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HAPSAT Nigeria: Policy Modeling to Support Strategic Planning for Sustainable HIV/AIDS Services

BACKGROUND

In the past five years, Nigeria has scaled up a comprehensive response to HIV and AIDS, putting nearly 300,000 persons on life-saving antiretroviral treatment (ART) regimens and adding hundreds of service delivery points for prevention of mother-to-child transmission (PMTCT) and HIV counseling and testing (HCT). Concomitant with this effort, HIV prevalence estimated from antenatal surveillance appears to be declining from its peak. The most recent estimate from population-based surveillance is that 3 million Nigerians are HIV-infected (Federal Ministry of Health, Antenatal Surveillance Report 2008). Even as it stabilizes, the epidemic generates a large and growing demand for health services as more people living with HIV/AIDS begin ART, move to second-line regimens, and need regular care to monitor progression of the disease.

Despite the size of the national HIV response, thousands of Nigerians are infected every day, including newborn babies who acquire the disease from their mother in childbirth or through breastfeeding. Epidemiological models estimate that over 800,000 of the HIV-infected population meet the clinical eligibility criteria for initiating ART described in national treatment guidelines, implying that less than half of the current need for ART is being met. Of those not on treatment, many have not been HIV tested and

do not know they are infected. Finally, there are over 1 million orphans and vulnerable children (OVC) who have lost parents to AIDS. Many of these children are HIV-infected themselves, and most face difficulties obtaining food, shelter, clothing, education, health care, and economic opportunity. These facts indicate the need for continued expansion of prevention, care, treatment, and mitigation activities.

Domestic financial resources from the public sector and private out-of-pocket spending have been supplemented substantially by external funders including the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), the Global Fund to Fight AIDS, TB and Malaria (GF), the World Bank Multi-country AIDS Program (MAP), and the U.K. Department for International Development (DFID). Excluding private out-of-pocket expenditures, about US\$600 million will be available for HIV programs in each of the next five years (2010-2014), with approximately 85 percent coming from donors (Table I). Although this level of funding is large in relation to total health spending in Nigeria, it falls far short of the resources needed to reach universal coverage in all programmatic areas. The scarcity of resources and the current reliance on external donors compel prudent allocation across programmatic areas to ensure that strategic policy goals can be sustainably achieved.



TABLE I. FUNDING SOURCES FOR HIV/AIDS PROGRAM (US\$ MILLIONS)*

Financing Source	2010	2011	2012	2013	2014
Federal Govt. Nigeria**	\$80.5	\$81.8	\$83.4	\$85.2	\$87.0
U.S. Govt.	\$427.0	\$427.0	\$427.0	\$427.0	\$427.0
DFID ENR	\$23.8	\$23.8	\$23.8	\$23.8	\$23.8
UN	\$10.0	\$10.0	\$10.0	\$10.0	\$10.0
GF Round 5	\$28.8	\$28.8	\$0.0	\$0.0	\$0.0
GF Round 8	\$0.0	\$11.1	\$11.1	\$11.1	\$11.1
Bill & Melinda Gates Fnd.	\$5.0	\$5.0	\$5.0	\$5.0	\$5.0
World Bank MAP2	\$27.0	\$27.0	\$27.0	\$27.0	\$27.0
Total	\$602.1	\$614.6	\$587.4	\$589.1	\$590.9

Note: ENR=Enhancing Nigeria Response to HIV/AIDS

*PEPFAR has not been reauthorized past 2009, so estimates are based on the assumption that 2009-level funding will be maintained for the next five years. **The Federal Government of Nigeria funding amount includes the estimated cost of human resources for health required for biomedical HIV/AIDS programs.

