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| Facility-Based Unit Costing for Antiretroviral Treatment in Five Sub-Saharan African Countries |
| May 2011 |

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# List of Abbreviations

|  |  |  |
| --- | --- | --- |
| **AIDS** | : | Acquired Immunodeficiency Syndrome |
| **ART** | : | Antiretroviral therapy |
| **ARV(s)** | : | Antiretroviral(s) |
| **BMGF** | : | Bill and Melinda Gates Foundation |
| **CDC** | : | Center for Disease Control and Prevention |
| **CHAI** | : | Clinton Health Access Initiative |
| **CHW** | : | Community Health Worker |
| **EMR** | : | Electronic Medical Records |
| **FTE** | : | Full-Time Equivalent |
| **GFATM** | : | Global Fund to fight AIDS Tuberculosis and Malaria |
| **HIV** | : | Human Immunodeficiency Virus |
| **HMIS** | : | Health Management and Information Systems |
| **HR** | : | Human Resource |
| **HRH** | : | Human Resources for Health |
| **IHME** | : | Institute for Health Metrics and Evaluation |
| **MAM** | : | Moderately Acute Malnutrition |
| **M&E** | : | Monitoring and Evaluation |
| **MOH** | : | Ministry of Health |
| **NGO** | : | Non-Governmental Organization |
| **OH** | : | Overhead |
| **OI** | : | Opportunistic Infection |
| **PEP** | : | Post-Exposure Prophylaxis |
| **PEPFAR** | : | US President’s Emergency Plan for AIDS Relief |
| **PMTCT** | : | Prevention of Mother-to-Child Transmission of HIV |
| **PPPY** | : | Per Patient Per Year |
| **PT** | : | Patient Type |
| **QALY** | : | Quality-Adjusted Life Year |
| **SAM** | : | Severe Acute Malnutrition |
| **SDA** | : | Service Delivery Area |
| **SCM** | : | Supply Chain Management |
| **TA** | : | Technical Assistance |
| **TB** | : | Tuberculosis |

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# Executive Summary

The availability of HIV care and treatment services worldwide has expanded rapidly, from 250,000 people on treatment at the start of 2003 to over 5 million in 2010. This success was driven, in part, by an unprecedented influx of resources: annual funding for HIV (prevention and treatment) has increased from $5 billion in 2003 to more than $15 billion in 2009.

Millions of additional people need to be put on treatment over the coming years. However, the global financial crisis has placed strains on the amount of funding available. Additional funds are needed, but an equally important priority in bridging the resource gap is making high-quality treatment as affordable as possible by increasing the efficiency and effectiveness with which funds are deployed. Doing so will maximize the impact of each dollar spent, reducing the size of the resource gap and encouraging donors to give more.

CHAI and the Gates Foundation are engaging in a multi country effort to analyze how to make spending on HIV/AIDS more efficient and effective. The study will take into account care and treatment costs, following a robust methodology for analyzing the total yearly costs for treatment applied in a standardized way across multiple settings in each country in order to understand cost differences.This document outlines the methodology and the analytical framework for facility-based costing of HIV treatment, to be carried out in 2011 in five focus countries: Ethiopia, Malawi, Rwanda, South Africa, and Zambia.   
  
This study protocol begins with an overview of methodology, research questions, objectives, and cost analysis strategy. These sections are followed by an in-depth review of methodological considerations taken into account for the costing work. A detailed review of the data collection and allocation methodology follows, and then an analysis of quality indicators is considered. The anticipated themes and methods of the descriptive and causal analysis appear at the end of the document. Annexes cover site selection methodology, quality indicators, assumptions in the data collection process, and site survey tools.

The goal of this exercise in data collection and analysis is to provide a benchmark for per-patient-per-year ART unit costs, and improve understanding of cost components and their variability across sites and countries. It aims to supplement existing costing work undertaken in recent years by others, notably PEPFAR. Where possible, the methodology will aim to produce outputs that can be compared with existing studies and research by explicitly noting where differences exist such that comparisons can be made. The collected data will enable both descriptive analysis of ART cost components and drivers and statistical analysis of behavioral cost functions, which estimate the strength of the link between potential policy instruments and costs. Lessons drawn from these two complementary efforts will suggest focused case studies of specific facilities and potential for follow-up analysis to test the most promising optimizations opportunities.

The design of this study strikes a compromise between, on the one hand, a detailed time-and-motion study of provider behavior and patient cohort histories in a few facilities and, on the other hand, a superficial study of hundreds of ART facilities in dozens of countries. The former would be ideal for revealing the quality of care and the intensity of provider effort, but would lack external validity beyond the facilities covered and have too little statistical power to support any both the most obvious of findings. The latter would reveal the broad range of cost variation across many national and local settings, but would be unable to cast much light on the detailed breakdown of costs in each individual facility or on the possible contribution of policy instruments to reducing the cost of ART. By selecting a sample of a few dozens of facilities in each of five countries and gathering data on the most easily available cost breakdowns, quality and complexity indicators and determinants of efficiency, the present study aspires to both describe the heterogeneity of costs across countries and facility types, taking into account basic quality indicators, and generate lessons which can guide fruitful additional policy innovations.

More specifically, the study aims to provide an assessment of total facility-derived antiretroviral treatment (ART) costs per patient for the most recent full year of treatment in a representative sample of sites which will also include an assessment of costs for pre-ART patients. For the purpose of this study, treatment is defined as the full range of HIV-related medical services provided to the patient at and above the facility. This definition excludes non-medical interventions such as income-generating activities and OVC interventions, but includes treatment-related interventions such as nutritional support and adherence programs. It also includes treatment-related costs incurred outside of the primary facility, e.g., any lab costs incurred at a tertiary facility associated with diagnosis of OIs or simply monitoring a patient. The study will capture any supervisory contacts observed and reported by facility personnel, but is unable to capture the costs of managerial or support activities that occur above the level of the facility for which there is no observable direct impact on the facility itself. Because the study does not include patient-level or cohort analysis, medical costs incurred outside the facility, such as referrals for in-patient days, will not be included as a part of the costing for most facilities. The data collection is expected to last six to nine months, depending on the ultimate sample size and on the vagaries of field operations in poor countries. Data cleaning and analysis will require an additional three months. Descriptive analysis will include both empirical (or “top-down”) and normative (or bottom-up”) decompositions so that any discrepancies can be reconciled, including possibly revisiting problematic facilities. Econometric modeling will include application and comparison of both econometric and operational research methods in order to measure aspects of the technical and economic efficiency of each facility and to infer from the data the relative importance of various policy instruments in reducing the cost per patient-year of treatment.

# 1. Overview and Costing Approach

Two alternative approaches to facility costing can be described as “norm-based costing” and “empirical costing.” Norm-based costing, which is sometimes called “bottom-up costing,” proceeds by inquiring about the “typical” or “expected” resources that are used in treating an individual patient, then multiplying this unit cost by the number of patients to estimate the average cost. Empirical costing, sometimes called “top-down costing,” proceeds instead by comprehensively collecting all of the resources used in a facility during a given costing period, allocating a portion of them to treatment of the relevant category(ies) of patients and then dividing this total cost by the number patients in order to arrive at unit cost. Since the objective is to estimate and project the real cost of ART delivery, based on real field experience, this study will primarily use an empirical or “top-down” approach to quantify current unit cost of ART and is scoped to include only those health-related services provided to HIV positive patients receiving care or treatment. In some cases this primary estimate will be compared with a normative or bottom-up analysis in order to reveal discrepancies and purge data collection errors. The study will evaluate approximately 30 health facilities in five sub-Saharan African countries (Ethiopia, Malawi, Rwanda, South Africa, and Zambia) using a top-down costing approach. Utilizing retrospective program records and other facility documentation, the study teams will collect comprehensive cost data for one year and allocate proportions of these costs to the selected patient types. These allocated costs will then be divided by the number of patient years for the same one year timeframe to arrive at cost per patient per year for each patient type.

Beyond quantitative cost data, the country teams will also attempt to capture descriptive information about facility characteristics, operations, treatment protocols, systems structures and challenges, and support (both donor and MoH.) The country teams will capture these data in a standardized format for comparison across facilities and countries.

## 1.1 Objectives

The project includes a facility-level ART costing exercise in five countries in Sub Saharan Africa, including facilities managed by government, NGOs and Faith-Based Organizations (FBOs). The focus of the work is on the following research objectives:

* Estimating the per patient per year (pppy) unit costs of pre-ART and ART
  + What are typical costs of treatment per patient per year in each country?
  + How are these costs distributed within each country among major cost centers or components, such as drugs, laboratory costs, personnel, etc.?
* Identifying and estimating the influence of the determinants or “drivers” of variability in treatment cost across sites and countries
  + How do average-costs per patient-year vary across countries, funding streams, administrators, facility types, rural/urban location, and other factors?
* Identifying potential opportunities to improve efficiency and effectiveness of pre-ART and ART
  + To what degree do policy instruments, such as recruitment threshold, second-line use, counseling policy, supervision frequency and intensity, explain variation in treatment cost across sites?
  + How much improvement in efficiency can be achieved through plausible manipulation of these policy instruments?
* Outlining further analysis required to evaluate potential opportunities
  + What potential lessons can be learned from this variation to improve the efficiency and effectiveness of treatment at the global, national, regional, and facility level?

Given the limited scope of this study and expected data limitations, this project on its own does not intend to provide authoritative, conclusive or indisputable conclusions on all of the topics under consideration. In particular, by design the study is focused on facility-level analysis and does not follow patient cohorts over time. The ability to assess the longer-term impact of different policy choices and service delivery models on existing body of knowledge will help to identify potential opportunities for improving both the efficiency and effectiveness of ART to the benefit of all patients.

## 1.2 Country Selection

The selection of the countries was based on an attempt to review the evidence in a range of settings and understand policy choices and trade-offs relative to different stages of the response to the epidemic and financing situation. The table below summarizes data related to the epidemic, ART coverage, and available aid within the selected countries.

**Table 1: List of Sub-Saharan African countries selected for the study**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | % of Total Aid | | |
| Country | Population, 2009 (millions) | HIV prevalence (%) | ART coverage, 2009 (%) | Total aid, 2008,  million USD | % GFATM | % Bilateral | % Domestic |
| Ethiopia | 82.8 | 2.3 | 53 | NA | NA | NA | NA |
| Malawi | 15.2 | 12 | 65 | 107 | 65 | 20 | 1.8 |
| Rwanda | 10 | 1.1 | 73 | 111 | 24 | 58 | 5.5 |
| South Africa | 49.3 | 11.6 | 56 | 1694 | 0.7 | 21.3 | 77 |
| Zambia | 12.9 | 14.3 | 64 | NA | NA | NA | NA |

Source: UNAIDS

* **Prevalence**: The sample of countries contains three high-prevalence countries, South Africa, Zambia and Malawi, and two low-prevalence countries, Ethiopia and Rwanda
* **Centralized vs Decentralized Administration**: South Africa and Ethiopia provide insight into large programs with significant regional control, while Rwanda and Malawi provide insight into smaller, more centralized programs
* **ART Coverage**: Rwanda provides insight into a country that is nearing universal coverage, while South Africa provides insight into the need for sound MOH policy choices in order to facilitate efficient and effective scale-up
* **Estimated ART Cost**: Malawi is widely recognized as one of the lowest-cost models of care, while South Africa provides one of the highest-cost settings in Africa
* **Funding Availability**: Zambia and Malawi provide examples of countries that face significant funding threats, following the rejection of the NSA and Round 10 GFATM submissions in Malawi and ongoing funding constraints in Zambia. South Africa is an example of a country that must make tough policy decisions given the projected costs of its program going forward. In Ethiopia and Rwanda, HIV is relatively well-funded, but must work within otherwise limited health systems, forcing policy makers to balance the needs of the relatively well-funded HIV programs and the far fewer resources available for the supporting health systems and other disease areas.

## 1.3 Study Period

The study will capture actual spend data for the most recently available full year record, no earlier than calendar year 2009. Ideally, all facilities in all countries will be costed over the same timeframe, however, this is likely unrealistic. Therefore, country teams will document significant cost differences related specifically to the time period of the study to facilitate comparison. These are likely to be limited to drug costs and regimen changes (e.g. later data may reflect global price declines and trends). Additionally, all costs collected in local currencies will be converted to USD for cross-facility and –country comparisons; the exchange rate used will be the closest to that at the time of the expenditure and variations will be documented.

Beyond the obvious expenditures within the costing timeframe, the study attempts to capture the impact of investments made prior to the study period by accounting for depreciation of infrastructure and equipment and amortization of training and TA. Similarly, the study will depreciate/amortize investment costs made during the study period using best estimate for useful life of the investment (see section 2.5 below). Depreciation will include, to the extent possible, not only the direct investment in HIV-related infrastructure and equipment, but the costs of broader investment in the health facility. For example, depreciation of lab costs should include not only HIV-specific equipment such as CD4 machines, but also an appropriate allocation of depreciation costs for generic lab equipment such as cooling rooms, freezers and generators.

## 1.4 Data Collection Overview

### 1.4.1 Descriptive Facility Information and Quality Indicators

In order to appropriately interpret cost data collected at each facility, descriptive characteristics will be collected for each facility. These characteristics will provide information on the facility setting, administration, operations, etc that will be helpful to understand some of the variations in cost. Some of the relevant data are listed here broadly, but detailed data elements are available in Annex 5.

* Facility type (i.e. clinic, health center, hospital)
* Facility administration (i.e. MoH, partner, faith-based)
* Level of service provision (i.e. primary, secondary, tertiary)
* ART start date
* Service provision (i.e. several questions regarding the type of service provision, guidelines for treatment, referral systems, utilization, health system, etc)
* Patient population characteristics
* Personnel information
  + Vacancies
  + Staff rotations
  + Education level
* ARVs and Other Drugs
  + Stock outs/availability of drugs
  + Regimens used
* Labs
  + Frequency of tests
  + Internal vs. external labs and related systems questions
* Quality indicators
  + Complexity indicators to assess case mix of patients within study period
  + Process/service quality indicators to provide some insight into model of care
  + Patient outcome indicators on a small samples of patients on treatment during costing year to provide some information on patients receiving treatment

### 1.4.2 Cost Categories

The study focuses on cost at the facility level, attempting to capture the comprehensive set of cost elements associated with HIV treatment. Expenditures will be mapped by input cost categories, divided into Direct running costs, Indirect running costs, Investment costs, and Overheads, largely reflecting the same cost categories used by other studies. The categories within each are enumerated below and greater detail related to scope, data sources, and allocations for each cost element are described in section 3.

Services and costs included in the categories below are: (1) health interventions only (excluding such activities as educational programs and income-generating activities, but including management and overhead costs associated with health interventions), and (2) the primary recipient of the service was the HIV-positive individual (as opposed to the patient’s family or the general community).

**Input costs categories:**

*Direct running costs*

1. Direct personnel (clinical care portion of clinical/lab/pharmacy staff)
2. ARVs (dispensed and buffer stock)
3. Other drugs (OIs, RUTF)\*
4. Lab supplies (reagents, consumables)

*Indirect running costs*

1. Indirect Personnel (non-clinical staff and non-clinical portion of clinical staff time: clerical, management, security etc.)
2. Other running costs (supplies, building use, utilities, travel)

*Investment costs*

1. Buildings
2. Medical equipment
3. Other equipment (lab, vehicles, IT, furniture, other)
4. Training
5. TA

*Overheads*

1. Allocation of on-site overhead costs\*\*

*\* Note: for these categories, capturing the full costs will be challenging since many of the services may be provided outside the facility. The study will attempt to capture all relevant costs, however, these could ultimately be excluded from analysis if it is determined that these data cannot be compared consistently across facilities and countries.*

*\*\* On-site OH costs are embedded in personnel, building and other costs, but will be allocated to OH as appropriate. Off-site OH costs will be reviewed but not fully costed as a part of this exercise, since costs are not available at the facility level.*

## 1.5 Protocol Structure

Because this study is being conducted in several different countries, this protocol is structured first to provide a broad overview of approach and methods – aspects that are common between countries. The protocol will then describe site selection for individual countries where a common approach was employed but country-specific variations exist. The document then describes power calculations based on the sampling approach followed by data collection and allocations for each cost element included. The final sections provide a high level descriptive analysis as well as the statistical analytical framework.

# 2. General Methods and Approach

This section describes methods at a high-level for all countries. Specific methodological details for costing by cost element are provided in section 3 along with country-specific site selection information.

The study is closely aligned in general methodology to that utilized by PEPFAR for its ART costing work, although some differences exist, given the different scope and focus. Both studies are based at the facility, rather than patient or program level, and are aiming for an average patient cost at that facility. This study selects sites randomly at each country, and focuses on one costing year, while the smaller PEPFAR study selected sites deliberatively and was able to return to the same facilities three times, providing more insight about cost evolution over time. The PEPFAR study focused on PEPFAR sites only, and had better access to program-level expenditure data, while this study has to rely more heavily on site-level data. This provides the PEPFAR study a somewhat higher level of accuracy in areas such as OI procurement, which, at some facilities, can be challenging to accurately capture and allocate between HIV and non-HIV use at the facility level. Patient breakdown is similar, although the PEPFAR study also provided breakdown of costs by new versus established patients. The PEPFAR study included no quality measures, while this study will attempt to capture basic patient complexity and outcome indicators from a review of a randomly-selected sample of charts, and use these indicators to determine outcomes and quality-adjust costs.

The study It will use a top-down approach to quantify current unit cost, starting with the total cost at a given facility, allocate costs to HIV patients, and then calculate the cost per patient per year (pppy). For example, in order to quantify the costs associated with treating a single pre-ART or ART patient, the study team will start with total personnel costs at a given facility, assign the portion of those costs that are incurred caring for pre-ART and ART patients using a simple allocation metric such as patient visits and then divide the total pre-ART and ART related personnel cost by the total number of patient years. The study team will complete this exercise for each cost category.

In certain categories, the study team will complement the top-down approach with a bottom-up calculation of cost based on the typical package of care offered at that facility. For example, to calculate the cost of ARVs, we can look at the number of patient per regimen and estimate the total cost for ARVs assuming strict adherence, no wastage, etc. This bottom-up costing will help us to sanity check our models, identify key cost drivers, and highlight potential efficiency gains.

## 2.1 Data Sources and Collection Tools

This section provides a general description of data sources to be utilized to collect descriptive, quality, and quantitative cost data listed in section 1.4. More specific details are available in section 3.

### 2.1.1 Data Sources

Key data sources include the following:

* Interviewer observation of the facility, and interviews with facility managers, accountant or budget officers, patient records manager, health care providers, sample of patients
* Patient record review (as needed particularly for patient outcome indicators)
* Aggregate data available from the ministry of health or elsewhere
* Program, donor and/or facility-level computerized data and expenditure records/reports
* Regional MOH database and interviews (e.g. for regional expenses such as supervision, regionally-supported training, regional laboratory costs)
* Central MOH databases (e.g. for payroll data, centrally-paid training, national lab costs)
* Other Ministries if needed (e.g. if HRH salaries are paid from outside MOH)
* Comparable facility-level data from adjacent health care centers in the absence of data from a specific facility
* HMIS will be used where available for statistics such as outpatient visits and inpatient admissions

Price data will be obtained from the most reliable source available. Standardized pricing for each country will be used for commodities and equipment unless otherwise noted. Prices may differ by funding channel (for example MOH may be paying more or less for commodities than GFATM or PEPFAR), and standardized pricing will reflect those differences where known and for the larger cost categories. For smaller categories such as furniture, standardized pricing will be used unless costs are known to be significantly different – for example if highest-standard hospital beds are imported on the one hand, or very cheap local manufacturers are used on the other.

### 2.1.2 Data Collection Tools

Data collection will take place using a standardized tool in a dedicated software package, DatStat. DatStat is a web-based platform which will be used at each facility to capture data by cost element. The tool will capture all sites’ data and it will be stored in a common database. Data collection is built in DatStat surveys by cost element and consists of the following information.

* Closed ended questions about the characteristics of the facility, the staff, the services delivered, donor support and the about the hypothesized determinants of efficiency
* Tables of detailed cost elements or “Quantitative input tables”
* Patient-level data questionnaire
* Open-ended text fields to allow respondents the freedom to answer in their own words or for interviewer comments

Wherever assumptions are made to fill in data gaps, they will be noted in the data collection tool (see Annex D for treatment of assumptions in data collection process). Data output will be analyzed for indicative findings using an excel model and will be available for regression analysis by researchers using statistical software such as Stata or SAS.

### 2.1.3 Data Management

Data required for each survey maybe captured using paper surveys, provided as electronic data (i.e. some quantitative information), or captured using the surveys on a computer or iPad. Where survey data is collected on paper, the paper copies will be stored securely in a locked cabinet in the relevant CHAI office and reviewed for data entry into the online system. All information provided to the study team in paper form will be stored securely as described. Data provided in electronic format will be stored securely under the direction of the principal investigator in each country. These data will also be analyzed and reviewed for data capture in the DatStat system.

All data entered in DatStat is stored in an oracle database located in Seattle, Washington, USA. These data are backed up daily and stored on secure servers administered by DatStat. These data are controlled through security features built into the tool and cannot be accessed by anyone without the appropriate permissions.

## 2.2 Allocation Methods: HIV, Patient Types, and Service Delivery Areas

The total cost data collected within each cost category in section 1.5 above will be allocated to:

* HIV – to ensure shared costs are only partially costed against HIV patients,
* Patient types – to calculate cost pppy,
* Service delivery areas – to understand the service areas contributing the greatest treatment cost per patient.

### 2.2.1 Allocation to HIV

Shared costs will be allocated to pre-ART and ART based on assessed proportion of pre-ART and ART to total utilization. The most broadly applicable measure for allocation will be number of visits by pre-ART and ART patients as a proportion of all patient visits. However for specific categories, allocation may be made using more directly-relevant measures; for example, facilities will be allocated based on approximate relative share of space, equipment and vehicles by approximate share of time, and staff by approximate allocation of working hours per week/month.

Allocation methodology will be specified for each category in Section 3 below.

### 2.2.2 Patient Types

The primary unit of analysis is patient years. The study will attempt to calculate patient years during the study period by accounting for month of initiation (i.e. calculating total patient months on treatment and divided by 12). The study reviews costs for the following patient types:

1. Pre-ART patients
2. Adult First Line Patients
3. Adult Second Line Patients
4. Pediatric First Line Patients
5. Pediatric Second Line Patients

Distinction between secondary patient categories such as newly initiated vs. established patients, pregnant women, TB-infected patients and other complicating factors will be made where possible, and used to help understand the complexity of the case mix in each site. Quality indicators will be measured separately for key patient groups as described below in section 3.9.

### 2.2.3 Service Delivery Areas

The service delivery areas are the main service areas contributing to HIV treatment cost. Total cost allocated into these areas can illustrate the greatest cost components of service provision. These service delivery areas will also be calculated on a per patient per year basis for each patient type in section 2.2.2. The areas included within this study are listed below with a brief description.

1. ARVs – this includes only the cost of ARVs
2. Clinical care – this includes any non-ARV clinical treatment such as personnel time spent on clinical care, the cost of other drugs, etc
3. Laboratory services – this includes any lab service such as labs personnel, the cost of reagents and consumables, etc
4. Supply chain management - this includes the cost of supply chain for drugs, labs, or personnel time dedicated to supply chain
5. Outreach programs (e.g. adherence, retention) – this include the cost of personnel or expenditures made for particular outreach programs
6. Training – this includes the cost of trainings which cannot be directly attributable to any other service delivery area
7. M&E and HMIS – this includes any personnel time or equipment related to reporting and/or data collection
8. Facility administration and management – this includes any cost to administer and manage a site (mainly personnel costs)
9. High level administration and management – this includes above the facility costs, such as those associated with the regional MoH, that can be attributed to ART service provision at the costed facility

## 2.3 Depreciation and Amortization

All costs will be depreciated/amortized over their expected life. Standard discount rate of 3% will be applied to all cost categories, consistent with conventional methods for economic evaluation, unless otherwise noted. Depreciation/amortization of costs incurred during the study period will be straight forward. More challenging will be to appropriately assess and depreciate costs incurred before the study period. These will include not only the costs of HIV-specific facilities, equipment, and training, but also an appropriate allocation of non-HIV investments. For example, where cooling equipment and other laboratory infrastructure or supporting equipment such as back-up generators pre-date the study period (or even the HIV program) and are used more broadly than HIV, it is easy to overlook the costs. However since HIV generally places additional burden on this infrastructure, and since it is investment that will need to be renewed to support HIV programs, it is appropriate to include a depreciation component for these investments to the cost of HIV care and treatment. Allocation relative to the proportional use of HIV will be determined on a case-by-case basis.

The following are approximate guides for amortization periods where more accurate estimates are not available:

* New buildings: 30 years
* Renovations: 10 years, unless expected to be repeated sooner (e.g. maintenance expected to be repeated every 3 or 5 years)
* Vehicles: 5 years
* Laboratory equipment purchase: 5 years, unless life expectancy of equipment otherwise specified
* Training: 3 years (to account for likely repeats, change in protocol, staff changeover - TBC), unless expected cycle of training expected sooner
* Other: TBD

All costs will be collected in currency utilized in the procurement process, and converted to USD at the prevailing rate during the time of expenditure. Depreciation will be based on the expected replacement value.

## 2.4 Ethical Approval

Country-specific applications to local ethics review boards will be submitted in each country. Rwanda, Malawi, and RSA have received in-country approval, Zambia is awaiting response, and Ethiopia has not yet submitted. RSA requires additional approvals at the provincial, district, sub-district and facility level for all facilities selected.

# 3. Sampling Strategy and Site Selection

This section will also describe the site selection process for each of the 5 countries. General site selection methods are available here and country-specific stratification criteria and site representation are available in Annex 1. The study aims to review 30 sites per country in 5 countries in 2011. Selection of 30 sites out of all ART sites in each country will be done using stratified random sampling. Two to three characteristics for stratification will be identified for each country depending on their relevance in the country e.g., size (small clinic vs. large hospital), location (rural vs. urban), funding stream (PEPFAR vs. GFATM vs. MoH), etc. Upon application of the stratification criteria, sites will be chosen randomly from the available sites to ensure an unbiased and representative sample.

Given the relatively small sample size, stratified random sampling ensured adequate representation of characteristics which are of interest (e.g. facility types), and allowed for greater precision, given the lower expected variability within individual strata relative to the population of sites as a whole. Accordingly, it is important to choose criteria that drive as much of the variation as possible. Since it is not possible to know with certainty, a-priori, which criteria will prove to drive most of the variation, the decision will be made based on the team’s initial hypothesis, informed by knowledge of the country context and findings of other studies.

In some countries, facility administration, patient management, and some clinical activities may be shared across facilities. For example, a single hospital may provide certain services to a group of smaller health centers. In these instances, the stratified sampling approach required “clustering” as well to ensure that facilities which held these types of relationships could be selected and comprehensive cost data would be available. Based on a parent-child facility relationship, relevant facilities within a country were clustered according to two distinctions: a “parent” facility where outsourced testing, inpatient care, and complex medical cases/procedures were referred up from the smaller facilities, and a “child” facility, or a smaller facility that needed to up-refer with frequency. The parent facilities were randomly selected first meeting the stratification criteria selected. The smaller facilities were selected second both accounting for the stratification criteria and limited to only those whose parent facilities had already been selected. This approach ensured that the study teams could follow the route of up-referrals, external labs, and outsourced complexities. Further, this approach ensured full costing of both “facility types” (parent and child facilities), which is important for accurate allocation of cost within a mixed system.

## 3.1 Basic parameters

* Sample size: 30 sites fully-costed per country
* Site selection approach: stratified random selection
* Potential stratification criteria (note: many of these will closely correlate, and the order of priority may vary by country):
  + Geographic location – ensuring most/all provinces are represented in some way
  + Facility type and/or care delivery model and/or size: e.g. hospital vs. clinic vs. health center
  + Facility size in terms of number of patients
  + Facility scope: integrated vs. stand-alone HIV care
  + Rural/urban/peri-urban location
  + Funding stream: PEPFAR vs. GFATM vs. MOH financed sites
  + Partner support and site management: supported vs. non-supported sites, NGO vs. MOH vs. FBO management
  + Length of operation for facilities: new vs. medium vs. established
  + Other considerations (not likely to act as primary axes of variation, but may influence selection): patient income levels, disease burden (e.g. ensuring at least one facility in high TB areas),

## 3.2 Process

The site selection process in each country will follow the following steps:

## 3.3 Stratification criteria

The most important axes of stratification – i.e. the ones which explain the greatest proportion of variation in unit costs – may vary by country. For example in Malawi PEPFAR plays a minor role, and “PEPFAR-support” as a category is therefore unlikely to drive variation in costs, while in another country PEPFAR-supported sites may receive substantially greater resources and therefore show higher costs (possibly with corresponding higher quality of care). In general, however, it is expected that regional representation, facility type/size, and urban/rural split and possibly program maturity will be the most important stratification criteria.

