



**NIGERIA:**

**ANTIRETROVIRAL QUANTIFICATION  
AND SUPPLY PLANNING  
(JULY–AUGUST 2006)**

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# **NIGERIA: ANTIRETROVIRAL QUANTIFICATION AND SUPPLY PLANNING**

**(JULY–AUGUST 2006)**

## **DELIVER**

DELIVER, a six-year worldwide technical assistance support contract, is funded by the U.S. Agency for International Development (USAID).

Implemented by John Snow, Inc. (JSI), (contract no. HRN-C-00-00-00010-00) and subcontractors (Manoff Group, Program for Appropriate Technology in Health [PATH], and Crown Agents Consultancy, Inc.), DELIVER strengthens the supply chains of health and family planning programs in developing countries to ensure the availability of critical health products for customers. DELIVER also provides technical management of USAID's central contraceptive management information system.

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## **Abstract**

The Government of Nigeria (GON) (through the Federal Ministry of Health and the U.S. Agency for International Development) requested DELIVER's technical assistance to conduct a quantification of antiretroviral drugs and to carry out a PipeLine monitoring and procurement planning exercise to support expansion of the GON federal antiretroviral therapy program. Some aspects of the quantification had to be based on assumptions, and these are discussed in the chapter on quantification methodology.

DELIVER  
John Snow, Inc.  
1616 North Fort Myer Drive, 11th Floor  
Arlington, VA 22209 USA  
Phone: 703-528-7474  
Fax: 703-528-7480  
Email: [deliver\\_project@jsi.com](mailto:deliver_project@jsi.com)  
Internet: [deliver.jsi.com](http://deliver.jsi.com)

# CONTENTS

<b>Acronyms</b> .....	<b>v</b>
<b>Acknowledgments</b> .....	<b>vii</b>
<b>Executive Summary</b> .....	<b>ix</b>
Purpose of the Technical Assistance .....	ix
Summary of Findings .....	ix
Recommendations .....	x
<b>Scope of Work</b> .....	<b>3</b>
Objectives .....	3
Scope of Work.....	3
<b>ARV Drug Quantification</b> .....	<b>5</b>
Purpose.....	5
Scope.....	5
<b>General Methodology</b> .....	<b>7</b>
Activities Completed.....	7
Site Visit Teams and Locations.....	8
Capacity-building Exercise.....	8
JSI/DELIVER and FMOH debriefing .....	10
<b>Quantification Methodology</b> .....	<b>11</b>
Activities Completed.....	11
Key Assumptions for Estimating Number of Patients for the Forecast Period.....	12
<b>Forecasting Process and Results</b> .....	<b>17</b>
Pipeline Principal Activities .....	19
Procurement Planning.....	20
Designation of Max-Min Levels at the FCMS.....	20
<b>Recommendations</b> .....	<b>23</b>
<b>Bibliography</b> .....	<b>25</b>
<b>Appendices</b> .....	<b>27</b>
A. Assessment Tool .....	27
B. List of Quantification Team Members.....	31
C. List of Quantification Sites and Contacts.....	33
D. Quantimed Forecast Results .....	37
E. Pipeline Procurement Planning Report.....	39

## Tables

1. Current and Projected Number of Patients .....	13
2. Breakdown of Patients on Adult First Line Regimens .....	14
3. Assumption for Weight Distribution of Pediatric Patients .....	14
4. Regimen Breakdown for PMTCT .....	15
5. Regimen Breakdown for PEP .....	15
6. Overview of Quantification Elements and Parameters.....	17
7. Forecast Results: ARV Products and Number of ARVs Required (2-year period).....	18
8. ARV Stock Status as of July 31, 2006, at 55 ART Sites Including FCMS .....	19
9. Shipment Summary by Supplier (October–December 2006).....	21

# ACRONYMS

AIDS	acquired immunodeficiency syndrome
ART	antiretroviral therapy
ARV	antiretroviral
DPRS	Department of Planning Research and Statistics
FCMS	Federal Central Medical Stores
FCT	Federal Capital Territory
FMOH	Federal Ministry of Health
GF	Global Fund (GFATM)
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GON	Government of Nigeria
HAART	highly active antiretroviral therapy
HIV	human immunodeficiency virus
JSI	John Snow, Inc.
LMIS	logistics management information system
NACA	National Action Committee on AIDS
NASCP	National AIDS and STI Control Program
PEPFAR	President's Emergency Plan for AIDS Relief
PMTCT	prevention of mother-to-child transmission
PO	per oral
S/N	serial number
STD	sexually transmitted disease
STG	standard treatment guideline
STI	sexually transmitted infection
USAID	U.S. Agency for International Development
WHO	World Health Organization



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In addition, the authors recognize the generosity of the FMOH, the Federal Central Medical Stores, donors and implementing partners, and the antiretroviral facility focal people who gave their time to provide the information needed for the quantifications. Without their help, the quantification process would have been incomplete.

A project of this scope involves contributions from so many people that it is impossible to acknowledge all of them, and we would surely unwittingly omit many if we attempted to do so. The numerous organizations and individuals who contributed to the quantification and PipeLine activities did so in various and positive ways. We are sincerely grateful for their in-depth and extensive assistance.



# EXECUTIVE SUMMARY

Since 2001, the Federal Government of Nigeria (GON), through joint efforts and close collaboration with other key stakeholders, has been working to develop sound and sustained programs to prevent the spread of the human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) and to care for and treat people living with HIV/AIDS. Nigeria's national commitment to confront AIDS has never been stronger.

To accomplish the goal of sound, sustained programs, the GON (through the Federal Ministry of Health [FMOH]) and the U.S. Agency for International Development (USAID) asked DELIVER to provide technical assistance in conducting a quantification of antiretroviral (ARV) drugs and to plan a procurement and supply schedule of ARV drugs for a two-year period.

## PURPOSE OF THE TECHNICAL ASSISTANCE

Since the last quantification, which was carried out in August 2005, some key changes have been made in the antiretroviral (ART) program. The most significant of these have been the addition of 30 new federal ART sites and the design of a logistics management information system (LMIS) for ARVs and HIV test kits.

Providing technical assistance involved three main activities:

1. Forecast the requirements for ARV drugs needed to support the expansion of the FMOH ART program for August 2006–July 2008.
2. Calculate the quantity of each commodity to order for the forecast period, August 2006–July 2008.
3. Plan supply quantities and shipment schedules to meet the ARV demand.

## SUMMARY OF FINDINGS

### QUANTIFICATION

For this quantification, the team selected a morbidity-based scaling-up methodology as the most practical method to use because logistics data for the past several months were not available. The methodology was chosen only after the collection, analysis, and validation of data from the 55 ART sites were completed.

The facility visits and quantification results showed that, at the end of July 2006, there were 29,986 adult patients on first line treatment and 213 adults on second line treatment. The 1,296 pediatric patients were all on first line treatment.

The forecasting exercise was carried out with Quantimed, a quantification software program, to estimate the quantities of drugs required to treat the projected number of patients on various regimens. The projected number of ART patients and the key assumptions used in the quantification were agreed upon by key stakeholders taking part in the quantification exercise. These included the National AIDS and STI Control Program (NASCP), the National Action Committee on AIDS, and the Department of Food and Drugs.

The following key assumptions were made during this quantification:

1. On the basis of the current number of patients on treatment and the rate of growth since the program's inception, it was projected that the number of patients on treatment will be 49,000 adults and 3,000 children by July 2007 and 62,000 adults and 4,300 children by July 2008.
2. The percentage breakdown of new patients among regimens was assumed to reflect the current regimen breakdown of existing patients.
3. In the absence of treatment data on pediatric patients by weights, the number of patients was evenly distributed among the following weight bands: 3–5 kg, 5–10 kg, 10–15 kg, 15–20 kg, 20–25 kg, 25–30 kg, and 30–40 kg.

## **SUPPLY PLANNING**

From the forecast results, a reliable ARV procurement and supply schedule was developed. This process required that appropriate stock levels be established at the national level, taking into consideration the inventory levels at both the facilities and the Central Medical Stores. In the final forecast, adjustments were made for wastage, including damages, pilferage, and other losses.

The forecast results estimated monthly consumptions that were used by PipeLine software to calculate the actual quantities of each drug to be procured to fill the pipeline. This action also took into consideration the stock on hand (total in-country), the quantities of drugs on order, and the buffer stocks and supplier lead times to recommend an appropriate delivery schedule that would ensure the correct management of the drugs between the desired maximum and minimum (max/min) stock levels.

