
Abacavir 300mg	tab	2	$ 397.44
Stavudine 30mg	tab	2	$ 37.54
Stavudine 40mg	tab	2	$ 41.82
Lamivudine/Stavudine 150/30mg	tab	2	$ 54.75
Lamivudine/Stavudine/Nevirapine 150/30/200mg	tab	2	$ 98.77
Lamivudine/Stavudine/Nevirapine 150/40/200mg	tab	2	$ 93.68
Videx (Diadinosine) 400mg	tab	1	$ 298.91
Efavirenz 600mg	tab	1	$ 225.23
Kaletra (Lopinavir/Ritanovir)133.3/33.3mg	tab	6	$ 545.41
Aluvia (Lopinavir/Ritanovir) 200/50mg	tab	4	$ 510.79
Viracept (Nelfinavir) 250mg	tab	10	$ 1,091.76
Nevirapine 200mg	tab	2	$ 54.25
Viread (Tenofovir) 300mg	tab	1	$ 206.83
Truvada (Tenofovir / Emtricitabine) 300/200mg	tab	1	$ 324.05
Lamivudine/Zidovudine+Efavirenz 150/300 (x2) +600mg	tab	1	$ 338.48
Lamivudine/Zidovudine+Nevirapine 150/300+200mg	tab	2	$ 255.66

Source: SCMS 2007

The cost of ARV drugs was based on the unit costs for individual or fixed-dose combinations in Table 10 and data collected by PEPFAR and through NNRIMS on the distribution of patients across popular regimens, shown in Figure 6 (a-b) below for first-line regimens and second line regimens. The two scenarios assume the distribution of patients across first-line regimens and the distribution of patients across second-line regimens, and ARV prices will be constant through 2013. This simplifying assumption was made for the base case because data to inform alternative assumptions was not available. However, the impact of shifting patients to different regimens and the impact of an assumed overall decline in regimen prices could be modeled with HAPSAT as sensitivity analyses.

FIGURE 6 (A-B). ARV REGIMEN UTILIZATION AND COST. (A) FIRST-LINE (B) SECOND-LINE





The HAPSAT model includes laboratory costs for three groups of PLWHA: ART patients, Pre-ART patients, Non-ART patients (i.e. patients clinically eligible for, but not receiving, ART).

Table 13 lists the current assumptions regarding the average cost of a single laboratory test, exclusive of labor, laboratory machines, and overhead. This cost represents the cost of test 'kits', reagents, and other consumable commodities that may be used in the test.

The operating and maintenance cost of laboratory equipment and space is also of interest. Currently, these costs are captured in a broad assumption of a 20% markup of the lab test costs. The capital cost of laboratory equipment is currently omitted from the marginal economic cost analyses. In data collection, we sought information from laboratory facilities regarding the list of machines and equipment in the lab, but this was generally not available.

The labor costs for laboratory are based on the average annual salaries shown in Table 14. We assume that for 1 ART patient-year of care, that 2 hours of laboratory labor is used. This corresponds to 30 minutes per patient visit to process any lab tests ordered during the clinic visit (4 visits per year are assumed to involve lab orders). Two-thirds of that time is assumed to be spent by laboratory technicians and technologist, and 1/3 of that time is spent by laboratory scientists.

TABLE 13. LABORATORY TEST COSTS (EXCLUDING LABOR AND CAPITAL EXPENSE)

Laboratory Costs By Test	Unit Cost
Full Blood Count*	$14.53
Combination (UC,BS,LFT)*	$78.97
CD4 Count**	$8.00
Viral Load*	$47.92
X-ray	$6.00
TB Smear*	$9.40
TB Culture*	$72.26
HIV Diagnosis Screen*	$14.53
HIV Diagnosis Confirm*	$41.36
STI-RPR*	$36.67
STI-G/C*	$28.20
OI Diagnostic- Bacterial Infection*	$18.80
Creatinine*	$10.26
Glucose*	$7.70
ALT*	$7.70
Liver Function Test*	$47.01
Hemoglobin*	$7.70
White Blood Cell*	$12.82
PCR Pediatric Diagnosis*	$27.78
Cholesterol*	$9.80
Triglycerides*	$14.50
Urine Protein*	$7.70

*The stated cost are based on the following:

1. 10% addition to cover the Lab hidden costs (supplies accessories, and health and safety)

2. The conversion rate is based on $1 = 117 Naira

**PEPFAR reported $47/per test for CD4 count, but other data sources indicated a lower cost. $8 was assumed for the unit cost of a CD4 test.

The cost of health worker labor is based on average wage rates. Nigeria's public sector health workers are paid according to a standard pay scale for government workers based on their profession and years of experience. Each state and the FCT have their own scale, and the variation in pay across states for the same level of the scale can vary as much as two-fold. The FCT and Lagos state have substantially higher wage rates than more rural states. In addition, many health workers receive additional supplements for taking on extra duties. In some health facilities, health workers are paid supplements by NGOs, although this practice is discouraged by the FMoH on equity grounds. For this analysis we assumed all public sector health workers of a given cadre in Nigeria are paid the same rate, shown in Table 14. The amount of labor spent delivering services in the clinical programme areas is shown in Table 15. These costs were assumed to rise by 4 percent per year (inflation adjusted) over the time horizon analyzed.

TABLE 14. HEALTH WORKER COSTS

Health Worker Cadre	Annual Salary
Doctors	$ 15,339
Medical interns (house officers)	$ 7,096
Registered Nurse	$ 6,743
Nurse Midwives / midwives	$ 5,395
Laboratory scientists	$ 10,383
Laboratory technicians/technologists/radiographers	$ 3,426
Pharmacists	$ 10,915
Pharmacy technicians and assistants	$ 5,165
Administrators	$ 6,104
Medical record officer (Data managers)	$ 6,548
Public health (nursing) officers	$ 6,104
Environmental health officers	$ 6,548
Community health officers	$ 6,104
Community health extension workers (J-CHEW)	$ 3,496

TABLE 15. LABOR COSTS BY CADRE FOR EACH CLINICAL PROGRAMME AREA

	Hours of Labor per Unit of Service					
Program Area	**ART**	**PMTCT**	**VCT**	**TB/HIV**	**Pre-ART Care**	**Palliative Care**
Unit of Service	**Patient-Year**	**Treated Pregnancy**	**Person Tested**	**DOTS Patient**	**Patient-Year**	**Patient-Year**
Doctors	0.75	-	-	1.00	0.75	0.75
Medical interns (house officers)	2.25	-	-	-	-	-
Registered Nurse	0.63	0.79	0.21	1.90	0.47	0.95
Nurse Midwives	1.37	1.71	0.46	4.10	1.03	2.05
Laboratory scientists	0.60	0.75	0.20	1.79	0.45	0.90
Laboratory & radiographers	1.34	0.34	0.17	2.01	0.67	0.34
Pharmacists	0.62	0.15	0.08	0.93	0.31	0.15
Pharmacy technicians and assistants	1.34	0.34	0.17	2.01	0.67	0.34
Community health workers	-	-	-	12.00	3.00	3.00
Total Cost per Unit of Service	$ 47.86	$ 13.07	$ 3.83	$81.60	$25.19	$28.24

3.6 POLICY SCENARIOS

Three scenarios for HIVAIDS response are modeled:

(1) 'MAINTAIN': maintaining current level of response

(2) 'SCALE-UP' : scaling-up according to current national strategic plans

(3) 'UNIVERSAL': scaling up to universal ART coverage

For each scenario, policy goals are represented in the model as target levels of service delivery. Although policymakers may specify absolute goals (e.g. "300,000 on treatment"), the current version of HAPSAT software requires that many of the policy goals be specified as proportions (e.g. "percentage of

known ART-eligible PLWHA receiving treatment") in order to accommodate the interaction of various components of the HIVAIDS response. Changes in the intensity of one service can impact the output of another. For example, if there were no resources allocated to HCT, it might be difficult to meet targets for ART, since the number of PLWHA that were known positive and seeking care would be lower. Similarly, scaling up ART might reduce the demand for some elements of care and support such as treatment of opportunistic infections. Likewise, over the medium-term, effective prevention activities may reduce HIV incidence and the corresponding demand for treatment, care and support, and mitigation. Policy goals stated as absolute goals in source documents were converted to equivalent "proportion" parameters through a manual iterative calibration exercise.10

The 'maintain scenario' is summarized in Table 16 (a-c). It assumed a constant level of 300,000 patients on ART for 2010-2014, with approximately 5000 of those patients on second-line therapy in any given year. It assumed non-PMTCT-related counseling and testing will stay constant at 1.5 million tested per year. This level of testing was estimated to detect approximately 220,000 cases per year. PMTCT was assumed to test 5% of all pregnancies and treat 70% of known HIV+ pregnancies with intrapartum therapy. This service level was held constant over the time horizon, but because the number of pregnancies was increasing over this time horizon and because of the cumulative effect of testing (once a woman is identified as positive, treatment can be offered not only during the current pregnancy but also in subsequent pregnancies), the number treat under the PMTCT program rose proportionally, from 32,800 in 2010 to 49,000 in 2014.

It was assumed that over the five-year time horizon, 12 percent of all known HIV cases that were not yet ART-eligible would receive 'Pre-ART' care and support. Similarly, it was assumed that 50% of HIV cases that were ART-eligible, but that were not receiving ART because of lack of access, would receive palliative care. It was assumed that approximately 35,000 TB-HIV cases would be detected per year and would receive DOTS. Good data on current coverage of OVC services was difficult to find. For the 'maintain' scenario, we made the simplifying assumption that in year each 2010-2014, each OVC services would be provided to 118,000 OVC. Current prevention activities were also difficult to quantify. The maintain scenario assumes that annual spending of $2.4 million for outreach to 19,500 persons in most-at-risk populations (5% coverage), $4 million for community mobilization reaching 1 million persons, 3.67 million of Youth Friendly Services to train 40,000 teachers and reach 100,000 out-of-school children, $5.6 million for workplace programs reaching 725,000 workers, $9.7 million for treatment of 1.16 million sexually transmitted infections (10% coverage), $0.45 Million for mass media, $0.925 million for Blood Safety (100% coverage), $36,000 for Post-exposure prophylaxis (360 PEP kits), $4.2 million for universal precautions (70% of hospital beds), and $16.2 million for Male circumcision for 250,00 men.