Where applicable, the “parent” facilities for a given site were identified. This is typically only required for smaller primary or secondary health facilities and is later used to limit the selection of these facilities based on the “parent” sites already sampled.

## 3.4 Divide all sites in the country into selection strata

Study teams will list all sites, alongside key attributes corresponding to stratification criteria (e.g. for each site list province, rural/urban location, type of facility, number of patients etc.). The list will then be divided according to the prioritized stratification criteria, such that every site fits into one (and only one) combination of criteria. For example Malawi’s 277 ART sites can be first divided into the 5 geographic zones (North, Central West, Central East, South West, South East), yielding 30-70 sites per zone. Within each zones, the sites can be divided into the 8 different hospital types (Central Hospital, Clinic, District Hospital, Health Centre etc.), yielding 40 ‘strata’ of varying numbers of sites.

## 3.5 Decide on relative representation per stratum

There are four main approaches for deciding on representation:

1. **Proportional to present site distribution**. In this approach, each ‘stratum’ is assigned a proportional number of sites in the sample to its relative proportion in terms of total ***number of sites*** in the population. For example a stratum that has 10% of the total number of sites will be allocated 3 of the 30 sites in the sample.
2. **Proportional to patient load**. In this approach, each stratum is assigned a proportional number of sites in the sample to its relative proportion in terms of total ***number of patients*** in the population. For example a stratum that has 10% of the total number of patients will be allocated 3 of the 30 sites in the sample.
3. **A hybrid of a) and b).** This approach is essentially beginning with a) and modifying the selection with b) For example in Malawi, **district hospitals represent 33% of all patients, but only 9% of sites**. Approach a) would assign only 3 of the 30 sites to be district hospitals, a likely under-representation of this critical pillar in the HIV program in the country. Approach b) would assign it 10 of the 30 sites, a potential over-representation leaving insufficient sample size for other facility types. A hybrid would use some form of compromise, perhaps a mathematical average, between the two.
4. **Alternative allocation approach.**  In South Africa, the current distribution of sites and patient loads is less important than the potential future distribution of the same, given very rapid expected scale up in the number of facilities. Given this situation, it is likely that an allocation that is more representative of future state, or helps inform options currently under consideration, will be more appropriate than a simple representation of the current allocation of patients and sites.

Option c is the preferred approach for this work, with potential exceptions for option D in the case that specific circumstances strongly encourage alternative approach to allocation. Minor modifications will likely be required, since a purely mathematical allocation will likely yield a fraction of sites in several strata, and a choice will need to be made amongst the several strata that may have been allocated less than one site. In these cases, the number of sites will always be rounded up.

## 3.6 Randomly select appropriate number of sites per stratum

Once the number of sites per stratum is decided, the actual sites will be drawn randomly. Each site in the stratum will be given a random number between 0 and 1 (e.g. using the RAND() command in excel or equivalent in another program). The sites will then be ordered from high to low, with the top site(s) being picked to represent the stratum until the required number of sites has been achieved.

## 3.7 Clustered sampling where required

Where necessary, the steps in section 3.1.6 will be done sequentially where “parent” facilities in a cluster will be sampled first. Once these facilities are selected, the “child” facilities will be randomly sampled using both the stratification criteria as well as limiting the sites for selection to those associated with the “parents” previously selected. If an inadequate number of sites meet all criteria (i.e. stratification criteria and “parent” facilities), a child facility will be selected which meets the stratification criteria but may not be linked to one of the previously selected “parent” facilities.

## 3.8 Vet site selection with MOH

Where possible, this step will precede Step 1 of the site selection process, in order to ensure integrity. However the chosen list of sites must receive authorization from the MOH. On rare occasions, it is possible the MOH will strongly prefer that the study team eliminate a site from the list. In Malawi, for example, one site was recently hit by an earthquake, and the MOH did not feel that a costing mission is appropriate. It is believed that these are going to be minimal, but the team will carefully document all such decisions, and in each case replace eliminated sites with the subsequent site in the randomly-generated list.

## 3.9 Pilot sites

In 3 of the 5 countries, ~8 pilot sites were visited in the preparatory phase of the work in order to understand the availability of data under different circumstances and refine the costing approach. Where these sites randomly fall into the sample, they will be included in the costing exercise. Where they have not, the team will deliberate on the potential bias that would be introduced if a pilot site is to replace a randomly selected site, and a decision will be made on a case by case basis. For any pilot case included in the final selection of sites additional visits will be made as needed to ensure that any changes made to the data collection tool are included.

# 4. Statistical Power to Detect Policy Relevant Cost Determinants

## 4.1 Statistical power and policy analysis

Evidence is accumulating that the delivery of antiretroviral treatment services in sub-Saharan Africa is subject to wide variation in both effectiveness and efficiency[[1]](#footnote-1). Several efforts are currently underway to collect data on the cost and effectiveness of a large sample of treatment facilities from different sub-Saharan African countries in order to learn more about the extent of variation. By collecting data from the same sample of facilities on a variety of plausible determinants of variation in efficiency and effectiveness, it will be possible to measure the degree to which variations in effectiveness and efficiency are correlated with variations in these determinants. The objective of this exercise is to develop evidence-based hypotheses regarding policies that governments, donors or patient collectives could adopt which would succeed in improving the efficiency of ART service delivery with a view to squeezing more patient-years of treatment out of any AIDS treatment budget.

Once a sample of facilities and the data is collected, analysts will attempt to use this data to formally test hypotheses about various possible causes of improved efficiency and effectiveness. Like all statistical tests on observational data, as opposed to data derived from an experiment, these tests will be contingent on hypotheses about the data which themselves are not readily testable. As in all such statistical analysis, the larger and more representative is the sample, the fewer such untestable hypotheses need to be retained as so-called “maintained assumptions” and the more sure the analyst can be that he will reject false hypotheses that are truly false and fail to reject those that are true. Thus, with sufficient time and budget, one should continue collecting data until the chance that an analyst will draw a wrong conclusion is arbitrarily small. In the real world, however time and budget considerations always constrain data collection, so that it becomes worthwhile to estimate *a priori* the size and structure of the smallest useful sample, the one that will be least expensive to collect, while still achieving some specified degree of accuracy on the eventual hypothesis tests.

More formally, the objective of ex ante statistical power analysis is to provide decision-makers with an evidence-based relationship between the time and budget they might spend on data collection and the statistical power that the data will subsequently offer.

The convention in statistical analysis is whenever possible to avoid a “false negative” outcome of a hypothesis test. For example, a plausible hypothesis is that the cost per patient-year of effective ART is lower if the patient begins treatment before suffering the worst effects of the disease. Table 1 illustrates the four possible results of a statistical test. The “null hypothesis” in this case is that starting patients early or late makes no difference for cost per patient-year of treatment. If the null hypothesis is true, the left column of the table applies. If it is false, and early starting reduces costs, the right column applies. With the data eventually collected, the analyst will want to test this hypothesis by comparing the cost per patient-year in facilities which start patients early to the cost per patient-year in facilities which start patients late. Finding a difference is a “positive finding,” represented by the bottom row of the table, while finding no difference is a “negative finding”, represented in the top row. If the early-starting facilities really do have lower costs (i.e. if the null hypothesis of no difference is truly false), but the hypothesis test fails to reject it, fails to discover that an early start helps patients, this would be a “false negative.” This is what we want to avoid. Statistical power is defined as the probability that a test will reject a null hypothesis when it is false.

**Table 1. Power is the probability of rejecting a false negative, of NOT making a Type II error**

|  |  |  |  |
| --- | --- | --- | --- |
|  | | **True state of theworld** | |
| Ho:  Early starting  does **not** reduce costs | Ha: Earlystarting  does reduces costs |
| **Finding from data** | Early starting does **not**  reduce costs  (“Negativefinding”) | Correct acceptance  of Ho | Type II Error “False Negative” |
| Early starting  does reduces costs  (“Positive finding”) | Type I Error “False positive” | Correct rejection  of Ho |

In order to estimate the anticipated power that can be attained with a given size and structure of a sample of health facilities, it is necessary to make some assumptions about the degree of heterogeneity of key dimensions of those facilities before the data is collected. If the data were already collected, then we would know how heterogeneous the facilities are and we could compute the power of any given sample design. However, we need to guess the statistical power before the data is collected, that is before we can know what we need to know. In this sense all power calculations are like an attempt to lift oneself by one’s own bootstraps.

In some cases power calculations must be performed with only the crudest information about the actual heterogeneity in the sample. But as studies of the efficiency and effectiveness of ART delivery begin to emerge, it is increasingly possible to use previously collected data to make educated guesses about the heterogeneity that we are likely to encounter where data has not yet been collected. In the present case, we benefit from a study in Zambia of the costs and effectiveness of delivering antiretroviral therapy (ART) to sample of 94,700patients who began treatment over a period of 50 months in 45 facilities operated by the Centre for Infectious Disease Research Zambia (CIDRZ) from approximately 2005 through 2010.[[2]](#footnote-2) In the next section, Section II, we describe that data and explain how it informs our guesses about the heterogeneity we are likely to encounter in a five-country sample of sometimes idiosyncratic health facilities.

Then in Section III we present a simplified version of the model for cost determination that lends itself to power calculations and we explain how we will use this model together with parameters based on the CIDRZ data from Zambia in order to simulate the statistical power for rejecting negative findings on several null hypotheses of interest, when they are truly false. In Section IV we present the results of the power calculations, showing that a sample of a given size and structure can be expected to have more power against some hypotheses than against others. In Section V we conclude. An annex contains the computer code used to generate the simulations.

## 4.2 Descriptive analysis of benchmark data from CIDRZ

For the present purposes, the CIDRZ data have many strengths, but are silent regarding at least three important issues. Thus, we will be able to use the CIDRZ data to inform many aspects of our power calculations, but will have to cast ourselves adrift from the CIDRZ data support and base some aspects of our model on assumptions, where the CIDRZ data is insufficiently detailed or comprehensive to be of help.

As Table 2 shows, the CIDRZ sample includes treatment facilities located in both clinics and hospitals in both rural and urban settings. Of the 45 facilities, six are private non-governmental organizations (NGOs) and 39 are public[[3]](#footnote-3). The 88,950 adults and 5,750 children, who have started ART in these facilities since 2005, accumulated a total of 124,753 person-years on ART.

**Table 2. The CIDRZ sample includes both hospitals and clinics in both urban and rural settings**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Hospital | Clinic | Total |
| Rural | 1 | 6 | 7 |
| Urban | 15 | 23 | 38 |
| Total | 16 | 29 | 45 |

Detailed facility-level accounts enable the computation of the total costs attributable to ART services in each facility as the sum of multiple cost components. For example, the analysts who collected the CIDRZ cost data went to substantial lengths to collect the information necessary to impute the opportunity costs of the buildings used to deliver ART services and the training costs of the personnel. For the purpose of the power analysis, we ignore these cost components and focus instead on total facility costs.

### 4.2.1 CIDRZ facilities have 11 – 50 months of accumulated experience

Another strength of the CIDRZ data is its inclusion of the entire history of up to five years experience of ART delivery in these CIDRZ facilities. The data includes activity and cost information since the beginning of ART service delivery. This feature offers the twin opportunities of a larger accumulated sample of patients and of tracking efficiency improvements over time. Figure 1 presents a frequency distribution of the duration of experience of the 45 facilities, which varies from 11 to 50 months. The top panel of the figure shows that the 16 hospitals in the sample range include both the least and the most-experienced facilities, varying in experience from 11 to 41 months, while the middle panel shows that the clinics in the sample range even more widely in experience, from 12 to 50 months.

As currently available, the data have been cumulated and averaged over the entire history of ART provision in each of the 45 facilities. As Figure 1 shows, the length of that history varies widely over the sample. For example, the available information on the clinic with 50 months experience include the total cost and total number of patient-years of treatment accumulated over more than four years, but do not permit the breakdown of costs by year. While one might imagine that efficiency improved over this period within this facility, direct confirmation of this conjecture is not possible with the data at hand on a single facility.[[4]](#footnote-4) Instead, it will be necessary to infer the effect of experience and improved technology from econometric estimates presented below.



**Figure 1. Duration of ART experience varies from 11 to 50 months in clinics and from 12 to 41 months in hospitals   
(gr use months.gph)**

In addition to handicapping the analysis of the effect of time and experience on the cost-effectiveness of ART service delivery, the cumulative nature of the available data is a barrier to using it as a foundation for analyzing the statistical power of alternative sample designs. The E^2 initiative is intending to collect data on the most recent complete year of ART service delivery experience with the intention of analyzing the level and the variation in total and average cost per year of ART service as they vary with the total amount of care delivered per year and other variables. A key assumption which we would like the CIDRZ data to inform is the size of the variance of these dependent variables, total cost per year and average cost per year. As Figure 1 shows, only seven of the 45 facilities are observed for approximately one year (i.e. between 11 and 18 months). Since seven is too small a number to estimate a variance and the short experience of these facilities might increase the variability of their costs, we must instead infer the variance at 12 months from the entire sample. The CIDRZ data will be useful for guessing the variance of costs, but less useful than it would be if each facility’s data were disaggregated into its component years.

### 4.2.2 Cumulated costs and treatment over 11 – 50 months

Figure 2 presents the distributions of the cumulated cost and output variables from the CIDRZ data. A facility’s cumulated cost of ART varies in the sample by two orders of magnitude, from $61,000 up to more than six million dollars. The total number of person-years of treatment, on the other hand, varies by four orders of magnitude, from only 1 up to more than 11,000.

Since power estimation involves simulating the variation in the variables under analysis, a key question will be whether the statistical distribution of these variables is approximately normal or Gaussian. Estimating the power of statistical tests under the wrong distributional assumption about costs and average costs is likely to induce errors in the analysis, leading for example to the conclusion that a sample will be large enough to provide adequate statistical power when it is not, or vice-versa. Clearly both the cumulated cost and the cumulated output variables are strongly skewed to the left, with 14 facilities bunched at the left with the smallest values of each. Neither variable has close to a normal distribution or even a symmetric one.

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**Figure 2. Frequency distributions of cumulated raw cost and quantity data from 45 facilities in the CIDRZ sample with superimposed kernel estimated density functions (gr combine cumcost.gph cumart.gph)**

Since the facilities are observed over different periods of time, it is possible that the long right tails of these distributions can be attributed to the facilities that have been operating for the longest time, which might have accumulated more cost and output than other facilities. One way to test for such a possibility is simply to divide the cumulated variables in Figure 2 by the duration variable in Figure 1, to see if the resulting quantities have a more homogeneous, less skewed distribution.

Figure 3 presents the distribution of the average number of patient-years of treatment per year of experience (the top panel) and the average cost per patient-year of treatment (bottom panel). Note that these average quantity and cost variables are also highly skewed to the left, with long right tails. Thus, simply expressing the cumulated variables as annual averages is not sufficient to arrive at a symmetrically distributed variable.



**Figure 3. Frequency distributions of average annual quantity and cost data from 45 facilities in the CIDRZ sample with superimposed kernel estimated density functions**

Because aggregate and average cost data typically have a skewed distribution, analysts frequently resort to analyzing the logarithms of these variables, transformations which often deliver a symmetric distribution and sometimes one that is normally distributed. Figure 4 presents the distribution of the log-transform of average per patient treatment cost, showing that this strategy is partly successful with the CIDRZ data. The bottom panel in figure 4 shows that the average cost per patient-year remains quite skewed to the left with a long right tail, despite the log transformation. However, when split into 16 facilities with fewer than 24 months experience in the top panel and the 29 facilities with 24 or more months of experience in the middle panel, the log-transformed average cost data do appear to be more symmetrically distributed within each subset. In this simple one-way analysis of variance, the facilities with less than two-years experience have both a higher average cost and display more variation around their average than is the case with the more experienced facilities. The much larger variance of the data from the shorter duration facilities is remarkable and raises issues not only for the present exercise in power analysis, but also for the data collection and its subsequent analysis. We return to this topic below.



**Figure 4. At less experienced sites, the average cost is more heterogeneous and on average higher than at more experienced sites (graph use costperpy\_log10\_edit.gph)**

**Table 3. Total accumulated costs of anti-retroviral therapy in 45 Zambian clinics, 2005-2009: One third of recorded costs are incurred at central levels of program operations and management.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Cost components** | **Overall Total Costs** | **Cost components as % of Total  in sub-category** | **On-site  Total Costs** | **Cost components  as % of Total  in sub-category** |
| **Personnel On-Site** | $4,473,999 | 26.3% | $4,473,999 | 100.0% |
| **Personnel Off-site** | $12,559,767 | 73.7% |  |  |
| ***Personnel Sub-total*** | ***$17,033,767*** | ***24.2%*** | ***$4,473,999*** | ***9.5%*** |
| **ARV drugs** | $29,473,910 | 57.5% | $29,473,910 | 72.2% |
| **Goods, on-site** | $1,898,803 | 3.7% | $1,898,803 | 4.7% |
| **Lab costs for site** | $9,451,497 | 18.4% | $9,451,497 | 23.2% |
| **Goods, off-site** | $10,420,689 | 20.3% |  |  |
| ***Goods and service  Sub-total*** | ***$51,244,815*** | ***72.9%*** | ***$40,824,211*** | ***86.7%*** |
| **Training, central** | $264,171 | 17.1% |  |  |
| **Training, on-site** | $1,279,277 | 82.9% | $1,279,277 | 100.0% |
| ***Training Sub-total*** | ***$1,543,447*** | ***2.2%*** | ***$1,279,277*** | ***2.7%*** |
| ***Buildings Sub-total*** | $506,274 | ***0.7%*** | $506,274 | ***1.1%*** |
| **Total program costs** | **$70,328,303** | 100.0% | **$47,083,762** | 100.0% |
|  |  |  |  |  |
|  | **On-site total as % overall total:** | | ***67%*** |  |

**Table 4. Average accumulated cost of anti-retroviral therapy per patient-year of treatment in 45 Zambian clinics, 2005-2009:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Cost components** | **Overall Total Costs per person year** | **Cost components as % of Total in sub-category** | **On-site Total Costs per person year** | **Cost components as % of Total in sub-category** |
|
|
| **Personnel On-Site** | $36 | 26.27% | $36 | 100.00% |
| **Personnel Off-site** | $101 | 73.73% |  |  |
| ***Personnel Sub-total*** | ***$137*** | ***24.22%*** | ***$36*** | ***9.50%*** |
| **ARV drugs** | $236 | 57.52% | $236 | 72.20% |
| **Goods, on-site** | $15 | 3.71% | $15 | 4.65% |
| **Lab costs for site** | $76 | 18.44% | $76 | 23.15% |
| **Goods, off-site** | $84 | 20.34% |  |  |
| ***Goods and service*** | ***$411*** | ***72.87%*** | ***$327*** | ***86.71%*** |
| ***Sub-total*** |
| **Training, central** | $2 | 17.12% |  |  |
| **Training, on-site** | $10 | 82.88% | $10 | 100.00% |
| ***Training Sub-total*** | ***$12*** | ***2.19%*** | ***$10*** | ***2.72%*** |
| ***Buildings Sub-total*** | $4 | ***0.72%*** | $4 | ***1.08%*** |
| **Total program costs** | **$564** | 100.00% | **$377** | 100.00% |
|  |  |  |  |  |

## 4.3 Causal analysis of benchmark data from CIDRZ

The objective of a power calculation is to establish under what conditions a proposed study is likely to be able to reject the hypothesis that a determinant of average cost variation has no effect when it actually has an effect. Hypothesis rejection will be easier, requiring a smaller sample, if the true effect is relatively large. Furthermore, larger effect sizes are more interesting to policy makers, since if they can be established by a study, they are more likely to justify a policy initiative than would a small effect size. Thus a critical question in power analysis is the choice of the effect sizes we will attempt to detect.

The CIDRZ data can help determine the most reasonable effect sizes for various possible determinants of variations in average cost which are available in the CIDRZ data. To this end Table 1 presents four estimates of a function relating average cost per patient year to eight possible determinants. The coefficients of the determinants in this table are point estimates of the magnitude of these effect sizes. Although estimated with less precision than we hope to achieve with the larger five-country E^2 sample, these effect sizes are a useful starting point for power calculations.

Table 5 includes four different specifications of the CIDRZ total average cost function, columns 1, 3, 4 and 5. Because of the skewness of the average cost variable described above, the regression results in columns 1, 3 and 4 all use the natural logarithm of average cost as the dependent variable. All include the same independent variables, but use alternative functional forms. Column 1 presents results from regressing the logarithm of cost per patient year on the logarithms of the continuous variables and dummy variables capturing the type of facility (clinic=1), the setting (urban = 1) and the sector membership of the facility (public = 1). This specification comes closest to a traditional cost function from the economics literature. The coefficients of the continuous variables, such as months of experience or number of patients served, can be interpreted as elasticities. So for example, the first coefficient in column 1, for the variable representing duration of ART experience, is -0.22 which means that on average every 10 % increase in experience decreases average cost by 2%. Similarly the second coefficient of -0.1 on scale of operation can be interpreted to mean that every 10 % increase in patients served decreases costs by 1 %. Both of these estimated elasticities are significantly different from zero at the 10 % level. The coefficients of the three dummy variables, when multiplied by 100, can be interpreted as estimates of the average percentage change in average-cost when the dummy variable changes from zero to one. The largest of these is that for clinics, which are estimated to be about 31 % more expensive than hospitals.

Column three uses the same dependent variable as column 1, but expresses all of the independent variables as dichotomous dummies, with the definitions given in column 2. The dummy variable capturing scale is set equal to one for the 35 facilities with more than 300 patient-years of treatment per year of experience. The results in column 4 are identical to those in column 3, with the addition of a second dummy variable set equal to one for the 20 facilities with more than 800 patient-years of service delivery per year of experience. The last column, column 5, uses the untransformed version of average cost per patient-year to allow comparison and for ease of interpretation.

**Table 5. Regression results to explain average total cost per patient-year of antiretroviral therapy in 45 Zambian facilities**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Column Number** | **\_1\_** | **\_2\_** | **\_3\_** | **\_4\_** | **\_5\_** |
| **Regression nickname** | **Log-log** | **Dummy =1 when …** | **Log-dummy** | **Log-dummy large scale** | **Linear-dummy large scale** |
| Transformation of dependent variable | Natural log |  | Natural log | Natural log | None |
| Transformation of independent variables | Natural log |  | Dummy variables | Dummy variables | Dummy variables |
| **Independent variables:** |  |  |  |  |  |
| Months of experience | -0.220\* | > 24 | -0.182\*\* | -0.182\*\* | -123.2\*\* |
|  | (0.115) |  | (0.073) | (0.061) | (0.0) |
| Average number of patient-years per year of experience | -0.102\* | > 300 | -0.218\*\* | -0.206\*\* | -173.2\*\* |
|  | (0.055) |  | (0.078) | (0.074) | (0.0) |
| Clinic = 1 | 0.316\*\* | same | 0.192\*\* | 0.203\*\* | 121.8\*\* |
|  | (0.067) |  | (0.066) | (0.065) | (0.0) |
| Public = 1 | -0.038 | same | -0.079 | -0.032 | 5.0 |
|  | (0.080) |  | (0.074) | (0.072) | (0.9) |
| Urban = 1 | 0.136+ | same | -0.015 | 0.012 | -5.3 |
|  | (0.098) |  | (0.084) | (0.082) | (0.9) |
| Average CD4 at treatment initiation over entire ART experience | -0.310+ | > 145 | -0.119\*\* | -0.125\*\* | -106.9\*\* |
|  | (0.208) |  | (0.057) | (0.058) | (0.0) |
| Adherence pill count as proportion of expected | 0.223 | > 0.91 | 0.106\* | 0.103+ | 63.0+ |
|  | (0.493) |  | (0.063) | (0.066) | (0.2) |
| Average proportion at WHO Stage IV at treatment initiation | 0.066 | > 0.12 | 0.044 | 0.036 | 26.8 |
|  | (0.061) |  | (0.046) | (0.047) | (0.5) |
| Average number of patient-years per year of experience |  | > 800 |  | -0.093+ | -69.8\* |
|  |  |  |  | (0.058) | (0.1) |
| Constant | 9.250\*\* |  | 6.624\*\* | 6.602\*\* | 801.3\*\* |
|  | (1.206) |  | (0.146) | (0.149) | (0.0) |
| Number of observations | 45 |  | 45 | 45 | 45 |
| R^2 | 0.730 |  | 0.746 | 0.781 | 0.739 |
| F | 11.373 |  | 15.170 | 11.705 | 7.8 |
| Root mean squared error | 0.159 |  | 0.154 | 0.146 | 116.7 |
| F-test of complexity & quality | 1.111 |  | 2.618 | 2.024 | 2.416 |
| p-value of complexity & quality | 0.357 |  | 0.066 | 0.128 | 0.083 |
| F-test of scale effects |  |  |  | 6.018 | 6.085 |
| p-value of scale effects |  |  |  | 0.006 | 0.005 |
| note: \*\* p<0.05, \* p<0.1, + p<0.2 |  |  |  |  |  |

Table 5 shows that average ART costs per patient-year are influenced by variables suggested by economic and managerial theory. The facilities demonstrate significant economies of scale, with average costs declining an average $157 per patient year in facilities providing more than 300 patient-years of service per year, and then another $71 if scale exceeds 800 patient-years per year. Economies of scope also appear, with patients in hospitals about $102 less per year. Patient complexity is captured here by the average CD4 count at initiation and the percentage of patients wh are clinically judged to have advance disease with WHO Stage IV at initiation. In facilities where the baseline CD4 average is less than 145 cells per microliter of blood, the cost per patient-year is about $111 higher. (Facilities with more than 12 % of patients initiating with advanced disease are estimated to incur about $45 of additional cost per patient-year, but this result is not statistically significant.) Since the multiple regression controls for baseline CD4 count, we can interpret the positive coefficient on high adherence to represent the additional cost to the facility of the counseling and patient support necessary to achieve this higher quality of care. The cost of this higher quality is estimated to be about $90 per patient-year.

According to economic theory and decades of empirical observation, two other important sources of cost reduction are governance structure and the years of experience of the individual decision-making unit, whether it be a manufacturing plant or, as in this case, a health facility. Unfortunately the only information on governance structure in the CIDRZ data is the classification of a facility as public or private. According to Table 5, the designation of private has no statistically significant effect on average total cost. The variable which captures months of experience does show a strongly significant effect on costs, with facilities with more than two years’ experience recording average costs $129 less per patient-year than those with less experience. However, since the available data is cumulated over the entire history of each facility, this variable unfortunately conflates the effect of “learning-by-doing” with two other important variables that have changed over time: drug prices and ART technology. Older facilities may appear less expensive over their entire history because the drugs they purchased in the past were less expensive than those they are now purchasing - . On the other hand, if the prices at which CIDRZ acquired its drugs have in fact fallen over time, then our inability to disentangle these effects means that that we are underestimating the powerful economizing effect of experience.

These results from an analysis of the CIDRZ data on total cost per patient-year inform the overall objective of the study of facility level ART costs, but because Table 5 regressions explain CIDRZ “total costs,” including off-site as well as on-site facility costs, these results do not directly apply to the problem of estimating the statistical power of the analysis of the proposed CHAI data. To improve our understanding of the CIDRZ data and arrive at effect-sizes for determinants of on-site facility costs, we repeat in Table 6 the linear regression from the last column of Table 5 and then estimate the same equation on each of the two components of CIDRZ total average cost per patient-year: on-site and off-site costs.

The analysis of the on-site versus the off-site components of CIDRZ average costs presented in Table 6 reveals the channels by which some of these determinants affect total costs. Furthermore, in the case of the variables capturing the Urban/Rural and the Public/Private distinctions, the analysis of the separate components reveals interesting, statistically significant effects on on-site average costs that are offset by their equal and opposite effects on off-site costs. The implications of these coefficient estimates are considered in more detail in the discussion of Section 7 on the analytical framework.