## **RECOMMENDATIONS**

The analysis resulted in the following recommendations:

- The PipeLine database should be updated regularly to reflect actual ARV consumption. As stated before, LMIS reports from the ART sites (that have been trained) have started coming in to the NASCP. These reports of actual consumption should be entered into PipeLine to replace the estimated consumption arrived at during the forecast.
- Procurement and shipments should be adjusted to maintain proper inventory levels. When the actual consumption from the ART sites is entered into PipeLine, the software automatically recalculates the months of stock. If the actual consumption is more or less than the forecasted consumption, it will be necessary to adjust the shipment schedules to avoid overstocking or understocking.
- To ensure that stocks are managed within the desired max/min inventory levels, subsequent procurement activity should be based on framework contracts, which will provide the flexibility to adjust order quantities and shipment dates.
- Measures should be taken to ensure that drugs near their expiry dates are used. Some of the ARV drugs in stock are due to expire very soon, and given their current rate of consumption, these drugs are certain to expire. Appropriate measures should be taken to ensure that as many of the drugs as possible are consumed before their expiration.
- Policy-level decisions should be made to determine whether or not to procure adult and pediatric second line drugs. Currently, large quantities of these drugs have expired, and some are near expiry, because either patient uptake is slow or patients needing second line drugs are referred to other ART programs such as the President's Emergency Plan for AIDS Relief. Meanwhile, these drugs sit on the shelves unused.

- Quantification should be reviewed within six months to update previous quantification parameters. As more reports containing actual consumption data from ART sites come in, and as uptake increases, the quantification should be reviewed, taking into consideration the new parameters and making new assumptions based on the prevailing circumstances.

If implemented, these recommendations will go a long way toward improving and sustaining the availability of drugs in-country. They will also help ensure that ARV drugs are managed within the max-min levels to ensure that an appropriate inventory level of drugs is available at all times to meet the needs of patients on ART.



# BACKGROUND

Nigeria, with an estimated population of 130 million people, is the largest country in the continent of Africa; it accounts for 47 percent of the population in the West African subregion. Since 1986, when the first cases of HIV/AIDS were reported in Nigeria, it has seen a steady increase in the rate of HIV/AIDS (1.8 percent in 1991 to 4.4 percent in 2005). It is estimated that today 3.5 million people in Nigeria are living with HIV/AIDS. This is the third-highest rate in the world.

According to Nigeria's Federal Ministry of Health (FMOH), AIDS is one of the leading causes of death in adults ages 15–49 years. The FMOH also reported that the epidemic has extended beyond the high-risk groups to the general population, impacting many segments of society.

In response to this challenge, in 2001, the Federal Government of Nigeria (GON) initiated a national antiretroviral therapy (ART) program. The primary goal is providing access to affordable ARV drugs to improve the quality of life of people living with HIV/AIDS. Implementation of the program began in 2002 with 25 federal centers selected to provide ART in various parts of the country. By the middle of 2004, approximately 13,500 people were receiving ART services. The 25 centers were pilot sites and have produced positive results. Because of these encouraging results and the need to meet ART scale-up plans, the GON has added 30 additional ART facilities and has plans for more sites in the near future.

Nigeria's ART program was started with funding that the FMOH allocated to begin services at the 25 federally supported sites. Initial government support for the ART program included funding for procurement and distribution of a limited selection of ARV drugs for the federal sites. Expansion of the GON's ART program has been limited, and government-funded procurement and distribution were suspended for a time in 2003.

However, since 2003, a number of opportunities and activities have helped move ART scale-up closer to meeting its goals. The World Health Organization (WHO) launched a major global effort to put 3 million people on ART by the end of 2005 (WHO's 3×5 target). Through this effort, more funds have become available to help finance ART in Nigeria. In 2005, for example, the GON received support from the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) and from the U.S. Government partners under the President's Emergency Plan for AIDS Relief (PEPFAR). With additional resources, the GON has made significant progress in expanding its ART program.

Together, with political commitment, national and international partners have helped shape and define how Nigeria will proceed in scaling up ART services to meet its growing need. In part, key to the success of this expansion will be the ability of all partners to ensure adequate financing, procurement, and distribution of a continuous supply of quality ARV drugs to the federally supported ART sites.

In June 2006, the GON (through the FMOH) and USAID asked DELIVER for technical assistance in conducting an ARV drug quantification and PipeLine planning exercise for a two-year period (August 2006–July 2008). The activity will assist the GON in making informed decisions about the financial requirements, procurement, and distribution of ARV commodities.



# SCOPE OF WORK

## OBJECTIVES

The overall objective of this consultancy was twofold: (1) conduct a quantification for ARV drugs for the GON's ART program and (2) utilize the output of the quantification activity to plan procurement and supply of ARV drugs for a medium time period of two years with PipeLine monitoring and procurement planning software.

The goal of this activity is to ensure that commodities needed for the ART program are secured and available at all levels of care and treatment, which will ensure optimum outcomes for those receiving ART services.

Quantifying and forecasting activities are critical when planning the resupply of ARV drugs. To maintain a full supply of ARVs for all patients on treatment and avoid gaps in the supply chain, as well as keep and manage proper inventory levels, this assessment focused on conducting an accurate quantification to forecast the requirements for ARV drugs needed to support the expansion of the ART program for August 2006 to July 2008.

## SCOPE OF WORK

The project involved the following activities:

- Develop a comprehensive tool for collecting logistics data on the supply and distribution of ARV drugs and new patient enrollments.
- Collect essential logistics data on ARV drugs at the Federal Central Medical Stores (FCMS) and at ART treatment sites, which will be used as part of the entire exercise.
- Conduct ART site visits at 55 facilities.
- Conduct capacity-building sessions on forecasting and quantification methodologies for key stakeholders.
- Document current sources of supply and funding commitments for procurement of ARV drugs for the federal ART program.
- Identify and discuss, with key stakeholders, the forecasting and quantification assumptions being considered; reach a consensus on these assumptions.
- Work with key stakeholders to finalize short- and medium-term commodity forecasts for ARV drugs to support the GON plans for scale-up of the federal ART program.
- Identify key policy and technical issues that affect quantification, procurement, and distribution of ARV drugs.
- Identify shipments and other commitments in the pipeline for the federal ART program.
- Establish maximum and minimum (max/min) stock levels for the FCMS.

- Draft and present a procurement plan that supports the continuous availability of ARVs to the federal ART program.
- Disseminate the results of the forecasting exercise to a national committee of stakeholders.

# ARV DRUG QUANTIFICATION

## PURPOSE

Since the last quantification, carried out in August 2005, the ART program has had some changes. The most significant changes have been the design of a logistics system for the ART program and the expansion of the program to 55 ART sites.

The current quantification activity was planned for July/August 2006 to enable the ART program to estimate the appropriate quantities of ARV drugs needed to meet the requirements of both the old and new sites and to plan the procurement accurately to meet the total demand. Specifically, the purpose of the quantification was to—

- Forecast the requirements for ARV drugs needed to support the expansion of the FMOH ART program for August 2006–July 2008.
- Calculate the quantity of each commodity to order for the forecast period of August 2006–July 2008.
- Plan supply quantities and shipment schedules to meet the demand.

## SCOPE

The quantification was performed for August 2006–July 2008; it covered the following health conditions:

### ADULT ANTIRETROVIRAL THERAPY

Patients in this group included—

- existing adult patients on first-line regimens as of August 1, 2006
- new adult patients on first line regimens starting August 1, 2006
- new adult patients on first line prevention of mother-to-child transmission (PMTCT) regimens
- existing adult patients on second-line regimens as of August 1, 2006
- new adult patients on second line regimens starting August 1, 2006.

### PEDIATRIC ANTIRETROVIRAL THERAPY

Patients in this group included—

- existing pediatric patients on first line regimens as of August 1, 2006
- new pediatric patients on first line regimens starting from August 1, 2006
- existing pediatric patients on second line regimens as of August 1, 2006
- new pediatric patients on second line regimens starting August 1, 2006.

## **PREVENTION OF MOTHER-TO-CHILD TRANSMISSION**

Categories of patients included those in regimens for—

- pregnant women eligible for highly active antiretroviral therapy (HAART)
- pregnant women not eligible for HAART
- newborn babies.

## **POST- EXPOSURE PROPHYLAXIS (PEP)**

This group included—

- patients with low risk for infection
- patients with high risk for infection.

# GENERAL METHODOLOGY

## ACTIVITIES COMPLETED

The following steps were accomplished:

1. review of policy and planning documents and technical reports
2. development and use of a standardized field tool for interviewing health facility staff and collecting data on ART patients and stock on hand
3. interviews and meetings with national policymakers and program managers and key GON partners
4. DELIVER/FMOH team visits to ART facilities
5. capacity-building exercise with the National Action Committee on AIDS (NACA) and the FMOH staff (both groups participated in the entire quantification process) that included—
  - data collection, analysis, and validation
  - familiarization with the use of Quantimed software
  - familiarization with the use of PipeLine software
  - participation in quantification debriefing.
6. DELIVER and FMOH debriefing to key stakeholders to disseminate assessment findings and results of the quantification and supply planning exercise.

Before departing for Nigeria, the Washington-based DELIVER project consultants had numerous conference calls with the DELIVER office in Nigeria. The calls focused on issues directly related to the quantification and PipeLine planning processes. The DELIVER (Washington and Nigeria) offices collected and shared information in preparation for both activities. Key GON documents, as well as technical reports, were reviewed before the exercise began; this continued throughout the entire process (see bibliography and appendix A for the documents used for this assessment)..