Various national planning documents were used as the source for construction the 'scale-up' scenario. The NNRIMS Operational Plan includes specification of program goals through 2010. These are summarized in Table 18 (a-b). In addition, there is a National Plan of Action for OVC, and a set of scale-up targets set forth in the Global Fund Round 8 application. The scale-up scenario assumes that 10,000 new ART patients are added per month over the time horizon, and that VCT is scaled-up sufficiently to achieve this. PMTCT was scaled up to 1.9 million pregnancies tested and 106,000 pregnancies treated. The scale-up of prevention activities was assumed as shown in Table 18(b). Generally prevention line-items were expected to grow at 10% per year. However, targeted programs for MARPs, Youth-Friendly Services, and Male Circumcision were assumed to be prioritized to grow at an accelerated rate. Blood Supply and Injection Safety were assumed to be constant since these programmes have already been scaled up to nearly full coverage. We assumed OVC services would scale up steadily to reach 166,000 by 2014 (Table 18c).

[10] More precise calibration could be achieved using formal optimization methods (e.g. linear programming), but project resources were not sufficient to support this refinement.

TABLE 16A. SPECIFICATION OF THE MAINTAIN POLICY SCENARIO: CLINICAL SERVICE DELIVERY TARGETS

Activity		2010	2011	2012	2013	2014
PMTCT Policy						
Target	Percent of All Pregnancies HIV Tested	5.00%	5.00%	5.00%	5.00%	5.00%
Target	Percent of Known HIV+ Pregnancies PMTCT treated	70.00%	70.00%	70.00%	70.00%	70.00%
Calculated Output	Pregnant Women Screened	**291,705**	**297,192**	**302,832**	**308,617**	**314,535**
Calculated Output	Number of Known HIV+ Pregnancies Treated	**32,824**	**37,652**	**41,831**	**45,574**	**49,065**
VCT Policy						
Target	Percent of Population that is tested per year	1.00%	1.00%	1.00%	1.00%	1.00%
Target	Percent of tested persons who receive results	80%	80%	80%	80%	80%
Calculated Output	Total HIV Diagnostic Tests	**1,453,537**	**1,481,747**	**1,510,643**	**1,540,168**	**1,570,273**
ART Policy						
Target	Percent of known ART-eligible PLWHA receiving 1st line	31.75%	32.40%	31.69%	30.50%	29.10%
Target	Percent of 1st line treatment failures receiving 2nd line	10.00%	10.00%	10.00%	10.00%	10.00%
Calculated Output	Number of PLWHA receiving 1st line	**295,123**	**295,076**	**294,990**	**294,892**	**294,880**
Calculated Output	Number of PLWHA receiving 2nd line	**4,884**	**4,996**	**5,069**	**5,120**	**5,157**
Calculated Output	Total on ART	**300,007**	**300,072**	**300,059**	**300,013**	**300,037**
Care & Support Policy: PLWHA						
Target	Percent of Known Eligible PLWHA receiving Non-ART CSS	50.00%	50.00%	50.00%	50.00%	50.00%
Calculated Output	Number of Known Eligible PLWHA receiving Non-ART CSS	**115,849**	**130,219**	**140,421**	**149,481**	**158,843**
Target	Percent of Known PLWHA receiving Pre-ART CSS	12.00%	12.00%	12.00%	12.00%	12.00%
Calculated Output	Number of Known PLWHA receiving Pre-ART CSS	**45,012**	**51,227**	**56,816**	**62,002**	**67,032**
TB/HIV Policy						
Target	Percent of TB cases receiving HIV test	32.00%	32.00%	32.00%	32.00%	32.00%
Calculated Output	Number of new HIV cases detected through TB program	**8,122**	**8,074**	**8,098**	**8,179**	**55,441**
Target	Percent of Known HIV+/TB getting DOTS TB treatment	95.00%	95.00%	95.00%	95.00%	95.00%
Calculated Output	Number of HIV+/TB getting DOTS TB treatment	**34,092**	**34,769**	**35,459**	**36,161**	**245,840**

TABLE 16B. SPECIFICATION OF THE MAINTAIN POLICY SCENARIO: PREVENTION ACTIVITY TARGETS

Peer Outreach to Male and Female CSWs						
Target	% sex workers reached per yr	5	5	5	5	5
Calculated	Sex workers reached	20,014	20,508	21,011	21,524	22,050
Community mobilization						
Target	Number reached	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Youth Friendly Services						
Target	Number of teachers trained	40,000	40,000	40,000	40,000	40,000
Target	Number Reached with Non-School Youth Friendly Services	100,000	100,000	100,000	100,000	100,000
Workplace programs						
Target	% workforce receiving peer education	2.0%	2.0%	2.0%	2.0%	2.0%
Target	% workforce receiving condoms	1.0%	1.0%	1.0%	1.0%	1.0%
Calculated	Workers reached with peer education	745,084	763,028	781,330	800,034	818,802
Calculated	Condoms provided	3,725,419	3,815,140	3,906,649	4,000,169	4,094,008
STI management						
Target	% of STI cases receiving treatment	10%	10%	10%	10%	10%
Calculated	STI cases treated	1,160,000	1,160,000	1,160,000	1,160,000	1,160,000
Mass media						
Target	Radio Spot - Months	10,000	10,000	10,000	10,000	10,000
Target	TV Spots - Months	100	100	100	100	100
Blood safety						
Target	Units of safe blood produced	47,187	48,117	49,049	49,049	49,049
Post-exposure prophylaxis						
Target	Number of PEP kits	361	361	361	361	361
Universal precautions						
Target	Percent of hospital beds covered	70%	70%	70%	70%	70%
Calculated	Number of hospital beds covered	14,000	14,000	14,000	14,000	14,000
Male circumcision						
Calculated	Number of circumcisions performed	250,000	250,000	250,000	250,000	250,000

TABLE 16C. SPECIFICATION OF THE MAINTAIN POLICY SCENARIO: OVC MITIGATION ACTIVITY TARGETS

	Unit Cost	2010	2011	2012	2013	2014
All OVC		19.0 M	19.5 M	20.1 M	20.6 M	21.2 M
All OVC Targetted for Service		948,158	975,275	1,003,168	1,031,859	1,061,370
Estimated Portion of OVC from AIDS (26%)		246,521	253,572	260,824	268,283	275,956
Health : National Health Insurance User Fee	$30	118,000	118,000	118,000	118,000	118,000
Direct Provision of Basic Care Package	$345	118,000	118,000	118,000	118,000	118,000
Pre-Primary Education; per OVC per year	$127	118,000	118,000	118,000	118,000	118,000
Primary Education; per OVC per year	$96	118,000	118,000	118,000	118,000	118,000
Secondary Education; per OVC per year	$300	118,000	118,000	118,000	118,000	118,000
Vocational Education; per OVC	$231	118,000	118,000	118,000	118,000	118,000
Clothing 2 pairs per year; per OVC per year	$23	118,000	118,000	118,000	118,000	118,000
Sandals	$16	118,000	118,000	118,000	118,000	118,000
Blankets/ Bedding	$15	118,000	118,000	118,000	118,000	118,000
Nutritional gardening program; per household	$57	118,000	118,000	118,000	118,000	118,000
Business grant; per out-of-school OVC or OVC caregiver	$445	118,000	118,000	118,000	118,000	118,000
Micro loan; per out-of-school OVC or OVC caregiver	$400	118,000	118,000	118,000	118,000	118,000
Average number of OVC services received per OVC	3					
Estimated Cost per OVC	$481					

TABLE 17A. PROGRAM TARGETS FROM NNRIMS OPERATIONAL PLAN 2007-2010. NACA.

Activity		2008	2009	2010
PMTCT Targets				
Outcome	HIV-infected newborns per 100 live births to HIV-infected mothers	30	25	22.5
Outcome	Number (and Percent) of Known HIV+ Pregnancies PMTCT treated with complete course	34,250 (20)	48,500 (40)	55,800 (50)
Output	Number women tested with results	640,000	900,000	1,040,000
Output	Number of PMTCT facilities	517	854	1293
Prevention				
Target	Percent of schools with teachers trained in life skills based HIVAIDS education who taught it in past year	40	60	80
Target	Number of male condoms distributed through social marketing	212M	233M	256M
VCT Targets				
Outcome	Percent of individuals ever received HCT and got result	20	26	31
Outcome	Percent of MARPs received HCT and got result in past 12 months	33	37	41
Output	Number of people tested with results (cumulative)	1.0M	1.4M	1.6M
Output	Number of HCT outlets	1584	2614	3960
ART Targets				
Outcome	Patient Volume: Percent of people with advance HIV infection receiving ART	40	60	85
Outcome	Geographical Coverage: Percent of LGA with >0 health facilities providing ART	30	50	76
Output	Current number enrolled	187,000	308,600	467,500
Output	Number of SDPs giving ART	250	300	387
Palliative Care				
Output	Number of HIV receiving HBC	7,500	10,500	13,500
Output	Number of HIV receiving TB treatment	19,300	27,300	31,500
Output	Number of HIV receiving cotrimoxazole	134,500	216200	309,500
OVC				
Outcome	Percent of AIDS OVC Households receiving free basic external support (In 2005, denominator was 1,300,000 households – 15% of all orphans)	10	15	20
Outcome	Geographical Coverage: Percent of LGA with >0 health facilities providing ART	30	50	76
Output	Number of AIDS OVC whose households receive free basic external support	70,000	80,000	100,000