METHODOLOGY

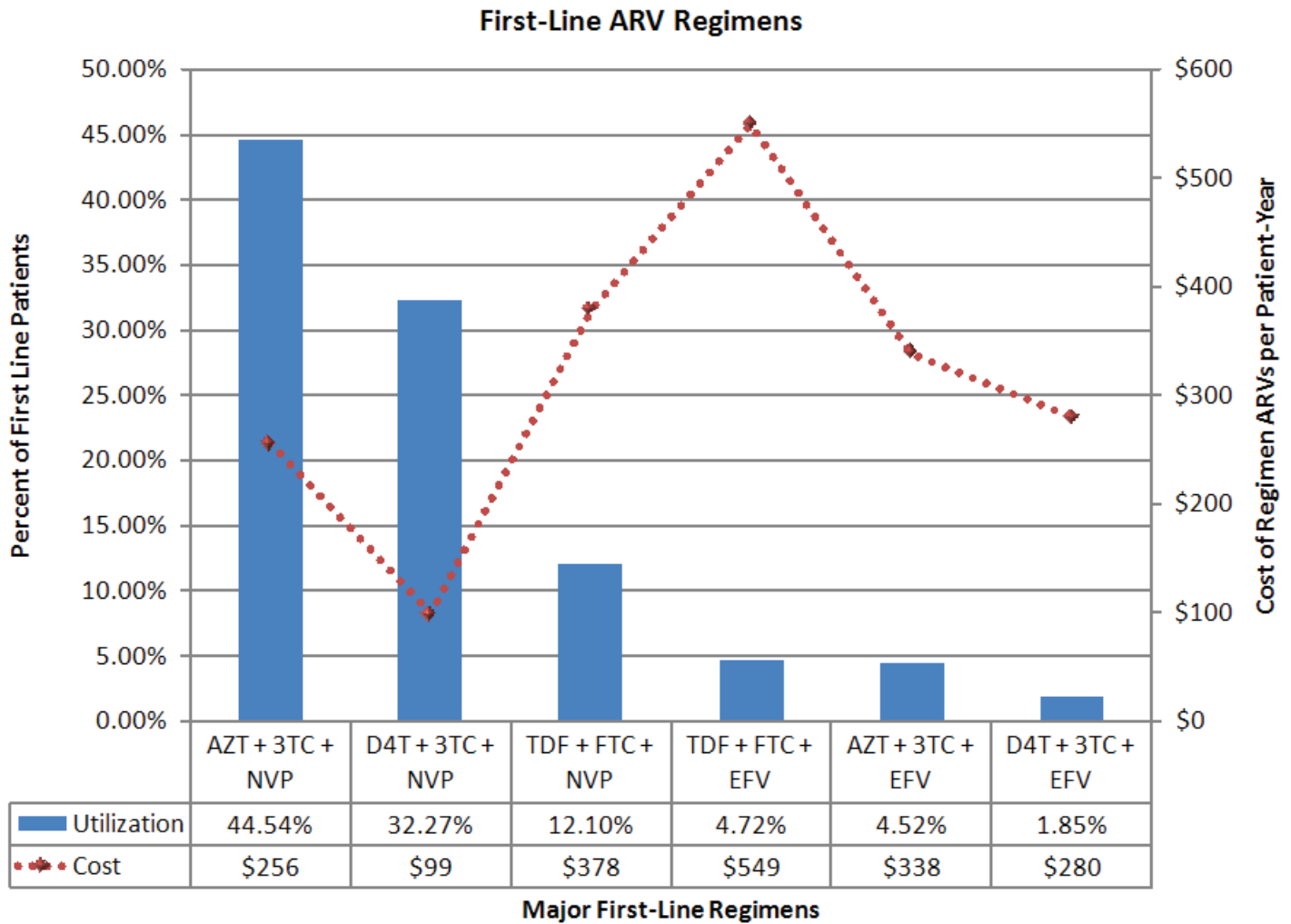
Data regarding epidemiology, demographics, funding levels, human resources, service delivery protocols, and service volume were collected from a sample of health facilities, health ministries, state agencies for the control of AIDS, and civil society organizations in 18 states across all six zones of Nigeria. In addition, information was gathered from donors, principal recipients, federal line ministries, and NACA in the Federal Capital Territory. These data serve as key inputs to a simulation model of HIV/AIDS service delivery in Nigeria.