Several activities took place during the first few days in-country. The DELIVER consultants met with multiple partners (the National AIDS/STD Control Programme [NASCP], NACA, and USAID) and key stakeholders to collect information and present the necessary steps and information needed for the quantification and supply planning activity.

Before departing to the field to conduct the site visits, the FMOH and JSI/DELIVER organized and conducted a stakeholder consultative meeting in Abuja. The purpose of this meeting was to explain the quantification methodology and data requirements for the exercises. This one-half day meeting included discussing and reaching agreement on the data collection tool used for the site visits. The data collection tool included the following:

- facility contact information: names of ART focal person and ART focal pharmacist
- number of patients on ART: adult first line and second line and pediatric first line and second line patients

- data collected by the Federal Capital Territory (FCT) team on the number of ART patients, broken down by ARV treatment regimen
- estimated number of new patients for August, September, and October 2006
- current ARV stock status: ARV physical inventory and expiry dates.

As mentioned, the tool was adapted and finalized on the basis of feedback from FMOH counterparts and the results of the pilot tests. The final version of the tool (shown in appendix A) was then formatted, printed, and distributed to the assessment teams before they departed from Abuja.

## **SITE VISIT TEAMS AND LOCATIONS**

### **TEAM COMPOSITION**

An activity of this scope requires in-depth coordination and collaboration among the different partners participating. To achieve this, a total of eight assessment teams were formed consisting of two to four persons per team who were selected from various GON institutions. These included NACA; NASCP; the Department of Food and Drugs, which includes the FCMS; and the Department of Planning Research and Statistics (DPRS). The makeup of the teams included pharmacists, physicians, program and assistant program managers, and laboratory scientists. (See appendix B for a list of quantification team members and their organizations.)

In response to requests from the GON and USAID, the field visits were also intended to identify and clear up concerns of ARV understock and overstock issues as well as ARV expiry dates.

The field visits were completed within a five- to six-day period. The team makeup and the travel distance between sites determined the number and location of sites visited by each team.

### **SITES VISITED**

Site selection was based on the current number of federally supported ART sites providing service. Given the current ART coverage of the 25 first-generation treatment sites (pilot ART facilities) and the need to expand ART coverage to achieve the national target goal of treating 250,000 patients, the GON has expanded ART services to include 30 additional facilities. According to the FMOH, these new ART facilities meet the basic capacity criteria to provide ART services.

The teams visited a total of 55 sites and collected data at all of the sites. (See appendix C for the sites visited, their locations, and names of primary contacts.)

## **CAPACITY-BUILDING EXERCISE**

### **OVERALL TRAINING**

One of the significant activities relating to the scope of work was capacity building among the local counterparts for the management of ARV drugs; this included forecasting and quantification as well as procurement planning.

In carrying out this activity, the DELIVER consultants worked with a team made up of selected staff members from the various stakeholders involved in the management of HIV/AIDS commodities. The team comprised staff from the FMOH departments, including Food and Drug Services; DPRS; FCMS; NASCP; and other government agencies such as NACA.

As mentioned, the stakeholder team worked closely on the various stages involved in the exercise, including data collection through field visits; data analysis and validation; development of forecast assumptions; forecast preparation, which included data entry; and procurement planning.

The process of the quantification and procurement planning involved the use of two software programs: Quantimed and PipeLine. Since these software programs were being used in Nigeria for the first time in the quantification of ARVs, most of the team members were not familiar with their functions. In addition to the theoretical aspect of the training on these programs, participants received hands-on training working with actual data and their outcomes. The participants also participated in the other activities of the quantification and procurement planning activities.

To use Quantimed, a quantification software, the training introduced the team to some of the components of the software and its capability. The software is designed to facilitate the process of determining quantities of medicines and medical supplies required for a health program and to assist in planning and budgeting.

### **SPECIFIC LEARNING TOPICS**

The training involved exposing participants to the following:

- getting started with Quantimed, including its key features, instructions for navigating the software, and defining Quantimed's data requirements
- defining quantification data set parameters
- data entry for the morbidity-based quantification method, including entry of regimens and medicines per regimen
- using the scaling-up function, which provides room for phasing in patients
- displaying results and analyzing data to come up with forecast needs
- generating queries from data and output reports.

In familiarizing the team with the use of PipeLine software, a procurement planning tool, participants were introduced to the components and capability of the software. The software is designed to help managers monitor the status of their product pipelines and product procurement plans and provides information needed to initiate and follow up with actions that will ensure regular and consistent stock of products in a program.

Participants were introduced to the capabilities of the PipeLine software, which included—

- monitoring stock balances in terms of quantities and months of stock on hand in the entire program
- comparing stock balances to max/min stock levels as designated by the program
- identifying pipeline problems including stockouts and balances below minimum or above maximum
- calculating shortfalls and surpluses and the quantities required to maintain the program's desired stock levels
- calculating and tracking of pending pipeline actions, such as when to plan, order, ship and receive products, based on lead times, so as to ensure uninterrupted supply of products
- estimating costs of products including freight.

Participants were also taken through the processes of actual data entry into PipeLine and planning shipments.

## **JSI/DELIVER AND FMOH DEBRIEFING**

Following the quantification and procurement exercise, JSI/DELIVER hosted a debriefing session involving key government and nongovernment stakeholders. The debriefing presented the preliminary findings and results of the quantifications for ARV drugs and the procurement and scheduling of ARV orders. Several key policy and technical issues regarding the selection and use of fixed-dose combinations versus single-dose ARV drugs for adult first line patients were highlighted during the debriefing. Other issues raised included future policy on treating adult second line patients and concerns of overstock of certain first-line single-dose ARVs. These issues will clearly affect the quantification, procurement, management, and use of ARV drugs at the federally supported ART sites. Further discussion on these issues, as well as other policy issues, are discussed throughout this report.

# QUANTIFICATION METHODOLOGY

## **ACTIVITIES COMPLETED**

In the quantification of ARVs, as for most health commodities, a number of methodologies can be employed. For this particular quantification and its process, the quantification team made a decision from the analysis of the data available as to which methodology would produce the most realistic results. The methodologies considered were the logistics-based methodology (consumption-based), the morbidity-based methodology, and the adjusted consumption-based methodology.

## **LOGISTICS-BASED METHODOLOGY**

The logistics-based methodology uses logistics data on consumption of commodities in the past as a basis for projecting future needs. Estimates of increases or other changes in consumption for each product during the period of the forecast are based on past trends in consumption. The use of this method requires the availability of data on the quantities of drugs actually dispensed to patients at service delivery points over a specified period of time. Because consumption must be as accurate as possible, data on quantities dispensed directly to patients are highly preferred over issues data, which reflect quantities distributed from a higher level in the system to a lower level.

As discussed above, the logistics data used are those that are reported by the ART sites and include quantities of drugs dispensed to patients, the stock on hand, and data on losses and adjustments made. Other data that are required are the stock on hand and the losses and adjustments at the FCMS to get an overall national picture of the current inventory status.

## **MORBIDITY-BASED METHODOLOGY**

When using a morbidity-based forecast, projections and estimates are made by using morbidity or occurrence of a disease, patient targets, and service statistics. This method involves estimating the number of patients expected to be on treatment and the number of visits or treatment episodes to be encountered during the period of the forecast. This method requires the availability and use of standard treatment guidelines (STGs) and must be adhered to by all service providers.

The use of the morbidity-based method depends on the service statistics reported by ART sites, including number of patients on treatment and the regimens they are on, the patient targets for the forecast periods, and the availability and use of the STGs.

## **ADJUSTED-CONSUMPTION METHODOLOGY**

The adjusted consumption method uses the consumption data of one or more facilities that has reliable data and extrapolates from those data to estimate the quantities of commodities needed at other or similar ART facilities for which there are no data or for which unreliable data exist. (Again, this method requires the availability of consumption data on quantities of drugs dispensed to patients at service delivery sites.)

## **SELECTION OF METHODOLOGY**

In selecting which methodology to use for quantification, a number of considerations were made that took into account both programmatic and technical issues that may affect the quantification.

In general, the methodology for estimating ARV drugs is based on the type and quality of data available on ART patients and the ARV drug supply as well as on program policies, the volume and quality of services being provided, and ARV drug management and stock status at the time of the quantification.

For this particular quantification, the morbidity-based methodology was selected following the collection, analysis, and validation of the data from the 55 ART sites.

In this method, the estimation of needs is based on morbidity data on the prevalence or incidence of disease and service utilization rates (e.g., number of sites offering the service, number of ART patients per site, and number of new and existing patients). To be able to use this method for the estimation of ARV drug requirements, the following key information is needed:

1. data on the number of existing patients
2. estimated number of new patients to be diagnosed and treated within the forecast period
3. percentage of patients who will be on each of the standard ARV drug regimens.