TABLE 17B. NEEDS BY HIV PROGRAM AREA REPORTED IN GFATM ROUND 8 APPLICATION

PMTCT	**2009**	**2010**	**2011**	**2012**	**2013**
PMTCT: HIV Screening of Pregnant Women	1,776,000	2,220,000	2,664,000	3,108,000	3,552,000
Met by Non-GFATM	270,107	270,107	270,107	270,107	270,107
Service Gap	1,505,893	1,949,893	2,393,893	2,837,893	3,281,893
GFATM R8	75,000	390,000	690,000	1,332,000	1,332,000
HCT	**2009**	**2010**	**2011**	**2012**	**2013**
HCT: Testing of Adults	15,000,000	18,000,000	18,000,000	18,000,000	18,000,000
Met by Non-GFATM	2,000,000	2,500,000	3,000,000	3,500,000	4,000,000
Service Gap	13,000,000	15,500,000	15,000,000	14,500,000	14,000,000
GFATM R8	307,200	1,286,400	2,126,400	4,634,400	4,634,400
ART	**2009**	**2010**	**2011**	**2012**	**2013**
ART: Persons on Treament (All ages)	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Met by Non-GFATM	320,000	417,460	497,709	431,061	433,269
Service Gap	680,000	582,540	502,291	568,939	566,731
GFATM R8	203,524	282,160	362,409	436,361	438,569
BCC	**2009**	**2010**	**2011**	**2012**	**2013**
BCC: Family Life Education to Students	3,364,800	3,533,200	3,710,000	3,895,400	4,071,000
Met by Non-GFATM	1,450,000	1,600,000	1,780,000	1,850,000	2,200,000
Service Gap	1,914,800	1,933,200	1,930,000	2,045,400	1,871,000
GFATM R8	300,000	480,000	600,000	840,000	0
OVC	**2009**	**2010**	**2011**	**2012**	**2013**
OVC: Care and Support Services to OVC	1,134,717	1,134,717	1,134,717	1,134,717	1,134,717
Met by Non-GFATM	118,000	142,000	166,000	166,000	166,000
Service Gap	1,016,717	992,717	968,717	968,717	968,717
GFATM R8	1,250	3,250	5,750	925	925

Table 18 (a-c) shows the policy scenario for scaling up aggressively through 2014. It assumes non-PMTCT-related counseling and testing will grow by about 1 million additional people tested per year, rising from 3 million in 2010 to 6 million in 2014. PMTCT is assumed to test about 1 million pregnancies and treat an increasing number of women, rising from 58,000 in 2010 to 130,000 in 2014. It was assumed that over the five-year time horizon, 12 percent of all known HIV cases that were not yet ART-eligible would receive 'Pre-ART' care and support. Similarly, it was assumed that 50% of HIV cases that were ART-eligible, but that were not receiving ART because of lack of access, would receive palliative care. It was assumed that approximately 35,000 TB-HIV cases would be detected per year and would receive DOTS. The scale-up of prevention activities was assumed as shown in Table 18(b). Generally prevention line-items were expected to grow at 10% per year. However, targeted programs for MARPs, Youth-Friendly Services, and Male Circumcision were assumed to be prioritized to grow at an accelerated rate. Blood Supply and Injection Safety were assumed to be constant since these programmes have already been scaled up to nearly full coverage. We assumed OVC services would scale up steadily to reach 1,00,000 by 2014 (Table 16c).

TABLE 18A. SPECIFICATION OF THE SCALE-UP POLICY SCENARIO: CLINICAL SERVICE DELIVERY TARGETS

Activity		2010	2011	2012	2013	2014
PMTCT Policy						
Target	Percent of All Pregnancies HIV Tested	10%	15.00%	20.00%	25.00%	30.00%
Target	Percent of Known HIV+ Pregnancies PMTCT treated	70.00%	70.00%	70.00%	70.00%	70.00%
Calculated	Pregnant Women Screened	**583,447**	**891,489**	**1,210,677**	**1,541,170**	**1,883,153**
Calculated	Number of Known HIV+ Pregnancies Treated	**40,355**	**54,654**	**70,393**	**87,472**	**105,918**
HCT Policy						
Target	Percent of Population that is tested per year	1.20%	1.31%	1.41%	1.50%	1.56%
Target	Percent of tested persons who receive results	80%	80%	80%	80%	80%
Calculated	Total HIV Diagnostic Tests	**1,744,248**	**1,940,558**	**2,128,683**	**2,307,917**	**2,446,143**
ART Policy						
Target	Percent of known ART-eligible PLWHA receiving 1st line	95.00%	95.00%	95.00%	95.00%	95.00%
Target	Percent of 1st line treatment failures receiving 2nd line	10.00%	10.00%	10.00%	10.00%	10.00%
Calculated	Number of PLWHA receiving 1st line	**405,223**	**516,829**	**625,678**	**730,505**	**830,838**
Calculated	Number of PLWHA receiving 2nd line	**20,682**	**29,661**	**41,450**	**57,189**	**77,444**
Calculated	Total on ART	**425,904**	**546,490**	**667,127**	**787,694**	**908,281**
Care & Support Policy: PLWHA						
Target	Percent of Known Eligible PLWHA receiving Non-ART CSS	50.00%	50.00%	50.00%	50.00%	50.00%
Calculated	Number of Known Eligible PLWHA receiving Non-ART CSS	**71,850**	**69,030**	**74,178**	**83,390**	**94,740**
Target	Percent of Known PLWHA receiving Pre-ART CSS	95.00%	95.00%	95.00%	95.00%	95.00%
Calculated	Number of Known PLWHA receiving Pre-ART CSS	**383,385**	**474,422**	**572,369**	**676,896**	**787,133**
TB/HIV Policy						
Target	Percent of TB cases receiving HIV test	32.00%	32.00%	32.00%	32.00%	32.00%
Calculated	Number of new HIV cases detected through TB program	**7,889**	**7,445**	**7,006**	**6,613**	**42,019**
Target	Percent of Known HIV+/TB getting DOTS TB treatment	95.00%	95.00%	95.00%	95.00%	95.00%
Calculated	Number of HIV+/TB getting DOTS TB treatment	**34,095**	**34,786**	**35,496**	**36,222**	**246,422**

TABLE 18B. SPECIFICATION OF THE SCALE-UP POLICY SCENARIO: PREVENTION ACTIVITY TARGETS

Peer Outreach to Male and Female CSWs						
Target	% sex workers reached per yr	10	20	30	40	50
Calculated	Sex workers reached	20,014	41,016	84,043	129,147	176,397
Community mobilization						
Target	Number reached	1,000,000	1,100,000	1,210,000	1,331,000	1,464,100
Youth Friendly Services						
Target	Number of teachers trained	50,000	75,000	100,000	110,000	125,000
Target	Number Reached with Non-School Youth Friendly Services	100,000	110,000	121,000	133,100	146,410
Workplace programs						
Target	% workforce receiving peer education	2.0%	2.2%	2.4%	2.7%	2.9%
Target	% workforce receiving condoms	1.0%	1.1%	1.2%	1.3%	1.5%
Calculated	Workers reached with peer education	745,084	763,028	859,463	968,041	1,089,825
Calculated	Condoms provided	3,725,419	3,815,140	4,297,314	4,840,204	5,449,125
STI management						
Target	% of STI cases receiving treatment	10%	20%	30%	40%	50%
Calculated	STI cases treated	1,160,000	2,320,000	3,480,000	4,640,000	5,800,000
Mass media						
Target	Radio Spot - Months	10,000	10,000	10,000	10,000	10,000
Target	TV Spots - Months	100	100	100	100	100
Blood safety						
Target	Units of safe blood produced	46,261	47,187	48,117	49,049	49,049
Post-exposure prophylaxis						
Target	Number of PEP kits	361	361	361	361	361
Universal precautions						
Target	Percent of hospital beds covered	70%	77%	85%	93%	100%
Calculated	Number of hospital beds covered	14,000	15,400	16,940	18,634	20,000
Male circumcision						
Calculated	Number of circumcisions performed	250,000	375,000	500,000	750,000	1,000,000

TABLE 18C. SPECIFICATION OF THE SCALE-UP POLICY SCENARIO: OVC MITIGATION ACTIVITY TARGETS

	Unit Cost	2010	2011	2012	2013	2014
All OVC		19.0 M	19.5 M	20.1 M	20.6 M	21.2 M
All OVC Targetted for Service		948,158	975,275	1,003,168	1,031,859	1,061,370
Estimated Portion of OVC from AIDS (26%)		246,521	253,572	260,824	268,283	275,956
Health : National Health Insurance User Fee	$30	118,000	142,000	166,000	166,000	166,000
Direct Provision of Basic Care Package	$345	118,000	142,000	166,000	166,000	166,000
Pre-Primary Education; per OVC per year	$127	118,000	142,000	166,000	166,000	166,000
Primary Education; per OVC per year	$96	118,000	142,000	166,000	166,000	166,000
Secondary Education; per OVC per year	$300	118,000	142,000	166,000	166,000	166,000
Vocational Education; per OVC	$231	118,000	142,000	166,000	166,000	166,000
Clothing 2 pairs per year; per OVC per year	$23	118,000	142,000	166,000	166,000	166,000
Sandals	$16	118,000	142,000	166,000	166,000	166,000
Blankets/ Bedding	$15	118,000	142,000	166,000	166,000	166,000
Nutritional gardening program; per household	$57	118,000	142,000	166,000	166,000	166,000
Business grant; per out-of-school OVC or OVC caregiver	$445	118,000	142,000	166,000	166,000	166,000
Micro loan; per out-of-school OVC or OVC caregiver	$400	118,000	142,000	166,000	166,000	166,000
Average number of OVC services received per OVC	3					
Estimated Cost per OVC	$481					

Table 19 shows the additional scale-up of clinical services to reach universal access targets by 2014. Specifically, reaching 80% of pregnant women with HIV testing and PMTCT treatment, providing ART to greater than 80% of those in need of ART, and providing Pre-ART care to 80% of those known to have HIV but who are not yet eligible for ART.