For the purposes of power calculations, the important distinction between the total and on-site regression analyses is that the effect sizes tend to be smaller for the on-site regression. Comparing column 2 to column 1 of Table 6, the effect of experience in the on-site regression to reduce costs by $123 in the total regression, compared to only $75 in the on-site regression. Thus to the extent that our proposed study is unable to capture the total costs, the effect sizes seen in the Zambian study will be attenuated. The only exceptions in Table 6 are the estimated impacts of the sector and of the urban/rural distinction, both of which are negligible on total costs but statistically significant and substantial on the on-site average costs.

Therefore, we assume that the relevant effect sizes for our study are either equal to or smaller than those estimated on the benchmark Zambian data. We proceed by estimating the statistical power for detecting the benchmark effect sizes and then we do sensitivity analysis with respect to effect sizes that are respectively 75%, 50% and only 25% as large as those estimated in the Zambian data.

**Table 6. Regression results to explain average total cost per patient-year of antiretroviral therapy in 45 Zambian facilities**

|  |  |  |  |
| --- | --- | --- | --- |
| **Column Number** | **\_1\_** | **\_2\_** | **\_3\_** |
| **Regression nickname** | **Linear total** | **Linear  on-site** | **Linear  off-site** |
| Transformation of dependent variable | None | None | None |
| Transformation of independent variables | Dummy variables | Dummy variables | Dummy variables |
| **Independent variables:** |  |  |  |
| Months of experience > 24 | -123.2\*\* | -73.9\*\* | -49.2\*\* |
|  | (0.0) | (0.0) | (0.0) |
| Average number of patient-years per year of experience > 300 | -173.2\*\* | -4.1 | -169.0\*\* |
|  | (0.0) | (0.9) | (0.0) |
| Clinic = 1 | 121.8\*\* | 104.9\*\* | 16.9 |
|  | (0.0) | (0.0) | (0.5) |
| Public = 1 | 5.0 | 62.2\* | -57.2\* |
|  | (0.9) | (0.1) | (0.1) |
| Urban = 1 | -5.3 | 84.1\* | -89.4+ |
|  | (0.9) | (0.1) | (0.2) |
| Average CD4 at treatment initiation over entire ART experience > 145 | -106.9\*\* | -42.8+ | -64.1\* |
|  | (0.0) | (0.2) | (0.1) |
| Adherence pill count as proportion of expected > 0.91 | 63.0+ | 60.1+ | 2.9 |
|  | (0.2) | (0.1) | (0.9) |
| Average proportion at WHO Stage IV at treatment initiation > 0.12 | 26.8 | 22.0 | 4.8 |
|  | (0.5) | (0.4) | (0.9) |
| Average number of patient-years per year of experience > 800 | -69.8\* | -46.9+ | -22.9 |
|  | (0.1) | (0.1) | (0.3) |
| Constant | 801.3\*\* | 243.0\*\* | 558.4\*\* |
|  | (0.0) | (0.0) | (0.0) |
| Number of observations | 45 | 45 | 45 |
| R^2 | 0.739 | 0.592 | 0.689 |
| F | 7.8 | 6.1 | 5.9 |
| Root mean squared error | 116.7 | 81.6 | 86.0 |
| F-test of complexity & quality | 2.416 | 1.019 | 1.237 |
| p-value of complexity & quality | 0.083 | 0.396 | 0.311 |
| F-test of scale effects | 6.085 | 1.177 | 5.664 |
| p-value of scale effects | 0.005 | 0.320 | 0.007 |
| note: \*\* p<0.05, \* p<0.1, + p<0.2 |  |  |  |

## 4.4 Power analysis based on the proposed stratified sampling strategy

When the objective is to compare the mean value of a statistic in two samples, such as one in an experimental arm and another in a control arm of a randomized control trial, the sample size required to detect a given effect size on a target percentage of replications of the experiment can be calculated immediately, based only on assumptions about the variance of the variable under study. However, because the present study has the more ambitious objective of estimating the effects of a variety of contextual and policy variables on the average cost of ART, taking into account basic quality indicators, and because it will analyze observational, rather than experimental, data, a formulaic approach to power calculations is likely to provide misleading conclusions. Instead our approach to estimating the statistical power is to posit a linear regression function whose coefficients are the effect sizes we would like to estimate and to simulate estimation of that regression equation under a variety of assumptions about the sample size and the effect sizes.

As described above, we take as our starting point a sampling frame consisting of a list of all the facilities in each of five countries which are currently delivering ART services. We supplement this established information on the sampling frame in the five countries with simulated values of the other determinants for which we had data in the benchmark data set and can therefore make a reasonable guess regarding the possible effect size. We simulate the values of these determinants to have correlations with established variables similar to those that obtain in the Zambian data. While superior to assuming the various variables like baseline CD4 and WHO disease stage are uncorrelated, this approach imposes a specific assumption regarding the correlation between any two explanatory variables. If variables are more correlated in the actual data than we have assumed them to be, this additional multicollinearity will generally reduce the power of our sample.

Because the data set is to be drawn from five countries, we assume that a portion of the variance of average cost is explained by a country-specific fixed effect. We arbitrarily set that proportion at 0.5.

Our procedure then is as follows:

1. Estimate a benchmark regression on the 45 observations in the CIDRZ data.
2. Select a sample size, N, from 10 to 50 of facilities to be sampled in each country. (The total sample size for pooled estimation of the average cost function will be 5 times this number.)
3. Select a relative effect size, E, from the range 0.25, 0.50, 0.75 and 1.0.
4. Supplement the data on the sampling frame for the five countries with simulated values of the additional variables of interest by randomly drawing such values to have the same mean and standard deviation as in the Zambian benchmark data. (For simplicity, each of these variables is represented by a dichotomous or “dummy” variable, so that in practice we assure only that the mean of the dummy variable matches the known mean in the Zambian data.) Where possible, generate these values of the determinants using known bivariate correlations.

**Table 7 Power to reject the hypothesis of zero effect on costs for sample sizes per country of 10-50 and effect sizes from 30% to 100% of those estimated on the Zambian CIDRZ data. Each row of the table is the result of 400 replications**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Obs. Per Country | Effect as proportion of benchmark | Exper-ience | Base-line CD4 | Adher-ence | WHO stage | Q >300 | Q > 800 | Hospital | Private Sector | Rural |
| 10 | 0.25 | 41.3 | 24.3 | 19.5 | 11.3 | 29.8 | 15.3 | 26.8 | 13.5 | 10.3 |
| 10 | 0.50 | 82.8 | 55.5 | 40.8 | 13.0 | 74.0 | 24.0 | 64.5 | 9.3 | 9.3 |
| 10 | 0.75 | 98.3 | 90.0 | 70.8 | 19.5 | 95.0 | 37.5 | 91.3 | 14.5 | 10.8 |
| 10 | 1.00 | 100.0 | 98.0 | 90.3 | 27.0 | 99.5 | 55.3 | 99.0 | 17.0 | 13.3 |
| 15 | 0.25 | 54.0 | 33.5 | 23.0 | 10.3 | 47.0 | 15.3 | 40.3 | 9.5 | 10.0 |
| 15 | 0.50 | 94.5 | 75.0 | 61.0 | 17.0 | 92.3 | 28.8 | 85.0 | 10.0 | 10.8 |
| 15 | 0.75 | 100.0 | 97.8 | 88.5 | 29.0 | 100.0 | 57.3 | 98.8 | 15.8 | 9.0 |
| 15 | 1.00 | 100.0 | 100.0 | 99.3 | 38.8 | 100.0 | 77.0 | 100.0 | 14.0 | 12.3 |
| 20 | 0.25 | 69.3 | 47.5 | 30.3 | 12.8 | 53.0 | 17.0 | 50.8 | 8.8 | 10.0 |
| 20 | 0.50 | 99.3 | 87.0 | 76.0 | 21.3 | 95.8 | 42.3 | 94.5 | 13.3 | 10.5 |
| 20 | 0.75 | 100.0 | 99.8 | 94.5 | 33.3 | 100.0 | 68.3 | 100.0 | 13.0 | 8.3 |
| 20 | 1.00 | 100.0 | 100.0 | 99.8 | 50.5 | 100.0 | 89.8 | 100.0 | 20.5 | 10.8 |
| 25 | 0.25 | 69.5 | 49.8 | 36.5 | 14.8 | 65.3 | 21.5 | 59.8 | 12.0 | 10.0 |
| 25 | 0.50 | 99.8 | 95.3 | 84.0 | 22.8 | 97.5 | 45.5 | 98.5 | 13.0 | 12.3 |
| 25 | 0.75 | 100.0 | 100.0 | 99.0 | 41.5 | 100.0 | 78.5 | 100.0 | 14.5 | 14.5 |
| 25 | 1.00 | 100.0 | 100.0 | 100.0 | 58.3 | 100.0 | 95.8 | 100.0 | 26.5 | 15.3 |
| 30 | 0.25 | 80.8 | 56.5 | 41.3 | 13.8 | 70.8 | 24.5 | 67.5 | 10.3 | 10.3 |
| 30 | 0.50 | 100.0 | 97.8 | 89.8 | 24.5 | 99.8 | 54.5 | 99.5 | 16.5 | 10.8 |
| 30 | 0.75 | 100.0 | 100.0 | 99.8 | 44.5 | 100.0 | 81.3 | 100.0 | 19.8 | 15.8 |
| 30 | 1.00 | 100.0 | 100.0 | 100.0 | 68.3 | 100.0 | 97.5 | 100.0 | 29.0 | 15.8 |
| 35 | 0.25 | 83.8 | 56.8 | 47.3 | 13.8 | 78.5 | 27.0 | 77.8 | 11.0 | 9.8 |
| 35 | 0.50 | 100.0 | 99.0 | 92.5 | 30.8 | 100.0 | 60.8 | 99.8 | 15.5 | 13.5 |
| 35 | 0.75 | 100.0 | 100.0 | 100.0 | 50.3 | 100.0 | 89.3 | 100.0 | 21.8 | 15.8 |
| 35 | 1.00 | 100.0 | 100.0 | 100.0 | 69.8 | 100.0 | 97.8 | 100.0 | 31.8 | 18.3 |
| 40 | 0.25 | 88.3 | 68.5 | 45.0 | 15.3 | 83.3 | 28.0 | 78.5 | 10.0 | 10.0 |
| 40 | 0.50 | 100.0 | 99.5 | 94.8 | 30.5 | 100.0 | 64.5 | 100.0 | 19.0 | 13.8 |
| 40 | 0.75 | 100.0 | 100.0 | 100.0 | 55.0 | 100.0 | 90.5 | 100.0 | 27.8 | 15.0 |
| 40 | 1.00 | 100.0 | 100.0 | 100.0 | 78.3 | 100.0 | 99.5 | 100.0 | 35.5 | 17.0 |
| 45 | 0.25 | 93.3 | 72.0 | 56.0 | 16.3 | 86.5 | 28.3 | 83.8 | 12.3 | 10.5 |
| 45 | 0.50 | 100.0 | 100.0 | 97.0 | 32.5 | 100.0 | 68.3 | 100.0 | 19.3 | 10.5 |
| 45 | 0.75 | 100.0 | 100.0 | 100.0 | 65.3 | 100.0 | 94.8 | 100.0 | 25.5 | 13.3 |
| 45 | 1.00 | 100.0 | 100.0 | 100.0 | 81.8 | 100.0 | 99.8 | 100.0 | 35.8 | 16.0 |
| 50 | 0.25 | 96.0 | 77.3 | 57.5 | 16.0 | 89.0 | 36.5 | 86.5 | 10.8 | 9.3 |
| 50 | 0.50 | 100.0 | 99.5 | 99.0 | 36.3 | 100.0 | 74.8 | 100.0 | 15.3 | 14.3 |
| 50 | 0.75 | 100.0 | 100.0 | 100.0 | 62.3 | 100.0 | 97.3 | 100.0 | 29.3 | 13.8 |
| 50 | 1.00 | 100.0 | 100.0 | 100.0 | 86.3 | 100.0 | 100.0 | 100.0 | 43.3 | 22.3 |

1. Use the estimated coefficients from the benchmark regression on the Zambian data (each of which is multiplied by relative effect size E) to generate the expected value of (the natural logarithm of) average cost.
2. Generate five country-specific fixed effects.
3. Add to the expected value for all facilities a random disturbance term composed of a weighted average of a country fixed effect and a normally distributed random variable with variance equal to 0.2, the approximate variance of the logarithm of average cost in the benchmark data. This gives a simulated value of the logarithm of average cost, ln(AvgCost), for every facility in the sampling frame of every country.
4. Randomly sort the facilities in each of the five countries.
5. Draw the first N of the facilities in each country and assemble them into a sample of size 5\*N.
6. Estimate the fixed effect regression of ln(AvgCost) on the randomly generated right-hand side variables.
7. Note the p-values of the coefficients on this regression and keep track of whether they are inferior to 0.05.
8. Repeat steps 4-11 for Nreps replications .
9. For each of the independent variables, report the percentage of times out of the Nreps replications that the associated p-value is less than 0.05.
10. Repeat steps 4-13 for each value of N and E.

The results of this procedure are presented in Table 7. Each row of the table is the result of 400 replications of steps 3-10 above. The first column of the table gives the number of observations per country, while the second gives the effect sizes. The other columns give the power to reject the null hypothesis of no effect for each of nine facility characteristics that were found in the Zambian data, most of which had a large and a statistically significant effect either on average total costs or on average on-site costs. As expected, the power to reject the null hypothesis rises with both the sample size and with the effect size. 

Figure 5. Power to detect a statistically significant effect of nine determinants as a function of sample size and relative effect size.

To better appreciate these effects, the data in Table 7 is presented graphically in panels a) and b) of Figure 5. The left panel, panel a, presents the power calculations for effect sizes comparable to those estimated from the benchmark Zambian data. Subject to the assumptions used to generate the simulated data and the samples from the five study countries, panel a suggests that a sample size of 20 facilities per country would suffice to achieve 80 percent power for six of the nine determinants. However, the cost saving effects of a scale larger than 800 patients would only be detected with 80 percent power with a sample of 50 per country (250 overall). And the effects of the public/private and the rural/urban distinctions would remain undetectable even at that extreme sample size.

However, suppose that the effect sizes in the sample are only one quarter as large as they are estimated to be on the average total cost data from Zambia. That would be the case if our methods are unable to capture much more than what the CIDRZ study defined as on-site costs or if the effect sizes outside of Zambia are in truth smaller than in the Zambian sample. The assumption of an effect size only 25% as large as those estimated in the Zambian data can also represent other ways in which our simulation procedure has been too optimistic. For example, power calculations with these smaller effect sizes can suggest the reduction in power that might result from country-imposed sample stratification schemes which limit the independence of randomly drawn facilities in each country. Panel b) suggests that the power of the proposed analysis will only rise to acceptable levels of 80% or higher for sample sizes of 30 or above. Sample sizes of 30, 35 and 40 will provide sufficient power to detect a statistically significant effect of experience (at 30) of scale above 300 patients (at 35) and of scope as represented by the hospital (at 40). The power to detect as statistically significant effect of the baseline CD4 count on average cost will almost reach the 80% threshold at a sample size of 50.

Like all power analyses, this one can yield very different results depending on the assumptions and especially on the effect size that one aims to detect. The estimated power will be sufficient at a modest sample size of 20 facilities per country under optimistic assumptions but even a sample of 50 per country will be insufficient under more pessimistic assumptions. Given these results, it seems wisest to push to obtain 30 or more facilities per country, with the knowledge that every additional facility with reliable data will improve the statistical power of the analysis.

# 5. Specific Methods by Cost Element

This section of the protocol document outlines the specific data methodology for each cost category, the acceptable approaches to data collection, and cost allocation to HIV, patient type, and service delivery area. For each cost category, an overview of the costing method employed is described as well as potential sources for data collection. The options for data collection are outlined in descending order of preference followed by strategies for allocation SDA and patient type. In each country and each facility, the teams will strive to collect data in the most robust way possible given data quality and availability.

**Snapshot of allocation between pre-ART and ART**

The following table provides a snapshot of how key cost components are allocated between pre-ART and ART patients. For a more detailed discussion of data sources used to determine these allocation, see the remainder this section.

|  |  | **Pre-ART** | **ART** | **Excluded** |
| --- | --- | --- | --- | --- |
| **Definition** | **Basic** | HIV+ and not yet on ART | HIV+ and on ART | HIV- |
|  | **Starting point** | First visit AFTER initial HIV+ confirmation | Initiation on ARVs | Initial diagnosis visit, regardless of status |
|  | **End point** | Visit prior to initiation on ARVs (incl. staging, regardless of outcome) | Confirmed death, confirmed transfer out, otherwise 3 months after last known visit |  |
| **ARVs** |  | None | All used for treatment | PMTCT, PrEP, PEP |
| **Lab** | **Rapid test** | None | None | All rapid tests considered VCT |
|  | **CD4** | All up to and including first to indicate eligibility (staging) | All AFTER (and excluding) first test to determine eligibility | None |
|  | **VL** | None (unless used to determine eligibility or before eligibility is reached) | All, including first baseline VL | None |
|  | **Other** | Included where specifically a part of pre-ART program (e.g. TB and other OI testing) | Included where a part of ART program, including tests used to support initiation (e.g. decide which regimen to begin patient on or monitor response to ARVs) | Tests not related to HIV status of patient (e.g. X-ray for broken leg, malaria test); portion of tests that are at times related to HIV but conducted for HIV- patients (e.g. TB) |
| **Personnel** | **Counseling** | Counseling AFTER initial HIV+ status is known (excluding VCT) | Counseling immediately before or any time after ARV initiation, any counseling related to adherence to ARVs | VCT |
|  | **Clinical** | Portion of personnel dedicated to pre-ART patients/program | Portion of personnel dedicated to ART patients/program | Portion of personnel dedicated to non-HIV patients, or HIV patients before HIV status is known |
|  | **Non-clinical** | Proportional to utilization-adjusted patient years | Proportional to utilization-adjusted patient years | Proportion allocated to non-HIV (based on proxy such as # of visits) |
| **Building, Equipment, ORC, etc.** |  | Building, equipment, ORC etc. related to the section of the hospital/ clinic where pre-ART services are provided; portion of general costs allocated to pre-ART patient utilization (e.g. % of admin costs) | Building, equipment, ORC etc. related to the section of the hospital/ clinic where ART services are provided; portion of general costs allocated to ART patient utilization (e.g. % of admin costs) | Any building, equipment, ORC etc. associated with other HIV and non HIV services, including VCT, (in cases where VCT section is separate from the ART clinic) |

## 5.1 Personnel

Personnel costs will be calculated using top down methodology: the total cost of personnel will be allocated to the facility, to HIV treatment, and then to patient types and service delivery areas. These allocated costs can then be divided by respective patient years (e.g. total personnel costs dedicated to pediatrics divided by total pediatric patient years) to calculate personnel cost per patient per year.

Direct personnel include all staff members who are in contact with a patient directly during a visit to the facility e.g., doctors, nurses, community healthcare workers (CHW), HIV counselors, etc. Indirect personnel include staff members who manage background processes and provide administrative and logistical support e.g., data managers, administrative assistants, cleaners, security, etc.

***Scope:***

* **Costs included in this category**: all costs of employing human resources (HR) required for both direct and indirect contact with patients in the HIV program. This includes base salary, any bonuses, overtime, top-ups, and performance-based component of salaries; stipends paid to CHW and expert patients; and all costs of employment such as payroll taxes, health insurance, benefits and other charges paid.
* **Costs excluded from this category:** training costs (covered under Training), personnel above the facility such as regional/provincial/national Ministry of Health staff that might provide administrative oversight to the facility.

#### Data Collection

Sources and data collection options for personnel may vary by site and country. Outlined here are the potential sources of information, options for data collection based on available sources, and methods to estimate allocations. Country teams will employ one or a combination of the methods described based on the scope of data available within the context of the respective site/country.

**Specific data collection note:** HRH may be grouped by cadre where roles, salaries and allocation to patient types are similar. For example instead of listing every nurse, a general category of “nurse” can be entered, with number of FTEs and average salary. Where roles or salaries are significantly different, each staff member or group of staff should be entered separately, e.g. “pediatric nurse”, “supervisory nurse”, or simply “nurse 1” “nurse 2” etc.

**Data Sources for Personnel Costs and Allocations**

1. Costs
   1. Facility payroll and staffing records
   2. Donor payroll and staffing records
   3. MOH payroll and staffing records
   4. Interviews with staff and facility management
   5. Similar facilities where data is available.
2. Allocations
   1. Facility or donor records
   2. Time motion studies
   3. Staff interviews

|  |  |  |
| --- | --- | --- |
| Data Collection Options | Possible Data Sources (See Above) | Scope of Data collected |
| 1. Acquire facility-specific compensation and staffing levels data for all relevant employees. Verify staffing and salary levels with facility management | 1a, 1b or 1c  (1d for verification) | All data collection options include fully loaded cost of employees – salary, benefits, insurance, and bonuses/top-ups |
| 1. Apply MoH standard salary scale where facility-specific data is not available. Verify with facility management and If needed, estimate typical top-ups, benefits, bonuses, insurance, etc. based on data from similar facilities and site interviews | 1c  (1e for top-up estimates, 1d for verification) |
| 1. Estimate salary levels from similar facilities such as those funded by the same donor, with similar patient loads, similar staff ratios, similar staff distribution, etc. Verify applicability through site interviews. | 1d  (1d for verification) |

#### Allocations

Because personnel are often a shared resource between facilities in a particular region and within a facility between different units, allocations of personnel time/cost must first be made both to the facility and to HIV treatment. Below are options to estimate percentage allocations of personnel time/cost at various levels (facility, pre-ART and ART, etc). Study teams will use one or a combination of the options mentioned to make the most accurate and robust estimations. Additionally, these allocations can be tested with a sensitivity analysis to determine impact on overall cost.

**Allocation to Facility**

*Note: This is only required for those personnel who do not spend 100% of their time at a particular facility e.g. rotating physicians.*

1. Actual allocation for each individual employee associated with the facility, designated by administration (generally available in PEPFAR sites)
2. Estimate allocation based on management/staff interviews to determine the approximate amount of time spent at the costed facility

**Allocation to HIV Treatment**

*Note: This is only required for those personnel who do not spend 100% of their time within the pre-ART and ART unit or if HIV treatment is fully integrated into other types of care.*

1. Actual allocation for each individual employee associated with the facility, designated by administration
2. Estimate allocation based on actual time spent at the facility (time-motion)
3. Estimate allocation based on management/staff interviews to determine the approximate amount of time spent in HIV unit/ward

**Allocation to SDA**

1. Estimate allocation based on actual time spent within the activities of each SDA (time-motion) – likely focused on sample of cases to test interview responses
2. Estimate allocation based on staff interviews to determine approximate time spent on different activity types

**Allocation to Patient Type**

1. Estimate allocation based on time spent with individual patient types (time-motion) – likely focused on sample of cases to test interview responses (e.g. verify what proportion of time a pediatric nurse spends with non-peds patients, if any; detailed analysis of time spent on pre-ART patients)
2. Estimate allocation based on staff interviews
3. Estimate allocation based on patient type distribution at the facility being costed. This is considered the “default” allocation for patient type allocations in all cost elements and will be used only as a final option where no additional information is available.

## 5.2 ARVs

The costs for ARVs include all costs associated with providing ARVs to patients, including the actual cost of drugs and all supply chain costs associated with getting drugs from the supplier to the facility pharmacy (transportation, storage, etc). Systems costs like supply chain, etc. may or may not be captured within the ARVs section; the ability to capture this information within this section depends on the system structure and availability of information. Where these costs are available, we will allocate them to the appropriate service delivery areas so we can make consistent comparisons of ARV cost across facilities.

ARVs will be costed primarily using top-down methodology where the total annual cost will be calculated by taking initial stock, plus receipts minus final stock, times unit cost per drug. A bottom-up approach may be utilized, as needed, to check the cost numbers against expected cost based on patient load and regimen distribution. The total expenditure on ARVs for the costed year will be allocated to patient types. These values will then be divided by the total number of patient years, to calculate the cost of ARVs per patient per year.

***Scope:***

* **Costs included in this category**: cost of ARVs consumed and supply chain costs where applicable
* **Costs excluded from this category:** Some supply chain costs above the facility will be covered in the TA/OH section.

#### Data Collection

Sources and data collection options for ARVs may vary by site and country. Outlined here are the potential sources of information, options for data collection based on available sources, and methods to estimate allocations. Country teams will employ one or a combination of the methods described based on the scope of data available within the context of the respective site/country.

**Data Sources for ARV Quantity/Costs and Allocations**

1. Quantity/Costs
   1. Receipts or stock cards from the facility pharmacy
   2. Receipts/ income statement from the management office (e.g., regional or national office of NGO that runs the facility)
   3. Patient information management system at the facility
   4. Tenders/contracts at MOH (for ARV pricing information)
   5. Central medical stores (national and/or regional depots)
   6. Other procurement partners (i.e. UNICEF for pediatric or PMTCT drugs, CHAI for pediatric and/or second line drugs)
   7. Expiry records
   8. Pharmacy visit and site interviews
2. Allocations
   1. Pharmacy records documenting which patients were given which drugs
   2. ART and PMTCT records and regimen distributions (including weight distributions for pediatrics)
   3. Default based on ARV type (i.e. certain drugs are used only in pediatrics, etc)

**Quantity**

|  |  |  |
| --- | --- | --- |
| Data Collection Option | Possible Data Sources (See Above) | Scope of Data collected |
| 1. Determine consumption at the facility by measuring initial and final stock, inflows and outflows, including records for expiries | 1a, 1b, 1e, 1f and/or 1g | Actual consumption including drugs dispensed, buffer stock, and expired stock |
| 1. Multiply patients per regimen by number of drugs per regimen, using interviews or pharmacy visit to determine breakdown of formulations | 1c, 1h | Required demand - does not provide actual consumption or include data on buffer or expired stock |

**Cost**

|  |  |  |
| --- | --- | --- |
| Data Collection Option | Possible Data Sources (See Above) | Scope of Data collected |
| 1. Utilize data from receipts/income statements at the facility or central level | 1a and/or 1b | All-inclusive of drug costs (supply chain costs need to be verified in each case) |
| 1. Use MOH tenders/contracts (standardized commodity pricing in country) | 1d | All-inclusive of drug costs (supply chain costs need to be verified in each case and estimated where not available) |
| 1. Use another reliable source such as CHAI, SCMS, UNICEF or other for country-specific estimates | 1f | All-inclusive of drug costs (supply chain costs need to be estimated where not available) |

#### Allocations

ARVs are not shared between facilities and therefore an allocation to the facility is unnecessary. However, an allocation to HIV treatment is critical because the same ARVs used in treatment are also used in prevention (i.e. PMTCT) and post-exposure prophylaxis (PEP). While the latter is likely a very small proportion of ARVs at a particular facility, the former can be a large percentage of particular molecules depending on the size and scope of the PMTCT program. PMTCT programs generally follow specific guidelines limiting the number of ARVs impacted for allocation to HIV. Allocations to SDA are fairly straightforward as the bulk of cost will fall under the ARV SDA, with the exception of some costs that can be allocated to SCM. The PT allocation can be more ambiguous and might require one or a combination of the assumptions outlined here.

**Allocation to treatment**

*Note: Since the scope of this study is treatment (not prevention), teams will attempt to distinguish the proportions of relevant ARVs used for treatment only. ARVs overlap between ART and PMTCT; ARVs consumed by women on HAART for life are included in this study but other PMTCT drug usage will be excluded where possible. ARVs overlap for post-exposure prophylaxis (PEP) will also be excluded.*

1. All ARVs used specifically for treatment are allocated 100% to HIV (default). If procurement is separate for ART and PMTCT, only those drugs used for ART will be included and an allocation to HIV for treatment will not be required.
2. Those ARVs used for PMTCT within the facility will be identified. The number of PMTCT patients receiving treatment at the particular facility as well as the distribution of those patients by regimen, if available, can be used to estimate an allocation to treatment for the relevant molecules.
3. The proportion of PMTCT patients relative to ART patients can be used to allocate the relevant drugs to HIV treatment.