These data must either be available or be arrived at through informed assumptions. STGs have to be clearly documented, disseminated, and assumed to be adhered to by service providers who are adequately trained in ART.

In addition, specific information on the percentage of patients currently on first line and second line regimens, the rate of single drug substitutions due to toxicities and side effects, and the rate at which patients will need to make a complete regimen switch from a first line to a second line regimen because of treatment failure or drug resistance must also be available. If all or some of this information is not available, agreement on what data to use must be arrived at through informed assumptions.

Estimates of the number of people requiring treatment within the period of the forecast should be based on prevalence or incidence of disease and program expansion plans. Where program targets have been established, it is critical that an assessment of actual service capacity to reach and treat patients and of the supply chain capacity to ensure the availability of the drugs for the patients who need them, when and where they need them, has been taken into consideration. Overly optimistic or unrealistic targets have resulted in overestimation of drug needs and costly procurement errors, leading to wastage of resources and products that cannot be distributed or used within their expiration period.

## **KEY ASSUMPTIONS FOR ESTIMATING NUMBER OF PATIENTS FOR THE FORECAST PERIOD**

### **ANTIRETROVIRAL THERAPY**

In estimating the number of patients expected to be on treatment for the forecast period of August 2006–July 2008, it was taken into account that one of the driving forces behind this quantification was for adequate procurement planning to ensure that stocks are managed appropriately. Extensive discussions were held with the program counterparts in an effort to arrive at the targets that were being envisaged by the program for this forecast period.

As a result, it was resolved that the scale-up scenario of 12,360 new patients coming on treatment between August 2006 and July 2007 and 10,360 patients coming on treatment between August 2007 and July 2008 be adopted. These projections were used in the quantification, and the current number of patients on treatment and their regimens, along with the service capacity currently available, were also taken into consideration.

Quantification results showed that, at the end of July 2006, there were 29,986 adult patients on first line treatment and 213 adults on second line treatment. In addition, there were 1,296 pediatric patients, all on first line treatment. Table 1 provides an overview of the current and projected number of patients for the forecast period.

**Table 1. Current and Projected Number of Patients**

Category of Patients	No. of Patients at End of July 2006	Estimated No. of Patients by July 2007	Estimated No. of Patients by July 2008
Adult	29,986	49,000	62,000
Pediatric	1,296	3,000	4,300
PMTCT		12,000	18,000
PEP		500	500

### **PMTCT**

PMTCT is an entry point to ART. The GFATM proposal elaborated on a scale-up plan that provided for 5 percent of HIV-infected pregnant women to receive a complete course of ARV prophylaxis for PMTCT for 2006–2007 and 7.5 percent for 2007–2008, an increase of 3 percent from 2005–2006.

In projecting for the above designated numbers, the team assumed that care would be provided on the basis of the treatment recommendations in the PMTCT treatment guidelines and agreed that the following recommended regimens be used for the quantification:

### **Pregnant Women Eligible for Haart**

The recommended regimens are as follows:

- For mothers, the preferred regimen is AZT+3TC+NVP given from the 14th week of pregnancy. For women suffering from side effects of NVP, the recommendation is for AZT+3TC+NFV.
- For babies, the preferred regimen is a single dose of NVP as soon as possible after birth and then AZT for six weeks.

### **Pregnant Women Not Eligible for Haart**

The recommended regimens are as follows:

- For mothers, the preferred regimen is AZT, given from week 28, to continue during labor, and single-dose NVP at the onset of labor.
- For babies, single-dose NVP given as soon as possible after birth and then AZT for six weeks.

### **PEP**

For PEP treatment, the team agreed that a total number of 500 patients would receive treatment for 2006–2007. The recommended regimens for prophylaxis are as follows:

- for low risk: AZT+3TC given for 28 days
- for high risk: AZT+3TC+EFV given for 28 days.

At this point it should be noted that although these scale-up numbers were adopted for this quantification, the parameters used for the quantification may change (either slower or faster uptake of services than

anticipated) from those planned for in the quantification. However, these changes can be accommodated through constant monitoring of the pipeline to establish the actual rate of growth of the program, adjusting the procurement plan to reflect this growth, and eventual revision of the quantification.

### **ASSUMPTIONS FOR THE BREAKDOWN OF PATIENTS BY REGIMEN**

A revised version of Guidelines for the Use of Antiretroviral (ARV) Drugs in Nigeria was published in September 2005 (2005a), and the quantification was based on this version.

During the data analysis, the reports collected on patients from the various sites were organized by the number of patients per site, while data collected for FCT ART sites provided the number of patients on treatment and the ARV regimen they were receiving. This included both adult and pediatric patients. The reports were then aggregated (from the 55 sites), and the breakdown of the patients per regimen for FCT sites was used as representative of the national program. Table 2 shows the breakdown of adult patients on first line regimens.

**Table 2. Breakdown of Patients on Adult First Line Regimens**

<b>Treatment Regimen</b>	<b>Number of Patients</b>	<b>Percentage (%)</b>
AZT/3TC+NVP	900	3.0
AZT/3TC+EFV	600	2.0
d4T(30)+3TC+NVP	8,096	27.0
d4T(40)+3TC+NVP	18,891	63.0
d4T(30)+3TC+EFV	450	1.5
d4T(40)+3TC+EFV	1,049	3.5
<b>Total</b>	<b>29,986</b>	<b>100.0</b>

For adult second line therapy, most of the patients who were identified to be on second line treatment were on regimens not found in the STGs. Although these patients will continue to be on these drugs until they fail treatment and are switched to other regimens, the team agreed that provision for second line treatments should be based on the recommended STG, which is primarily ABC+ddI+IDV/r.

For pediatric patients, the facility reports did not break down these patients to the level of detail of each regimen by weight bands, body surface area, or age. This level of detail is a critical requirement for quantifying for pediatric patients. To quantify for this important category of patients, the team, in consultation with national program management, adopted a WHO-recommended tool proposed by the Clinton Foundation for forecasting of pediatric ARVs. This tool suggests that, when weight distribution of pediatric patients is unknown, each weight class receives an even weight distribution so that the total equals 100 percent. Table 3 provides a breakdown of weight category and distribution percentage.

**Table 3. Assumption for Weight Distribution of Pediatric Patients**

<b>Weight Band</b>	<b>Percentage (%)</b>
3–5 kg	14.3
5–10 kg	14.3
10–15 kg	14.3
15–20 kg	14.3

**Table 3. Assumption for Weight Distribution of Pediatric Patients (continued)**

<b>Weight Band</b>	<b>Percentage (%)</b>
20–25 kg	14.3
25–30 kg	14.3
30–40 kg	14.2
<b>Total</b>	<b>100.0</b>

For PMTCT, the breakdown was arrived at after discussions with the PMTCT program management and taking into consideration the revised PMTCT treatment guidelines that had been adopted. Tables 4 and 5, respectively, show the regimen breakdown for PMTCT and PEP. (See appendix D for details of the regimen breakdowns that can be found in Quantimed reports.)

**Table 4. Regimen Breakdown for PMTCT**

<b>Condition</b>	<b>Regimen</b>	<b>Breakdown (%)</b>
PMTCT Mother (NVP sensitive)	AZT/3TC/NFV	3
PMTCT Mother (NVP tolerant)	AZT/3TC/NVP	97
Child	AZT+NVP	100

**Table 5. Regimen Breakdown for PEP**

<b>Condition</b>	<b>Regimen</b>	<b>Breakdown (%)</b>
PEP Low Risk	AZT+3TC	90
PEP High Risk	AZT+3TC+EFV	10



# FORECASTING PROCESS AND RESULTS

The Quantimed quantification software, developed by Management Sciences for Health, was used for estimating the quantities of drugs required to treat the projected number of patients on the various regimens for the forecast period.

All the information collected was entered into Quantimed software along with the assumptions on the expected number of patients for the forecast period, the breakdown of patients by regimens, and the scale-up rate and timeline as elaborated by the NASCP. Table 6 outlines the elements and parameters used in the quantification.

**Table 6. Overview of Quantification Elements and Parameters**

<b>Elements of Quantimed Database Used in Quantification</b>	<b>Parameter Details</b>
Quantification method	Morbidity-based quantification
Established list of medicines	STGs used to provide information on ARVs in use in Nigeria, Federal Ministry of Health, 2005
Established cost parameters, currency codes, currency exchange rates, and price types (several sources)	International pricing index guidelines GFATM prices Federal Ministry of Health prices
Established health conditions	Existing adults on first line Existing adults on second line Existing pediatric on first line Existing pediatric on second line New adult first line New adult second line New pediatric first line New adult first line from PMTCT New pediatric second line PEP PMTCT
Regimens and percentages established for each health condition	Based on STGs and agreed assumptions
Morbidity-based scaling-up estimates	Based on interviews with FMOH, reviewing the GFATM Proposal (Scale-up of Comprehensive HIV and AIDS Treatment, Care and Support in Nigeria) and other national documents, including data collected from ART sites
Quantification reports	Type of ARVs, estimated requirements and price, regimen breakdown, and scaling-up parameters

The scaling-up scenario took into consideration the estimated number of patients who would come on treatment monthly in the entire program rather than by individual sites. This scale was done for all the conditions that were being quantified.