TABLE 19A. SPECIFICATION OF THE UNIVERSAL ACCESS POLICY SCENARIO: CLINICAL SERVICE DELIVERY TARGETS

Activity		2010	2011	2012	2013	2014
PMTCT Policy						
Target	Percent of All Pregnancies HIV Tested	20.00%	35.00%	50.00%	75.00%	90.00%
Target	Percent of Known HIV+ Pregnancies PMTCT treated	75.00%	80.00%	85.00%	85.00%	85.00%
Calculated	Pregnant Women Screened	**1,166,064**	**2,077,474**	**3,020,755**	**4,605,872**	**5,611,347**
Calculated	Number of Known HIV+ Pregnancies Treated	**61,589**	**100,037**	**143,903**	**200,225**	**241,173**
HCT Policy						
Target	Percent of Population that is tested per year	1.40%	1.40%	2.20%	2.75%	3.00%
Target	Percent of tested persons who receive results	80%	80%	80%	80%	80%
Calculated	Total HIV Diagnostic Tests	**2,034,073**	**2,072,591**	**3,318,730**	**4,224,145**	**4,691,191**
ART Policy						
Target	Percent of known ART-eligible PLWHA receiving 1st line	95.00%	95.00%	95.00%	95.00%	95.00%
Target	Percent of 1st line treatment failures receiving 2nd line	10.00%	10.00%	10.00%	10.00%	10.00%
Calculated	Number of PLWHA receiving 1st line	**452,312**	**576,273**	**764,685**	**960,423**	**1,132,618**
Calculated	Number of PLWHA receiving 2nd line	**4,999**	**5,845**	**7,022**	**8,761**	**10,933**
Calculated	Total on ART	**457,311**	**582,118**	**771,708**	**969,185**	**1,143,551**
Care & Support Policy: PLWHA						
Target	Percent of Known Eligible PLWHA receiving Non-ART CSS	50.00%	50.00%	50.00%	50.00%	50.00%
Calculated	Number of Known Eligible PLWHA receiving Non-ART CSS	**80,302**	**74,388**	**83,339**	**98,299**	**113,971**
Target	Percent of Known PLWHA receiving Pre-ART CSS	95.00%	95.00%	95.00%	95.00%	95.00%
Calculated	Number of Known PLWHA receiving Pre-ART CSS	**448,636**	**571,721**	**767,234**	**1,016,249**	**1,257,735**
TB/HIV Policy						
Target	Percent of TB cases receiving HIV test	50.00%	50.00%	50.00%	50.00%	50.00%
Calculated	Number of new HIV cases detected through TB program	**11,644**	**10,791**	**9,132**	**7,373**	**40,824**
Target	Percent of Known HIV+/TB getting DOTS TB treatment	95.00%	95.00%	95.00%	95.00%	95.00%
Calculated	Number of HIV+/TB getting DOTS TB treatment	**34,095**	**34,788**	**35,499**	**36,233**	**246,563**

TABLE 19B. SPECIFICATION OF THE UNIVERSAL POLICY SCENARIO: PREVENTION ACTIVITY TARGETS

Peer Outreach to Male and Female CSWs						
Target	% sex workers reached per yr	10	20	30	40	50
Calculated	Sex workers reached	20,014	41,016	84,043	129,147	176,397
Community mobilization						
Target	Number reached	1,000,000	1,100,000	1,210,000	1,331,000	1,464,100
Youth Friendly Services						
Target	Number of teachers trained	50,000	75,000	100,000	110,000	125,000
Target	Number Reached with Non-School Youth Friendly Services	100,000	110,000	121,000	133,100	146,410
Workplace programs						
Target	% workforce receiving peer education	2.0%	2.2%	2.4%	2.7%	2.9%
Target	% workforce receiving condoms	1.0%	1.1%	1.2%	1.3%	1.5%
Calculated	Workers reached with peer education	745,084	763,028	859,463	968,041	1,089,825
Calculated	Condoms provided	3,725,419	3,815,140	4,297,314	4,840,204	5,449,125
STI management						
Target	% of STI cases receiving treatment	10%	20%	30%	40%	50%
Calculated	STI cases treated	1,160,000	2,320,000	3,480,000	4,640,000	5,800,000
Mass media						
Target	Radio Spot - Months	10,000	10,000	10,000	10,000	10,000
Target	TV Spots - Months	100	100	100	100	100
Blood safety						
Target	Units of safe blood produced	46,261	47,187	48,117	49,049	49,049
Post-exposure prophylaxis						
Target	Number of PEP kits	361	361	361	361	361
Universal precautions						
Target	Percent of hospital beds covered	70%	77%	85%	93%	100%
Calculated	Number of hospital beds covered	14,000	15,400	16,940	18,634	20,000
Male circumcision						
Calculated	Number of circumcisions performed	250,000	375,000	500,000	750,000	1,000,000

TABLE 19C. SPECIFICATION OF THE UNIVERSAL POLICY SCENARIO: OVC MITIGATION ACTIVITY TARGETS

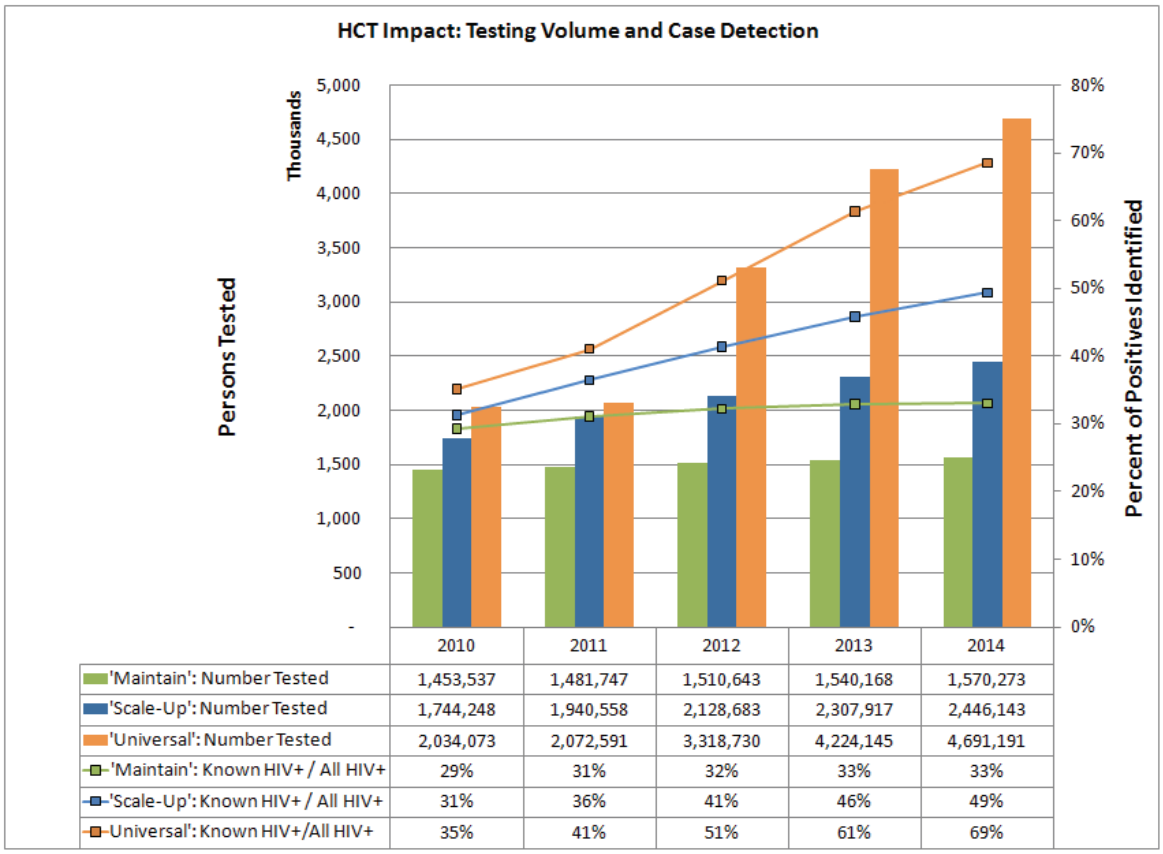
	Unit Cost	2010	2011	2012	2013	2014
All OVC		19.0 M	19.5 M	20.1 M	20.6 M	21.2 M
All OVC Targetted for Service		948,158	975,275	1,003,168	1,031,859	1,061,370
Estimated Portion of OVC from AIDS (26%)		246,521	253,572	260,824	268,283	275,956
Health: National Health Insurance User Fee	$30	246,521	253,572	260,824	268,283	275,956
Direct Provision of Basic Care Package	$345	246,521	253,572	260,824	268,283	275,956
Pre-Primary Education; per OVC per year	$127	246,521	253,572	260,824	268,283	275,956
Primary Education; per OVC per year	$96	246,521	253,572	260,824	268,283	275,956
Secondary Education; per OVC per year	$300	246,521	253,572	260,824	268,283	275,956
Vocational Education; per OVC	$231	246,521	253,572	260,824	268,283	275,956
Clothing 2 pairs per year; per OVC per year	$23	246,521	253,572	260,824	268,283	275,956
Sandals	$16	246,521	253,572	260,824	268,283	275,956
Blankets/ Bedding	$15	246,521	253,572	260,824	268,283	275,956
Nutritional gardening program; per household	$57	246,521	253,572	260,824	268,283	275,956
Business grant; per out-of-school OVC or OVC caregiver	$445	246,521	253,572	260,824	268,283	275,956
Micro loan; per out-of-school OVC or OVC caregiver	$400	246,521	253,572	260,824	268,283	275,956
Average number of OVC services received per OVC	3					
Estimated Cost per OVC	$481					

4. RESULTS

4.1 KEY PROGRAM IMPACTS

Figure 7 shows the case-finding of HCT activities under the two scenarios. Under the 'Maintain' scenario, the testing program plateaus at about 33% of all HIV-positive persons being identified. Under the scale up scenario, by 2014, about half of all HIV-positive persons know their status. The additional testing of the 'universal access' strategy achieves over two-thirds of HIV+ persons knowing their status, but this requires testing reach a level of 4.7 million people per year by 2014.