The analysis was implemented in HAPSAT, a Microsoft Excel-based tool for conducting sustainability analysis that allows policymakers to account for the complex interaction of HIV/AIDS program inputs, use simulation to estimate an HIV/AIDS program's output, and identify gaps in financial and human resources. After calibrating the model to Nigeria's HIV epidemic trends, three policy scenarios were examined for a five-year time horizon, 2010-2014: (1) 'maintaining' the

HIV/AIDS response at its current size and scope, (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 unit costs of services in each biomedical programmatic area (e.g. HCT, PMTCT, ART, care and support services [CSS]) were calculated from the average price and quantity of inputs using an ingredients (bottom-up) approach. Antiretroviral medications (ARVs) accounted for the biggest share of input costs. Figure 1 shows the utilization and cost of first-line ARV regimens. When drug costs are combined with the costs of health worker labor, laboratory tests, and program overheads, the average cost of one person-year of ART is \$793. This cost is expected to increase as a greater proportion of patients migrate to more expensive regimens containing tenofovir or protease inhibitors (e.g. lopinavir, atazanavir). Under all three policy scenarios, it was assumed that all first-line ART patients failing treatment will be migrated to second-line regimens.

FIGURE I. ARV REGIMEN UTILIZATION AND COST



Because data were not available to cost OVC services and Abstinence, Behavior Change (AB) prevention programs using an ingredients-based approach, the analysis leveraged the costing results reported in published national plans in each area. We assumed OVC services are currently being delivered at the level reported for 2006 in the National OVC Plan of Action. (US\$130 million). In the scale-up scenario, we assumed the program would be scaled from this level as projected in the plan of action

(but shifted four years later), reaching US\$485 million by 2014. For AB prevention, we used the cost estimates from the National Prevention Plan (US\$180 million per year), and assumed that under the scale-up scenario, these costs would grow by 10 percent per year. We did not model scale-up to universal access for OVC or AB prevention. Instead we assumed the same service level for both the scale-up and universal scenario for these two programmatic areas.