The results and reports generated from Quantimed were then computed and analyzed. The reports obtained included the quantities of ARV drugs required to treat patients who are expected to be on treatment during the forecast period and the total cost of these drugs. Table 7 presents the total ARV requirements for each specific ARV.

**Table 7. Forecast Results: ARV Products and Number of ARVs Required (2-year period)**

S/N	Products	Total
1	abacavir 300 mg/tab tablet (PO)	705,038
2	AZT 10 mg/ml SOLUTION (PO)	41,830,592
3	AZT 300 mg/tab tablet (PO)	3,804,466
4	didanosine 400 mg/tab tablet (PO)	358,298
5	efavirenz 200 mg/tab tablet (PO)	1,079,420
6	efavirenz 600 mg/tab tablet (PO)	2,160,221
7	indinavir 400 mg/tab tablet (PO)	1,410,076
8	lamivudine 10 mg/ml SOLUTION (PO)	21,098,593
9	lamivudine 150 mg/tab tablet (PO)	13,348,560
10	lamivudine-stavudine-nevirapine 150 mg+30 mg+200 mg TABS (PO)	16,233,149
11	lamivudine-stavudine-nevirapine 150 mg+40 mg+200 mg TABS (PO)	28,726,817
12	lamivudine-zidovudine 150 mg+300 mg/tab tablet (PO)	8,603,394
13	nelfinavir 250 mg/tab tablet (PO)	1,304,100
14	nevirapine 10 mg/ml SUSPEN (PO)	41,765,339
15	nevirapine 200 mg/tab tablet (PO)	16,670,206
16	ritonavir 100 mg/tab tablet (PO)	705,038
17	stavudine 1 mg/ml SOLUTION (PO)	212,188
18	stavudine 20 mg/tab tablet (PO)	6,213
19	stavudine 30 mg/tab tablet (PO)	1,091,037
20	stavudine 40 mg/tab tablet (PO)	11,669,281

# PIPELINE PRINCIPAL ACTIVITIES

The in-country pipeline use for ARVs was determined first by using the stock status of sample first line drugs. This was necessary to determine how many months of stock were available on the basis of current consumption. A physical inventory was completed at the 55 sites including the FCMS. The results were aggregated and used in the procurement planning exercise as this served as an actual representation of the total in-country stock on hand at the time of the quantification. Table 8 presents stock on hand per ARV.

**Table 8. ARV Stock Status as of July 31, 2006, at 55 ART Sites Including FCMS**

S/N	Product	Pack Size	Total Stock
1	abacavir 300 mg/tab tablet (PO)	B/60	5,302
2	zidovudine 10 mg/mL solution (PO)	B/100 mL	80,931
3	didanosine 400 mg/tab tablet (PO)	B/30	5,827
4	efavirenz 200 mg/tab tablet (PO)	B/90	2,710
5	efavirenz 600 mg/tab tablet (PO)	B/30	11,899
6	indinavir 400 mg/tab tablet (PO)	B/60	14,036
7	lamivudine 10 mg/mL solution (PO)	B/100 mL	48,521
8	lamivudine 150 mg/tab tablet (PO)	B/60	154,809
9	lamivudine-stavudine-nevirapine 150 mg+30 mg+200 mg/tab	B/60	60,946
10	lamivudine-stavudine-nevirapine 150 mg+40 mg+200 mg/tab	B/60	90,901
11	lamivudine-zidovudine 150 mg+300 mg/tab TABLET (PO)	B/60	16,930
12	nevirapine 10 mg/mL suspension (PO)	B/100 mL	103,969
13	nevirapine 200 mg/tab tablet (PO)	B/60	187,811
14	ritonavir 100 mg/tab tablet (PO)	B/84	2,362
15	stavudine 30 mg/tab tablet (PO)	B/60	13,257
16	stavudine 40 mg/tab tablet (PO)	B/60	155,651
17	didanosine (ddl 100 mg)	B/30	1,696
18	abacavir (ABC syrup 20 mg/mL)	B/240 mL	2,333
19	nelfinavir (NFV powder 50 mg/g)	B/100 mL	832

It should be noted that some of the quantities of drugs included in the stocks in table 8 are near their expiry dates and appropriate measures should be taken to use as many of the drugs as possible before they expire. Some of these drugs include nelfinavir powder due to expire by November 2006 as well as indinavir 400 mg tablets and quantities of lamivudine 150 mg tablets and stavudine 30 mg and 40 mg tablets due to expire in the first quarter of 2007.

## **PROCUREMENT PLANNING**

In the final forecast, adjustments were made for wastage; this included damages, pilferage, and other losses. The adjustments were entered into the PipeLine software to quantify actual numbers of drugs to be ordered during the forecast period. In using the PipeLine software for procurement planning, the following data set was entered into the software:

- stock on hand
- drugs currently on order by the various sources (GFATM [through Crown Agents] and the FMOH)
- estimated consumption as forecasted.

In establishing appropriate stock levels (max/min), PipeLine also takes into consideration the buffer stocks that have been established and procurement lead times. With the use of PipeLine, a supply plan is established that shows the desired delivery dates of the product so that the stock is managed appropriately to ensure continuous availability of the product in-country.

## **DESIGNATION OF MAX-MIN LEVELS AT THE FCMS**

For effective stock management at the FCMS, it is essential to designate desired stock levels within which the ARV stock would be managed. After consultation with stakeholders, including the program and FCMS management, the team agreed to set the maximum stock level for the FCMS at nine months and the minimum stock level at six months. This took into consideration that lead time—from the time orders are placed until the drugs arrive in-country and are ready for use—had been set at four months, as confirmed by Crown Agents and the DPRS. It should be noted that max/min stock levels at the facility level are four months and two months, respectively, resulting in a national maximum ARV stock level of 13 months and a minimum level of eight months.

The quantity of ARV drugs on order was determined through consultations with the procurement agents: DPRS for FMOH and Crown Agents for NACA and GFATM. The team had access to invoices of shipments that were yet to arrive in-country for drugs ordered by Crown Agents and also from DPRS and copies of the drug quantities that had been approved but not yet supplied by the manufacturers. All of this information on drug quantities was then entered into PipeLine (see table 9).

The forecasted quantities of drugs for the forecast period were also entered into PipeLine. The forecast results produced estimated monthly consumption data that were used by PipeLine software to calculate the actual quantities of each drug to be procured to fill the pipeline. This action also took into consideration the stock on hand (total in-country), the quantities of drugs on order, and the buffer stocks and supplier lead times before recommending an appropriate delivery schedule to ensure proper management of the drugs between the desired stock levels (max/min).

At this point, it is extremely important to highlight that procurement contracts should be constructed to allow for flexible shipments (i.e., those shipments that can be brought forward or delayed depending on demand). Through formal discussions, the team discovered that this has not been practiced. Having flexibility would provide high-level management with sound planning options for ARV drug resupply. This type of system would also provide for adequate quantities of drugs in the system at all times and avoid overstocking or understocking.

**Table 9. Shipment Summary by Supplier (October–December 2006)**

Supplier/Product	Receipt Date	Quantity	Status
<b>FMOH</b>			
<b>Antiretroviral Drugs</b>			
efavirenz 200 mg	31-Oct-06	334,760	Ordered
efavirenz 600 mg	31-Oct-06	697,800	Ordered
lamivudine 10 mg/mL		5,494,100	Received
nelfinavir 250 mg	31-Oct-06	376,740	Planned
nevirapine 10 mg/mL		5,494,100	Received
d4T30/3TC/NVP	01-Aug-06	1,054,380	Received
d4T30/3TC/NVP	30-Sep-06	3,314,808	Ordered
d4T 30 mg tabs	01-Aug-06	143,340	Received
d4T40/3TC/NVP	30-Sep-06	7,518,846	Ordered
zidovudine 10 mg/mL		5,494,100	Received
AZT/3TC tabs	01-Aug-06	681,720	Received
AZT/3TC tabs	31-Oct-06	1,408,414	Ordered
<b>GFATM</b>			
<b>Antiretroviral Drugs</b>			
efavirenz 600 mg	30-Sep-06	103,500	Ordered
lamivudine 10 mg/mL		3,679,900	Received
lamivudine 10 mg/mL		10,500	Ordered
nevirapine 10 mg/mL		3,671,900	Received
zidovudine 10 mg/mL		2,848,000	Received
zidovudine 10 mg/mL		851,200	Ordered
AZT/3TC tabs	30-Nov-06	159,840	Ordered

The final results of the forecast and quantification exercise were presented to all partners and stakeholders, including service providers from some of the current ART sites, donor agencies, officials of the FMOH, NACA, Crown Agents, AXIOS, and others at a debriefing meeting.