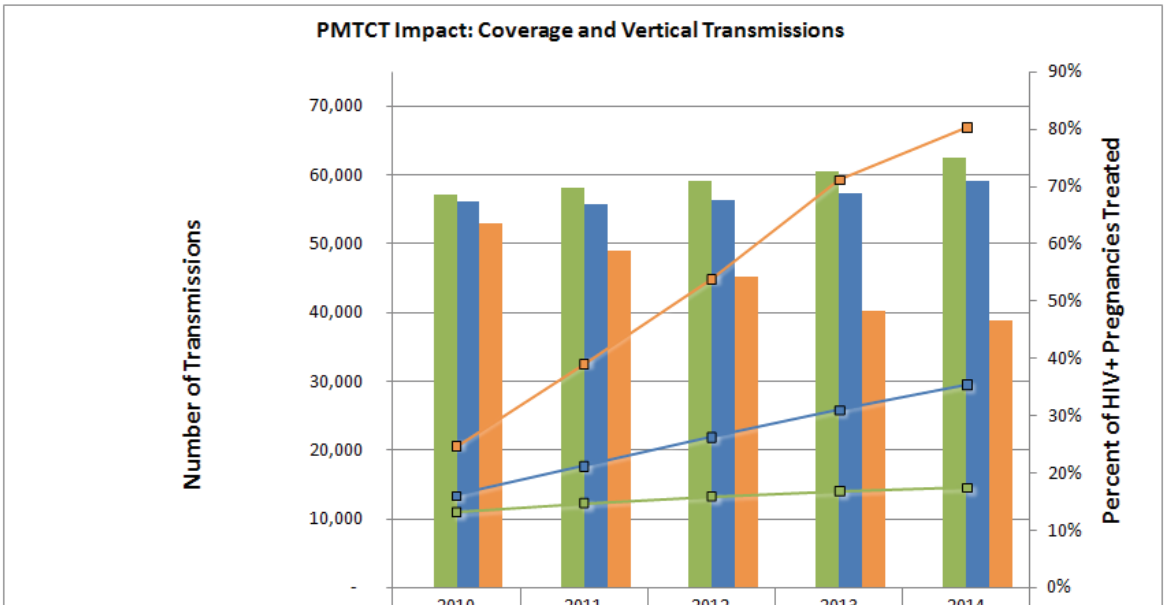
FIGURE 7. HIV CASE-FINDING



	2010	2011	2012	2013	2014
'Maintain': Number Tested	1,453,537	1,481,747	1,510,643	1,540,168	1,570,273
'Scale-Up': Number Tested	1,744,248	1,940,558	2,128,683	2,307,917	2,446,143
'Universal': Number Tested	2,034,073	2,072,591	3,318,730	4,224,145	4,691,191
'Maintain': Known HIV+ / All HIV+	29%	31%	32%	33%	33%
'Scale-Up': Known HIV+ / All HIV+	31%	36%	41%	46%	49%
Universal': Known HIV+/All HIV+	35%	41%	51%	61%	69%

Figure 8 shows the PMTCT impact under the three scenarios. Under the maintain scenario, there are about 60,000 vertical transmissions per year. Under the scale-up scenario, 12,700 of these vertical transmissions are averted over 5 years. In the 'Universal Access' scenario, by 2014 80% of HIV+ pregnancies are PMTCT treated, but this requires high levels of HIV testing among pregnant women, as well as high acceptance of treatment. Under the 'universal' scenario which reaches 80% coverage of PMTCT by 2014, an additional 72,000 vertical transmissions are averted compared to the current level of PMTCT in Nigeria.

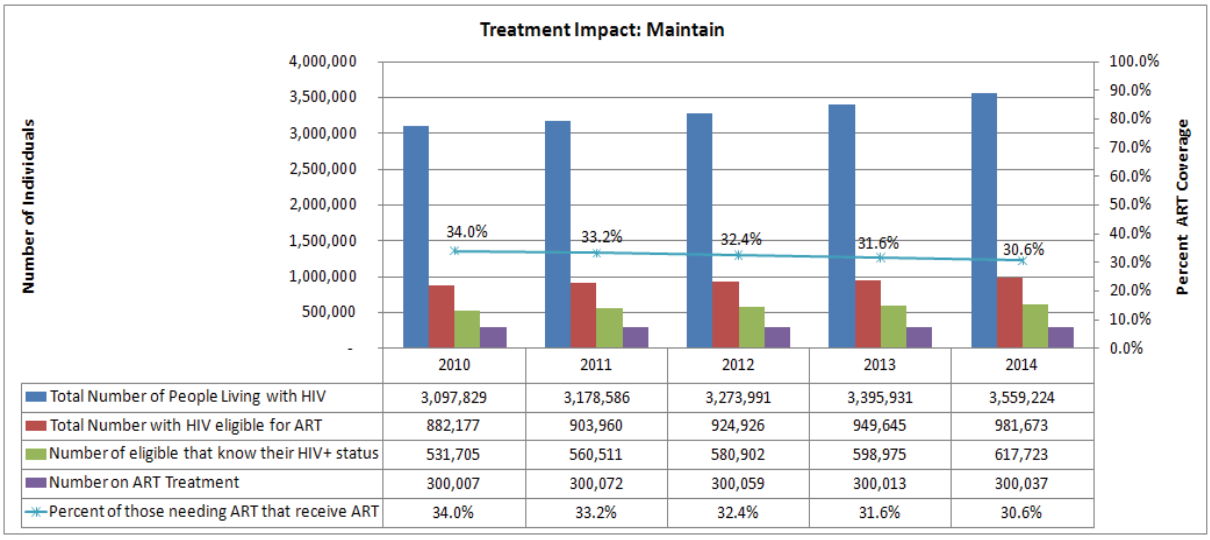
FIGURE 8. PMTCT IMPACT



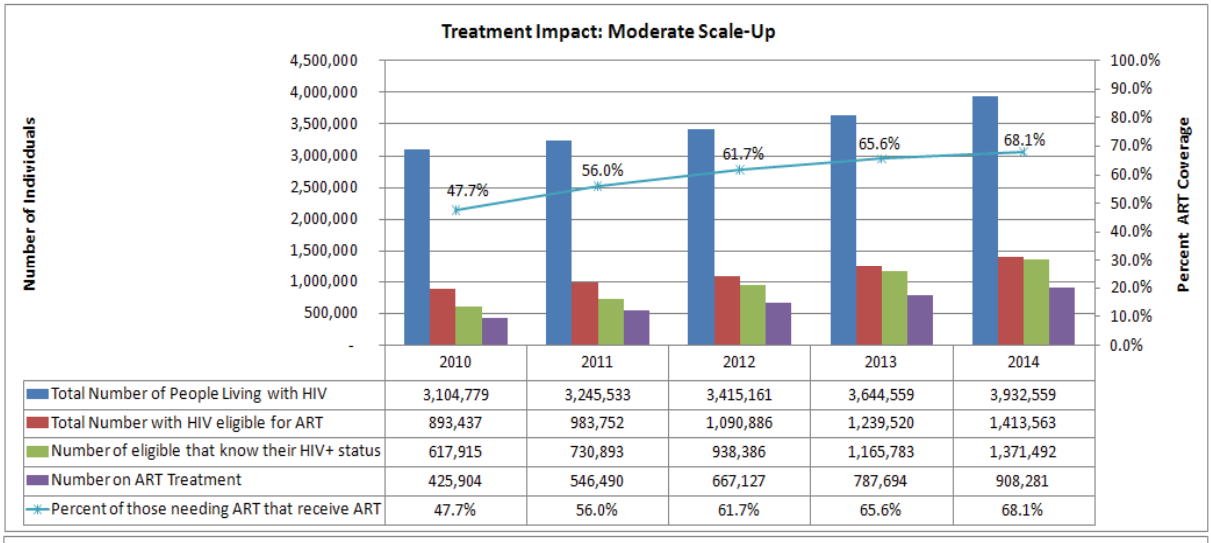
	2010	2011	2012	2013	2014
HIV+ Pregnancies	242,935	248,568	255,817	267,437	281,478
Maintain: Vertical Transmissions	57,214	58,134	59,167	60,568	62,552
Scale-up: Vertical Transmissions	56,240	55,823	56,325	57,428	59,088
Universal: Vertical Transmissions	52,904	48,949	45,274	40,336	38,927
Maintain: Treated / All HIV+ Pregnancies	13%	15%	16%	17%	18%
Scale-up: Treated/All HIV+ Pregnancies	16%	21%	26%	31%	35%
Universal: Treated/All HIV+ Pregnancies	25%	39%	54%	71%	80%

Figure 9(a-c) shows the HIV-infected population under the three policy scenarios. In the Maintain scenario, slightly more than half of the ART-eligible population known their status, about one-third are receiving ART. In the 'Scale-Up' scenario, by 2014, nearly all ART-eligible persons know their status and 68% are on ART. The universal access scenario increases the numbers on ART even further to reach the 80% target.

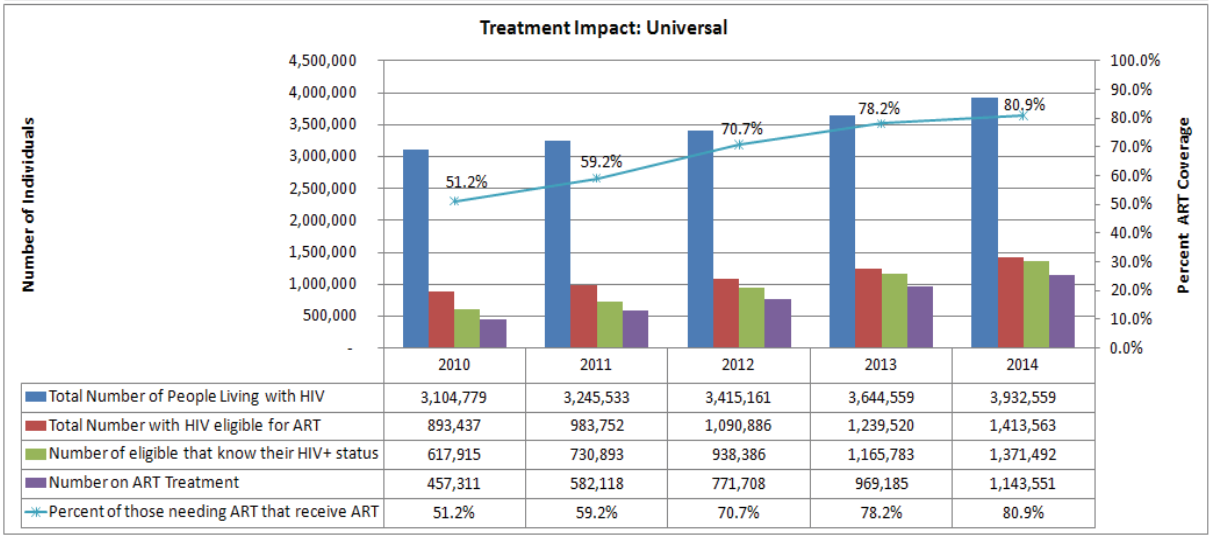
FIGURE 9 (A-C) . HIV STATUS, ART ELIGIBILITY AND COVERAGE



	2010	2011	2012	2013	2014
Total Number of People Living with HIV	3,097,829	3,178,586	3,273,991	3,395,931	3,559,224
Total Number with HIV eligible for ART	882,177	903,960	924,926	949,645	981,673
Number of eligible that know their HIV+ status	531,705	560,511	580,902	598,975	617,723
Number on ART Treatment	300,007	300,072	300,059	300,013	300,037
Percent of those needing ART that receive ART	34.0%	33.2%	32.4%	31.6%	30.6%