**Allocation to SDA**

1. ARV unit costs (minus the percentage for supply chain management) are allocated 100% to the service delivery area “ARVs”. In this scenario, supply chain costs might not be captured within the ARV unit cost.
2. If the total ARV cost includes supply chain costs, the percentage of the ARV unit cost that is dedicated to supply chain costs is allocated 100% to the service delivery area SCM. Assuming the proportion of supply chain cost within the total ARV cost is discernable, the appropriate percentage will be allocated to the SCM SDA and the remainder will be allocated to the ARVs SDA.

**Allocation to Patient Type**

*Note: Allocation to patient type is only relevant for certain drugs. Some drugs are only used for specific patient types and specific regimen lines. The uses of various molecules can be ascertained in the national treatment guidelines for both adults and pediatrics.*

1. Estimate the allocation based on pharmacy/medical records (chart review) at the facility to determine specifically which drugs are being used for which patient types.
2. Estimation based on interviews with clinical staff; this method can be extremely accurate in contexts where the patient load at a facility is low and the staff is personally familiar with each patient on treatment.
3. Estimation based off of patient type distribution (default). This method calculates a distribution based on the distribution of patient types at the facility. Drugs that are mixed between adult and pediatric would be distributed based on the volume of each patient type at the facility. Similarly, drugs that can be used both in first and second line treatment would be allocated in the same way.
   1. The ‘type’ (adult/pediatric) and ‘line’ (1st/2nd) of ARVs will be based upon country guidelines and interviews regarding how well those guidelines are implemented at the facility
4. Estimate the allocation based on regimen distribution of the patient population at the facility. This estimation is not precise but, depending on the data availability regarding regimens, doses, and formulations, could be used to allocate ARV cost.

## 5.3 Opportunistic Infections (OIs)

This category covers the cost of all non-ARV drugs taken by ART and pre-ART patients at the ART clinic (OI drugs used in in-patient wards or provided in other facilities or wards will not generally be covered). As with ARVs, this cost should include the actual cost of drugs and all supply chain costs associated with getting drugs from the supplier to the facility pharmacy (transportation, storage, etc). These costs, if included, will be allocated appropriately by SDA.

The costing methodology for Opportunistic Infections is similar to that for ARVs except for one critical difference – drugs for opportunistic infections are not specific to pre-ART and ART patients and can be used to treat many diseases or illnesses affecting patients outside these programs. Therefore, the study team will estimate the percent dispensed of each drug to ART and pre-ART patients relative to all patients at a site.

Total consumption for the costed year will be calculated by looking at initial stock plus total receipts less final stock for critical drugs. These quantities will be multiplied by unit cost per drug to calculate total cost which can then be allocated by PT and divided by patient years to determine the cost per patient per year.

* **Costs included in this category**: cost of drugs consumed and some supply chain costs, depending on which data source is used.
* **Costs excluded from this category:** Some supply chain costs above the facility will be covered in the TA/OH section.

#### Data Collection

Sources and data collection options for Opportunistic Infections may vary by site and country. Outlined here are the potential sources of information, options for data collection based on available sources, and methods to estimate allocations. Country teams will employ one or a combination of the methods described based on the scope of data available within the context of the respective site/country.

**Data Sources for Other Drugs Quantity/Costs and Allocations**

1. Quantity/Costs
   1. Receipts or stock cards from the facility pharmacy
   2. Receipts/ income statement from the management office (e.g., NGO that runs the facility)
   3. Patient information management system at the facility
   4. Tenders/contracts at MOH (for pricing information)
   5. Central medical stores (national and/or regional depots)
   6. Other procurement partners (i.e. MSF for isoniazid)
   7. Expiry records
   8. Pharmacy visit and site interviews
2. Allocations
   1. Pharmacy records documenting which patients were given which drugs
   2. Prevalence information on specific opportunistic infections used in conjunction with treatment guidelines

**Quantity**

|  |  |  |
| --- | --- | --- |
| Data Collection Option | Possible Data Sources (See Above) | Scope of Data collected |
| 1. Determine consumption at the facility by measuring initial stock, final stock, inflows and outflows (via an electronic system or stock cards). | 1a, 1b , 1e, 1f, and/or 1g | Actual consumption including drugs dispensed, buffer stock, and expired stock |

**Cost**

|  |  |  |
| --- | --- | --- |
| Data Collection Option | Possible Data Sources (See Above) | Scope of Data collected |
| 1. Utilize data from receipts/income statements at the facility or central level | 1a and/or 1b | Includes drug costs and best estimate of supply chain costs |
| 1. Use MOH tenders/contracts (standardized commodity pricing in country), and best available estimate of supply chain costs | 1d |
| 1. Estimate using costs from a similar facility or where another source is available (i.e. partner data) | 1f |

#### Allocations

Essential medicines are not shared between facilities and therefore an allocation to the facility is unnecessary. However, an allocation to HIV treatment is critical because the same drugs are used to treat all patients regardless of their participation in the pre-ART and ART programs. Some drugs are more commonly used in pre-ART and ART patients because of common opportunistic infections or because pre-ART and ART patients are given prophylaxis (i.e. cotrimoxazole). When allocating these drugs to pre-ART and ART patients, consideration must be given to the proportion of those that are actually on pre-ART or ART since the scope of this analysis includes only those actually receiving treatment. Allocations to SDA are more straightforward than to HIV as the bulk of cost will fall under the clinical Care SDA. The PT allocation is more ambiguous, similar to the allocation to HIV, and might require one or a combination of the assumptions outlined here.

**Allocation to HIV**

*Note: When considering the allocation to HIV, the study team must also determine which HIV+ patient receiving these drugs are actually on pre-ART or ART or in care. This allocation can be extremely complex and often lacks sufficient data for a robust estimation.*

1. Determine the actual allocation according to pharmacy/medical records.
2. Estimate the allocation based on management/staff interviews of the proportion of different drugs given to pre-ART and ART vs. non-HIV patients. With this method, it is very difficult to determine the number of HIV patients that are on treatment so a proxy can be used based on the proportion of pre-ART and ART patients to total patients at the facility.
3. Estimate the allocation based on the ratio of pre-ART and ART patient visits to outpatient visits. While this method could likely under estimate the proportion of drugs in some instances, it maybe the best proxy available where pharmacy records are unreliable.
4. Estimation of the allocation can be based on similar facilities if patient data is not available.
5. Estimation based on country-level prevalence/patterns; this method requires several inferences based on treatment protocols for common opportunistic infections. Facility-level prevalence data is rarely available.

**Allocation to SDA**

1. Opportunistic infection drug unit costs (minus the percentage for supply chain management) are allocated 100% to the Clinical Care SDA. In this scenario, supply chain costs might not be captured within the ARV unit cost.
2. If the total Opportunistic Infection cost includes supply chain costs, the percentage of the Opportunistic Infection unit cost that is dedicated to supply chain costs is allocated 100% to the SCM SDA. Assuming the proportion of supply chain cost within the total Opportunistic Infection cost is discernable, the appropriate percentage will be allocated to the SCM SDA and the remainder will be allocated to the Clinical Care SDA.

**Allocation to Patient Type**

*Note: Patient type allocations for other drugs can be difficult without proper pharmacy records. Unlike ARVs, only a limited number of drugs and formulations can be specifically designated to particular patient types (i.e. adults versus pediatrics). No drugs can be designated as drugs exclusively prescribed to first or second line patients.*

1. Estimate the allocation based on pharmacy/medical records (chart review) at the facility to determine specifically which drugs are being used for which patient types.
2. Estimation based on interviews with clinical staff; this method can be accurate in contexts where the patient load at a facility is low and the staff is personally familiar with each patient on treatment.
3. Estimation based off of patient type distribution (default). This method calculates a distribution based on the distribution of patient types at the facility.

## 5.4 Laboratory

Laboratory as a cost category, as opposed to laboratory services as a service delivery area, includes the cost of all lab tests done on pre-ART and ART patients, but excludes other laboratory costs such as personnel and equipment, accounted for under other cost categories. This cost includes tests done on-site as well as those done at external facilities. The unit cost of lab tests should include the cost of consumables and reagents, along with the associated supply chain costs and/or sample transportation cost (if applicable).

Similar to other cost categories, the top-down costing approach is the primary methodology for costing. Data for labs will include both quantities of tests done by type of test as well as the unit cost per test. Some lab tests are specific to pre-ART and ART patients, while others can be performed on other outpatients as well. Those that are not pre-ART and ART-specific will be allocated to HIV based on one or a combination of the allocation options outline below.

Both internal and external lab volumes and costs will be captured to determine the total cost for the facility within the costed year. This total cost will then be divided by patient years to calculate cost per patient per year.

#### Data Collection

Sources and data collection options for Labs may vary by site and country. Outlined here are the potential sources of information, options for data collection based on available sources, and methods to estimate allocations. Country teams will employ one or a combination of the methods described below based on the scope of data available within the context of the respective site/country.

**Data Sources for Labs Quantity, Internal and External Costs, and Allocations**

1. Quantity/Cost
   1. Facility laboratory records (for number and type of tests conducted on-site and/or off-site, and qty of reagents and consumables procured), including numbers recorded on CD4 and other machines where available
   2. Facility laboratory budget (for cost data)
   3. Interviews with facility laboratory technicians for both cost data as well as laboratory procedures for pre-ART and ART patients if records are not available
   4. Central medical stores or national referral/reference laboratory records for cost of consumables and/or reagents
   5. Facility reports, HMIS statistics, M&E data, etc that can provide information on the number of tests performed by patient type
2. Allocations
   1. Patient information management system
   2. Facility reports, HMIS statistics, M&E data, etc that can provide information on the number of tests performed by patient type
   3. Treatment guidelines as well as patients on treatment and regimen distributions

**Quantity**

|  |  |  |
| --- | --- | --- |
| Data Collection Option | Possible Data Sources (See Above) | Scope of Data collected |
| 1. Obtain number of tests performed and quantity of all reagents and consumables procured during costing period (from records at the facility or other more centralized source) | 1a, 1b and/or 1d | Actual number of tests performed, and quantities of reagents and consumable procured |
| 1. Estimate number of tests performed and quantity of all reagents and consumables procured based on patient records and physician interviews, and extrapolation for total tests performed | 1c, 1d and/or 1e | Estimate of above |

**Cost of Internal Labs**

*Note: Costs of internal labs will only include consumables and reagents because other components such as personnel, equipment, etc are captured in the other cost elements for the costed facility.*

|  |  |  |
| --- | --- | --- |
| Data Collection Option | Possible Data Sources (See Above) | Scope of Data collected |
| 1. Use costs from procurement records at the facility level | 1a and/or 1b | Consumables and reagents |
| 1. Use costs from a procurement records at the central level | 1d | Consumables and reagents |
| 1. Use costs from a similar facility | 1e | Consumables and reagents |

**Cost of External Labs**

*Note: In some instances, the external lab fees charged to the facilities is a fully-loaded cost. If this is the case, a breakdown needs to be obtained and verified for accuracy. If this is not the case, the entire external facility needs to be costed and appropriately allocated to estimate accurate fully-loaded costs.*

|  |  |  |
| --- | --- | --- |
| Data Collection Option | Possible Data Sources (See Above) | Scope of Data collected |
| 1. Use fully-loaded costs at the external facility level, collected through site visit | 1a and/or 1b | Consumables, reagents, Infrastructure, HR, OH |
| 1. Use fully-loaded costs from a central source such as National Labs or Central Hospitals | 1d | Consumables, reagents, Infrastructure, HR, OH |
| 1. Use fully-loaded cost from a similar facility (with similar administration, staffing level, # of tests performed) | 1e | Consumables, reagents, Infrastructure, HR, OH |

#### Allocation

**Allocation to HIV**

*Note: A subset of tests such as CD4, Viral Load, and certain diagnosis tests are HIV-specific and therefore do not need to be allocated to HIV. This section applies to the rest of the labs tests that can be for both HIV and non-HIV patients.*

1. Actual allocation according to pharmacy records (with the understanding that certain lab tests are only for pre-ART and ART patients)
2. Estimation based on the ratio of pre-ART and ART visits to outpatient visits, adjusted for estimated proportion of visits by other patients that require tests. Calculation based on treatment guidelines and patient by regimen to determine number and types of tests that should have been done for patients within the study can then be used to make an informed allocation for comparison.

**Allocation to SDA – Internal Labs**

1. Unit cost for consumables and reagents (minus the percentage for SCM if included) are allocated 100% to the Laboratory SDA.
2. If the total Laboratory cost includes supply chain costs, the percentage of the Laboratory unit cost that is dedicated to supply chain costs is allocated 100% to the SCM SDA. Assuming the proportion of supply chain cost within the total Laboratory cost is discernable, the appropriate percentage will be allocated to the SCM SDA and the remainder will be allocated to the Laboratory SDA.

**Allocation to SDA – External Labs**

*Note: If the unit cost of external labs is fully-loaded, the total cost will be disaggregated to ensure appropriate allocation to SDAs.*

1. If accurate information is available, unit cost will be disaggregated and percentages will be appropriately allocated to SDAs.
2. If unit cost cannot be disaggregated, the cost of reagents and consumables per test can be used to determine the proportion of cost to be allocated to labs. The remainder can be allocated to the relevant SDAs based on findings from similar facilities (e.g. costed district hospitals) if those are included in the study, or by conducting a deep-dive analysis of the external lab.

**Allocation to Patient Type**

1. Allocation based on medical records (chart review) at the facility. Careful attention will be paid to allocating CD4 tests properly between pre-ART and ART patients. Estimation based on PT distribution (default), verified through clinician interviews.This method calculates a distribution based on the distribution of patient types at the facility, but should be verified with clinician to ensure that specific patient groups do not systematically receive more/fewer tests (e.g. peds, 2L).

## 5.5 Nutrition

This category covers the cost of all nutrition supplements taken by pre-ART and ART patients. As with ARVs, this cost includes the actual cost of nutrition commodities and all supply chain costs associated with commodities from the supplier to the facility (transportation, storage, etc). However, the supply chain costs may not be captured as part of the unit cost or total cost within Nutrition depending on the context for the relevant facility.

The costing methodology for Nutrition is similar to that for Opportunistic Infections, as nutrition commodities are not specific to pre-ART and ART patients and can be used to treat other malnourished patients as well. Therefore, for each commodity we must estimate the percent consumed by pre-ART and ART patients.

Total consumption for the costed year will be calculated by looking at initial stock plus total receipts less final stock for critical commodities. These quantities will be multiplied by unit cost per commodity to calculate total cost which can then be allocated by patient type and divided by patient years to determine the cost per patient per year.

* **Costs included in this category**: cost of commodities consumed and some supply chain costs, depending on which data source is used.
* **Costs excluded from this category:** May or may not include cost of buffer stock and/or cost of expired stock, depending on data source used. Some supply chain costs above the facility will be covered in the TA/OH section.

#### Data Collection

Sources and data collection options for Nutrition may vary by site and country. Outlined here are the potential sources of information, options for data collection based on available sources, and methods to estimate allocations. Country teams will employ one or a combination of the methods described based on the scope of data available within the context of the respective site/country.

**Data Sources for Nutrition Commodity Quantity/Costs and Allocations**

1. Quantity/Costs
2. Receipts or stock cards from the facility pharmacy
3. Receipts/ income statement from the management office (e.g., NGO that runs the facility)
4. Patient information management system at the facility (where available)
5. Tenders/contracts at MOH (for pricing information)
6. Central medical stores (national and/or regional depots)
7. Other procurement partners (i.e. UNICEF, WFP)
8. Allocations
9. Pharmacy or facility records documenting which patients were given which commodities
10. Prevalence information used in conjunction with treatment guidelines

**Quantity**

|  |  |  |
| --- | --- | --- |
| Data Collection Option | Possible Data Sources (See Above) | Scope of Data collected |
| 1. Determine consumption at the facility by measuring initial stock, final stock, inflows and outflows (via an electronic system or stock cards). | 1a and/or  1b and/or  1e and/or 1f | Actual consumption including drugs dispensed, buffer stock, and expired stock |
| 1. Use receipts at a facility (similar approach as #1 but different scope of information collected) | 1a and/or  1b and/or  1e and/or 1f | Total stock only – does not include data on consumption or expired stock |
| 1. Use procurement records or tenders from a centralized level and allocate to facilities. | 1d and/or  1e and/or 1f | Total stock only – does not include data on consumption or expired stock |

**Cost**

|  |  |  |
| --- | --- | --- |
| Data Collection Option | Possible Data Sources (See Above) | Scope of Data collected |
| 1. Utilize data from receipts/income statements at the facility or central level | 1a and/or 1b | All-inclusive of drug costs |
| 1. Use MOH tenders/contracts (standardized commodity pricing in country) | 1d | Includes drug costs (and supply chain costs to get drugs into the country, but not all the way to the facility) |
| 1. Estimate using costs from a similar facility or where another source is available (i.e. partner data) | 1f | May or may not include supply chain costs |

#### Allocations

In general, nutrition commodities are not shared between facilities and therefore an allocation to the facility is unnecessary. However, an allocation to HIV treatment is critical because the same commodities are used to treat all malnourished patients regardless of their participation in the pre-ART or ART program. Depending on the integration of nutrition programs with the ART clinic, some commodities may be more commonly used in pre-ART and ART patients (often pediatrics). When allocating these nutrition commodities to pre-ART and ART patients, consideration must be given to the proportion of those that are actually on pre-ART or ART or in care since the scope of this analysis includes only those actually receiving treatment. Allocations to SDA are more straightforward than to HIV as the bulk of cost will fall under the Clinical care SDA. The PT allocation is more ambiguous, similar to the allocation to HIV, and might require one or a combination of the assumptions outlined here.

**Allocation to HIV**

*Note: When considering the allocation to HIV, the study team must also determine which HIV+ patient receiving these drugs are actually on pre-ART or ART or in care. This allocation can be extremely complex and often lacks sufficient data for a robust estimation.*

1. Determine the actual allocation according to pharmacy/medical records.
2. Estimate the allocation based on management/staff interviews of the proportion of different nutrition commodities given to HIV versus non-HIV patients. With this method, it is very difficult to determine the number of HIV patients that are on treatment so a proxy can be used based on the proportion of pre-ART and ART patients to total patients at the facility.
3. Estimate the allocation based on the ratio of pre-ART and ART visits to outpatient visits. While this method could likely under estimate the proportion of commodities in some instances, it maybe the best proxy available where pharmacy records are unreliable.
4. Estimation of the allocation can be based on similar facilities if not patient data is available.
5. Estimation based on country-level prevalence/patterns; this method requires several inferences based on treatment protocols for common opportunistic infections. Facility-level prevalence data is rarely available.

**Allocation to SDA**

1. Nutrition drug and commodity unit costs (minus the percentage for supply chain management) are allocated 100% to the Clinical Care SDA. In this scenario, supply chain costs might not be captured within the Nutrition unit cost.
2. If the total Nutrition cost includes supply chain costs, the percentage of the Nutrition unit cost that is dedicated to supply chain costs is allocated 100% to the SCM SDA). Assuming the proportion of supply chain cost within the total Nutrition cost is discernable, the appropriate percentage will be allocated to the SCM SDA and the remainder will be allocated to the Clinical Care SDA.

**Allocation to Patient Type**

*Note: PT allocations for nutrition drugs can be difficult without proper pharmacy records. Unlike ARVs, only a limited number of drugs and formulations can be specifically designated to particular patient types (i.e. adults versus pediatrics.) No drugs can be designated as drugs exclusively prescribed to first or second line patients.*

1. Estimate the allocation based on pharmacy/medical records (chart review) at the facility to determine specifically which drugs are being used for which patient types.
2. Estimation based on interviews with clinical staff. This method can be accurate in contexts where the patient load at a facility is very low and the staff is personally familiar with each patient on treatment.
3. Estimation based on patient type distribution (default). This method calculates a distribution based on the distribution of patient types at the facility. However, it is essential to understand whether or not a certain PT (for instance, pediatric patients) is more likely to require nutritional supplements while on pre-ART and ART.

## 5.6 Building, Equipment, and Other Running Costs

Building costs, equipment costs, and other running costs will all be calculated using top-down methodology; the total cost for each category will be allocated to the facility, to HIV treatment, and then to PT and SDA. These allocated costs can then be divided by respective patient years (e.g. total personnel costs dedicated to pediatrics divided by total pediatrics patient years) to calculate personnel cost per patient per year.

Building costs include the cost of the building and any renovations that have been completed, amortized if necessary.

Equipment costs include all medical and non-medical equipment used specifically for pre-ART and ART services as well as shared equipment for the entire facility. It includes heavy machinery such as vehicles, IT equipment such as computers and printers, and other small equipment and furniture that are either leased or owned.

Other Running Costs include utilities, non-clinical and clinical supplies, building maintenance, security, administration/systems, and other miscellaneous recurring costs.

***Scope:***

* **Costs included in this category**: all costs incurred on a regular basis as well as all costs associated with purchase or lease of equipment, building space, and renovations, amortized if necessary.
* **Costs excluded from this category:** cost of personnel involved with maintenance, security, or operating equipment (included in Personnel).

#### Data Collection

Sources and data collection options for buildings, equipment, and other running costs may vary by site and country. Outlined here are the potential sources of information, options for data collection based on available sources, and methods to estimate allocations. Country teams will employ one or a combination of the methods described based on the scope of data available within the context of the respective site/country.

**Data Sources for Buildings, Equipment, and Other Running Costs and Allocations**

1. Costs
2. Accounting records or receipts for all purchased/leased equipment, building space, and running costs (kept at facility level, donor records at site or centrally, or MOH)
3. Interviews with staff and facility management
4. Similar facilities or (based on size, services, location) where data is available could be used to inform costs if unavailable at a costed facility.
5. Current costs for equipment and construction may be used if amortized appropriately.
6. Allocations
7. Staff interviews
8. Observations (size of the facility)
9. Proportion of patient visits (pre-ART and ART patient visits : Outpatient visits)

|  |  |  |
| --- | --- | --- |
| Data Collection Options | Possible Data Sources (See Above) | Scope of Data collected |
| 1. Acquire exact annual spend for running costs incurred and total spend on equipment and building costs (amortized) at the facility from receipts or accounting records. | 1a | All running costs, equipment and infrastructure paid for at the facility |
| 1. Interviews with staff and facility management to determine the different types of running costs and equipment and building components to include as well as their costs (including variations due to seasonality) | 1a, 1b | Major categories of equipment, infrastructure, and running costs with anecdotal information about variance throughout the year |
| 1. Estimate types and amount spent on equipment, building components, and running costs based off similar facilities such as those funded by the same donor, with similar services, similar size, and or similar location, etc. | 1c | Major categories of equipment, infrastructure, and running costs only |
| 1. Estimate types and amount spent on equipment and building components based off of current day estimates, amortized appropriately. | 1d | Major categories of equipment and infrastructure |

#### Allocations

Although equipment costs, building costs, and other running costs are usually incurred at the facility level, if the facility is part of a hierarchical structure, a parent facility may be responsible for paying a portion of these costs. As a result, allocations of these categories must first be made both to the facility and then to HIV treatment. Below are options to estimate percentage allocations of equipment costs, building costs, and other running costs at various levels (facility, HIV treatment, etc). Country teams will use one or a combination of the options mentioned to make the most accurate and robust estimations. Additionally, these allocations can be tested with a sensitivity analysis to determine impact on overall cost.

**Allocation to Facility**

*Note: This is only required for equipment costs, building costs, and running costs that are shared across facilities and are therefore not allocated 100% to the costed facility.*

1. Actual allocation for each equipment, building, or running cost associated with the facility, designated by administration or accounting records
2. Estimate allocation based on number and size of facilities that share resources, equipment, and infrastructure
3. Estimate allocation based on management/staff interviews to determine the approximate amount of each cost category that should be allocated to the costed facility

**Allocation to HIV Treatment**

*Note: This is only required for equipment costs, building costs, and running costs that are not specifically associated with the HIV unit/ART clinic.*

1. Actual allocation for each equipment, building, or running cost associated with the facility, designated by administration or accounting records
2. Estimate allocation based on proportion of space devoted to HIV services within the facility
3. Estimate allocation based on management/staff interviews to determine the approximate amount of each cost category that should be allocated to the treatment of HIV at the costed facility

**Allocation to SDA**

1. Estimate allocation based on actual amount spent within each SDA
2. Estimate allocation based on staff interviews to determine approximate amount spent on different activity types

**Allocation to Patient Type**

1. Estimate allocation based on amount spent on individual patient types (if a new pediatric wing was constructed, allocations to pediatric patients will be higher)
2. Estimate allocation based on staff interviews
3. Estimate allocation based on patient type distribution at the facility being costed. This is consider the “default” allocation for patient type allocations in all cost elements and will used only as a final option where no additional information is available.

## 5.7 Patient Breakdown

This category collects information on the patient population including, but not limited to, the number of patients on Pre-ART vs ART, number of initiations per month, number of patients on PMTCT, and attrition rates. Although it doesn’t contain any specific cost information, it identifies the denominator required to calculate per person per year costs.

The total number of patient-years would ideally be determined by reviewing patient records each month, although an initial and final number may be used to calculate average scale-up. The option below outlines how the team will obtain the breakdown of those patients between 1L/2L, adults/peds. Pre-ART breakdown is considered under a separate section (detailed analysis), given the challenges and importance of that question.

#### Data Collection

Sources and data collection options to collect Patient Breakdown data may vary by site and country. Outlined here are the potential sources of information and options for data collection based on available sources. Country teams will employ one or a combination of the methods described based on the scope of data available within the context of the respective site/country.

**Data Sources for Patient Breakdown**

1. Patient Breakdown
2. Electronic database/electronic medical records on site
3. Patient logbooks or registers
4. Patient chart review
5. Estimates based on similar facilities (similar patient load, location, services offered, etc)
6. National database/reports

**Patient Breakdown**

|  |  |  |
| --- | --- | --- |
| Data Collection Option | Possible Data Sources (See Above) | Scope of Data collected |
| 1. Collect consolidated data electronically regarding patient breakdown at the facility | 1a | Patient information at a granular level |
| 1. Collect data manually at the facility level and compile it | 1b, 1c | Patient information at a granular level |
| 1. Use patient breakdown from a similar facility as a proxy | 1d | Patient information based on an aggregate breakdown |
| 1. Use patient breakdown from national statistics or reports as a proxy | 1e | Patient information based on an aggregate breakdown |

## 5.8 Assessing quality of care

### 5.8.1 Overview

In order to truly understand the efficiency and effectiveness of funding spent on ART, it is necessary to evaluate not only the cost of providing treatment, but also the quality of care currently provided at that cost. Lower unit cost does not necessarily represent the most desirable outcome, and the quality of care must be carefully considered before making policy recommendations.

While data collection and allocations of costs is relatively unambiguous and more quantitative in nature, quality of care is more complicated to assess. This section outlines the proposed approach to assessing quality of care within the limited scope of this work.

### 5.8.2 Approach

The most appropriate methodology for assessing quality of service and patient outcomes is a prospective cohort-based analysis, which follows patients over time and can assess the impact of policy options such as choice of drugs and frequency of testing. The most robust analysis adjusts the costs by calculating cost per QALY (Quality-Adjusted Life Years) over several years. This analysis, by contrast, provides a retrospective snapshot in time and is focused on the facility level, and will therefore have limited ability to assess the level of detailed patient data necessary to arrive at a robust analysis of patient outcomes and, by extension, quality of service. Instead, this analysis will be able to provide an indicative measure of quality that can be used to inform and help evaluate the cost data for each facility.

The study teams will capture data to analyze three indicator categories: complexity, process/service, and patient outcome. These indicators will be used to determine outcomes at the facility, and adjust the costs by those outcomes. For example, a facility that spends $500 per patient year and in which 80% of patients are retained and responding, will show a cost of $500, but a quality-adjusted cost of $500/80%=$625. If only 60% of patients are retained and responding, average cost will remain $500, but the quality-adjusted cost would be $500/60%=$833. The indicators that were selected as well as some that were considered are described at a high-level in Annex 2. Selected indicators are described in section 5.8.3 below.

#### Complexity Indicators

Complexity indicators capture the variations of incoming cases seen by different facilities (and in different country contexts) and include both clinical and non-clinical factors. These indicators may be uncontrollable factors that might drive the cost and/or outcomes regardless of the facility’s service provision.