See appendix E for a complete list of the products used in Nigeria.



# RECOMMENDATIONS

The following recommendations are proposed:

- The PipeLine database should be updated regularly to reflect actual ARV consumption. As stated before, LMIS reports from the ART sites (that have been trained) have started coming in to NASCP. These reports of actual consumption should be entered into PipeLine to replace the estimated consumption arrived at during the forecast.
- Procurement and shipments should be adjusted to maintain proper inventory levels. When the actual consumption from the ART sites are entered into PipeLine, PipeLine automatically recalculates the months of stock; if the actual consumption is more or less than the forecasted consumption, it will be necessary to adjust the shipment schedules to avoid overstocking or understocking.
- Subsequent procurement activity should be based on framework contracts to provide the flexibility to adjust order quantities and shipment dates to ensure that stocks are managed within the desired maximum and minimum inventory levels.
- Appropriate measures should be taken to ensure that drugs near their expiry dates are used. As stated earlier, some of the ARV drugs in stock are due to expire very soon, and given their current rate of consumption, these drugs are certain to expire. Appropriate measures should be taken to ensure that as many of the drugs as possible are consumed before their expiration.
- Policy-level decisions need to be made on whether or not to procure adult and pediatric second line drugs. Currently, large quantities of these drugs have expired, and some are near expiry, because either patient uptake is slow or patients needing second line drugs are referred to other ART programs such as PEPFAR. In the meantime, these drugs sit on the shelves unused.
- Quantification should be reviewed within six months to update previous quantification parameters. As more reports containing actual consumption data from ART sites come in, and as uptake increases, it will be necessary to review the quantification, taking into consideration the new parameters and making new assumptions that are based on the prevailing circumstances.



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# APPENDICES

**APPENDIX A – ASSESSMENT TOOL**

**APPENDIX B – LIST OF QUANTIFICATION TEAM MEMBERS**

**APPENDIX C – LIST OF QUANTIFICATION SITES AND CONTACTS**

**APPENDIX D – QUANTIMED FORECAST RESULTS**

**APPENDIX E – PIPELINE PROCUREMENT PLANNING REPORT**



# APPENDIX A

## ASSESSMENT TOOL

FACILITY ARV DRUG STOCK-TAKING FORM					
FEDERAL MINISTRY OF HEALTH: JULY 2006					
Name of Facility:					
Location of Facility:					
<b>Interviewer 1</b>			<b>Interviewer 2</b>		
Name:	Name:				
Signature:	Signature:				
Date:	Date:				
Tele. #	Tele. #				
<b>Treatment Center Physician</b>		<b>ART Focal Pharmacist</b>			
Name:	Name:				
Tele. #	Tele. #				
Email:	Email:				
Number of Patients on ART					
	Adult 1st Line	Adult 2nd Line	Total	Pediatric 1st Line	Pediatric 2nd Line
How many months of ARVs are <u>usually</u> Prescribed to patients _____ Months					
Please examine patients register and write the total number of patients by month					
		April	May	June	
How many new patients do you plan to treat each month for the following three months?					
		Aug-06	Sep-06	Oct-06	

ARV Drug Physical Inventory: Treatment Centers									
Serial #	Regimen	Unit	Source (GON or GF)	Date Received	Expiration Date	Stock on Hand in Store	Stock on Hand in Dispensing Area	Stock on Hand in PMTCT Center	Stock on Hand in Other Station
<b>FIXED DOSE COMBINATIONS - ADULT FIRST LINE</b>									
1	d4T/3TC/NVP (30/150/200)								
	Batch 1	60 tabs							
	Batch 2	60 tabs							
2	d4T/3TC/NVP (40/150/200)								
	Batch 1	60 tabs							
	Batch 2	60 tabs							
3	AZT/3TC (300/150)								
	Batch 1	60 tabs							
	Batch 2								
<b>SINGLE DOSES - ADULT FIRST LINE</b>									
4	Stavudine (d4T 30mg)								
	Batch 1 BN-G56699	60 caps							
	Batch 2	60 caps							
5	Stavudine (d4T 40mg)								
	Batch 1 BN-7200258	60 caps							
	Batch 2	60 caps							
	Batch 3	60 caps							
	Batch 4	60 caps							
	Batch 5	60 caps							
6	Zidovudine (AZT 300 mg)								
	Batch 1	60 tabs							
	Batch 2	60 tabs							
7	Lamivudine (3TC 150 mg)								
	Batch 1 BN-7200257	60 tabs							
	Batch 2	60 tabs							
	Batch 3	60 tabs							
	Batch 4	60 tabs							



# APPENDIX B

## LIST OF QUANTIFICATION TEAM MEMBERS

Teams and Members	Position Title and Organization
<b>North East (1) Team</b>	
Mr. Oto Hatru Bravo	Pharmacist, Department of Food and Drug Services, FMOH
Mrs. Olajumoke Adebari	Health Education, NASCP, FMOH
<b>North East (2) Team</b>	
Mr. Linus Odoemene	Pharmacist, Central Medical Stores, FMOH/Lagos
Mrs. Ope Abegbunde	External Relations Manager, NACA
Mrs. R.O. Abiodun	Focal Person for Information, Communication, Education. and Special Events, NASCP/FMOH
<b>North West Team</b>	
Mr. Fawa	Assistant Director of Planning, DPRS/FMOH
Mr. Abu James	Senior Pharmacist, FMOH
Mr. Tim O'Hearn	Public Health Logistics Advisor, JSI/DELIVER
<b>North Central Team (Middle Belt)</b>	
Mr. Oloyede	Pharmacist, Central Medical Stores, FMOH/Lagos
Mr. Amosun	Deputy Director, Food and Drug Services
Mr. Van Ooijen	Logistics Consultant, JSI/DELIVER, Nigeria
Mr. Okwudili	Monitoring and Evaluation Officer, NASCP/FMOH
<b>South East Team</b>	
Mr. Ben Nwobi	Assistant Director, Program Administration Department, FMOH/NASCP
Mrs. O.F. Adegoke	Chief Nursing Officer, Focal Person. Universal Precautions, NASCP/FMOH
<b>South South Team</b>	
Mr. Sule Abah	HIV/AIDS Logistics Advisor, JSI/DELIVER, Nigeria
Dr. Emi Monye	Program Coordinator, Pediatric ART Program, NASCP/FMOH
Mr. Peter Chendo	Focal Person, Department of Health. Planning. and Research, FMOH
Dr. Lawson	Assistant Director In-Charge of Care and Support, NASCP/FMOH
<b>South West</b>	
Mr. Gbenga Ishola	Monitoring and Evaluation Reproductive Health Advisor, JSI/DELIVER Nigeria
Dr. O. Salawu	National Coordinator, NASCP/FMHO

Dr. Adedeji	Scientific Officer, Blood Safety and Lab Support, NASCP, Department of Public Health, FMOH
Charles Lerman, Ph.D.	Chief of Party , JSI/DELIVER, Nigeria
Dr. Bako	Monitoring and Evaluation Officer, NASCP/FMOH
<b>Federal Capital Territory</b>	
Mr. Eric Takang	Pharmaceutical and Logistics Advisor, JSI/DELIVER
Mr. Omoyele	Deputy Director, Department of Food and Drug Service, In-Charge of Central Medical Stores, FMOH/Lagos