	2010	2011	2012	2013	2014
Total Number of People Living with HIV	3,104,779	3,245,533	3,415,161	3,644,559	3,932,559
Total Number with HIV eligible for ART	893,437	983,752	1,090,886	1,239,520	1,413,563
Number of eligible that know their HIV+ status	617,915	730,893	938,386	1,165,783	1,371,492
Number on ART Treatment	425,904	546,490	667,127	787,694	908,281
Percent of those needing ART that receive ART	47.7%	56.0%	61.7%	65.6%	68.1%



	2010	2011	2012	2013	2014
Total Number of People Living with HIV	3,104,779	3,245,533	3,415,161	3,644,559	3,932,559
Total Number with HIV eligible for ART	893,437	983,752	1,090,886	1,239,520	1,413,563
Number of eligible that know their HIV+ status	617,915	730,893	938,386	1,165,783	1,371,492
Number on ART Treatment	457,311	582,118	771,708	969,185	1,143,551
Percent of those needing ART that receive ART	51.2%	59.2%	70.7%	78.2%	80.9%

4.2 FINANCIAL REQUIREMENTS

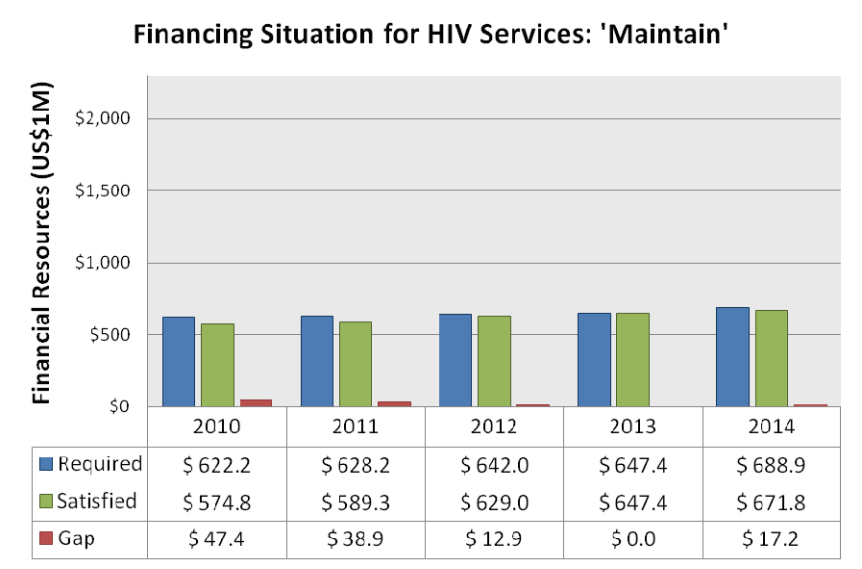
The total costs of the 'Maintain' policy scenario are shown in Figure 10 (detailed breakdown in Table 20). The total costs of the 'Scale-up' policy scenario are shown in Figure 11 (with detailed breakdown in Table 21). The total costs of the 'Universal Access' policy scenario are shown in Figure 12 (with detailed breakdown in Table 22).

Given the expected financing for HIV programme, sustaining the service levels in the 'Maintain' scenario will require US$622 - US$689 million per year. There is a resource shortfall of about US$100 over 5 years expected, even if Nigeria is awarded GFATM Round 8 and World Bank MAP 2 funds. If either of these funding sources are not available, the gap will be substantially larger. Policymakers can use HAPSAT sub-analyses to explore policy options and estimate the impact of efficiency gains in order to close the resource gap. If the resource envelope cannot be expanded, policymakers may have to consider a reallocation across programs to meet priorities under these constraints and explore policies for rationing services.

The scale-up scenario shows that dramatic increases in financial resources would be required to achieve continued scale-up of Nigeria's HIV response. The financial gap, over 5 years is US$3 billion. The "Scale-Up" scenario reaches 68% coverage of ART. The Scale-Up scenario fall well short of universal coverage in other programmatic areas including PMTCT (<50% coverage), OVC, and prevention activities.

The universal coverage scenario demonstrates further the significant gap in resources that remains despite sizable donor involvement in Nigeria. It is estimated that Nigeria would need an additional US$4.5 billion over 5 years to reach all the targets in the 'Universal' policy scenario including 80% on ART, 80% of PMTCT need met, and the scale-up of OVC and prevention to moderate levels.

FIGURE 10. FINANCIAL RESOURCES REQUIRED AND EXPECTED ANNUAL FUNDING GAPS FOR 'MAINTAIN' SCENARIO



	2010	2011	2012	2013	2014
Required	$ 622.2	$ 628.2	$ 642.0	$ 647.4	$ 688.9
Satisfied	$ 574.8	$ 589.3	$ 629.0	$ 647.4	$ 671.8
Gap	$ 47.4	$ 38.9	$ 12.9	$ 0.0	$ 17.2

TABLE 20. FINANCIAL RESOURCES REQUIRED TO ACHIEVE POLICY GOALS OF THE 'MAINTAIN' SCENARIO (US $MILLIONS)

Program Area	2010	2011	2012	2013	2014	Total
Prevention	$52.6	$53.1	$53.7	$54.2	$54.6	$268.2
PMTCT (Drugs, Lab, Labor)	$5.1	$5.4	$5.7	$6.0	$6.4	$28.6
Other	$47.5	$47.7	$48.0	$48.2	$48.2	$239.6
Care	$278.4	$281.0	$283.3	$285.6	$333.7	$1,462.0
VCT (Lab, Labor)	$12.8	$13.3	$13.9	$14.4	$15.0	$69.5
Palliative Care (Drugs, Lab, Labor)	$8.3	$9.5	$10.4	$11.3	$12.2	$51.7
Pre-ART care (Drugs, Lab, Labor)	$3.8	$4.4	$4.9	$5.4	$6.0	$24.4
TB-HIV (Drugs, Lab, Labor)	$7.5	$7.8	$8.1	$8.4	$54.5	$86.1
OVC	$246.0	$246.0	$246.0	$246.0	$246.0	$1,230.2
Treatment (ART)	$158.2	$159.0	$168.3	$169.0	$151.5	$806.0
Drugs	$86.2	$86.3	$94.9	$94.9	$76.6	$438.9
Laboratory Tests	$55.2	$55.2	$55.2	$55.2	$55.2	$276.1
Labor (incl. Clinical, Lab, Pharmacy, CHEW)	$16.8	$17.5	$18.2	$18.9	$19.7	$91.0
Shared Costs Across Program Areas	$133.0	$135.1	$136.7	$138.6	$149.2	$692.6
Training	$12.2	$12.4	$12.1	$12.3	$13.9	$62.8
Facility / Program Overhead	$48.6	$49.4	$48.6	$49.3	$55.5	$251.3
Central-Level Costs	$72.2	$73.3	$76.0	$77.0	$79.9	$378.4
Grand Total	$622.2	$628.2	$642.0	$647.4	$688.9	$3,228.7
Expected Resources	$574.8	$589.3	$629.0	$660.7	$671.8	$3,125.5
*Predicted Shortfall (*surplus)*	*$47.4*	*$38.9*	*$12.9*	*($13.2)**	*$17.2*	*$103.2*

FIGURE 11. FINANCIAL RESOURCES REQUIRED AND EXPECTED ANNUAL FUNDING GAPS FOR 'SCALE-UP' SCENARIO

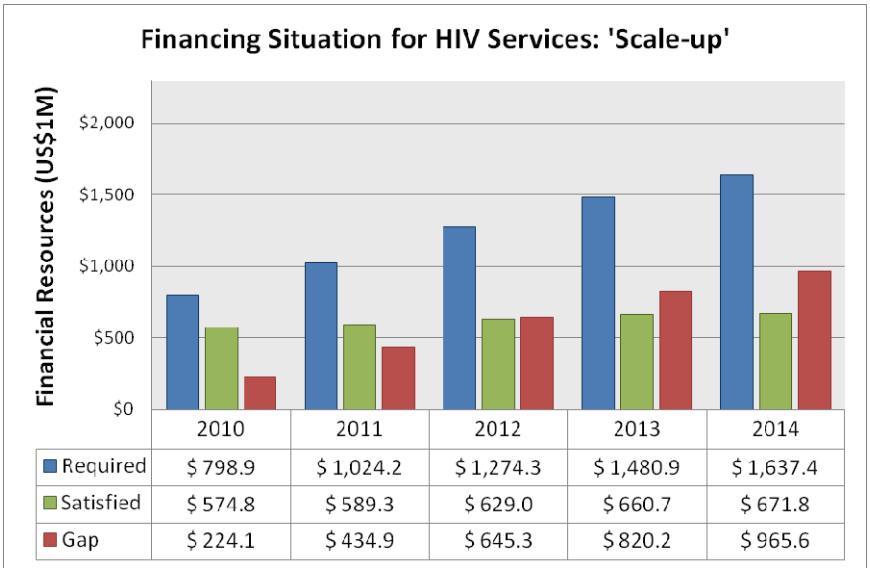


TABLE 21. FINANCIAL RESOURCES REQUIRED TO ACHIEVE POLICY GOALS OF THE 'SCALE-UP' SCENARIO (US $MILLIONS)

	2010	2011	2012	2013	2014	Total
Prevention	$61.2	$93.4	$126.1	$167.6	$175.4	$623.6
PMTCT (Drugs, Lab, Labor)	$10.0	$15.8	$22.3	$29.4	$37.2	$114.7
Other	$51.1	$77.5	$103.8	$138.2	$138.2	$508.9
Care	$306.2	$366.7	$428.6	$441.7	$501.5	$2,044.7
VCT (Lab, Labor)	$15.4	$17.5	$19.6	$21.6	$23.4	$97.5
Palliative Care (Drugs, Lab, Labor)	$5.1	$5.0	$5.5	$6.3	$7.3	$29.3
Pre-ART care (Drugs, Lab, Labor)	$32.2	$40.4	$49.4	$59.3	$70.0	$251.3
TB-HIV (Drugs, Lab, Labor)	$7.5	$7.8	$8.1	$8.4	$54.6	$86.3
OVC	$246.0	$296.1	$346.1	$346.1	$346.1	$1,580.4
Treatment (ART)	$236.1	$306.7	$398.5	$479.1	$524.4	$1,944.8
Drugs	$133.8	$174.3	$235.3	$284.5	$297.7	$1,125.6
Laboratory Tests	$78.4	$100.6	$122.8	$145.0	$167.2	$614.0
Labor (incl. Clinical, Lab, Pharmacy, CHEW)	$23.8	$31.8	$40.4	$49.6	$59.5	$205.2
Shared Costs Across Program Areas	$195.5	$257.4	$321.0	$392.5	$436.2	$1,602.5
Training	$17.9	$23.5	$28.6	$34.9	$40.6	$145.5
Facility / Program Overhead	$71.5	$94.1	$114.3	$139.7	$162.3	$582.0
Central-Level Costs	$106.1	$139.7	$178.1	$217.8	$233.3	$875.1
Grand Total	$798.9	$1,024.2	$1,274.3	$1,480.9	$1,637.4	$6,215.7
Expected Resources	$574.8	$589.3	$629.0	$660.7	$671.8	$3,125.5
Predicted Shortfall ('Gap')	*$224.1*	*$434.9*	*$645.3*	*$820.2*	*$965.6*	*$3,090.1*