* ***Environmental Factors*** provide an assessment of the overall level of health within the catchment population for a specific facility. Examples of these factors include prevalence of TB or Malaria and inform the costing analysis with epidemiological wellness characteristics that could be expected in the patient population.
* ***Characteristics at Initiation*** provide a baseline from which clinical progress can be measured. Understanding the HIV disease progression for patients upon initiation of pre-ART and ART will provide a valuable starting point from which to monitor progress as a result of enrolling in the pre-ART or ART program. Examples of quality indicators include median CD4, WHO stage, and TB status at initiation.

#### Process and Service Quality Indicators

These indicators capture the services and amenities provided to patients within a health facility. They provide a perspective on factors that impact quality of care both internal to a facility and external within the health system, and are likely to be correlated with improved patient outcomes over time, compensating for the limited ability to directly measure those within the context of this study.

* ***Facility*** ***Characteristics*** provide context from which to measure the level of care available at a facility from the perspective of an observer. Examples of facility characteristics include degradation of infrastructure, availability of utilities such as water and electricity, and adequate space for patients.
* ***Process indicators*** provide insight into how closely patient management follows protocol and best practice. On the whole, a facility that closely follows protocol is likely to have better outcomes than a facility that fails to provide components of pre-ART and ART. While indicators differ between countries and sites, several indicators can be selected to provide a proxy for good service. Process indicators include adherence to minimum frequency of tests and doctor visits, availability of essential services like laboratory testing and adherence management programs, and sufficient time for clinical visits.
* ***System Characteristics*** provide context regarding the robustness of the health system infrastructure supporting facility-based services. Examples of quality indicators include the number of pharmaceutical stock outs per year, the availability of sample transportation for lab tests, and the availability of reagents/consumables to perform lab tests.

#### Patient Outcome Indicators

Patient Outcome Indicators monitor the progress that has been made as a result of enrollment in the pre-ART or ART program, taking into consideration appropriate *complexity* Indicators. Although some of these indicators are difficult to quantify due to data availability and quality, they are perhaps the most essential in determining the overall quality of care for a specific pre-ART and ART program. Improvements in health must be captured along with the cost of care to allow for a thorough comparison across facilities and countries. Examples of patient outcome indicators include median CD4 and/or Viral Load (VL) after 12 months, toxicities, attrition (defaulted, stopped, died), transfers, and adherence. The patient outcome indicators will be collected from a sample of patient charts and supplemented with information from central data management systems where necessary.

### 5.8.3 Selected Indicators

Due to limited data availability of several important indicators in study countries, patient chart reviews are necessary in order to accurately gauge quality of care. The following indicators will be used by study teams to assess complexity, process and service quality of care, and patient outcome in this analysis:

#### Complexity indicators:

1. **CD4 at initiation.** Median baseline CD4 is one measure to describe the disease progression of patients at ART initiation and robustness of pre-ART care for those patients enrolled prior to initiation. This indicator will provide insight into expected treatment response within the study timeframe. Additionally, it will serve as a reliable starting point from which to monitor progress.
2. **TB/HIV co-infection (catchment and from patient charts).** HIV/TB co-infection can have a significant impact on both the cost of treatment and expected outcomes for pre-ART and ART patients. While co-infection rates are not always known at the facility level, this indicator will be collected at the most granular level available (country at minimum, province, district, or facility). These data are also being collected from the patient charts sampled where available.
3. **WHO Stage at initiation.** Stage at initiation can be used to help determine complexity of case load and can be particularly useful in places where CD4 is not often done such as Malawi.
4. **VL at initiation.** Viral load can be a very good measure of response to treatment and current status of HIV infection in a patient. Although it is not widely available, the study teams will abstract this data from patient charts where possible.
5. **KS at initiation (existence of WHO stage IV OI).** Kaposi Sarcoma is a stage IV opportunistic infection and can help inform analysis on WHO stage at initiation.
6. **Prevalence of TB in catchment.** Information on prevalence of TB in the catchment population can provide some indication of environmental factors affecting HIV patients.
7. **Prevalence of SAM/MAM in catchment.** Similar to TB prevalence, this indicator can provide an indication of external factors that could complicate HIV patients that initiate ART.

#### Process and service quality

1. **Facility staff adherence to treatment guidelines.** Clinical practice at the facility can be one indicator to measure service delivery.
2. **Assessment of service disruptions.**  Disruptions in treatment might be caused by several factors including lack of personnel, stock outs, etc. Assessing the frequency and magnitude of these disruptions will help determine the quality of services provided.
3. **Stock-outs (ARVs and Cotrimoxazole).** Providing consistent treatment to pre-ART and ART patients requires a constant supply of both ARVs and OI drugs. Understanding the frequency and specifics of stock outs (i.e. which drugs, duration, etc) at each facility will inform health systems or facility management issues impacting quality of care and patient outcomes.
4. **Stock management for ARVs.** Stock outs of vital drugs is an important indicator of quality of care. While the cause of the stock out will not be evident through this study, information on stock management practices may help evaluate the quality of the ARV cost and quantity information collected.
5. **Adherence programs.** The availability of adherence management programs reflects strength of case management. The presence of adherence program provides an indication that a facility is providing a high level of care, and will be more likely to have other quality process care elements in place, even if this study is unable to assess them all.
6. **Number of CD4 tests.** Adherence to protocol in terms of number of CD4 tests performed pppy provides another indicator that a facility is able to adhere to minimum level of care required by the national guidelines. The actual number of tests may vary country to country, so the indicator examines adherence or otherwise to national guidelines.
7. **Availability of certain basic equipment.** In order to provide basic treatment, certain equipment is critical. The study team will assess the availability of selected basic equipment as a measure of quality of care. Those included are defaulted into the equipment section of the data collection tool.
8. **Amenity indicators.** Understanding the quality, breadth and availability of amenities at a facility will provide insight into the quality level of care from the patient’s perspective. This indicator may be subjective and based on auditor’s impressions, and will be provided in the data as both individual and average scores against a range of qualitative measures of the facility, including (some indicators could be assessed visually):
   1. Overall facility physical condition
   2. Adequate space/ Ease of patient flow
   3. Availability of water
   4. Availability of electricity
   5. Ventilation in waiting rooms
   6. Availability of basic furniture
   7. Availability of soap

#### Patient outcomes

1. **CD4 change from initiation.** Comparing the median baseline CD4 count with the median CD4 count over time (6 and 12 months) after initiation on ART is an indicator that can be used to monitor the overall improvement seen in the health of patients since initiating treatment. While virological response could provide a more robust view into patient health than immune response, data availability is severely limited to capture this information.
2. **VL change from initiation.** Where available, the study teams will capture VL results that can help determine response to treatment.
3. **Weight gain from initiation.** Weight gain is often used as a measure of response to treatment and where available, these data will be recorded from patient charts.
4. **Loss to follow-up, including separation into mortality and non-death causes of LTFU**

Attrition includes the following stratifications: defaulted, stopped treatment, and died, as described below:

* **Defaulted:** This category includes patients who defaultand are essentially lost from the system. The standard definition is patients who fail to check in with the clinic after 3 months. This definition could vary slightly in different countries.
* **Stopped treatment:** This category includes patients who willingly stop treatment
* **Died:** This category is limited to patients who die while enrolled in the pre-ART or ART program.

Interpretation of these indicators is complex and will require granularity in data collection, and a robust understanding of these three strata may not be feasible. Separating out attrition from transfers to other facilities will be important to assess the effectiveness of the facility in maintaining patient care. Given the emphasis on decentralization in many countries, programs are actively working to encourage patients to seek treatment closer to home. It will be important to account for high transfer rates so as to avoid the assumption that the facility is losing patients to defaults or deaths.

### 5.8.4 Methodology for Data Capture

In order to collect data as consistently as possible, a data collection algorithm was developed for Median baseline CD4 count, Median CD4 count after 12 months, and attrition rates). The other indicators will similarly be managed for consistency using standardized data collection tools. The process differs for each indicator and may also vary slightly by country and between sites, depending on the most available reliable source of data.

All indicators in all categories will be obtained by a combination of survey questions at the facility through the DatStat data collection tool and/or patient chart abstraction where needed. As with data collection for the cost elements, the interviewers will obtain the information either through interviews or documentation where available.

#### Patient Outcome Indicators

In all instances, data will be collected at the most centralized source possible. Where Electronic Management Records (EMRs) are available, for example, data will be collected from that source. It is expected that in many facilities individual patient records will need to be examined to extract the information. In those situations, a sample of 50 charts will be drawn randomly. For sample randomization and selection process, see annex \_\_\_\_\_

Data management and recording procedures in different facilities/countries will necessitate tailored approaches to data collection for these indicators. Facilities utilizing EMRs to collect and consolidate data will most easily be able to calculate the measures. In the absence of EMRs, manual data collection using paper-based systems including patient charts, health cards, and/or registers will be used. Where interviewers must use paper charts, the data will be captured using DatStat as with all other data. Where data is available via an electronic system, the interview will request the required indicators and visit data as a query from that system and these data will reside outside the DatStat database.

## 5.9 Determinants

In a sample of 150 ART facilities in five countries we expect that some will deliver antiretroviral therapy services at a much lower cost per patient-year than others. Some of these differences will be justifiable due to variations in case-mix complexity and some will clearly relate to variation in the quality of care. But after we have used the techniques described in Sections 5.8 and 7.4 to control our efficiency comparisons for complexity and quality differences, we expect efficiency differences to remain substantial, with some facilities being up to 5 times more efficient than others. A major objective of this research protocol is to explain this remaining variation in efficiency by identifying its determinants and estimating their strength.

We expect that some determinants of quality/complexity-adjusted efficiency will be outside the immediate control of policy makers. We call these the “environmental determinants.” They include truly immutable characteristics such as the terrain over which supplies and patients must travel and the weather conditions in the region. We also include in this category variables that might be controlled by policy makers, but only over years or decades, such as the condition of the roads, the education and wealth of the patients and the supply of trained physicians and nurses. and the ethnic and eIn contrast, the “policy determinants” are those which policy makers can manipulate in order to improve efficiency and thereby enable available financial resources to support more patients on antiretroviral therapy.

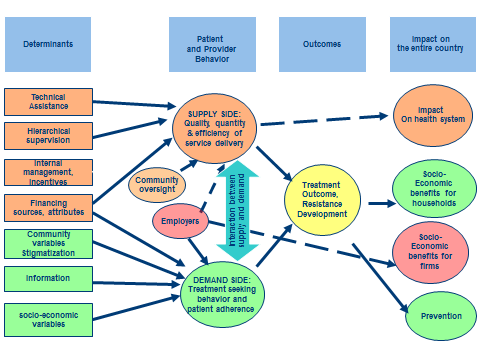


Figure 6. Determinants of efficient, high quality ART service delivery. The arrows indicate hypothesized causal influences, while the color coding is for survey type as follows: Orange: facility survey; Green: household survey; Pink: employers; Yellow: clinical records; Light orange: community questionnaire. The teal colored two-headed arrow does not represent a data type. This protocol describes an attempt to understand the determinants of quality, quantity and efficiency based on a survey of facilities. (Source: Modified from Over and de Walque, Learning agenda for the World Bank’s Treatment Acceleration Project, unpublished)

Figure 6 presents the hypothesized causal structure determining the efficiency of antiretroviral treatment services in field operation (as opposed to ideal conditions). The arrows represent hypothetical causal influences. The direction of causality flows from left to right, from determinants to patient and provider behavior to outcomes and finally to overall social impact, with these categories designated by blue rectangles at the top. The determinants at the left are grouped into roughly two categories, with four types of determinants in each. The first four types on the top left (in orange rectangles) are hypothesized to influence the supply-side of antiretroviral therapy by directly affecting the quantity, quality and efficiency of the supply of services in the top oval in the second column. The fourth of these as well as the three types of variables at the bottom left (in green rectangles) are hypothesized to influence the demand for antiretroviral therapy services. The two-headed vertical blue arrow connecting the supply and demand ovals signifies that supply and demand interact to generate the observed quantity of services delivered, their quality and efficiency and ultimately, in the third column of the chart, the health outcomes produced by the services. The yellow shading applied to the oval containing the health outcomes indicates they must be inferred from clinic level data on the medical condition of the patient, such as the CD4 counts, viral loads and Body-Mas-Index variables described in Section 5.8.3.

Table 8. Enumeration of questions in the survey instrument which elicit information about policy determinants of efficient service delivery: By survey module

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Module** | **Technical Assistance** | **Supervision, hierarchical** | **Supervision, community** | **Internal Management** | **Financing,  sources and attributes** |
| *Facility Information* | 160 | 12 | 2 | 117 | 45 |
| *Patient Breakdown* | 1 | 0 | 0 | 65 | 0 |
| *ARVs* | 0 | 8 | 0 | 10 | 0 |
| *Opportunistic Infections* | 2 | 0 | 0 | 10 | 0 |
| *Nutrition* | 1 | 0 | 0 | 11 | 6 |
| *Laboratory* | 0 | 0 | 0 | 17 | 6 |
| *Other Medical Equipment* | 0 | 4 | 0 | 13 | 23 |
| *Buildings* | 0 | 0 | 0 | 2 | 1 |
| *Other Running Costs* | 0 | 0 | 0 | 2 | 6 |
| *Personnel* | 5 | 39 | 0 | 65 | 29 |
| *Total* | 169 | 63 | 2 | 312 | 116 |

A comprehensive study of antiretroviral therapy services would attempt to collect data using several different coordinated surveys. In Figure 6, the color coding represents the type of survey best suited to gather each type of data. The data types shaded orange concern health facilities and are best collected at these facilities through a facility survey. This protocol describes the methods to collect this kind of data through a health facility survey.

The data represented in Figure 6 by green shapes concerns individual patients and their households and social context and would be best collected in household surveys administered at their homes, where multiple family members can be consulted and the patient is less inhibited by the proximity of his or her health care providers. The data in the pink shapes concerns employers and would best be collected at the employment site. In light orange shapes, data on community oversight or supervision would best be collected at the community level, through interviews with community leaders. Since the scope of the current effort excludes the collection of household, employer or community level data, we will attempt to control for these variables using data collected at the facility and publicly available spatially geocoded data from each individual country. For example, we can ask facility personnel about their interaction with and supervision by the community and we can use recent Demographic and Health Surveys within the same country to characterize roughly the HIV-prevalence and the socioeconomic status of households in the neighborhood of a health facility.

Table 8 enumerates the number of questions in the data collection instrument that provide information for each of the five categories of determinants that are hypothesized to directly affect facility performance: Technical assistance, Hierarchical supervision, Internal management and incentives, Community supervision or oversight and Financing sources and attributes[[5]](#footnote-5). Table 9 gives examples of questions in the survey instrument that may elicit useful information regarding each category of policy determinant.

A key determinant of performance is the knowledge of the health care providers on the site. We will use measures of their training to proxy their knowledge, and measures of received technical assistance to capture on-the-job training. In order to measure the frequency and intensity of technical assistance to any given facility, the questionnaire asks facility staff about the number of technical assistance visits during the costing period, the institutional affiliation of those rendering the technical assistance and whether the visitors left in the facility any guidelines or other support material that might help the staff remember and apply what they have learned. Table 8 reports that there are 169 such questions in the instrument and Table 9 lists a few examples of the information elicited by these 169 questions.

Assuming that health care providers are likely to be motivated not only by an intrinsic desire to perform well but also by extrinsic financial and non-financial rewards and sanctions, the next three categories of variables are intended to characterize the extent and intensity of these extrinsic rewards that influence performance in any given facility. The hierarchical supervision category captures supervision from any of a variety of superior levels of authority, including the ministry of health, the district health officials and, for private sector or NGO operated facilities, the appropriate supervisory officials in the national office of that NGO.

The nature of a facility’s financial support and the conditions attached to it are likely to have a strong influence on efficiency. The last column of Table 9 lists a few example questions that characterize a facility’s source or sources of financing. Since only a few facilities in our sample are likely to receive funding from a unique source, we will rarely be able to discern the effect of any source’s support on facility-level efficiency from observing or comparing a few individual facilities. However, if questions like those in the last column of Table 9 enable us to construct an index of the relative contributions of all the financing sources that support any individual facility, a multiple regression which uses these variables or composites of them as explanatory variables might yield an estimate of the impact of a financing source’s participation at a site on efficiency.

The next section of this protocol proposes descriptive analysis of the facility costing data. Descriptive analysis may reveal some likely proximate correlates of inefficiency. For example, descriptive analysis might reveal that facilities with high laboratory costs typically have higher unit costs of delivery. But the question then arises why some facilities have higher lab costs. By analyzing the relationship between lab costs as a dependent variable and the variables characterizing the environmental and policy determinants, we can hope to find policy levers which will induce the facility managers to use laboratory services more economically.

Table 9. Examples of questions from the survey instrument which are intended to elicit information on the policy detrminants that affect efficiency in each facility

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Policy Determinants** | | | | |
| **Technical Assistance** | **Supervision, hierarchical** | **Supervision, community** | **Internal Management** | **Financing,  sources and attributes** |
| Number of Technical Assistance visits in costing year to child facility | Who provides oversight to this facility | Elected or appointed governing board for the facility | How are staff rewarded for performance? | Name of primary funding source of the facility. |
| Facility aware of SAM MAM treatment guidelines. | The facility ARV needs are assessed by the supplying site (larger facility or medical store) and drugs are sent to facility as needed (push supply chain). | Do advisory councils exist formally or informally | Level of influence facility director has over budget | Use of the funding at the facility. |
|  |  |  |  |  |
| Entity which provides trainings | Who is authorized to buy equipment |  | Availability of Soap for employees | Who pays for nutritional foods |
|  |  |  |  |  |
| Date of last Technical Assistance visit | Who is authorized to repair equipment |  | Months of buffer stock that SHOULD be held at facility | CD4 Consumables/Reagents funder |
|  |  |  |  |  |
| Left eductation materials for Technical Assistance visit | Who makes hiring and firing decisions for ART Personnel |  | Frequency of HIV specific trainings | Facility pays for sample transportation |
|  |  |  |  |  |
| Does this facility abide by WHO guidelines for PMTCT? | Who makes promotion and job assignment decisions for ART Personnel |  | Which types of patients get priority in case of a nutrional supplement stockout | Equipment by funder (PEPFAR, MOH, etc) |
|  |  |  |  |  |

# 6. Descriptive Analysis

This section describes very broadly the basic descriptive analysis of the cost data. This section is not intended to be fully comprehensive of all possible analyses done but is intended to provide a high-level overview of the basic information to be calculated and presented from the data collected. The analysis process will be iterative and data availability and quality will help determine what calculations or comparisons are useful, insightful and feasible.

The descriptive analysis described here will focus mainly on calculations of cost data but could also include descriptive statistics and basic correlations of other descriptive data captured in the surveys. Because the data set will ultimately include nearly 9000 variables, all possible analyses and calculations are not presented here.

The unit of measure and denominator for all per-patient-per-year costs is patient year. Patient year is calculated based on the number of active patients at the end of every month in the costing period. These patient-months are then summed and divided by twelve to determine patient years for the costing timeframe.

The econometric and statistical analysis plan is presented in a separate section.

## 6.1 Cost Per Patient Per Year

The primary cost calculation used to measure cost of ART across facilities is cost per patient per year. This calculation will be based on aggregate cost data with all relevant allocations as described in section 3, divided by the common denominator of patient years at a site. The figure below is a representation of how the data might look on a per patient basis for a single facility:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Input Cost Category** | **Pre-ART** | **Adult 1L** | **Adult 2L** | **Pediatric 1L** | **Pediatric 2L** | **All Patients** |
| **Direct Running Costs** |  |  |  |  |  |  |
| Direct Personnel |  |  |  |  |  |  |
| ARVs |  |  |  |  |  |  |
| Other Drugs |  |  |  |  |  |  |
| Lab Supplies |  |  |  |  |  |  |
| **Total Direct Running Costs** |  |  |  |  |  |  |
| **Indirect Running Costs** |  |  |  |  |  |  |
| Indirect Personnel |  |  |  |  |  |  |
| Other Running Costs |  |  |  |  |  |  |
| **Total Indirect Running Costs** |  |  |  |  |  |  |
| **Investment Costs** |  |  |  |  |  |  |
| Buildings |  |  |  |  |  |  |
| Medical Equipment |  |  |  |  |  |  |
| Non-medical Equipment |  |  |  |  |  |  |
| Training |  |  |  |  |  |  |
| TA |  |  |  |  |  |  |
| **Total Investment Costs** |  |  |  |  |  |  |
| **GRAND TOTAL** |  |  |  |  |  |  |

*Note: The GRAND TOTAL provides the total cost per patient per year as described above.*

Cost per patient per year will be calculated individually for each cost element in this table above. Most cost elements are comprised of pre-defined subcategories which aggregate the line item detail of the data collected. The dummy tables which illustrate how the cost data might look for each cost element are available in Annex 6. These cost data, either by individual cost element or aggregated, will be calculated per site as displayed in the table above and compared across facilities.

## 6.2 Cost Per Patient Per Year by SDA

Total cost for each cost element will also be allocated across service delivery areas as described in section 2.2. These allocations can be multiplied across the patient type allocations to determine the SDA distribution per patient per year. The values per patient per year in this table will be equal to the GRAND TOTAL row in the table above.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Service Delivery Area** | | | **Pre-ART** | **Adult 1L** | **Adult 2L** | **Pediatric 1L** | **Pediatric 2L** | **All Patients** |
| ARVs | |  |  |  |  |  |  |  |
| Clinical Care | |  |  |  |  |  |  |  |
| Lab Services |  |  |  |  |  |  |  |  |
| SCM |  |  |  |  |  |  |  |  |
| Outreach |  |  |  |  |  |  |  |  |
| Training | |  |  |  |  |  |  |  |
| M&E / HMIS | | |  |  |  |  |  |  |
| Facility Admin and Mgmt | |  |  |  |  |  |  |  |
| Prog Mgmt and OH | | |  |  |  |  |  |  |
| **Total** | | |  |  |  |  |  |  |

*Note: The Total provides the cost per patient per year by SDA as described above.*

## 6.3 Cost Elements

For each of the cost elements listed, cost data will be calculated per patient per year and by SDA as shown in the aggregated cost tables above. For cost-element specific tables, see Annex 6. As previously described, these data will be available on a per-facility basis and compared across facilities to identify variations and investigate the drivers of those differences.

Beyond basic cost calculations, several other analyses will be done to better understand the drivers of costs and how they relate to basic patient outcome indicators. For example, to better understand lab costs, the study teams will collect consumption data on reagents and consumables as well as the number of tests done within the costing year. These data will allow the team to assess whether lab costs are driven by number of tests per patient, mix of tests or price per test, or some combination of these drivers. This understanding is critical, since higher lab costs driven by higher prices will have no clinical implications, while higher lab costs driven by more frequent tests may (or may not) improve patient outcomes.

Below are some of the possible calculations by cost element that will be included (not exhaustive):

* General
  + Basic frequencies and correlations of descriptive data captured  
    These basic statistics will likely look at facility characteristics such as size and services offered in relation to cost of treatment. For example, the analysis may reveal that large tertiary care facilities generally have lower cost ART illustrating the benefit of economies of scale and/or integration of services.
  + Case study analyses of specific facilities or facility types  
    Some special facilities such as centers of excellence or might offer a model that may be more costly but shows significantly better patient outcomes. The analysis could highlight pieces of this care model that could be implemented elsewhere and potential cost implications to do so.
* Patient Outcome (these are described in greater detail in section 5.8)  
  Descriptive analysis of patient complexity and outcome indicators in relation to cost and other factors at the facility:
  + Median CD4 at initiation and change over time
  + Change in weight over time
  + Analysis of VL and TB information where possible
* Personnel
  + Number of clinical / non-clinical FTEs per patient year  
    This information can be used to assess the human resources available to provide services to HIV patients which can be used to compare across facilities with the basic quality indicators.
  + Average salaries for different cadres  
    Salaries can cause variation in personnel costs between facilities and countries and should be analyzed to ensure comparable costs.
  + Analysis of opportunities for task shifting  
    Based on cost data and allocations to service delivery areas, it is possible to estimate potential cost savings with task-shifting.
  + Evaluation of descriptive data around nurse-led initiation, TA provided, etc  
    These are important descriptive data that will inform costs at a particular facility and when comparing across.
* ARVs
  + Regimen distributions and changes during costing period  
    Because many countries are implementing the 2010 WHO guidelines, the regimens used and the change in regimens within the costing period are an important contributor to total ARV cost within and across facilities. Descriptive analysis will allow us to understand the relative impact of regimen choice on overall ART costs, and observe how regimen choices vary by country and facility type
  + ARV price comparisons  
    Per pack prices will impact total cost particularly in countries that are not currently accessing lowest available prices or the least expensive formulations. As with regimens, this is an important consideration when looking at total ARV cost.
  + Wastage calculations where possible  
    These calculations will be estimates because these data are not systematically collected. However, where available, this is an important contributor to ARV cost.
  + Comparison with bottom-up calculations  
    The study team will capture regimen distribution information by facility that can be used to estimate ARV cost for a particular facility. This calculation can be used to sanity check the ARV costs at a particular facility and ensure accurate comparisons across facilities.
  + Evaluation of descriptive data including supply chain
* Labs
  + Count of CD4s and VL per patient year  
    In addition to total cost for these tests, it is important to understand the number of tests done. These data will help estimate the true cost per test and if there is wastage or expiry, but also highlight the differences in the model of care across countries and facility types.
  + Comparison of lab services and costs relative to key indicators such as patients on 2L and CD4 at initiation. While the study will not provide long-term cohort-based data, it will allow a descriptive analysis that can point to likely correlation. For example, facilities that provide on-site CD4 for pre-ART patients (e.g. by using POC devices in clinics or an on-site machine for larger hospitals) may show higher CD4 at initiation. Similarly, if the data shows that sites that provide no VL testing have no or few patients on 2L, access to VL can be postulated as a key barrier to monitoring treatment failure.
* Opportunistic Infections / Nutrition
  + Evaluation of cost
  + Analysis of Cotrimoxazole distribution among HIV patients  
    CTX and INH are two very cheap and effective interventions that can prevent opportunistic infections.
  + Analysis of infections treated versus referred; most common infections

The brief bulleted list provides a very high-level overview of the types of analyses that may be done with the DatStat data set. This list is not exclusive or exhaustive and the study team expects to conduct other analyses depending of the quality and completeness of the 9000 variables collected.

# 7. Analytical Framework[[6]](#footnote-6)

## 7.1 Defining efficiency

The building block of the discussion on efficiency is the production function, which describes the relation between inputs and outputs for a given technology. Panel I of Figure 7 describes this concept graphically for a hypothetical ART program, with the number of patient years of quality-adjusted ART measured on the vertical axis and a single representative input on the horizontal axis. A production function thus, describes for any level of inputs (X1) the resulting amounts of (quality-adjusted) outputs produced (Y1). Assuming that no resources are wasted, the production function then describes production at the most efficient levels possible at various levels of input, given the current technology.

As documented over decades by health service researchers, measuring a unit of output which is homogenous across patients within a facility or across facilities is a challenging task ([Over and Smith 1980](#_ENREF_5); [Zaslavsky 2001](#_ENREF_8)). A person-year of ART service delivery can justifiably cost more if the patient has a more complex situation or if the facility provides greater quality of care. Failure to consider these differences in comparing the unit cost of production can lead to the erroneous conclusion that a facility is less efficient, when in fact it is serving more complex patients or delivering higher quality of care. The rest of this section defines efficiency and describes methods for measuring it under the assumption that a unit of output is well-defined. Section 7.2 demonstrates an approach to explaining variations in efficiency under the assumption that the complexity of a facility’s case-load can be adequately captured by including complexity measures (e.g. the facility’s average for its patient’s initiating CD4-count and WHO clinical stage) among the control variables in a multiple regression. This approach could be extended using a broader array of complexity and quality measures and can be used to generate complexity and quality adjusted estimates of average cost. However those untrained in multivariate regression methods may have difficulty accepting this approach to adjusting an average cost estimate, and even those who understand the technique may question the assumptions on which it is based. Therefore, in Section 7.3 we present a more ambitious approach to incorporating complexity and quality into the cost analysis, an approach which allows us to directly adjust the average cost of service delivery before we analyze its variation. While this more ambitious approach also rests on strong assumptions, those assumptions are more transparent than those required for the multiple-regression approach to complexity and quality adjustment.