KEY FINDINGS

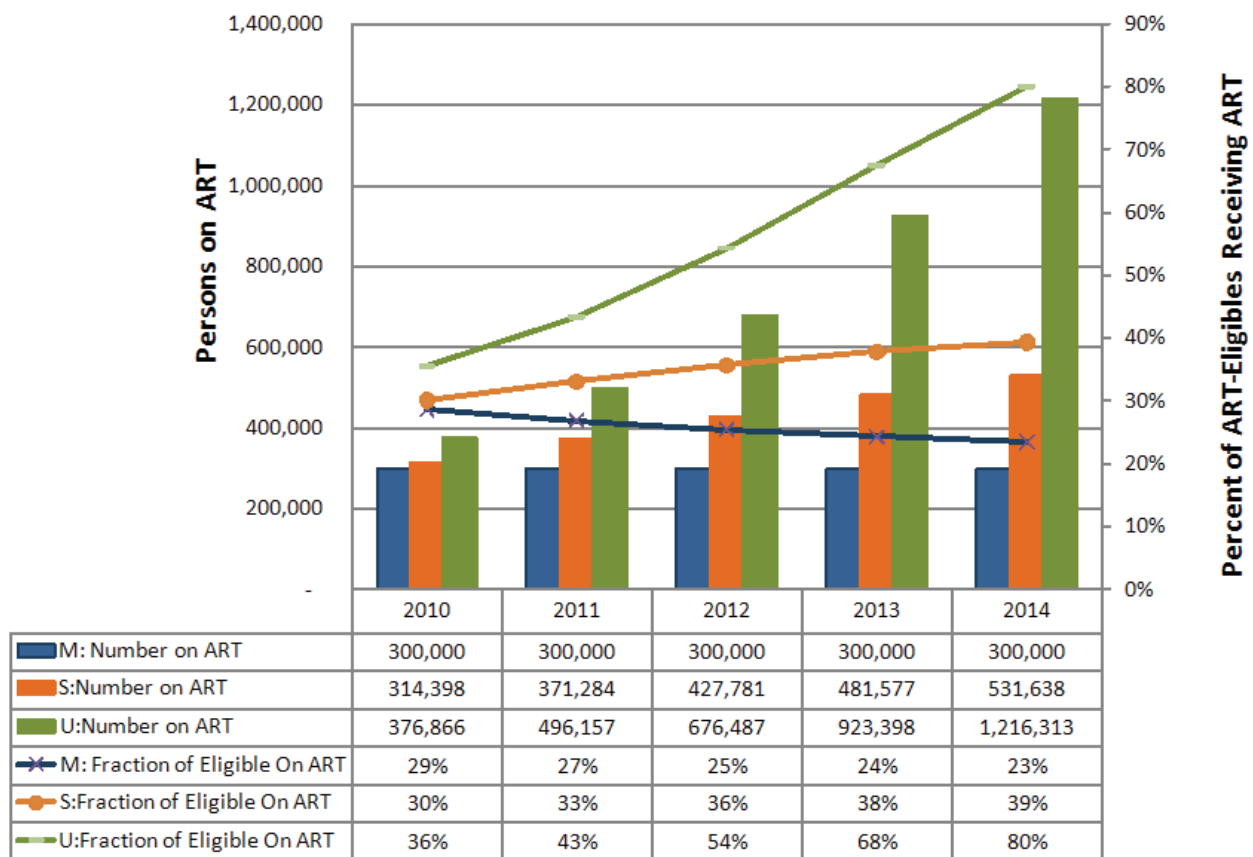
Service Levels

The maintain and scale-up scenarios have HCT programs of the same size, testing about 1.5 million per year, and detecting about 170,000 cases per year. The scenarios differ in how the detected cases are handled. Under the maintain scenario, treatment capacity is limited to 300,000, so many newly detected eligible cases are not put on ART. In the scale-up scenario, 80 percent of all detected eligible cases are put on ART. In the universal scenario, HCT must be scaled up in order to find a sufficient number of ART-eligible cases to meet the target of treating 80 percent of all cases in need (including both detected and undetected clinically eligible cases).

Under the maintain scenario, there are about 32,000 vertical transmissions per year. Under the scale-up scenario, the number treated grows to 109,000 per year by 2014 averting an estimated 42,000 vertical transmissions over five years. In the universal access scenario, by 2014, 80 percent of HIV-positive pregnancies are PMTCT treated, but this requires high levels of HIV testing among pregnant women, as well as high acceptance of treatment.

Figure 2 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, almost 30 percent are receiving ART in 2010. However, the fraction covered declines over time because the number on treatment is fixed at 300,000 while the pool of eligibles grows. In the scale-

FIGURE 2. ART ELIGIBILITY AND COVERAGE UNDER THREE POLICY SCENARIOS



up scenario, it is observed that if testing volumes were unchanged from the maintain scenario, but 80 percent of the detected eligibles were put on treatment, ART coverage would reach 39 percent by 2014. The universal access scenario increases the numbers on ART even further to reach the 80 percent target, with 1.2 million on treatment by 2014.

Costs

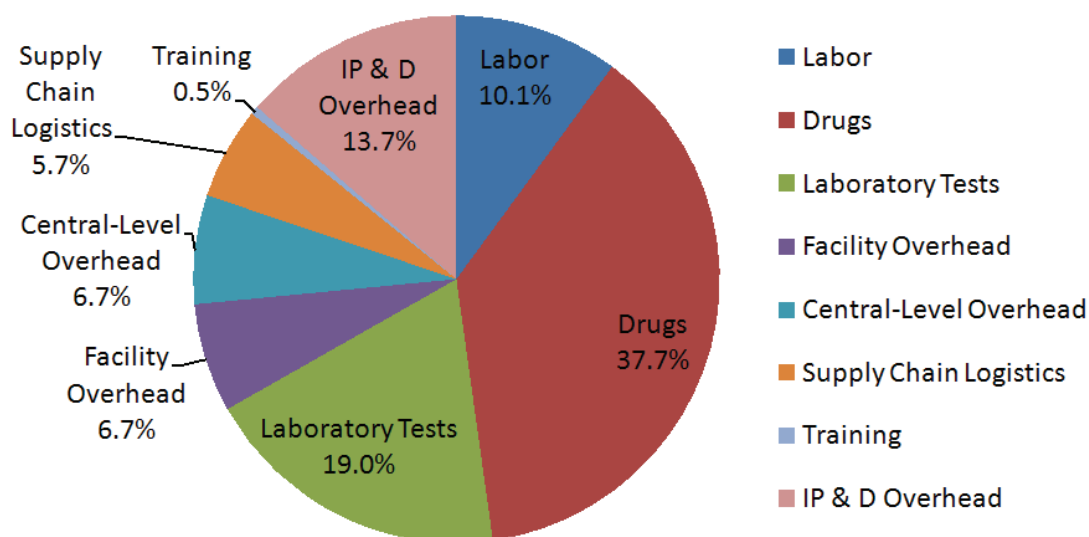
The total cost of the volume of HIV/AIDS services, if maintained at 2009 levels through 2014, is US\$530-650 million per year, reaching US\$2.9 billion over five years (Table 2). Prevention, care, and treatment constitute 35 percent, 20 percent, and 45 percent of the total cost, respectively. Continued donor funding commitments will be required for years 2010 to 2014, as domestic government spending accounts for only about 15 percent of resources required to sustain HIV/AIDS program at current levels of service delivery. PEPFAR accounted for 70 percent of the total budget. Figure 3 shows the breakdown of costs by input category for the maintain policy scenario. Drugs represent 38 percent of the total HIV program costs.