# APPENDIX C

## LIST OF QUANTIFICATION SITES AND CONTACTS

Location	Sites Visited	Primary Contacts
<b>North East (1)</b>		
Yobe State	1. Federal Medical Center, Nguru	Dr. Kawuwa Bello, ART Team Leader Mr. Balarabe Ado, Pharmacist
Bauchi State	2. Federal Medical Center, Azare	Dr. A. Mohammed, ART Team Leader Mrs. Zerha Fatima Waziti, Pharmacist
	3. Specialist Hospital, Bauchi	Dr. Fanti Ahmed, ART Team Leader Mr. James Dinda, Pharmacist
Borno State	4. University Maiduguri Teaching Hospital (UMTH), Maiduguri	Dr. Wazami Gashau, ART Team Leader Mr. Salisu Zaruma, Pharmacist
Plateau State	5. Jos University Teaching Hospital (JUTH), Jos	Dr. Agbaji, ART Team Leader Mr. K.E. Falang, Pharmacist
<b>North East (2)</b>		
Nassarawa State	6. Federal Medical Center, Macurdi	Dr. J.O. Abah, ART Team Leader Mr. Atende Edward, Pharmacist
Benue State	7. St. Vincent Hospital, Aliade	Dr. Oche Yusuf, ART Team Leader
	8. St. Monica Hospital, Adikpo	Dr. Moses Uwaezuke, ART Team Leader Mr. Odilora Ogechukwu, Pharmacist
Adamawa State	9. Federal Medical Center, Yola	Dr. Danburam, ART Team Leader Mr. Abdul Gafar, Pharmacist
Gombe State	10. Federal Medical Center, Gombe	Dr. Yusuf Jibrin, ART Team Leader Mr. S. A. Adamu, Pharmacist
Taraba State	11. Federal Medical Center, Jalingo	Dr. A. Egboga, ART Team Leader Mr. V.I. Mairafi, Pharmacist
	12. Government House Clinic, Jalingo	Dr. Boniface Haziel Mr. Samuel O. Okoke, Pharmacist
<b>North West</b>		
Kaduna State	13. Ahmadu Bello University Teaching Hospital, Zaria	Dr. H.M. Muktar, ART Team Leader S.M. Ibrahim, ART Pharmacist
Kano State	14. Aminu Kano Teaching Hospital, Kano	Dr. Babasham, ART Team Leader Musa Abdullahi, ART Pharmacist
Katsina State	15. Federal Medical Center, Katsina	Dr. Jibrin Firday, ART Team Leader Kabir Hamza, ART Pharmacist
Zamfara State	16. Federal Medical Center, Gusau, Zamfara	Dr. Olayinka Popoola, ART Team Leader Mrs. Hauwa I. Bature, ART Pharmacist
Sokoto State	17. Usman Dan Fodio University Teaching Hospital, Sokoto	Dr. C.H. Njoku, ART Team Leader Ygwa Michael, ART Pharmacist
Kebbi State	18. Federal Medical Center, Birnin, Kebbi	Dr. Oyetunji Jaiycola, ART Team Leader Alimi Suleman, ART Pharmacist
Kogi State	19. Federal Medical Center, Lokoga, Kogi	Dr. J.A.Ojho, ART Team Leader Victor Sumanu, Pharmacist

<b>North Central (Middle Belt)</b>		
Kaduna State	20. Army Reference Hospital, Kaduna	Brigadier General Vmar, ART Team Leader Col. Ali Baba, Pharmacist
	21. Barau Dikko Specialist Hospital, Kaduna	Dr. H. Yahya, ART Team Leader Burga Alheri, Pharmacist
Nassarawa State	22. Federal Medical Center, Keffi, Nassarawa	Dr. Giyan Joshua, ART Team Leader Elisha Emuladu, Pharmacist
Niger State	23. Federal Medical Center, Bide, Niger	Dr. Aboyemi, ART Team Leader Nuonche Idu, Pharmacist
Kogi State	24. Federal Medical Center, Lokoga, Kogi	Dr. J.A.Ojho, ART Team Leader Victor Sumanu, Pharmacist
<b>South East</b>		
Anambra State	25. Nnamidi Azikiwe University Teaching Hospital, Nnewi	Dr. P.U. Ele, ART Team Leader Mr. Obietuna Ike, Pharmacist
Imo State	26. Federal Medical Center, Owerri	Dr. E.O. Ofondu, ART Team Leader Mr. Nkechi Anyanwu, Pharmacist
Abia State	27. Federal Medical Center, Umuaiha	Dr. R. Nwanke, ART Team Leader Mr. S.O. Orikania, Pharmacist
Ebonyi State	28. Ebonyi State University Teaching Hospital, Abakiliki	Dr. L.U. Ohbonnaya, ART Team Leader E.O. Iduma, ART Pharmacist
Enugu State	29. Federal Medical Center, Abakiliki	Dr. N. Ifebunandu, ART Team Leader K.B. Oritola, ART Pharmacist
Enugu State	30. Enugu University Teaching Hospital	Dr. Chinwe Chukwuka, ART Team Leader O. Anyaebosi, ART Pharmacist
<b>South South</b>		
River State	31. University of Port Harcourt Teaching Hospital, Port Harcourt	Dr. C.A. Nwauche, ART Team Leader Ibidum Dokuka, ART Pharmacist
Bayelsa State	32. Federal Medical Center, Yenogoa, Bayelsa	Dr. Finomo, ART Team Leader Andrew Momoh, ART Pharmacist
Delta State	33. Federal Medical Center Asaba, Delta State	Dr. N.L. Orhue., ART Team Leader Blessing Agbese, ART Pharmacist
Akwa Ibom State	34. University Uyo Teaching Hospital, Akwa Ibom	Dr. Mfon Edyhana-Erpa, ART Team Leader Edet Imalkop, ART Pharmacist
Edo State	35. University of Benin Teaching Hospital, Benin	Dr. Onwah, ART Team Leader Mrs. Olumbor, ART Pharmacist
<b>South West</b>		
Ogun State	36. Federal Medical Center Abeokuta, Ogun	J.K.L. Osinfade, ART Team Leader I.A. Mawaal, ART Pharmacist
Ekiti State	37. Federal Medical Center, Iddo-Ekiti	Dr. Ajayi, ART Team Leader E.O. Akorele, ART Pharmacist
Ondo State	38. Federal Medical Center, Owo	Dr. F. Imarhiagbe, ART Team Leader A. Adeniyi, ART Pharmacist
Osun State	39. Obefemi Awolowo University Teaching Hospital, Ife-Ife	O.O. Balmebade. ART Pharmacist
Oyo State	40. University Teaching Hospital, Ibadan	Charity I. Nwankwo, ART Pharmacist
Kwara State	41. University of Ilorin Teaching Hospital, Ilorin	Dr. P.O. Olatunji, ART Team Leader Grace Medubi, ART Pharmacist
Lagos State	42. Lagos University Teaching Hospital, Lagos	Dr. O. Lasi, ART Team Leader Akintunde Akinwunmi, ART Pharmacist
	43. National Institute of Medical Research, Lagos	Ebere Herbertson, ART Pharmacist

	44. Police Clinic, Fanomo	Dr. G. Okodo, ART Team Leader Sunday Obaseki, ART Pharmacist
	45. Federal Civil Service Clinic, Victoria Island	Dr. Bozegha, ART Team Leader Mrs. A.O. Akinbisehin, ART Pharmacist
	46. Prison Hospital, Kirikiri	Dr. N.C. Ahamneze, ART Team Leader Emmanuel Udeogu, ART Pharmacist
	47. 68 Army Reference Hospital, Yaba	Lt. Col. A.O. Itabiyi, ART Pharmacist Dr. Brg. General Idhen, ART Team Leader
	48. Creek Hospital, Ikoyi	Dr. A. Idehosa, ART Team Leader Mr. Ninakute, ART Pharmacist

#### **Federal Capital Territory**

Abuja	49. Department of State Services, Abuja	Dr. A.M. Olubukun, ART Team Leader Sambo Habu, ART Pharmacist
	50. National Intelligence Agency Clinic, Abuja	Dr. Fagbemi, I.N., ART Focal Person O.C. Okeke. ART Pharmacist
	51. National Institute for Pharmaceutical Development, Abuja	Dr. Ekpeyong Magert, ART Team Leader Anaita Dashe, ART Pharmacist
	52. Gwagwalada Specialists Hospital, Abuja	Dr. Mukhtar Umar, ART Team Leader Garba Mohammed, ART Pharmacist
	53. National Hospital, Abuja	Isaac Enemeli, ART Focal Pharmacist Abdu Mshelize, ART Pharmacist
	54. Central Bank of Nigeria, Abuja	Dr. Gailu, ART Team Leader F.U. Shamaki, ART Pharmacist
	55. State House Clinic, Abuja	Dr. T.T. Mohammed, ART Team Leader M. Abraham , ART Pharmacist



# APPENDIX D

## QUANTIMED FORECAST RESULTS

Products	Quantity
abacavir 300 mg/tab TABLET (PO)	705,038
AZT 10 mg/ml SOLUTION (PO), ml	41,830,592
AZT 300 mg/tab TABLET (PO)	3,804,466
didanosine 400 mg/tab TABLET (PO)	358,298
efavirenz 200 mg/tab TABLET (PO)	1,079,420
efavirenz 600 mg/tab TABLET (PO)	2,160,221
indinavir 400 mg/tab TABLET (PO)	1,410,076
lamivudine 10 mg/ml SOLUTION (PO), ml	21,098,593
lamivudine 150 mg/tab TABLET (PO)	4,198,058
lamivudine-stavudine-nevirapine 150 mg+30 mg+200 mg/tab TABLET (PO)	16,233,149
lamivudine-stavudine-nevirapine 150 mg+40 mg+200 mg/tab TABLET (PO)	37,877,307
lamivudine-zidovudine 150 mg+300 mg/tab TABLET (PO)	8,603,394
nelfinavir 250 mg/tab TABLET (PO)	1,304,100
nevirapine 10 mg/ml SUSPEN (PO), ml	41,765,339
nevirapine 200 mg/tab TABLET (PO)	7,519,704
ritonavir 100 mg/tab TABLET (PO)	705,038
stavudine 1 mg/ml SOLUTION (PO), ml	212,188
stavudine 20 mg/tab TABLET (PO)	6,213
stavudine 30 mg/tab TABLET (PO)	1,091,037
stavudine 40 mg/tab TABLET (PO)	2,518,779