*Scale efficiency.* The shape of the function displays the common, but not universal, pattern of increasing returns to scale for the range of inputs up to the point O, as the number of units of output per unit of input increases throughout that range. The extent of such economies of scale in actual ART delivery is an important empirical question to be addressed by the proposed study.

***O***

*X1*

*Y1*

*X1*

*Y1*

*Y2*

A

B

C

D

***II***

*Input X*

*Input X*

*ART*

*ART*

***I***

E

Figure 7. Hypothetical production function for antiretroviral treatment services

*Technical efficiency.* From the production side, we define technical efficiency as the achievement of maximum possible output per unit of input, or conversely as the production of any given amount of output with the minimum possible input. We use panel II of Figure 7 to illustrate this concept. The production function depicted is the same theoretical function as the one showed in panel I, but in this case each dot in the figure represents a specific facility for which empirical data exists. Facilities A through D are operating with technical efficiency at different levels of output (or scale of production). Of these technically efficient units, Facility D achieves the maximum number of outputs per unit of input (as represented by the steepness of the angle of the ray from the origin to that point) and thus benefits the most from economies of scale. In contrast to all of these units on the technical frontier, Facility E is not technically efficient, because it is using more inputs (X1) than it should, given its level of output (Y1). The horizontal arrow represents the amount of resources wasted. Alternatively, the vertical distance from output Y1 to Y2 represents the amount of output that the facility should have been able to produce with input quantity Y1 and constitutes the output-oriented measure of this facilities inefficiency.

The concepts of scale and technical efficiency can also be defined from the cost perspective. The average cost of delivering quality-adjusted antiretroviral treatment services can be related to the scale of production and will typically display a U-shaped relationship, with the lowest point on the U-shaped curve representing the scale at which the technology permits the most efficient production. Figure 8 presents a prototype application of these ideas to data on the production of ART in Zambia by the CIDRZ facilities.[[7]](#footnote-7) The facilities on the U-shaped curve are those identified as technically efficient, though they vary in their scale efficiency. This analysis suggests that the efficient scale of production is about 800 patients, with the smallest facility, Sioma, receiving a scale efficiency score of only 0.563. The facilities indicated by red dots that lie above the piecewise linear average cost curve are technically inefficient, with the degree of inefficiency indicated by the deviation of their indicated efficiency scores from 1.0.[[8]](#footnote-8)

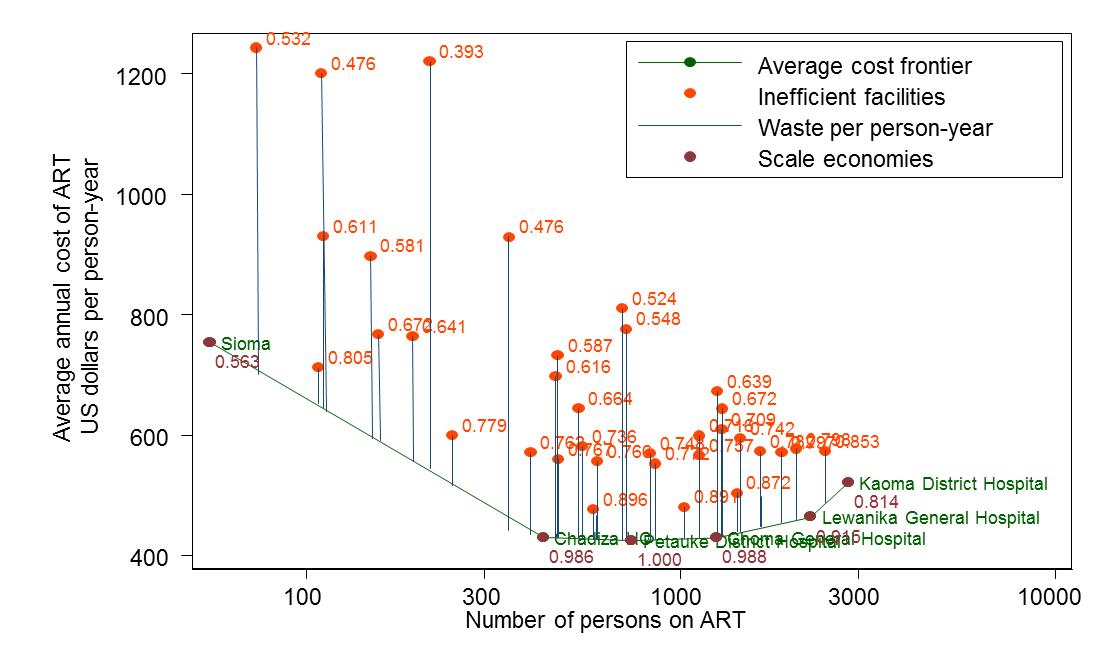


Figure 8. Illustration of technical and scale inefficiency from the cost perspective, applied to 45 ART facilities in Zambia

In the markets of goods and services produced by the private sector, competition among profit maximizing producers minimizes the existence of inefficiencies. Any firm producing at substantially higher costs than its competitors, such as facility E in Figure 7 or any of the firms indicated by a red dot in Figure 8, will eventually be driven from the market by its more efficient competitors.

However, public sector enterprises and all nonprofit firms (as well as some for-profit firms, such as monopolies) are much less subject to the discipline of the marketplace. First, maximizing profits is not the main goal of a non-profit or public sector firm. Their objectives might instead be to achieve good quality results for a small pool of clients, or to obtain great visibility in their communities, or to exhaust their annual budget regardless of the demand of services they face, etc. Public sector enterprises and non-profits can survive despite inefficiency, because their income or that of their employees does not typically depend on maximizing profits or on any measure of performance whatsoever. A third factor reducing the efficiency of nonprofit organizations, which is particularly important for ART provision, is that they might face severe demand-side constraints. In order to provide adequate ART services, a minimum level of investment is necessary and this level of investment might be high for certain geographical areas where the demand for this type of service will be very small. Finally, nonprofit firms sometimes pay prices for their inputs that are either higher than the market prices for these inputs (because the nonprofits have less incentive than would a for-profit firm to shop around or seek competing bids for the best price) or lower than market prices when supplies or labor services are donated. In the latter case, failure to appreciate that some input prices are artificially low could lead the analyst to underestimate the cost of program expansion, when inputs are less likely to be donated.

## 7.2 Measuring efficiency

As described above, efficiency can be estimated using a cost perspective or a production perspective. In both cases, we need to collect data on three dimensions of the production of HIV prevention services, at the facility level: outputs, all services produced at a given time; inputs, everything that the facility used to produce such services in the same period of time – this include purchased as well as donated inputs, at market prices and at actual prices; and finally organizational and environmental characteristics describing the process and environment in which decisions production decisions are made. Using this information we can then estimate cost functions or production functions using parametric or non-parametric techniques and obtain a measure of inefficiency for each facility.

There are different methodological alternatives to estimate inefficiency, however the intuition is basically the same for all of them. First, the average unit cost per output and the average productivity is estimated for each facility (in Figure 7, panel II and in Figure 8, these are represented by each dot). Second, an empirical efficiency frontier is estimated. This empirical estimate of the frontier describes the observed relation between inputs and outputs in the production example or between outputs and costs in the cost function example, i.e. the technology observed; but also represents the maximum productivity (or the minimum cost) achievable at any given level of output (in Figure 7, panel II, this frontier is represented by the gray line and in Figure 8 by the piece-wise linear average cost curve). Third, the distance between the observed level of productivity (or cost) and the production frontier is measured. This distance, whether is a production distance or a cost distance, is the empirical estimate of inefficiency (in Figure 7, panel II, these are represented by the vertical arrow and the horizontal arrow, respectively, for facility E and in Figure 8 by the vertical lines measuring the degree of cost inefficiency of each of the red dots).

## 7.3 Explaining (in)efficiency

One useful approach to explain heterogeneity in efficiency levels among a sample of firms, focuses on explaining the inefficiency levels observed in the sample, i.e. the distance between any given observation and the production frontier. Using regression techniques, the objective is to explain the variability in the distance with relevant facility-level characteristics. These characteristics describe decisions made at the facility (the organizational and managerial structure of the facilities are very relevant for this process), but also constraints faced by the facility (the environment, demand for services, and donor restrictions and requirements are the important structures to consider in this case). The following three categories of variables describe these characteristics in more detail, although they are not necessarily mutually exclusive.

*Outputs.* Examples of output related variables that can explain inefficiency in a given facility include: quality, which is typically resource-consuming; complexity, which is in many cases imposed from the demand side, for instance by the type and localization of clients; and scope of the production, that is whether the organization produces more than one type of service.

*Inputs.* Here, we are interested in which inputs are used and how. Usually, this category of variables have to do with decisions made at the facility, for example: how are the inputs shared in different processes of the production, which specific inputs are purchased and used for the production, and how are the labor inputs managed and which incentives for performance they face.

*Other environmental constraints.* In this category, we include two types: first, environmental determinants related to outputs and inputs, such as complexity of the service and funding source of the organization; and other environmental determinants such as location (urban/rural), competition, facility type (hospital clinic), HIV prevalence, ownership (public/private), supply of services (to what extent electricity and water work), and size of the demand. Second, policy lever determinants related to outputs or inputs, such as M&E intensity, procurement autonomy, manager’s training, user fees, etc; and other policy levers such as management (e.g. supervision, incentives), MIS quality and use, and accountability to local community, patients, board, government, donor, etc.

Some of these variables are intervention-specific or country/program-specific. We can use three types of criteria when deciding where to put our efforts and resources to collect them: first, based on previous analysis which of these variables seem to explain a larger proportion of the variability in inefficiency; second, which of these variables seem to offer a better alternative for manipulation to improve performance, i.e. to create regulations or incentives; and third, how easy and inexpensive is the variable to collect. Using these criteria we can chose the most promising set of determinants of inefficiency.

The literature offers the analyst several alternative methods for measuring and explaining inefficiency in a sample of production units. Given measures on each of a sample of N facilities of the multiple outputs of each facility, represented by the vector Y, the multiple inputs to each, represented by the vector X, the unit wages or prices of the inputs, represented by the vector W and a set of variables from the environment or from the available policy instruments that plausibly might influence efficiency, each of several analytical approaches is available.

Where input and output quantities are well defined and few in number, the most straightforward approach to efficiency analysis is to estimate a production function like those depicted in Figure 7. From the production function estimate one can then estimate the efficiency of each facility (for example by measuring a distance like that between Y1 and Y2 in Figure 7) and then in a separate step, attempt to explain the degree of inefficiency by regressing that measure on the vector of Z variables. Applications of efficiency analysis in the health sector rarely use this production function approach, however, because the multiplicity of inputs and outputs makes such analysis unwieldy. In the health sector it is more common to adopt the perspective of the cost function, which is the approach we adopt in this study protocol.

From the cost function perspective, the objective is to first define the total cost of production and then to attempt to explain it using the available data on outputs, Y, inputs, X, input prices, W, and other determinants of efficiency, Z. Defining the total cost of production requires a choice among various perspectives. The most relevant perspective for explaining efficiency variation is that of the individual who makes the key decisions about resource allocation on a day-to-day basis that determine the facility’s efficiency. This individual, typically the “facility manager”, faces constraints in managing daily productivity which are partly captured by the scarcity of the facilities various inputs. The total cost of production from his or her perspective consists of the weighted sum of all the input quantities where the weights are the prices that best reflect the scarcity to that manager of these resources. However, for the purpose of projecting the cost of scaling up production, the prices at which additional quantities of each input can be purchased are more relevant. We intend to do the analysis with both budget-relevant costs, which might be subsidized, and economic costs, which represent the market value or the scarcity value of the input. The former analysis is appropriate for explaining past resource allocation decisions by the facility manager. The latter is more appropriate for valuing the social cost of service delivery and for scaling up analyses.

Several alternative methods exist for the causal analysis of the effects of cost determinants on cost and efficiency across facilities. The most straightforward approach is to estimate a multiple regression of average cost with a selection of the most salient determinants variables as independent or “right-hand-side” variables in the regression. This is the approach we followed in Tables 5 and 6 in section 4. Two other approaches that are prominent in the literature can usefully complement this simple approach. Both of these other two approaches distinguish between variables that directly affect the placement of the technology frontier that determines ideal efficiency and a second set of variables (sometimes called “Z variables”) that explain deviations of individual facilities from that frontier. The two approaches are called “stochastic frontier analysis” and “data envelopment analysis”. We intend to apply the these techniques, as well as the straightforward regression analysis approach, in order to compare the approaches to one another and to coax from the data the most useful lessons regarding the determinants of efficiency in any given facility.

As an example of the straightforward regression analysis approach, consider the data on ART production that are presented in Figure 8 and also used for the power analysis in section 4 of this document. The regression analyses of the variation in average cost presented in Tables 5 and 6 above reveal several statistically significant determinants of average cost in this Zambian data. Because the independent variables in these regressions are dichotomous (or “dummy”) variables, and the dependent variable in the Table 6 regressions is average cost, the coefficients represent the estimated marginal impact of each of these indicator variables on average costs. Figure 9 presents the magnitudes of the coefficients for two of the Table 6 regressions, those explaining average total cost and average on-site cost, where the distinction between these two cost definitions is given in Table 6 in Section 4 above. Although the Tables 6 cost functions are linear, they are able to capture varying economies of scale by including two dummy variables on scale: one

The Zambian data includes variables that capture the important classes of determinants of efficient production. The variable “monthsonart” measures the duration of ART experience at the site. Figure 9 illustrates that less than 24 months experience is estimated to increase average total cost by $123 per patient year, of which $74 is on-site cost and the balance off-site cost. The variables “onart<300” and “onart<800” capture the sizable inefficiencies from insufficient scale, with facilities serving fewer than 800 patients having $70 more average total costs while those with fewer than 300 patients having costs that are another $173 greater per patient-year. Thus, according to this estimate, facilities serving fewer than 300 patients are fully $243 more expensive than those serving more than 800.

In addition to experience and scale, the Zambian data includes indicators of the quality of care (higher patients adherence), the complexity of incoming patients (the average CD4 count at baseline and the proportion of patients at WHO Stage 4). Economies of scope are indicated (imperfectly) by the distinction between clinics and hospitals, with the latter apparently benefiting in the form of substantially lower average on-site and total average costs. Among the important categories of determinants of average cost, that which is least well represented in the Zambian data is “governance”. While theoretically extremely important, especially in non-profit facilities which are protected from market competition, the only indicator available in the Zambian data is the facility’s designation as public or private sector. Interestingly, according to the estimates in Table 6, and their representation in Figure 9, public sector facilities incur average on-site costs approximately $62 greater per patient-year of ART, but these extra costs are offset by lower off-site costs so that the total average cost of public sector facilities in the Zambian data is not significantly different than that of private sector facilities.

Figure 9. Point estimates of estimated marginal impact of facility characteristics on total and on-site average cost per patient-year (Source: Regression coefficients from Table 6.)

Table 6 and Figure 9 illustrates the kind of findings that we hope to extract from the causal analysis of the broader sample of facilities to be collected in the proposed five-country research. An important purpose will be to explore the potential variation in average costs that might be achieved by allocating ART scale-up resources so as to achieve maximum efficiency.

Figure 10, which is also based on the estimates of Table 6 and the coefficient estimates displayed in Figure 9, illustrates how large the estimated variability in average cost might be. Starting on the left of the figure, the reference facility is a CIDRZ facility which is an urban, public sector clinic which achieves greater than 91% adherence among its fewer than 300 clients. The Table 6 estimates predict that such a clinic would have an average total cost of $1,013 per patient year and an average on-site cost of $576 per patient-year. If that facility were instead a hospital, benefiting from the economies of scope a hospital affords, those two costs would be $891 and $471 respectively. If that public sector urban hospital with high adherence were to have more than 300 patients, its costs would be lower again, down to $768 and $397 respectively. According to these estimates the lowest costs can be achieved with large scale facilities which recruit patients before their CD4 counts fall below 145. On-site costs appear to be lower in rural or private facilities, but these savings seem to be offset by higher offsite costs.

Figure 10. Predicted average cost per patient-year of ART for facilities with different composite characteristics

Figure 10 offers an opportunity to demonstrate how the regression approach adjusts average cost estimates for complexity and quality. Because the impacts of the complexity and quality variables have been controlled through their inclusion in the regression (via the variables CD4 count and adherence), the average cost of a hospital of $891 dollars per patient year is an estimate of the average cost of a patient with specific values of those variables. In this case, as explained in Figure 10’s caption and in the text, the $891 estimate is specific to a hospital with high adherence (i.e. high “quality”) and with high complexity (i.e. CD4 at initiation less than 145).[[9]](#footnote-9) This application also demonstrates the weaknesses of the regression approach to adjusting average cost for complexity and quality. First, while the approach can only adjust for the proxies of complexity and quality that have been included among the right-hand-side variables in the regression, that limitation of the method might not be obvious to the casual viewer of Figure 10, especially if the vertical axis were misleadingly labeled “Average quality- and complexity/adjusted average cost per patient-year”. Second, even if the right-hand-side variables include complete and accurate indices of complexity and quality, this approach requires those variables to be statistically “exogenous.” A formal term from mathematical econometrics, the word “exogenous” means that the level of a right-hand-side variable is imposed on the facility from outside, with complete disregard for the characteristics of the facility or the wishes of its managers. For example, if the data were generated from a randomized controlled trial in which the researchers randomly assign patients of a given complexity and service quality targets to facilities, the assumption of exogeneity might hold. However, in observational data on facilities, such as this protocol proposes to collect, this exogeneity assumption is unlikely to apply. For these reasons, in section 7.3 below we propose an additional approach to measuring the quality and complexity of ART services, one that will place these measures on the left-hand-side of explanatory regressions, where the exogeneity assumption is not required.

The analysis in Table 6 and Figures 9 and 10 is illustrative and subject to a variety of assumptions which are forced upon us by the small sample size, the lack of representativeness of the CIDRZ sample even for Zambian ART delivery, the small number of variables to characterize the quality of ART service delivery and the origin of the data within a single country. For example, the small sample size makes it difficult to explore the possibility of interactions among the measured variables, the inclusion of which might alter the estimates presented in Figures 9 and 10. We look forward to working with the full sample of data from 150 facilities as described in this protocol so that we can explore these and other hypotheses more fully and with more flexible specifications.

## 7.4 Measuring and adjusting for quality of care

The objective of this study is to describe variation in cost per quality-adjusted person-year of ART and to explain that variation. For example, we might hope to find that, after controlling statistically for all of the other variables we measure, facilities which supervise and reward their health providers for the quality or quantity of their work produce more quality-adjusted patient months of ART for the same expenditure. Such findings from observational data can then generate empirically-based hypotheses regarding the best policies to improve the efficiency of ART service delivery, hypotheses which can then be tested with rigorous field experiments.

As described earlier in Section 5.8 and in this section, health services researchers have struggled for decades with the challenge of measuring the complexity and the quality of patient care. A general rule, which may be violated in particular cases, is that health care providers who are better trained and more highly remunerated, and who are supported with the newest an best maintained buildings and medical equipment and who are accountable to outside, independent critics for the quality of their care, deliver higher quality care than providers who lack these advantages. Furthermore, typically referring physicians and even patients themselves come to know that such providers are more likely to succeed in complex cases and thus channel more complex cases to these facilities. The result is likely to be a positive correlation between patient cost and both the quality and complexity of the delivered services. However, this correlation between cost and these two service characteristics that could justifiably explain it is not perfect. Sometimes, due to the reasons exposited in Sections 7.1, costs are too high to be justified, even after accounting for higher complexity and quality. The challenge to government regulators and third party payers, and thus to governments and donor agencies which play these roles, is to measure efficiency of a facility after adjusting for complexity and quality, and then to seek ways to improve it by better understanding the causes of variation of quality and complexity adjusted costs.

The more comprehensive and granular is the data about a facility’s incoming patient population and the nature of its health care services, the easier is the analyst’s task of measuring the complexity and quality of the facility’s services. So one approach to this study would have been to select study facilities with high quality data. However, this study intends to measure the average cost of antiretroviral therapy in field conditions, as it is actually happening. To this end, the sample of facilities is a stratified *random* sample, not a convenience or a purposive one. Therefore the study design must make allowances for situations in which complete data will not be available and the most advanced and informative measure of quality will be impossible to collect[[10]](#footnote-10). This note proposes an approach to measuring aspects of the quality of ART that will be sufficiently robust to work in these low resource settings, where data quality is frequently problematic.

The eventual contribution to ART policy of the proposed empirical analysis of the determinants of quality-adjusted efficient ART service delivery depends on the design of a data collection strategy which supports the estimation of the quality of an individual facility’s service delivery, not with perfect accuracy which would require infinite time and resources, but with “sufficient accuracy” that measurement error in this quality dimension does not obscure or distort the associations between policy instruments and quality-adjusted efficiency actually present in the study population of facilities. *This memo makes the case that ART service quality can be measured with “sufficient accuracy” for this purpose by narrowing the measurement focus to two mutually exclusive classes of adult patients (A) those who have initiated treatment no earlier than 12 months before the beginning of the period in which facility inputs and costs are observed and (B) those who are continuing patients at this facility for at least six months.*

This focus excludes pediatric patients and adult patients who transfer in to the treatment facility. We distinguish patients initiating treatment no earlier than 12 months before the costing yearnewly initiating adult patients on three grounds. First, we know from the literature that the most dramatic and easily observable health benefits of ART occur during the first three to nine months of treatment, so focusing on patients who have recently initiated treatment should increase the sensitivity of a quality measure. Second, our objective of explaining quality-adjusted cost variation by variables we observe during a “costing-year” requires us to focus on quality information measured close in time to the period for which we measure these explanatory variables. Since focusing only on patients who initiate during the costing year would in some cases produce too few patients, we reach back 12 months from the beginning of the costing year, but no further. Third, in view of our objective of collecting data from a large number of facilities and the scarcity of electronic data systems in this population of facilities, the search for patient-level data earlier than 12 months prior to the start of our costing year would impose insurmountable cost and implementation obstacles or would necessitate restricting our sample to the unrepresentative facilities with good data.

While the goal is to measure the quantity and quality of service delivery that characterize a health care facility, facility level quantity and quality are by definition some kind of average of the quality of its performance over all of its patients multiplied by the number of patients it serves.[[11]](#footnote-11) For the individual patient suffering from a life-threatening disease like AIDS, the quality of service delivery is defined as the increase in the patient’s chance of survival, which can be attributed to the patient’s consumption of ART at this facility.

Survival of AIDS patients depends partly on the assiduity with which they adhere to the scheduled routine of treatment, which we assume to partly depend on the quality of the facility’s ART service delivery. Therefore, both the punctuality of patients’ visits to the facility and the match between prescribed and reported drug consumption are plausible intermediate indicators of ART quality. While we intend to collect these intermediate indicators and use them in the analysis, we set them aside here and focus instead on direct measures of patient survival and patient health improvement, on the obstacles to their observation in the data and on the strategy we propose to overcome those obstacles.

### 7.4.1 Types of treatment failure

Failure to improve. Following a body of work by Sydney Rosen and her associates at Boston University ([Rosen, Fox et al. 2007](#_ENREF_7)), a possible measure of successful treatment is the magnitude of the increase in a patient’s CD4 count from a time close to treatment initiation to some later time. A patient who improves by at least a threshold amount, H, is considered a success, whereas failure to achieve this large an improvement is considered a failure. Since improvement is the goal of national ART programs, we focus on failure to improve as the failure event of primary interest.

However, the patient runs several other risks during the two-years of treatment, which compete with and are probably correlated with the failure to improve. They are the risk that the patient will (a) fail to survive, (b) disappear from the facility’s treatment rolls, or (c) fail to get a CD4 test at the appropriate interval, or (d) transfer away from the facility. Since the patient and facility characteristics that determine the first three of these other risks are likely to contribute to the risk that a patient will fail to improve, we choose to treat these first three other risks as “competing risks.” We treat a formally announced or planned transfer to another treatment facility as a censored event, which is independent of these four risks of failure.

Mortality. The most irreversible adverse outcome for the patient is death. Since mortality rates of AIDS patients can be as high as 20% during the first 24 months of treatment, we expect to observe a substantial amount of mortality in the patient data. However, facilities that keep their patients alive during our 6-month to two year window without improving their CD4 counts, are likely to lose those patients soon thereafter. Therefore, in order to distinguish treatment quality among facilities with similar mortality rates we will measure two other types of treatment “failure”.

Loss-to-follow-up. It is common practice in epidemiological studies to treat loss-to-follow-up as a form of data censoring, which is independent of the outcome of interest. Using this traditional approach, the practice is to gauge success by measuring survival as the ratio of those observed to survive to the total number not lost to follow-up. Failure of an ART patient to come back to the treatment facility might mean only that the patient has switched treatment locations without formally transferring out, but could also be an extreme form of poor adherence. Since these two possibilities cannot be distinguished, and the latter possibility implies that a facility that keeps more patients is likely to improve patient survival more than one that loses patients, loss-to-follow-up cannot be considered a simple censoring of the patient-survival data. Instead, following recent literature, loss-to-follow-up must be considered a “competing risk,” in the sense that its occurrence prevents the observation of the outcomes of primary interest and may be correlated with them. So we will consider loss-to-follow-up to be a type of treatment failure.

Following Rosen et al ([Rosen, Fox et al. 2007](#_ENREF_7)), we group mortality and loss-to-follow-up together into a category called “failure to retain”.

Failure to receive a progress measure. The most widely used measure of a patient’s progress is his or her CD4 test improvement over a specified interval. Based on the literature and on the analysis of pilot data, we note that facilities do not test and record CD4 counts for all patients at precisely specified intervals. The question thus arises whether the CD4 success of a patient known to be in treatment whose CD4 test is absent from the patient record should be considered (a) “censored” or (b) unobserved due to the intervention of a “competing risk”. Anecdotal evidence suggests that either the health care provider or the patient is more likely to seek a CD4 test when the patient is having manifest health problems. If this is true, it argues that among otherwise compliant patients, failure to receive a CD4 test should be considered a competing risk. Rather than refraining altogether from measuring the progress of a patient who is missing either the initial or the 6-month or 12 month CD4 test, we will instead attempt to collect the patient’s measured weight at the same intervals. A patient whose chart contains insufficient information to track either the improvement in the CD4 count or the weigh gain has failed to receive a progress measure, which is one type of failure we record.

The distinction between the “retention rate” and the “improvement rate” is important because it provides an indicator of a common explanation for some facilities having markedly higher measured success rates than others: selection bias due to the facility’s failure to retain its sickest patients long enough to measure whether or not they improve. This selection bias can be inadvertent or, in some cases, a perverse result of the facility’s being rewarded primarily on its success with retained patients. In the US health care system, this latter practice is referred to as cream-skimming. While it improves the performance statistics of the individual facility, it generates a negative spillover effect on society as a whole and on the facilities where the shed patients next seek treatment.

In summary, in order to obtain an unbiased estimate of the degree of patient success at a given facility, each individual patient must be considered to be subject to three possible failures, namely (1) failure to remain in treatment (which includes both mortality and loss-to-follow-up), (2) failure to receive a progress measure, and (3) failure to improve.[[12]](#footnote-12) Either of the first two failures can prevent our observing improvement, and thus prevent us from observing the event “failure to improve”. Thus, in analyzing variation over facilities in failure to improve, we will treat either of these preceding failures as a competing risk.

### 7.4.2 Using rates within grouped data as indicators of quality

One application of these definitions is to assemble patients into a defined group of similar patients and then from the patient charts for this group calculate certain ratios or “rates” which can be thought of as indicators of the quality of ART service delivery for that group and, by extension, for the facility as a whole. These rates can then be used to quality-adjust the number of observed patient-months and subsequently the cost per quality-adjusted patient month of newly initiated treatment. In order to operationalize these definitions for an individual facility, we will need to collect data on (a) the total number of patient-months of ART delivered during the costing year; (b) the breakdown of these person-months of ART into two groups, the patient-months of care delivered to patients who were “continuing” at the beginning of the year and the patient-months of care delivered to patients who are newly initiated during the costing year; and (c) the total cost during the costing year that is attributable to newly initiated patients[[13]](#footnote-13). Then we will need the following proportions or “rates” derived from the above definitions.