TABLE 2. FINANCIAL RESOURCES REQUIRED FOR NEXT FIVE YEARS (2010-2014) TO ACHIEVE POLICY GOALS (US\$ MILLIONS)

PROGRAMMATIC AREA	POLICY SCENARIO		
	MAINTAIN	SCALE-UP	UNIVERSAL
Prevention			
PMTCT	\$28.30	\$40.70	\$172.20
HCT	\$84.30	\$83.50	\$431.00
Other prevention	\$900.00	\$1,098.90	\$1,098.90
Treatment			
ART	\$1,345.90	\$1,813.70	\$3,049.90
CSS - Pre-ART	\$72.80	\$570.30	\$360.90
Care			
CSS - Non-ART	\$346.40	\$501.60	\$1,539.20
CSS - TB-HIV	\$59.70	\$59.10	\$58.80
Mitigation			
OVC	\$87.20	\$207.60	\$207.60
Grand total	\$2,924.30	\$4,374.90	\$6,918.20
Resources available*	\$2,961.90	\$3,192.40	\$3,404.50
Gap	\$77.80	\$1,182.40	\$3,521.80

Note: Non-ART CSS= care for persons who are ART-eligible, but not receiving ART. The resources available for health worker labor are assumed to be paid primarily from domestic resources and to expand to the level required under each scenario. Other domestic and external resources were assumed to be as shown in Table 1.