# APPENDIX E

## PIPELINE PROCUREMENT PLANNING REPORT

### Shipment Summary by Supplier

PipeLine 3

Date: 29-Oct-06

Report Period: Jan 2006 - Dec 2008 Nigeria FMOH ART Program Page:

Category: ALL  
Supplier: FMOH, GF  
Status: Ordered, Planned, Received, Shipped

#### Supplier

Type

Product	Receipt Date	Quantity	Status	ID
<b>FMOH</b>				
Antiretroviral Drugs				
Abacavir 300mg	31-Mar-07	132,060	Planned	29
Abacavir 300mg	31-Jul-07	171,898	Planned	30
Abacavir 300mg	30-Nov-07	213,134	Planned	31
Abacavir 300mg	31-Mar-08	241,316	Planned	32
Abacavir 300mg	31-Jul-08	249,429	Planned	33
Abacavir 300mg	31-Dec-08	238,815	Planned	34
Didanosine 400mg	31-Mar-07	53,970	Planned	36
Didanosine 400mg	31-Jul-07	87,358	Planned	37
Didanosine 400mg	30-Nov-07	108,314	Planned	38
Didanosine 400mg	31-Mar-08	122,636	Planned	39
Didanosine 400mg	31-Jul-08	126,759	Planned	40
Didanosine 400mg	31-Dec-08	121,365	Planned	41
Efavirenz 200mg	31-Oct-06	334,760	Ordered	42
Efavirenz 200mg	28-Feb-07	118,840	Ordered	44
Efavirenz 200mg	31-Mar-07	138,651	Planned	46
Efavirenz 200mg	31-Jul-07	223,633	Planned	47
Efavirenz 200mg	30-Nov-07	239,173	Planned	48
Efavirenz 200mg	31-Mar-08	255,019	Planned	49
Efavirenz 200mg	31-Jul-08	257,955	Planned	50
Efavirenz 200mg	31-Dec-08	281,735	Planned	51
Efavirenz 600mg	31-Oct-06	697,800	Ordered	53
Efavirenz 600mg	31-Mar-07	515,280	Ordered	54
Efavirenz 600mg	31-Jul-07	327,780	Ordered	55
Efavirenz 600mg	30-Nov-07	598,340	Planned	56
Efavirenz 600mg	31-Mar-08	510,210	Planned	129
Efavirenz 600mg	31-Jul-08	516,000	Planned	58
Efavirenz 600mg	31-Dec-08	563,710	Planned	59

Indinavir 400mg tabs	31-Mar-07	58,200	Planned	61
Lamivudine 10mg/ml	01-Aug-06	5,494,100	Received	27
Lamivudine 10mg/ml	31-Jul-07	5,125,090	Ordered	62
Lamivudine 10mg/ml	30-Nov-07	6,194,804	Ordered	64
Lamivudine 10mg/ml	31-Mar-08	6,600,106	Ordered	65
Lamivudine 10mg/ml	31-Jul-08	6,665,096	Planned	66
Lamivudine 10mg/ml	31-Dec-08	6,739,655	Planned	67
Lamivudine 150mg	31-Jul-07	4,752,000	Ordered	70
Lamivudine 150mg	31-Mar-08	4,099,521	Planned	71
Lamivudine 150mg	31-Jul-08	2,512,947	Planned	72
Lamivudine 150mg	31-Dec-08	2,991,780	Planned	73
Nelfinavir 250mg	31-Oct-06	376,740	Planned	74
Nevirapine 10mg/ml	01-Aug-06	5,494,100	Received	28
Nevirapine 10mg/ml	31-May-07	7,710,487	Ordered	76
Nevirapine 10mg/ml	30-Sep-07	11,562,586	Ordered	77
Nevirapine 10mg/ml	30-Nov-07	6,647,000	Ordered	79
Nevirapine 10mg/ml	31-Mar-08	12,453,061	Planned	80
Nevirapine 10mg/ml	31-Jul-08	13,174,779	Planned	81
Nevirapine 10mg/ml	31-Dec-08	13,289,490	Planned	82

**Shipment Summary by Supplier** PipeLine 3 Date: 29-Oct-06  
 Report Period: Jan 2006 - Dec 2008 Nigeria FMOH ART Program

**Supplier**

Type

Product	Receipt Date	Quantity	Status	ID
Nevirapine 200mg	31-Aug-07	4,958,400	Ordered	86
Nevirapine 200mg	31-Dec-07	3,877,541	Planned	87
Nevirapine 200mg	31-May-08	5,440,582	Planned	88
Nevirapine 200mg	30-Sep-08	3,899,728	Planned	89
Nevirapine 200mg	31-Dec-08	2,755,281	Planned	90
Stavudine	01-Aug-06	1,054,380	Received	2
Stavudine	30-Sep-06	3,314,808	Ordered	17
Stavudine	31-Jan-07	3,000,469	Ordered	18
Stavudine	31-May-07	3,438,360	Ordered	19
Stavudine	30-Sep-07	3,460,045	Planned	6
Stavudine	31-Jan-08	3,690,906	Planned	7
Stavudine	31-May-08	3,923,889	Planned	8
Stavudine	31-Oct-08	4,389,815	Planned	9
Stavudine 30mg tabs	01-Aug-06	143,340	Received	22
Stavudine 30mg tabs	31-Aug-07	197,668	Ordered	92
Stavudine 30mg tabs	31-Jan-08	299,378	Ordered	93
Stavudine 30mg tabs	30-Jun-08	317,304	Ordered	94
Stavudine 30mg tabs	31-Oct-08	222,480	Ordered	95
Stavudine	30-Sep-06	7,518,846	Ordered	97
Stavudine	31-Jan-07	6,247,560	Ordered	98
Stavudine	30-Jun-07	6,853,187	Planned	99
Stavudine	31-Oct-07	6,695,500	Planned	100
Stavudine	31-Mar-08	9,135,857	Planned	101
Stavudine	31-Aug-08	9,067,947	Planned	102
Stavudine	31-Dec-08	6,356,040	Planned	103
Stavudine 40mg tabs	31-May-07	1,555,200	Ordered	104
Stavudine 40mg tabs	31-Oct-07	2,682,007	Planned	105
Stavudine 40mg tabs	31-Mar-08	2,588,651	Planned	106
Stavudine 40mg tabs	31-Aug-08	2,585,311	Planned	107
Stavudine 40mg tabs	31-Dec-08	2,023,128	Planned	108
Zidovudine 10mg/ml	01-Aug-06	5,494,100	Received	26
Zidovudine 10mg/ml	28-Feb-07	7,373,228	Ordered	120
Zidovudine 10mg/ml	30-Jun-07	9,754,578	Ordered	121
Zidovudine 10mg/ml	30-Sep-07	8,792,200	Ordered	122
Zidovudine 10mg/ml	31-Jan-08	12,354,502	Planned	123
Zidovudine 10mg/ml	31-May-08	12,651,577	Planned	124
Zidovudine 10mg/ml	30-Sep-08	11,003,022	Planned	125
Zidovudine 10mg/ml	31-Dec-08	7,681,623	Planned	126
Zidovudine/Lamivudi	01-Aug-06	681,720	Received	21
Zidovudine/Lamivudi	31-Oct-06	1,408,414	Ordered	109
Zidovudine/Lamivudi	28-Feb-07	1,385,792	Ordered	110

Zidovudine/Lamivudi	31-May-07	1,523,470	Ordered	111
Zidovudine/Lamivudi	31-Jul-07	1,492,740	Ordered	112
Zidovudine/Lamivudi	30-Nov-07	2,686,002	Planned	114
Zidovudine/Lamivudi	31-Mar-08	2,941,029	Planned	115
Zidovudine/Lamivudi	31-Jul-08	2,995,370	Planned	116
Zidovudine/Lamivudi	31-Dec-08	2,956,455	Planned	117

**Shipment Summary by Supplier** PipeLine 3 Date: 29-Oct-06  
 Report Period: Jan 2006 - Dec 2008 Nigeria FMOH ART Program

**Supplier**

Type

Product	Receipt Date	Quantity	Status	ID
<b>GF</b>				
Antiretroviral Drugs				
Efavirenz 600mg	30-Sep-06	103,500	Ordered	52
Lamivudine 10mg/ml	01-Aug-06	3,679,900	Received	24
Lamivudine 10mg/ml	31-Oct-06	10,500	Ordered	63
Lamivudine 150mg	28-Feb-07	474,180	Ordered	69
Nevirapine 10mg/ml	01-Aug-06	3,671,900	Received	25
Nevirapine 10mg/ml	31-Mar-07	9,300	Ordered	75
Nevirapine 200mg	31-Mar-07	1,001,700	Ordered	84
Stavudine 30mg tabs	31-Jan-07	6,180	Ordered	96
Zidovudine 10mg/ml	01-Aug-06	2,848,000	Received	23
Zidovudine 10mg/ml	30-Nov-06	851,200	Ordered	119
Zidovudine/Lamivudi	30-Nov-06	159,840	Ordered	113