(1)

(2)

(3)

The above three rates defined by equations (1), (2) and (3) are all defined such that their numerators are less than their denominators. So all are bounded by the unit interval. As written above, the three rates apply to patient’s retention and improvement in their first six months. However, by confining both numerator and denominator counts to the subset of patient records observed over 12 months, we can define 12 month versions of all three rates. The product of the three rates yields, ***Iqw/Nqw***, the proportion of newly initiated patients whose charts record an improvement in either their CD4 count or their body weight as defined in equation (4). Since both patient retention and timely measurement of progress indicators are partially the responsibility of the facility, both can be used as indicators of quality. So by measuring the four quantities ***Nqw, Rqw, Mqw*** and ***Iqw***, we can choose to use the comprehensive measure of quality, ***Iqw/Nqw***, or to instead decompose it into its three parts using the identity:

(4)

For some purposes we might even disregard the measurement and retention rates, focusing exclusively on the improvement rate.

Suppose that we have a count of newly initiated adult patient months during the costing year, Ncy. Suppose that a portion of total facility costs can be attributed to newly initiated patient-months CNcy. Then we can distinguish the following measures of average cost:[[14]](#footnote-14)

Crude average cost per newly initiated patient month = CNcy/Ncy (5)

Average cost per retained newly initiated patient = (6)

Average cost per measured newly initiated patient = (7)

Average cost per improved newly initiated patient = (8)

These cost definitions can be used for descriptive work to break down cost within a single facility or within several facilities that can be compared. If available on all or most of the approximately 150 facilities in the overall sample, we can take advantage of the above definitions to note that the logarithm of the cost per improved newly initiated patient can be decomposed into an additive identity as in equation (9):

(9)

If we use small letters to denote these log-ratios, we can write this identity as in equation (10):

(10)

where the subscript i enumerates the F facilities, with i = 1,…,F. On each of these F facilities, we are collecting data on a variety of potential determinants of both cost and quality. Suppose the vector of variables for facility i is Xi (where the first element of the vector is constant and equal to one). Then we can write a set of five “seemingly unrelated” regressions like this:

(11)

The vector Xi can be identical across all five equations, or we could constrain some of its elements to have zero coefficients in some of the equations. The left-hand-side variables for the last three of these equations are the three rates, ***imi, mri*** and ***rni,***  that we have estimated from a random sample of patient records in each of the facilities. Like all statistics computed from a sample, these rates are estimates of the true rates, varying from the true rates by a sampling error. The magnitude of the sampling error is inversely proportional to the square root of sample size. Our judgment has been that a sample size of 50 adult newly initiated patients per facility will suffice, but like all statistical power estimates, this one is hypothetical, based on assumptions about the true values they are estimating. Our concern that these samples might be too small is somewhat mitigated, however, by a felicitous feature of the structural specification given in equation (11): the rates subject to sampling error appear on the left-hand-side. This means that, while the sampling error in these rates may reduce the precision with which the β coefficients are estimated, it will not, by itself, bias the estimates of these coefficients as sampling error on a right-hand-side variable would do ([Greene 2008](#_ENREF_3)) pp. 325-327).

Because of the above identity (10), which guarantees that the sum of the left-hand-sides of the second through fifth equation in (11) add to the left-hand-side variable in the first equation of (11), the full set of five equations cannot be jointly estimated[[15]](#footnote-15). The standard approach to estimating a system such as equations (11) is to group together any four of them for estimation by Zellner’s seemingly-unrelated estimation approach ([Greene 2008](#_ENREF_3))( pp. 254-267) and then derive the coefficients of the fifth equation using the result that the sum of the β coefficients must add across the equations, according to the following identity:

(12)

The advantage of specifying these five equations is twofold. First, from an analytical perspective the possibility that individual variables within the Xi vector have differential effects on the components of quality-adjusted cost provides an opportunity for improved understanding of the various effects likely to follow the manipulation of these variables. While the coefficients of the first above equation will reveal the net effects of each of the variables in the X vector on the average cost per improved initiated patient, the coefficients in the other equations will decompose that effect into its constituent parts. For example, we may find that some kinds of provider incentives reduce the cost per newly initiated patient, , but simultaneously reduce the retention rate, . If facilities are “cream skimming”, these two effects could offset each other, producing no net improvement in cost per improved initiated.

The second advantage of this statistical approach is statistical. Joint estimation of equations (11) improves the statistical power to detect the effects of the right-hand-side variables on cost per improved newly initiated patient and on its components ([Greene 2008](#_ENREF_3)).

### 7.4.3 Using the individual data of which the above rates are composed

The advantage of using individual data is that we need not resort to the simplified grouping of patients such as the discrete distinction between those who have been retained at least 12 months and the larger group of those who have been retained six months or longer. Instead we can exploit the fact that for each newly initiated patient who meets our denominator criteria, we will observe the start and end of a “spell” of treatment, which has the length determined by the actual dates of first initiation and last visit or progress measurement. The types of spells we will observe are depicted in the following figure.

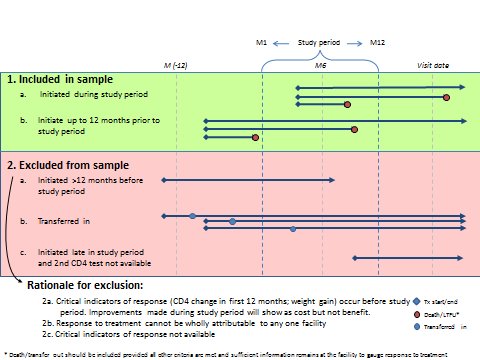


Figure 1. Description of patient spells to be sampled as distinct from those to be excluded from the sample

Data describing the spells can be organized in various ways. One way to organize the data is presented in Table 1. In this hypothetical example, each patient is represented by multiple records, one record for each event that is recorded from the chart. Using data structured like this it is possible to apply the methods of survival analysis to analyze the time until “failure” for each of the possible “failure types” discussed at the beginning of this note: (a) failure to retain, (b) failure to receive a progress measure; and (c) failure to improve.

Using simple Kaplan-Meier analysis it will be possible to present descriptive survival functions for each of these failures. To illustrate the sort of figure that might be produced, Figure 2 presents Kaplan-Meier survival estimates of hypothetical data on a sample of patients observed over 24 months. In this hypothetical example about 70% of the patients are retained in treatment for 12 months, but only 65 % have measured progress indicators at that point and only about 60% show improvement. A figure such as this is assembled by piecing together the information from all of the records across all the facilities.

Table 10. Data structure for part of the data from three hypothetical adult patient charts.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Record number | Patient ID | Date of initiation | Patient age | Patient gender | Percentage missed appointments | Event type | Date of event | Days since initiation |
| 1 | 1 | 3-Mar-09 | 43 | F | 1 | CD4 test | 5-Mar-09 | 2 |
| 2 | 1 | 3-Mar-09 | 43 | F | 1 | Body weight | 7-Mar-09 | 4 |
| 3 | 1 | 3-Mar-09 | 43 | F | 1 | CD4 test | 9-Sep-09 | 190 |
| 4 | 1 | 3-Mar-09 | 43 | F | 1 | Body weight | 26-Feb-10 | 360 |
| 5 | 1 | 3-Mar-09 | 43 | F | 1 | Transfer out | 3-Mar-10 | 365 |
| Retained and Measured. Patient ID 1 fits the criteria to be a newly initiated adult who is retained at least 6 months and is measured. By comparing her CD4 improvement to any selected threshold, we can determine whether this patient “improved” at each date on which CD4 was measured. Since the second CD4 test is greater than 6 months after the first one, but there is no subsequent CD4 test, we can measure 6-month, but not 12-month CD4 improvement. The interval between the two body weights falls just short of 12 months, so it could be used to approximate a 12-month improvement in that metric on this patient. | | | | | | | | |
| 6 | 2 | 25-Apr-09 | 27 | M | 15 | CD4 test | 26-Apr-09 | 1 |
| 7 | 2 | 25-Apr-09 | 27 | M | 15 | Death | 11-May-09 | 16 |
| Not retained. Patient ID 2 fits the criteria for chart extraction as a newly initiated adult who does not transfer out before six months. Since the patient is not retained for 6 month, this patient is recorded as a “failure to retain”. The information on this patient’s initiating CD4 test will be useful for the analysis of the individual data (because the CD4 count at initiation may predict early death),, but plays no role in the cascade identified by equations (1), (2) and (3). | | | | | | | | |
| 8 | 3 | 5-Nov-09 | 32 | F | 9 | Body weight | 6-Nov-09 | 1 |
| 9 | 3 | 5-Nov-09 | 32 | F | 9 | CD4 test | 8-Nov-09 | 3 |
| 10 | 3 | 5-Nov-09 | 32 | F | 9 | CD4 test | 15-Jan-10 | 71 |
| 11 | 3 | 5-Nov-09 | 32 | F | 9 | LTFU | 24-May-10 | 200 |
| Retained but not measured. Patient ID 3 fits the criteria to be a newly initiated adult who does not transfer out before six months. Like patient ID 2, this patient fits the criteria for chart extraction. The patient is successfully retained for 6 months and so makes it into the denominator for the measurement rate. However, because the CD4 test is not close enough to the 180 days duration since ART initiation, the patient is recorded as failure to measure. The two CD4 tests cannot be used for the grouped analysis of the measurement rate at the 6-month cut-off, but can still play a role in the individual analysis leading to Kaplan-Meier curves for measurement failure. | | | | | | | | |

Note: Actual data would have columns giving the result of CD4 and body weight measurements as well as facility characteristics and other patient characteristics.

By using Cox proportional hazard regression techniques, it will also be possible to search for statistically significant survival patterns across the sample of facilities. Where such patterns are found, we can construct smoothed estimated survival curves for retention, measurement and survival for distinct facility characteristics. Their interpretation would be similar to the interpretation of Figure 2, with the addition that some combinations of facility characteristics will appear to be more favorable to these three types of “survival” than others.



Figure 2. Hypothetical Kaplan-Meier survival curves for retention, measurement and improvement

An alternative and more sophisticated approach to the analysis of this individual level data is to treat “failure to retain” and “failure to measure” as competing risks, which potentially prevent the observation of the progress indicators. Using this approach, we would instead estimate a competing risk regression on the data, specifying that “failure to retain” and “failure to measure” compete with the risk of not improving. This analysis, founded on arguably more plausible assumptions, will yield cumulative incidence functions rather than survival curves ([Putter, Fiocco et al. 2007](#_ENREF_6); [Ingle, May et al. 2010](#_ENREF_4); [Allignol, Schumacher et al. 2011](#_ENREF_1)).

### 7.4.4 Structuring chart review in order to measure retention, measurement and improvement rates

In the above exposition we have assumed that it is possible to collect a random sample of the charts of a specific subset of ART patients at a health facility. Crucial to the above proposed analysis is the assumption that the sample of patients will be drawn *randomly* from a well-defined population. For example, in order to measure a 6-month or 12-month “retention rate,” the first of our cascade of three survival rates, we must be able to sample from the population of “adult patients known to have initiated ART during the 18 month quality window who did not transfer out to another facility for at least 6 months”. This is the denominator of the fraction we designate above as the “Retention Rate”. In order to collect this required data on the patient’s history, a systematic approach is to employ the set of questions presented in Annex 1 to this note. Annex 1 makes specific reference to the suggested questions in order to define each of the three survival rates given as equation (1), (2) and (3).

A second annex to the note takes as a starting point the facility questionnaire currently being fielded by the Clinton Health Access Initiative within which data has already been collected for approximately 20 facilities. This second annex proposes the minimal changes to the existing questionnaire which will enable it to collect the data necessary to measure the three failure rates defined in this memo.

### 7.4.5 Conclusion regarding adjustment for quality and complexity

This note has presented an analytical framework and empirical strategy for adjusting output and average cost for three simple indices of quality which might be sufficiently robust to be operational in all the facilities selected by a stratified random sampling method applied to the antiretroviral treatment facilities in five African countries. Our proposal is to focus on measuring quality-adjusted output and cost for the newly initiated adults in the facility, while setting aside the question of service quality for other patient groups.

Should additional resources become available, it would be useful to expand patient chart reviews at each facility to include continuing adult patients and pediatric patients. The logic in this note should apply without change to the computation of both retention and measurement rates among continuing adult patients. However, in place of the “failure to improve” which is the last of the three risks we have defined for the newly initiated patients, we would substitute “failure to maintain” a presumably already improved CD4 count. For pediatric patients, we would again define retention and measurement rates. Since some pediatric patients start treatment with high CD4 counts, that the facility should attempt to maintain, and others with low CD4 counts, which the facility would attempt to improve, we refrain from declaring in advance how we will define this third “failure” event. We will allow the data to guide us in this respect.

In proposing this simple cascade of three quality adjustments to average costs, our intention is not to preclude the use of other quality indicators. Indeed our questionnaire collects a variety of indicators of the quality of facility inputs suggested by the literature ([Zaslavsky 2001](#_ENREF_8)). However, our study’s objective of exploring the variation in cost per quality-adjusted output across a representative sample of African ART service facilities precludes our use of the most sophisticated and precise measures of quality, which would require much more intensive data collection in a much smaller sample of facilities. We anticipate that the measures we propose will provide useful information in this sample and contribute to understanding the variation of the quality-adjusted cost of antiretroviral service delivery in low resource settings.

# Annex 1: Country-specific Site Selection

This section provides stratification criteria, representation per stratum, and a general approach for each site selection in each country. Each country will cost 30 health facilities. For those where the selection is complete, the facility list is available below.

## Ethiopia

Site selection for Ethiopia has not yet been finalized. The following site-selection information is not yet finalized but is currently the preferred approach. The study team is trying to acquire additional information to inform the site selection process.

**Inclusion/Exclusion:** All health facilities offering ART services in Ethiopia were included.

**Stratification Criteria:** The first stratification criterion used was the geographic location including all 9 regions and 2 city administrations of Ethiopia. The second criterion used was facility type according to FHAPCO guidelines. It was decided not to stratify two facility types – Private Hospitals and Uniformed Force Hopsitals – by geography. The reasoning behind this was that these types of facility are either usually based in Addis Ababa (in the case of Private Hospitals) or have clients who are not necessarily from the area where the facility is based (in the case of Uniformed Force Hospitals). Therefore, for these two facility types, sites were chosen from one stratum each which contained all the sites of that facility type, nationally.

**Representation Per Stratum:** Average of number of sites based on distribution of facilities and number of patients per stratum.

* The average was rounded to zero decimals to determine the final number of sites per stratum
* Any stratum with 0-1% representation was always rounded up to 1 so no stratum ever had a probability of zero sites to be selected unless it’s representation was actually 0.  Actual probably per stratum can be calculated based on the table titled “Number of Facilities Per Stratum Based Average of Representation Methods”.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Percentage of Sites Per Stratum** | | | | |  |  |  |  |  |  |  |
| **Count of Facility Name** | **Clustered Region** |  |  |  |  |  |  |  |  |  |  |  |
| **Facility Type** | **Addis Ababa** | **Oromia** | **SNNPR** | **Tigray** | **Benishangul** | **Afar** | **Somali** | **Amhara** | **Harar** | **Gambella** | **Dire Dawa** | **Grand Total** |
| Health Centre | 6.57% | 20.20% | 8.59% | 8.84% | 0.76% | 1.01% | 0.76% | 19.44% | 0.00% | 1.01% | 0.76% | 67.93% |
| Hospital | 2.27% | 7.58% | 4.04% | 3.28% | 0.51% | 0.25% | 0.76% | 4.29% | 0.76% | 0.25% | 0.25% | 24.24% |
| Private Hospital | 3.54% | 0.25% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.25% | 4.04% |
| Uniformed Forces Hospital | 1.01% | 0.51% | 0.51% | 0.76% | 0.00% | 0.00% | 0.00% | 0.51% | 0.51% | 0.00% | 0.00% | 3.79% |
| **Grand Total** | **13.38%** | **28.54%** | **13.13%** | **12.88%** | **1.26%** | **1.26%** | **1.52%** | **24.24%** | **1.26%** | **1.26%** | **1.26%** | **100.00%** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Number of Facilities Per Stratum Based on Percentage of Sites Per Stratum** | | | | | | |  |  |
| **Facility Type** | **Addis Ababa** | **Oromia** | **SNNPR** | **Tigray** | **Benishangul** | **Afar** | **Somali** | **Amhara** | **Harar** | **Gambella** | **Dire Dawa** | **Grand Total** |
| **Health Centre** | 2 | 6 | 3 | 3 | 1 | 1 | 1 | 6 | 0 | 1 | 1 | 25 |
| **Hospital** | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 12 |
| **Private Hospital** |  |  |  |  |  | 1 |  |  |  |  |  |  |
| **Uniformed Forces Hospital** |  |  |  |  |  | 1 |  |  |  |  |  |  |
| **Grand Total** | **3** | **8** | **4** | **4** | **2** | **4** | **2** | **7** | **1** | **2** | **2** | **37** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Percentage of Patient Load Per Stratum** | | | | |  |  |  |  |  |  |
| **Sum of Currently on ART** | **Clustered Region** |  |  |  |  |  |  |  |  |  |  |  |
| **Facility Type** | **Addis Ababa** | **Oromia** | **SNNPR** | **Tigray** | **Benishangul** | **Afar** | **Somali** | **Amhara** | **Harar** | **Gambella** | **Dire Dawa** | **Grand Total** |
| Health Centre | 9.29% | 8.72% | 2.10% | 3.16% | 0.15% | 0.45% | 0.19% | 13.22% | 0.00% | 0.40% | 0.32% | 37.99% |
| Hospital | 12.42% | 14.06% | 5.54% | 6.11% | 0.58% | 0.58% | 0.28% | 14.09% | 0.99% | 0.27% | 0.82% | 55.75% |
| Private Hospital | 3.25% | 0.06% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.10% | 3.42% |
| Uniformed Forces Hospital | 1.59% | 0.27% | 0.09% | 0.36% | 0.00% | 0.00% | 0.00% | 0.31% | 0.22% | 0.00% | 0.00% | 2.85% |
| **Grand Total** | **26.55%** | **23.11%** | **7.72%** | **9.63%** | **0.74%** | **1.03%** | **0.47%** | **27.62%** | **1.21%** | **0.67%** | **1.24%** | **100.00%** |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Number of Facilities Per Stratum Based on Percentage of Patient Load Per Stratum** | | | | | | | |
| **Facility Type** | **Addis Ababa** | **Oromia** | **SNNPR** | **Tigray** | **Benishangul** | **Afar** | **Somali** | **Amhara** | **Harar** | **Gambella** | **Dire Dawa** | **Grand Total** |
| **Health Centre** | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 4 | 0 | 1 | 1 | 17 |
| **Hospital** | 4 | 4 | 2 | 2 | 1 | 1 | 1 | 4 | 1 | 1 | 1 | 22 |
| **Private Hospital** |  |  |  |  |  | 1 |  |  |  |  |  |  |
| **Uniformed Forces Hospital** |  |  |  |  |  | 1 |  |  |  |  |  |  |
| **Grand Total** | **7** | **7** | **3** | **3** | **2** | **4** | **2** | **8** | **1** | **2** | **2** | **39** |

**Clustering:** No clustering was used as data to inform this approach was not available.

**Selected Sites:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Facility Name** | **Facility Type** | **Region** | **Selected Replacement** | **Reason for Replacement** |
| T/Haimanot HC | Health Centre | Addis Ababa |  |  |
| Yeka HC | Health Centre | Addis Ababa |  |  |
| Blacklion HP | Hospital | Addis Ababa |  |  |
| St Paul HP | Hospital | Addis Ababa |  |  |
| MCM HP | Private Hospital | Addis Ababa |  |  |
| Addis G.HP | Private Hospital | Addis Ababa |  |  |
| Gawanie HC | Health Centre | Afar |  |  |
| Dupti HP | Hospital | Afar |  |  |
| Dabat HC | Health Centre | Amhara |  |  |
| Kemisie HC | Health Centre | Amhara |  |  |
| Tillili HC | Health Centre | Amhara |  |  |
| Shoarobit HC | Health Centre | Amhara |  |  |
| Aykel HC | Health Centre | Amhara |  |  |
| Metema HP | Hospital | Amhara |  |  |
| Felege Hiwot HP | Hospital | Amhara |  |  |
| Assosa HC | Health Centre | Benishangul |  |  |
| Assosa HP | Hospital | Benishangul |  |  |
| Sabian | Health Centre | Dire Dawa |  |  |
| Dilechora HP | Hospital | Dire Dawa |  |  |
| Dimma HC\* | Health Centre | Gambella |  |  |
| Gambella HP | Hospital | Gambella |  |  |
| TB Sanitarium Harer HP | Hospital | Harar |  |  |
| Arsi Robe HC | Health Centre | Oromia |  |  |
| Goha Tsion HC | Health Centre | Oromia |  |  |
| Begi HC | Health Centre | Oromia |  |  |
| Woliso HC | Health Centre | Oromia |  |  |
| Gimbi Ardventist HP | Hospital | Oromia |  |  |
| Negele Borena HP | Hospital | Oromia |  |  |
| Woliso HP | Hospital | Oromia |  |  |
| Air Forces DB HP | Uniformed Forces Hospital | Oromia |  |  |
| Sheko HC | Health Centre | SNNPR |  |  |
| Mizan HC | Health Centre | SNNPR |  |  |
| Awaasa HP | Hospital | SNNPR |  |  |
| Awassa Army HP | Uniformed Forces Hospital | SNNPR |  |  |
| Kebre beyah Refugee1 | Health Centre | Somali | Jijiga Health Center |  |
| Jijiga HP | Hospital | Somali |  |  |
| Baeker HC | Health Centre | Tigray |  |  |
| Humera HC | Health Centre | Tigray |  |  |
| Shire(Civil) HP | Hospital | Tigray |  |  |

**1 Jijiga Health Center was selected instead of Kebre beyah Refugee**

The CHAI team was unable access to this facility for security reasons.

## Malawi

**Inclusion/Exclusion:** All public facilities providing ART services that were considered individual sites were included. Any ART service that was considered outreach from another site was excluded as outreach is costed as part of the facility. Private sector facilities were excluded.

**Stratification Criteria:** New Facility Type (hospital, special/other, health center), Region, Authority-collapsed (MoH, Other)

**Representation Per Stratum:** Average of number of sites based on distribution of facilities and number of patients per stratum

* The average was rounded to zero decimals to determine the final number of sites per stratum
* Any stratum with 0-1% representation was always rounded up to 1 so no stratum ever had a probability of zero sites to be selected unless it’s representation was actually 0.  Actual probably per stratum can be calculated based on the table titled “Number of Facilities Per Stratum Based Average of Representation Methods”.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Percentage of Sites Per Stratum** | | |  |  |
| **Percent of Facilities** | | **Authority - Collapsed** |  |  |
| **New Facility Type** | **Region** | **MoH** | **Other** | **Grand Total** |
| **hospital** | Central | 6.31% | 6.76% | 13.06% |
|  | North | 5.41% | 3.15% | 8.56% |
|  | South | 6.76% | 4.95% | 11.71% |
| **special / other** | Central | 0.45% | 4.05% | 4.50% |
|  | North | 0.00% | 1.80% | 1.80% |
|  | South | 0.00% | 2.70% | 2.70% |
| **health centre** | Central | 15.32% | 3.60% | 18.92% |
|  | North | 9.01% | 0.00% | 9.01% |
|  | South | 23.87% | 5.86% | 29.73% |
| **Grand Total** |  | **67.12%** | **32.88%** | **100.00%** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number of Facilities Per Stratum Based on Percentage of Sites Per Stratum** | | | | |
| **Percent of Facilities** | | **Authority - Collapsed** |  |  |
| **Facility Type** | **Region** | **MoH** | **Other** | **Grand Total** |
| **hospital** | Central | 1.77 | 1.89 | 3.66 |
| **hospital** | North | 1.51 | 1.00 | 2.51 |
| **hospital** | South | 1.89 | 1.39 | 3.28 |
| **special / other** | Central | 1.00 | 1.14 | 2.14 |
| **special / other** | North | 0.00 | 1.00 | 1.00 |
| **special / other** | South | 0.00 | 1.00 | 1.00 |
| **health centre** | Central | 4.29 | 1.01 | 5.30 |
| **health centre** | North | 2.52 | 0.00 | 2.52 |
| **health centre** | South | 6.68 | 1.64 | 8.32 |
| **Grand Total** |  | **19.67** | **10.06** | **29.73** |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Percentage of Patient Load Per Stratum** | | | | |  | | |  | |
| **Count of Alive on ART** | | | **Authority - Collapsed** | |  | | |  | |
| **New Facility Type** | **Region** | | **MoH** | | **Other** | | | **Grand Total** | |
| **hospital** | Central | | 6.36% | | 6.82% | | | 13.18% | |
|  | North | | 5.45% | | 3.18% | | | 8.64% | |
|  | South | | 6.82% | | 5.00% | | | 11.82% | |
| **special / other** | Central | | 0.45% | | 4.09% | | | 4.55% | |
|  | North | | 0.00% | | 1.82% | | | 1.82% | |
|  | South | | 0.00% | | 2.73% | | | 2.73% | |
| **health centre** | Central | | 15.45% | | 3.18% | | | 18.64% | |
|  | North | | 8.64% | | 0.00% | | | 8.64% | |
|  | South | | 24.09% | | 5.91% | | | 30.00% | |
| **Grand Total** |  | | **67.27%** | | **32.73%** | | | **100.00%** | |
| **Number of Facilities Per Stratum Based on Percentage of Patient Load Per Stratum** | | | | | | | | |
| **Percent of Facilities** | | | | **Authority - Collapsed** | |  |  | |
| **Facility Type** | | **Region** | | **MoH** | | **Other** | **Grand Total** | |
| **hospital** | | Central | | 1.78 | | 1.91 | 3.69 | |
| **hospital** | | North | | 1.53 | | 1.00 | 2.53 | |
| **hospital** | | South | | 1.91 | | 1.40 | 3.31 | |
| **special / other** | | Central | | 1.00 | | 1.15 | 2.15 | |
| **special / other** | | North | | 0.00 | | 1.00 | 1.00 | |
| **special / other** | | South | | 0.00 | | 1.00 | 1.00 | |
| **health centre** | | Central | | 4.33 | | 1.00 | 5.33 | |
| **health centre** | | North | | 2.42 | | 0.00 | 2.42 | |
| **health centre** | | South | | 6.75 | | 1.65 | 8.40 | |
| **Grand Total** | |  | | **19.71** | | **10.11** | **29.82** | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number of Facilities Per Stratum Based Average of Representation Methods** | | | | |
| **Facility Type** | **Region** | **MoH** | **Other** | **Grand Total** |
| **hospital** | Central | 2.00 | 2.00 | 4.00 |
| **hospital** | North | 2.00 | 1.00 | 3.00 |
| **hospital** | South | 2.00 | 1.00 | 3.00 |
| **special / other** | Central | 1.00 | 1.00 | 2.00 |
| **special / other** | North | 0.00 | 1.00 | 1.00 |
| **special / other** | South | 0.00 | 1.00 | 1.00 |
| **health centre** | Central | 4.00 | 1.00 | 5.00 |
| **health centre** | North | 2.00 | 0.00 | 2.00 |
| **health centre** | South | 7.00 | 2.00 | 9.00 |
| **Grand Total** |  | **20.00** | **10.00** | **30.00** |

**Clustering:** Hospitals were randomly selected first based on stratification criteria; health centers were randomly selected second based on stratification criteria and hospitals that were selected to ensure only health centers were selected whose parent facility was selected.  If no health centers met both the stratification criteria and the limited number of hospitals as a parent, the parent criterion was lifted and the health center was selected to meet the stratification criteria but could have a parent that was not selected.