FIGURE 12. FINANCIAL RESOURCES REQUIRED AND EXPECTED ANNUAL FUNDING GAPS FOR 'UNIVERSAL' SCENARIO

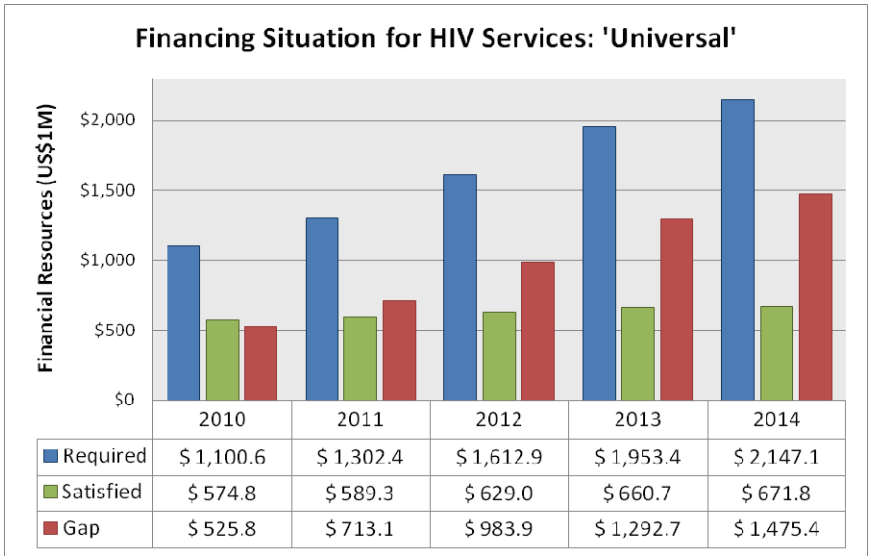


TABLE 22. FINANCIAL RESOURCES REQUIRED TO ACHIEVE POLICY GOALS OF THE 'UNIVERSAL' SCENARIO (US $MILLIONS)

Financial Resources Required to Achieve Policy Goals of the Universal Scenario (US $millions)						
TOTAL COSTS	2010	2011	2012	2013	2014	Total
Prevention	$71.1	$114.2	$159.0	$225.3	$248.2	$817.7
PMTCT (Drugs, Lab, Labor)	$19.9	$36.7	$55.2	$87.1	$109.9	$308.8
BCC - ABC	$51.1	$77.5	$103.8	$138.2	$138.2	$508.9
Care	$583.1	$609.5	$655.1	$704.1	$795.6	$3,347.3
VCT (Lab, Labor)	$17.9	$18.7	$30.5	$39.6	$45.0	$151.7
Palliative Care (Drugs, Lab, Labor)	$5.7	$5.4	$6.2	$7.4	$8.8	$33.6
Pre-ART care (Drugs, Lab, Labor)	$37.7	$48.7	$66.2	$89.0	$111.9	$353.4
TB-HIV (Drugs, Lab, Labor)	$7.7	$8.0	$8.3	$8.7	$54.6	$87.4
OVC	$514.0	$528.7	$543.8	$559.4	$575.4	$2,721.2
Treatment (ART)	$239.1	$305.2	$428.0	$539.8	$586.1	$2,098.3
Drugs	$129.3	$164.2	$239.2	$300.4	$300.7	$1,133.8
Laboratory Tests	$84.2	$107.2	$142.0	$178.4	$210.5	$722.3
Labor (incl. Clinical, Lab, Rx)	$25.6	$33.9	$46.7	$61.0	$74.9	$242.2
Shared Costs Across Program Areas	$207.4	$273.5	$370.8	$484.1	$517.2	$1,853.1
Training	$19.0	$25.0	$33.1	$43.3	$50.5	$171.0
Facility / Program Overhead	$75.8	$100.0	$132.5	$173.3	$202.2	$683.8
Central-Level Costs	$112.6	$148.5	$205.2	$267.5	$264.5	$998.3
Grand Total	$1,100.6	$1,302.4	$1,612.9	$1,953.4	$2,147.1	$8,116.4
Expected Resources	$574.8	$589.3	$629.0	$660.7	$671.8	$3,125.5
Predicted Shortfall ('Gap')	*$520.2*	*$667.0*	*$903.4*	*$1,161.8*	*$1,344.5*	*$4,596.9*

Figure 13 shows the breakdown of costs across cost categories. Approximately one-quarter of the total costs were for ARV drugs. The cost of ARVs could be much higher if second-line regimens were made more widely available. In both scenarios modeled, access to second-line therapies was restricted to just 5 percent of patients who fail first-line regimens. Laboratory accounted for 32 percent of total costs. Laboratory costs were driven by the cost of HCT. Unit costs for HIV testing were US$14.53 for screening and US$41.36 for confirmatory diagnostic testing. For ART patients the most expensive laboratory tests were Viral Load and Liver Function Tests (LFT). Every ART patient was assumed to get 2 LFTs per year at a cost of US$47.01 per test. However, only one in five ART patients were assumed to get a Viral Load test each year (at a cost of $47.92). Health worker labor represented 12 percent of programme costs. Facility and programme-level overhead and central-level costs combined represented 35% of the total costs. It was extremely challenging to collect data for these cost categories. Most facilities and organizations participating did not have or could not share financial tracking or accounting data that is necessary to measure and allocate shared costs. Central-level costs, such as the portion of the cost of operating the Ministry of Health and other government agencies (e.g. NASCP, NACA) that allocated to HIVAIDS response and the portion of donor funds spend on program management are largely unknown. Therefore, the analysis relies on rules-of-thumb for 'marking up' direct costs to account for shared costs and central level costs. For example, all ARVs are marked up 15% to account for supply chain expenses. It is important to note that the cost of non-clinical labor (e.g. M&E officers, secretaries, data specialists, etc) was not micro-costed and is assumed to be captured in overhead costs.

ART represents about 50% of the total program. In the 'Scale-Up' scenario, OVC and prevention services grow at a faster rate than other programmatic areas. PMTCT, as a proportion of the whole program, decreases, despite an increasing number of women treated intrapartum. In part, this is because

case-finding becomes more efficient (HIV positive pregnant women are more likely to know their status when HCT is scaled up and due to the cumulative effect of testing).

FIGURE 13. FINANCIAL BREAKDOWN OF HIV/AIDS PROGRAM COSTS BY COST CATEGORY ('MAINTAIN' SCENARIO)

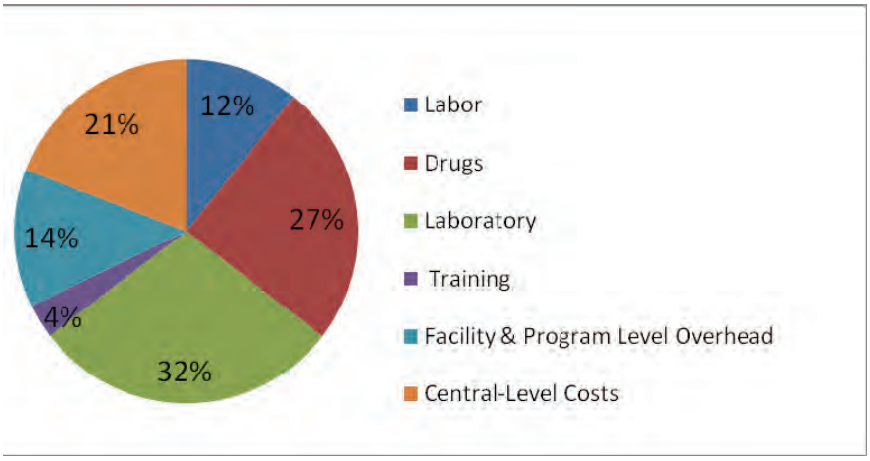


Table 23 shows the breakdown of ART costs by category. ART costs about $900 per patient-year, and 37.5% of that cost is estimated to be for ARVs, 20% for laboratory tests, 7% for health worker labor, and the remainder for training and overheads.

TABLE 23. RESOURCE ALLOCATION ACROSS HIVAIDS SERVICES

ART	Average Cost Per Patient-Year
Labor	$ 61 (6.8%)
Drugs & Supplies	$ 336 (37.5%)
Laboratory	$ 182 (20.3%)
Facility-level Overhead	$ 116 (12.9%)
Training	$ 29 (3.2%)
IP & Donor Overheads	$ 172 (19.2%)
Total	$ 895 (100%)

Table 24 shows the breakdown of costs of OVC services for the most comprensive OVC scenario considered. Although this scenario was run as part of the 'universal' HIV programme scenario, it does not represent universal coverage of AIDS orphans and vulnerable children. Instead, it represents current plans for scaling up OVC services in Nigeria. The plan calls for the provision of services to about 1 million OVC, but we only counted the portion (26 percent) estimated to be AIDS OVC for this costing.