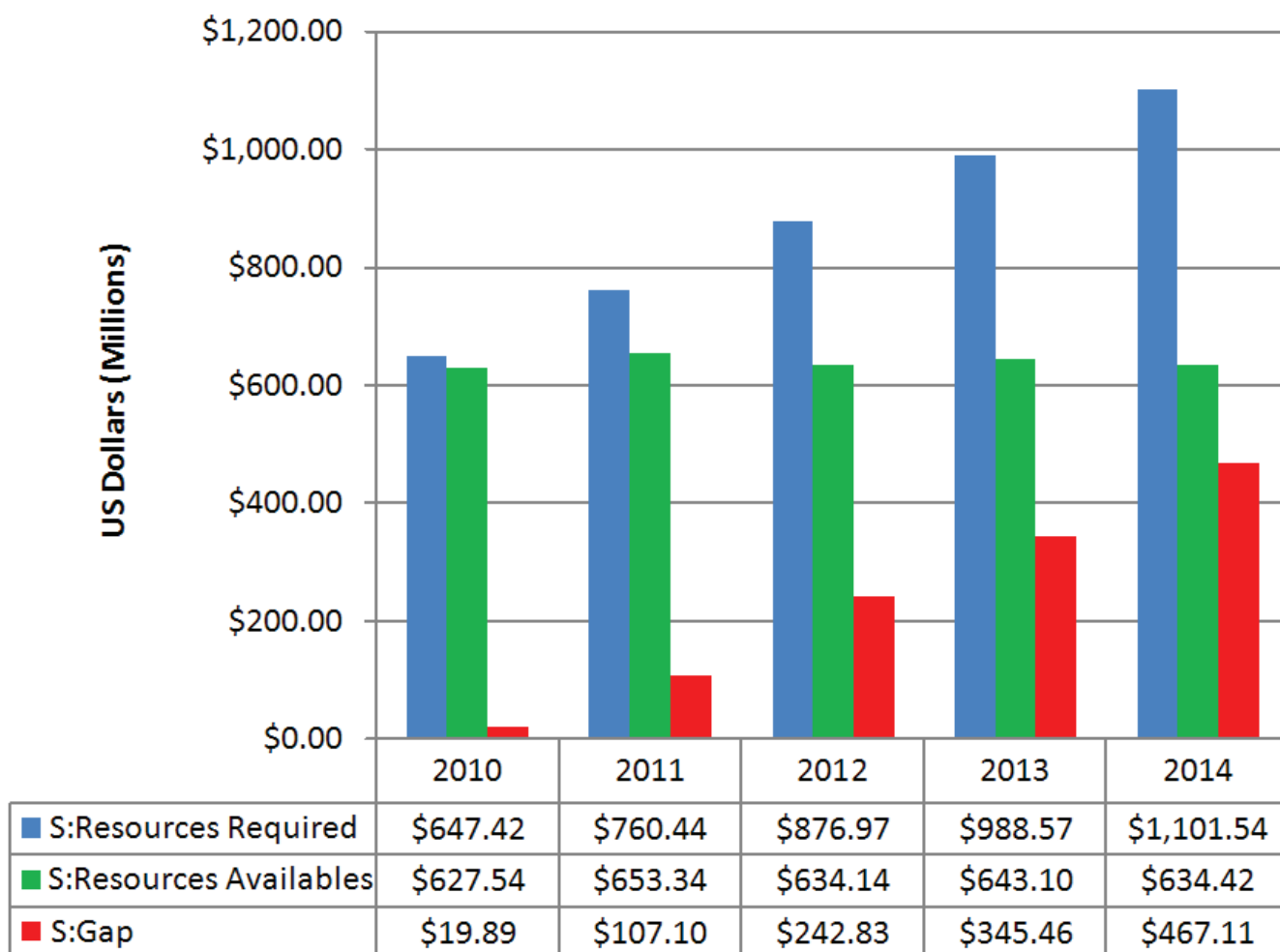
FIGURE 3. FINANCIAL BREAKDOWN OF HIV/AIDS PROGRAM COSTS BY INPUT CATEGORY (MAINTAIN SCENARIO)



To continue scaling up HIV/AIDS services over the next five years would require an additional US\$113 million per year, reaching a total annual funding level of US\$1.1 billion by 2014 (Figure 4). Reaching universal access by 2014 would require even greater resources, rising steadily to over US\$2.5 billion per year by 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.

FIGURE 4. RESOURCE NEEDS AND GAPS FOR THE SCALE-UP SCENARIO



For complete findings, please refer to full report available from the web sites of Health Systems 20/20 (www.healthsystems2020.org) and NACA (www.naca.gov.ng).

DISCUSSION

At present, over 4,000 patients are being enrolled on ART per month. To support this growth, substantial innovation in service delivery and health system design will be needed to increase operational efficiency and mobilize additional resources. In light of the scarcity of financial resources, careful attention should be paid to prioritization of services, policy initiatives, and resource allocation. Additionally, efforts to continue scaling 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 routinely capturing and reliably transmitting this financial data to the Federal Ministry of Health and NACA need to be developed so the cost of collecting this information is significantly reduced. Coordinated donor participation in providing data regarding their levels expenditure, unit costs, and service delivery volumes will enhance NACA's capacity to support planning for the continued national response to HIV and AIDS.

Findings for the three scenarios illustrate the usefulness of policy modeling for analyzing the sustainability of current programs and the feasibility of scale-up. The calibrated HAPSAT-Nigeria tool can now be used in strategic planning, policymaking, and budgeting processes to generate information regarding the resources required for any proposed HIV policy alternative. The flexible tool rapidly produces results that are useful for resource mobilization, resource allocation, priority-setting, and program optimization.

The HAPSAT-Nigeria model can be updated periodically as the context in which HIV/AIDS services are being implemented evolves. Donor funding continues to be unpredictable, drug costs are falling, and new technologies for HIV/AIDS prevention, diagnosis, and treatment continue to emerge.

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

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