TABLE 24. FINANCIAL RESOURCES REQUIRED TO ACHIEVE OVC POLICY GOALS UNDER THE "UNIVERSAL" SCENARIO (US $MILLIONS)

OVC Service Category	Unit Cost	Target Number of OVC	Resource Need (Per Year Average)
Health : National Health Insurance User Fee; per OVC per year	$30	261,031	$ 7.83 M (1.4%)
Direct Provision of Basic Care Package; per OVC per year	$345	261,031	$ 90.06 M (16.5%)
Pre-Primary Education; per OVC per year	$127	261,031	$ 33.15 M (6.1%)
Primary Education; per OVC per year	$96	261,031	$ 25.06 M (4.6%)
Secondary Education; per OVC per year	$300	261,031	$ 78.31 M (14.4%)
Vocational Education; per OVC	$231	261,031	$ 60.3 M (11.1%)
Clothing 2 pairs per year; per OVC per year	$23	261,031	$ 6 M (1.1%)
Sandals; per OVC per year	$16	261,031	$ 4.18 M (0.8%)
Blankets/ Bedding; per OVC per year	$15	261,031	$ 3.92 M (0.7%)
Nutritional gardening program; per household	$57	261,031	$ 14.88 M (2.7%)
Business grant; per out-of-school OVC or OVC caregiver	$445	261,031	$ 116.16 M (21.3%)
Micro loan; per out-of-school OVC or OVC caregiver	$400	261,031	$ 104.41 M (19.2%)
Total			$ 544.25 M (100%)
Assumption: Number of OVC Service per Individual OVC	3		
Average Cost per OVC served	$481		

4.3 HEALTH WORKERS NEEDED FOR SERVICE DELIVERY

In many settings, service delivery is constrained by the availability of health workers. However, Nigeria has more health workers per capita than most countries in Africa. Figure 15(a-b) shows the expected number of health workers required to deliver the HIV programme under each of the policy scenarios. Even under the 'Scale-Up' scenario, there are no expected gaps in human resources. However, these results should be interpreted with caution.

Full-Time Equivalent Staff

An FTE staff member for a given service (e.g., ART) is a health professional who spends all his/her working time allocated for patient visits to provide that service.

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

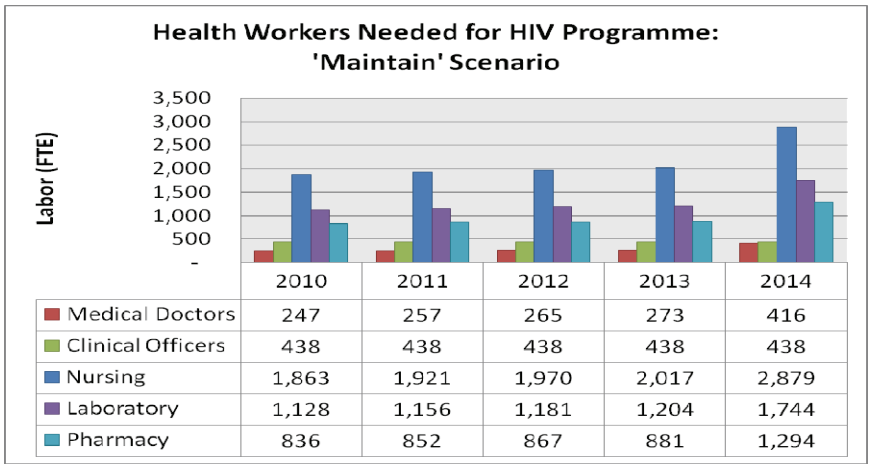
First, the number of needed workers is reported as 'full-time equivalents.' For example, in the 'Maintain' scenario, 230 FTE medical doctors are required in 2009. However, 230 unique individual doctors may not be sufficient to cover the entire geography of Nigeria, even if they were working full-time delivering HIV care and treatment. It is likely a much greater number of doctors is needed to achieve geographical coverage; but, each of these doctors would not be required to work full-time on HIV care and treatment. The current HAPSAT analysis could be supplemented with additional human resource data regarding the distribution of health workers and patient population across facilities in order to estimate how many unique individuals in each health worker cadres would be required and how they need to be distributed geographically (across health facilities in different locations). This more detailed HRH data collection and analysis was beyond the scope of the current activity.

Second, the estimated number of health workers required depends on the assumed frequency and duration of outpatient visits, as well as what type of tests are ordered during those visits. Practice patterns may vary significantly across facilities depending on the technical capacity of health workers, patient volumes, and available equipment and financial resources. The current scenarios are based on a combination of data reported from sample facilities and care and treatment guidelines. The data collection relied on interview of clinicians and managers at facilities and did not employ any empirical or observational methods such as 'time-motion' studies, medical chart review, or analysis of facility labor records (e.g. timecards).

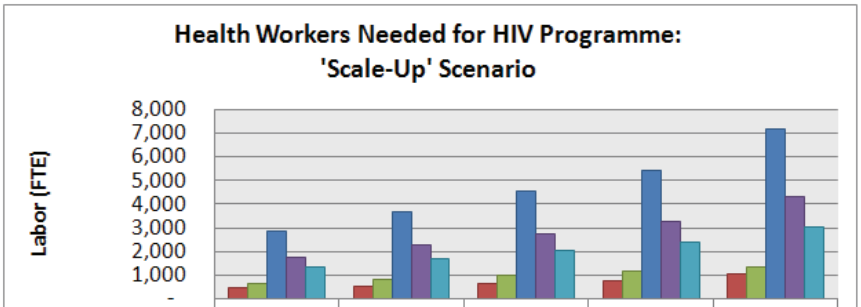
Third, the costs and human resources associated with inpatient hospital care for HIV patients were not considered in this analysis. The estimates are limited to outpatient programme delivery.

There were few projected gaps in human resource needs for clinical HIV care and treatment. Gaps in laboratory and pharmacy are expected in 2013 and 2014 if a 'universal' policy is pursued. The human resource needs for OVC and BCC prevention activities was not assessed.

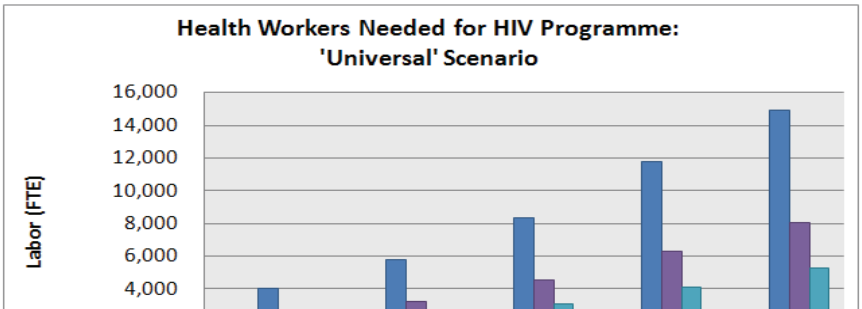
FIGURE 14 (A-C). HEALTH WORKERS NEEDED FOR HIV PROGRAMME.



	2010	2011	2012	2013	2014
Medical Doctors	247	257	265	273	416
Clinical Officers	438	438	438	438	438
Nursing	1,863	1,921	1,970	2,017	2,879
Laboratory	1,128	1,156	1,181	1,204	1,744
Pharmacy	836	852	867	881	1,294



	2010	2011	2012	2013	2014
Medical Doctors	451	553	663	777	1,032
Clinical Officers	622	798	975	1,151	1,327
Nursing	2,864	3,687	4,548	5,437	7,154
Laboratory	1,769	2,248	2,744	3,254	4,286
Pharmacy	1,337	1,678	2,028	2,386	3,054



	2010	2011	2012	2013	2014
Medical Doctors	502	621	813	1,038	1,385
Clinical Officers	668	850	1,127	1,416	1,671
Nursing	4,050	5,818	8,319	11,795	14,931
Laboratory	2,338	3,230	4,570	6,335	8,075
Pharmacy	1,652	2,185	3,053	4,117	5,293

5. CONCLUSIONS

Several conclusions can be drawn from this sustainability analysis. First, current data suggest that Nigeria is heavily dependent on donor funding for implementing majority of the HIV/AIDS services. Data could not be obtained to measure the GON contribution to HIV through the Ministry of Health. Nevertheless, it is unlikely the GON contribution exceeds 10 percent of the total financial resource envelope. Since Nigeria was not awarded a Global Fund Round 8 grant, the USG accounts for about 80 percent of the total resources for HIV that are expected to be available through 2014.

In order to scale up HIV/AIDS services over the long-term, significant financial and human resources need to be mobilized. The current HIV/AIDS budget does not appear to be adequate to achieve the 'maintain' scenario service coverage levels. This means that strategies need to be considered for (a) resource mobilization (b) efficiency gains in service delivery.

Because the feasibility of additional resource mobilization in the short-term and the potential for efficiency gains may be limited, policy makers should also consider plans for increasing demand for service in the context of supply constraints. Messages regarding the availability of services, plans for recruiting new patients or expanding to new sites should be considered carefully. Finally, policymakers should consider planning for a situation in which public demand for services may exceed capacity. For example, the establishment of clear, transparent policies regarding the allocation of limited ART treatment slots using a method that is fair and just, may minimize frustration among the target population. Additionally, programme managers should anticipate side-effect to a situation of unmet demand, such as medication sharing, and develop policies to minimize these negative impacts.

Fortunately, it does not appear that health worker availability poses a major constraint in sustaining or expanding services in the coming years. The country will need to provide HIV training to additional health workers, especially laboratory technicians and pharmacists, in order to scale up services beyond the current coverage levels. But, the aggregate number of health workers in Nigeria appears sufficient to support an expansion of HIV services. Two major caveats accompany this conclusion. First, the scope of the analysis stopped short of identifying whether local gaps in health worker availability constrain scale-up in specific areas of Nigeria. For example, if Nigeria health workers are not dispersed geographically in proportion to the distribution of HIV patients, or if Nigeria's health workers are not available for HIV service delivery because of competing demands to deliver other services, then scale-up may be constrained.

The results presented in this report focus on three specific scenarios to illustrate the use of HAPSAT and examine the general outlook for the sustainability of Nigeria's HIV program in the medium-term. The HAPSAT-Nigeria model can readily be reused frequently to rapidly model other scenarios to inform the process of national strategic planning and PEPFAR COP planning. For example, several 'cascade' scenarios in which HCT and PMTCT drive demand for ART were explored recently by USAID in preparation for the Partnership Framework meetings.

To remain useful, the HAPSAT-Nigeria model may need to be updated regularly (e.g. annually) since the context in which HIV/AIDS services are being implemented is changing rapidly. For example, donor funding continues to be unpredictable, drug costs are falling, and the state-of-art for HIV/AIDS diagnosis treatment continues to evolve. Moreover, as more complete data becomes available on actual HIV/AIDS expenditures and program outputs, estimates of unit costs can be refined and validated, and the output of OVC, STI, and prevention services can be refined. Further refinements might also consider the impact of the geographical distribution of health care workers, earmarks on donor funds, efficiency gains from scale-up (economies-of-scale) and the impact of prevention activities on incidence.