**Selected Sites:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Zone** | **Region** | **Facility Name** | **Authority** | **Mother** | **Facility Type** | **Selected Replacement** | **Reason for Replacement** |
| central east | Central | SALIMA DISTRICT HOSPITAL | MoH |  | hospital |  |  |
| central east | Central | NTCHISI DISTRICT HOSPITAL | MoH |  | hospital |  |  |
| central east | Central | NKHAMENYA COMMUNITY HOSPITAL | Other |  | hospital |  |  |
| central west | Central | SISTER THERESA COMMUNITY HOSPITAL MIKOKE | Other |  | hospital |  |  |
| north | North | CHILUMBA RURAL HOSPITAL | MoH |  | hospital |  |  |
| north | North | NKHATABAY DISTRICT HOSPITAL | MoH |  | hospital |  |  |
| north | North | EKWENDENI MISSION HOSPITAL | Other |  | hospital |  |  |
| south west | South | QUEEN ELIZABETH CENTRAL HOSPITAL | MoH |  | hospital |  |  |
| south east | South | MANGOCHI DISTRICT HOSPITAL | MoH |  | hospital |  |  |
| south east | South | MULANJE MISSION HOSPITAL | Other |  | hospital |  |  |
| central west | Central | LIGHTHOUSE | MoH |  | special / other |  |  |
| central west | Central | AREA 30 POLICE CLINIC | Other |  | special / other |  |  |
| north | North | MOYALE BARRACKS HEALTH CENTRE | Other |  | special / other |  |  |
| south east | South | BALAKA DREAM CLINIC | Other |  | special / other |  |  |
| central east | Central | KHOMBEDZA HEALTH CENTRE | MoH | SALIMA DISTRICT HOSPITAL | health centre |  |  |
| central east | Central | MALOMO HEALTH CENTRE | MoH | NTCHISI DISTRICT HOSPITAL | health centre |  |  |
| central east | Central | LIFUWU HEALTH CENTRE | MoH | SALIMA DISTRICT HOSPITAL | health centre |  |  |
| central east | Central | KANSONGA HEALTH CENTRE (Ntchisi) | MoH | NTCHISI DISTRICT HOSPITAL | health centre |  |  |
| central east | Central | Life Line Salima Health Centre | Other | SALIMA DISTRICT HOSPITAL | health centre |  |  |
| north | North | MZENGA HEALTH CENTRE | MoH | NKHATABAY DISTRICT HOSPITAL | health centre |  |  |
| north | North | KACHERE HEALTH CENTRE | MoH | NKHATABAY DISTRICT HOSPITAL | health centre |  |  |
| south west | South | CHILEKA HEALTH CENTRE BLANTYRE | MoH | QUEEN ELIZABETH CENTRAL HOSPITAL | health centre |  |  |
| south east | South | MULOMBA HEALTH CENTRE | MoH | MULANJE DISTRICT HOSPITAL | health centre |  |  |
| south east | South | MONKEYBAY COMMUNITY HOSPITAL | MoH | MANGOCHI DISTRICT HOSPITAL | health centre |  |  |
| south west | South | MADZIABANGO HEALTH CENTRE | MoH | QUEEN ELIZABETH CENTRAL HOSPITAL | health centre |  |  |
| south west | South | MDEKA HEALTH CENTRE | MoH | QUEEN ELIZABETH CENTRAL HOSPITAL | health centre |  |  |
| south east | South | CHILIPA HEALTH CENTRE (MANGOCHI) | MoH | MANGOCHI DISTRICT HOSPITAL | health centre |  |  |
| south east | South | Nkhulambe Health Center1 | MoH | PHALOMBE HEALTH CENTRE | health centre | Migowi HEALTH CENTRE |  |
| south east | South | MILONDE HEALTH CENTRE | Other | MULANJE DISTRICT HOSPITAL | health centre |  |  |
| south east | South | Namandanje HEALTH CENTRE | Other | MACHINGA DISTRICT HOSPITAL | health centre |  |  |

**1 Nkhulambe Health Center replaced by Migowi Health Center**

According to the site list, Nkhulambe had been providing ART since 2008 but upon arrival the team was informed they only started ART in Q4 of 2010.  No official exclusion criteria for service provision time was stipulated in the site selection because there were no sites on the original list from MoH that would have been operational < 1 year by the time costing commenced. However, this site was replaced because the required patient outcome data would be unavailable for the required sampling timeframe.

## RSA

**Inclusion/Exclusion**: All sites listed as offered ART services at the time the list was compiled were included. RSA is rapidly scaling up and expanding treatment so new sites might have started providing services after the facility list was compiled.

**Representation Per Stratum:** The number of sites per stratum were selected deliberately in consultation with national DOH.  This was done because number of sites and patients on treatment were rapidly changing due to scale up and using those numbers at a point in time would not have provided accurate representation.  The team and DOH considered these factors and scale up plans when choosing the number of sites to be selected per stratum.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number of Sites Chosen to Sample per Stratum** | | |  |  |
|  |  |  |  |  |
|  | **Standard sites** | **Large Sites** | **New sites** | **Grand Total** |
| Eastern Cape | 1 | 1 | 3 | 5 |
| Gauteng | 2 | 1 | 2 | 5 |
| KwaZulu-Natal | 1 | 2 | 3 | 6 |
| Limpopo | 1 |  | 1 | 2 |
| Mpumalanga | 1 | 1 | 1 | 3 |
| North West | 1 | 1 | 1 | 3 |
| Western Cape | 2 |  | 2 | 4 |
| Free State / Northern Cape | 1 |  | 1 | 2 |
| **Grand Total** | **10** | **6** | **14** | **30** |

**Consideration:** The RSA team requires approval at several levels of DOH to move forward with the selected sites.  The site list has been presented to several provincial DOHs as well as district level and during this process 3 of the 30 selected facilities have been changed.  These 3 are highlighted in yellow on the site list and explanations are provided below

* 4 provinces have not yet fully agreed to the site lists: Western Cape, Mpumalanga, North West, and Limpopo; Some facilities selected for these provinces could be replaced if the provincial or district DOHs choose to change them or if the facilities don’t meet the appropriate criteria for some reason (i.e. shutting down, poor data availability, etc)
* All other facilities should remain the same because most provincial/district DOH approvals have been ascertained.

**Selected Sites:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Stratification** | **Province** | **Site Name** | **ART Patients (original site)** | **Selected Replacement** | **Reason for replacement** |
| Standard sites | Eastern Cape | Mbekweni chc | 959 |  |  |
| Standard sites | Gauteng | Tembisa Main Clinic | 2891 |  |  |
| Standard sites | Gauteng | Mamelodi Hospital ARV Clinic | 4539 |  |  |
| Standard sites | KwaZulu-Natal | Lower Umfolozi War Mem1 | 2598 | Nkandla Hospital | Mainly focused on PMTCT |
| Standard sites | Eastern Cape | Dr CN Phatudi (Limpopo)2 | 1906 | Settlers Hospital |  |
| Standard sites | Mpumalanga | MMAMETHLAKE | 1909 |  |  |
| Standard sites | North West | PHOKENG | 1085 |  |  |
| Standard sites | Western Cape | Ikwezi | 2,384 |  |  |
| Standard sites | Northern Cape | Galeshewe Day Hospital | 3553 |  |  |
| Standard Sites | Mpumalanga | Piet Retief |  |  |  |
| Standard sites | Western Cape | Klawer Clinic3 | 708 | Oklahoma Hospital | No ART patients during costing period |
| Standard sites | Western Cape | Weltevreden Clinic4 | 557 | Mzamomhle Clinic | No ART patients during costing period |
| Standard sites | Northern Cape | Knysna STRETCH – Sedgefield5 | 41 | Groblershoop Clinic | No facility-level approval |
| New sites | Eastern Cape | Taaibos (Limpopo)2 |  | Steynsburg Clinic |  |
| New sites | Eastern Cape | Maluti CHC |  |  |  |
| New sites | Eastern Cape | Washington |  |  |  |
| New sites | Eastern Cape | Wells Estate6 |  | Port Elizabeth Provincial Hospital | No access to the facility |
| New sites | Gauteng | Zonkizizwe 2 Clinic | 195 |  |  |
| New sites | Gauteng | Bophelong R B Clinic | 0 |  |  |
| New sites | KwaZulu-Natal | Madwaleni Clinic | 471 |  |  |
| New sites | KwaZulu-Natal | Ekuphumeleni TB Settlement7 | 4276 | Thokozani Clinic | Facility mainly focused on TB; facility downsizing |
| New sites | KwaZulu-Natal | Pinetown Municipal Clinic | 61 |  |  |
| New sites | Mpumalanga | Agincourt CHC |  |  |  |
| New sites | North West | Ottosdal CHC |  |  |  |
| New sites | Free State | Lesedi Clinic (Kroonstad) |  |  |  |
| Large Sites | Eastern Cape | St Patricks Hospital | 5340 |  |  |
| Large Sites | Gauteng | Hillbrow CHC | 12583 |  |  |
| Large Sites | KwaZulu-Natal | Murchison Hospital | 5503 |  |  |
| Large Sites | KwaZulu-Natal | Estcourt Hospital8 | 11342 | Edendale Hospital | Facility downsizing and was no longer a “large’ site |
| Large Sites | North West | TSHEPONG | 16886 |  |  |

**1 Nkandla Hospital replaced Lower Umfolozi War Mem**

The KZN provincial department of health requested that Umfolozi War Memorial Hospital be removed from the site selection. The Facility only provides (maximum) 8 months of care to pregnant mothers and has no regular patient pool. All ART patients are down referred following birth. This caters to a transient population and is a one-of-a-kind facility. Nklandla Hospital was the next highest ranked on the randomized list.

**2 Dr CN Phatudi (Limpopo) & Taaibos (Limpopo) excluded and replaced by Settlers Hospital and Steynsburg Clinic**

Provincial approval was not attained with the Limpopo DOH within the time constraints of the project. The Eastern Cape Department of Health requested that CHAI cost two additional facilities in the province to ensure that all districts had a facility represented. For these two districts (Cacadu, Ukhahlamba) the facility first on the randomized list for this district was selected. For Cacadu district this was Settlers Hospital and for Ukhahlamba district this was Steynsburg Clinic.

**3 Oklahoma replaced Klawer Clinic**

The WCDOH noted that Klwaer Clinic did not manage ART patients during the costing period under review. The district identified two alternate facilities that were eligible based on our selection criteria i) Vredenberg Hospital and ii) Oklahoma Clinic. They requested that we did not visit Vredenberg Hospital due to significant renovations taking place that were already interrupting service provision at the ART clinic. District approval was given for Oklahoma Clinic, and instead provided an approval for our visiting Oklahoma.

**4 Mzamomhle Clinic replaced Weltevreden Clinic.**

On providing approval to visit this facility, it was noted by the sub-district manager that ART only commenced recently and no 12 month period would be viable for costing. The sub-district manager approved our visiting the next facility on the randomized selection list in the district, Mzamomhle Clinic.

**5 Groblershoop Clinic replaced Knysna STRETCH – Sedgefield**

Though provincial department of health approval was given from the facility visit to Sedgefield, no facility level approval was provided. Due to the delay in getting approval for this facility visit, a decision was taken to cost Groblershop Clinic in the Northern Cape at the request of the provincial HAST manager. The province wanted to include a rural facility in addition to the large urban hospital that was included in the costing, and identified this facility as being of particular interest to capture variation within the province.

**6 Port Elizabeth Provincial Hospital replaced Wells Estate**

On the arranged facility visit date, the Nelson Mandela Metropolitan HAST manager and the CHAI team arrived at the facility to find a facility wide strike. The facility had been locked-down and there was no clear understanding as to when this strike would end. The CHAI team then met with the District Health Manager to discuss alternatives. The District Manager suggested we cost the next facility in the District based on the randomized draw, this was Port Elizabeth Provincial Hospital.

**7 Thokozani Clinic replaced Ekuphumeleni TB Settlement**

The KZN provincial department of health requested that Ekuphumeleni TB Settlement be removed from the site selection. The facility is a residential TB treatment facility that also provides ART. Apparently the infrastructure is seriously deteriorating and some patients have been down referred as a consequence. The long term future of the site is unknown. As the facility is one-of-a-kind the relevance of this facility was thought to be very limited. Thokozani Clinic was selectively added by the province because they wanted to understand its unique model of care. It is a semi urban clinic with 24 hr service so that the working population can access treatment. The clinic is nurse led with a visiting doctor.

**8 Edendale Hospital replaced Estcourt Hospital**

The KZN provincial department of health requested that Estcourt Hospital be removed from the site selection. The ART patient numbers have declined (post the M&E data used in the random generation) and the facility is no longer considered “large” by the provincial HAST unit. Edendale Hospital was the next highest ranked on the randomized list.

## Rwanda

**Inclusion/Exclusion:** Private facilities and prison facilities were excluded from the population.

**Stratification Criteria:** Hospital vs Health Center, Urban vs Rural, Funder (Specific) – GFATM / PEPFAR

**Representation Per Stratum:** Average of number of sites based on distribution of facilities and number of patients per stratum

* The average was rounded down to determine the final number of sites per stratum
* Any stratum with 0-1% representation was always rounded up to 1 so no stratum ever had a probability of zero sites to be selected unless it’s representation was actually 0.  Actual probably per stratum can be calculated based on the table titled “Number of Facilities Per Stratum Based Average of Representation Methods”.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Percentage of Sites Per Stratum** | |  |  |  |
| **Percent of Facilities** |  | **Funder (Specific)** | |  |
| **Hospital vs. Health Center** | **Urban vs Rural** | **GF** | **PEPFAR** | **Grand Total** |
| **District Hospital** | Rural | 3.50% | 6.64% | 10.14% |
|  | Urban | 1.40% | 2.80% | 4.20% |
| **Health Center** | Rural | 37.06% | 39.86% | 76.92% |
|  | Urban | 3.50% | 5.24% | 8.74% |
| **Grand Total** |  | **45.45%** | **54.55%** | **100.00%** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number of Facilities Per Stratum Based on Percentage of Sites Per Stratum** | | | | |
| **Hospital vs. Health Center** | **Urban vs Rural** | **GF** | **PEPFAR** | **Grand Total** |
| District Hospital | Rural | 1.00 | 2.00 | 3.00 |
| District Hospital | Urban | 1.00 | 1.00 | 2.00 |
| Health Center | Rural | 12.00 | 13.00 | 25.00 |
| Health Center | Urban | 1.00 | 2.00 | 3.00 |
| **Grand Total** |  | **15.00** | **18.00** | **33.00** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Percentage of Patient Load Per Stratum** | | |  |  |
| **Percent of Total on ART** | | **Funder (Specific)** | |  |
| **Hospital vs. Health Center** | **Urban vs Rural** | **GF** | **PEPFAR** | **Grand Total** |
| **District Hospital** | Rural | 6.91% | 13.18% | 20.09% |
|  | Urban | 5.55% | 13.45% | 19.01% |
| **Health Center** | Rural | 14.52% | 25.10% | 39.62% |
|  | Urban | 10.53% | 10.75% | 21.28% |
| **Grand Total** |  | **37.52%** | **62.48%** | **100.00%** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number of Facilities Per Stratum Based on Percentage of Patient Load Per Stratum** | | | | |
| **Hospital vs. Health Center** | **Urban vs Rural** | **GF** | **PEPFAR** | **Grand Total** |
| District Hospital | Rural | 2.00 | 4.00 | 6.00 |
| District Hospital | Urban | 2.00 | 4.00 | 6.00 |
| Health Center | Rural | 5.00 | 8.00 | 13.00 |
| Health Center | Urban | 3.00 | 4.00 | 7.00 |
| **Grand Total** |  | **12.00** | **20.00** | **32.00** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number of Facilities Per Stratum Based Average of Representation Methods** | | | | |
| **Hospital vs. Health Center** | **Urban vs Rural** | **GF** | **PEPFAR** | **Grand Total** |
| **District Hospital** | Rural | 1 | 3 | 4 |
| **District Hospital** | Urban | 1 | 2 | 3 |
| **Health Center** | Rural | 8 | 10 | 18 |
| **Health Center** | Urban | 2 | 3 | 5 |
| **Grand Total** |  | **12** | **18** | **30** |

**Clustering:** Hospitals were randomly selected first based on stratification criteria; health centers were randomly selected second based on stratification criteria and hospitals that were selected to ensure only health centers were selected whose parent facility was selected.  If no health centers met both the stratification criteria and the limited number of hospitals as a parent, the parent criterion was lifted and the health center was selected to meet the stratification criteria but could have a parent that was not selected.

**Selected Sites:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **District** | **Facility Name** | **Province** | **Hospital vs. Health Center** | **Funder (Specific)** | **Urban vs Rural** | **Mother** | **Total on ART** |
| GICUMBI | Gihembe Refugee Camp | North | Health Center | PEPFAR | Rural | Byumba HD | 64 |
| GICUMBI | Kigogo CS | North | Health Center | PEPFAR | Rural | Byumba HD | 94 |
| GICUMBI | Rushaki CS | North | Health Center | PEPFAR | Rural | Byumba HD | 221 |
| GICUMBI | Rutare (Gicumbi) CS | North | Health Center | PEPFAR | Rural | Byumba HD | 234 |
| GICUMBI | Byumba HD | North | District Hospital | PEPFAR | Urban |  | 967 |
| KIREHE | Nyabitare CS | East | Health Center | GF | Rural | Kirehe HD | 17 |
| KIREHE | Gashongora CS | East | Health Center | GF | Rural | Kirehe HD | 69 |
| KIREHE | Nyarubuye CS | East | Health Center | GF | Rural | Kirehe HD | 179 |
| KIREHE | Mulindi (Kirehe) CS | East | Health Center | GF | Rural | Kirehe HD | 318 |
| KIREHE | Kirehe HD | East | District Hospital | GF | Rural |  | 724 |
| NGORORERO | Nyange A CS | West | Health Center | PEPFAR | Rural | Muhororo HD | 180 |
| NGORORERO | Muhororo HD | West | District Hospital | PEPFAR | Rural |  | 530 |
| NYABIHU | Rambura CS | West | Health Center | PEPFAR | Rural | Shyira HD | 270 |
| NYABIHU | Shyira HD | West | District Hospital | PEPFAR | Rural |  | 282 |
| NYANZA | Gatagara CS | South | Health Center | GF | Rural | Nyanza HD | 10 |
| NYANZA | Mweya CS | South | Health Center | GF | Rural | Nyanza HD | 24 |
| NYANZA | Cyaratsi CS | South | Health Center | GF | Rural | Nyanza HD | 36 |
| NYANZA | Kibilizi (Nyanza) CS | South | Health Center | GF | Rural | Nyanza HD | 36 |
| NYANZA | Kirambi CS | South | Health Center | PEPFAR | Rural | Nyanza HD | 220 |
| NYANZA | Nyanza HD | South | District Hospital | GF | Urban |  | 767 |
| NYARUGENGE | Butamwa CS | Kigali | Health Center | PEPFAR | Urban | Muhima HD | 154 |
| NYARUGENGE | Rugarama (Nyarugenge) CS | Kigali | Health Center | PEPFAR | Urban | Muhima HD | 175 |
| NYARUGENGE | Biryogo CS | Kigali | Health Center | PEPFAR | Urban | Muhima HD | 1096 |
| NYARUGENGE | Gitega (Nyarugenge) CS | Kigali | Health Center | GF | Urban | Muhima HD | 1238 |
| NYARUGENGE | TRAC Clinic CS | Kigali | Health Center | GF | Urban | Muhima HD | 1295 |
| NYARUGENGE | Muhima HD | Kigali | District Hospital | PEPFAR | Urban |  | 2589 |
| RUTSIRO | Nyabirasi CS | West | Health Center | PEPFAR | Rural | Murunda HD | 86 |
| RUTSIRO | Mushubati CS | West | Health Center | PEPFAR | Rural | Murunda HD | 88 |
| RUTSIRO | Congo-Nil CS | West | Health Center | PEPFAR | Rural | Murunda HD | 194 |
| RUTSIRO | Murunda HD | West | District Hospital | PEPFAR | Rural |  | 348 |

## Zambia

**Inclusion/Exclusion:** Health Posts were excluded because these sites are typically classified as “outreach” from larger sites and maybe be costed as part of those sites.

**Stratification Criteria:** The team used a collapsed facility type and collapsed version for partner support in order to reduce the number of strata. The collapsed facility type merged all levels of hospitals into a single category. JICA and MOH were merged as MOH sites.

**Representation Per Stratum:** Average of sites based on distribution of facilities and number of patients per stratum.

**Clustering:** Clustering was not utilized for this sampling process due to lack of consistent information on facility relationships.

|  |  |  |  |
| --- | --- | --- | --- |
| **Percentage of Sites Per Stratum** | |  |  |
| **% of Sites** | **Facility Type** |  |  |
| **Partner Support** | **Health Center** | **Hospital** | **Grand Total** |
| CHAMP | 0.93% | 0.00% | 0.93% |
| CHAZ/AIDSRELIEF | 7.48% | 9.35% | 16.82% |
| CIDRZ | 16.51% | 5.92% | 22.43% |
| MoH | 22.12% | 2.49% | 24.61% |
| ZPCT | 25.23% | 9.97% | 35.20% |
| **Grand Total** | **72.27%** | **27.73%** | **100.00%** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of Facilities Per Stratum Based on Percentage of Sites Per Stratum (Rounded)** | | | |
| **Partner Support** | **Health Center** | **Hospital** | **Grand Total** |
| **CHAMP** | 1 | 0 | 1 |
| **CHAZ/AIDSRELIEF** | 2 | 2 | 4 |
| **CIDRZ** | 4 | 2 | 6 |
| **MoH** | 6 | 1 | 7 |
| **ZPCT** | 7 | 3 | 10 |
| **Grand Total** | **20** | **8** | **28** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Percentage of Patient Load Per Stratum** | |  |  |
| **Total patients Q4 2010** | **Facility Type** |  |  |
| **Partner Support** | **Health Center** | **Hospital** | **Grand Total** |
| CHAMP | 0.00% | 0.00% | 0.00% |
| CHAZ/AIDSRELIEF | 4.84% | 13.53% | 18.37% |
| CIDRZ | 25.43% | 13.55% | 38.98% |
| MoH | 3.65% | 2.37% | 6.01% |
| ZPCT | 17.08% | 19.56% | 36.64% |
| **Grand Total** | **51.00%** | **49.00%** | **100.00%** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of Facilities Per Stratum Based on Percentage of Patient Load Per Stratum (Rounded)** | | | |
| **Partner Support** | **Health Center** | **Hospital** | **Grand Total** |
| **CHAMP** | 0 | 0 | 0 |
| **CHAZ/AIDSRELIEF** | 1 | 4 | 5 |
| **CIDRZ** | 7 | 4 | 11 |
| **MoH** | 1 | 1 | 2 |
| **ZPCT** | 4 | 5 | 9 |
| **Grand Total** | **13** | **14** | **27** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of Facilities Per Stratum Based Average of Representation Methods (Rounded)\*** | | | |
| **Partner Support NEW** | **Health Center** | **Hospital** | **Grand Total** |
| **CHAMP** | 1 | 0 | 1 |
| **CHAZ/AIDSRELIEF** | 2 | 3 | 5 |
| **CIDRZ** | 6 | 3 | 9 |
| **MoH** | 4 | 1 | 5 |
| **ZPCT** | 6 | 4 | 10 |
| **Grand Total** | **19** | **11** | **30** |

*\* Numbers do not appear to match for total sites because of rounding in Excel formulas. Also, stratum which had a probability of < 1 site were always rounded up to 1.*

**Selected Sites:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Selected Sites:Province | District | Site name | Facility type | Partner Support | Selected Replacement | Reason for Replacement |
| Southern | Mazabuka | Nkabika Clinic | Health Center | CHAMP |  |  |
| Central | Chibombo | Chipembi RHC | Health Center | CHAZ/AIDSRELIEF |  |  |
| Central | Kabwe | CHRESO Kabwe | Health Center | CHAZ/AIDSRELIEF |  |  |
| Lusaka | Luangwa | Katondwe Mission | Level 1 Hospital | CHAZ/AIDSRELIEF |  |  |
| Northern | Chinsali | Ilondola mission hospital | Level 1 Hospital | CHAZ/AIDSRELIEF |  |  |
| Eastern | Chipata | Mwami Adventist Hospital | Level 1 Hospital | CHAZ/AIDSRELIEF |  |  |
| Western | Senanga | itufa | Health Center | CIDRZ |  |  |
| Eastern | Petauke | Sinda RHC | Health Center | CIDRZ |  |  |
| Lusaka | Lusaka | chazanga | Health Center | CIDRZ |  |  |
| Western | Mongu | Limulunga RHC | Health Center | CIDRZ |  |  |
| Eastern | Lundazi | Mwase Lundazi | Health Center | CIDRZ |  |  |
| Lusaka | Kafue | Kafue Estates Urban HC | Health Center | CIDRZ |  |  |
| Eastern | Lundazi | Lundazi District Hospital | Level 1 Hospital | CIDRZ |  |  |
| Eastern | Chama | Chama District Hospital | Level 1 Hospital | CIDRZ |  |  |
| Eastern | Chipata | Chipata General Hospital | Level 2 Hospital | CIDRZ |  |  |
| Southern | Mazabuka | Kafue Gorge H | Health Center | MoH |  |  |
| North Western | Mwinilunga | Lwawu RHC | Health Center | MoH |  |  |
| Southern | Siavonga | Kafulafuta1 | Health Center | MoH | Kazangula RHC |  |
| Central | Kapiri-Mposhi | Nkole RHC | Health Center | MoH |  |  |
| Central | Mumbwa | Mumbwa District Hospital | Level 1 Hospital | MoH |  |  |
| Copperbelt | Kitwe | Luangwa Clinic | Health Center | ZPCT |  |  |
| Copperbelt | Kitwe | Company Clinic2 | Health Center | ZPCT | Buchi Main |  |
| Copperbelt | Chililabombwe | Lubengele Clinic | Health Center | ZPCT |  |  |
| Copperbelt | Kitwe | Riverside Clinic | Health Center | ZPCT |  |  |
| Copperbelt | Ndola | Kavu Health Center | Health Center | ZPCT |  |  |
| Copperbelt | Ndola | Masala New | Health Center | ZPCT |  |  |
| Copperbelt | Kitwe | Kitwe Central Hospital | Level 3 Hospital | ZPCT |  |  |
| Luapula | Mansa | Mansa General Hospital | Level 2 Hospital | ZPCT |  |  |
| Central | Kabwe | Kabwe General Hospital | Level 2 Hospital | ZPCT |  |  |
| North Western | Mufumbwe | Mufumbwe District Hospital | Level 1 Hospital | ZPCT |  |  |

**1 Kazangula RHC was selected in place of Kafulafuta**

This replacement was made because the latter did not offer ART services even though it was listed on the original facility list from the MoH as offering ART services.

**2 Buchi Main was changed from Company Clinic**

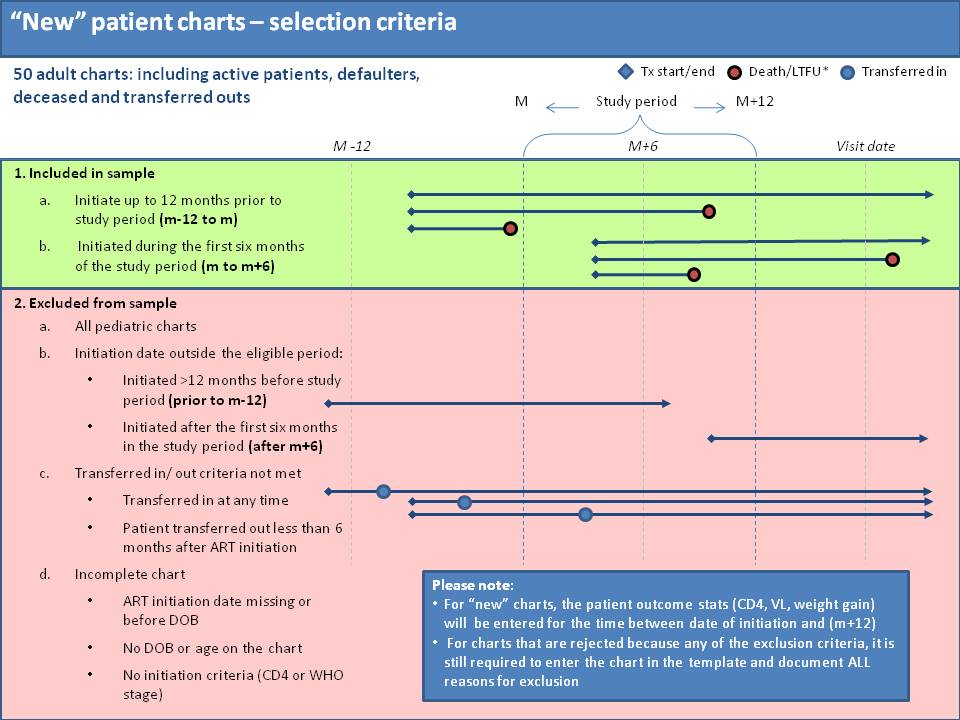
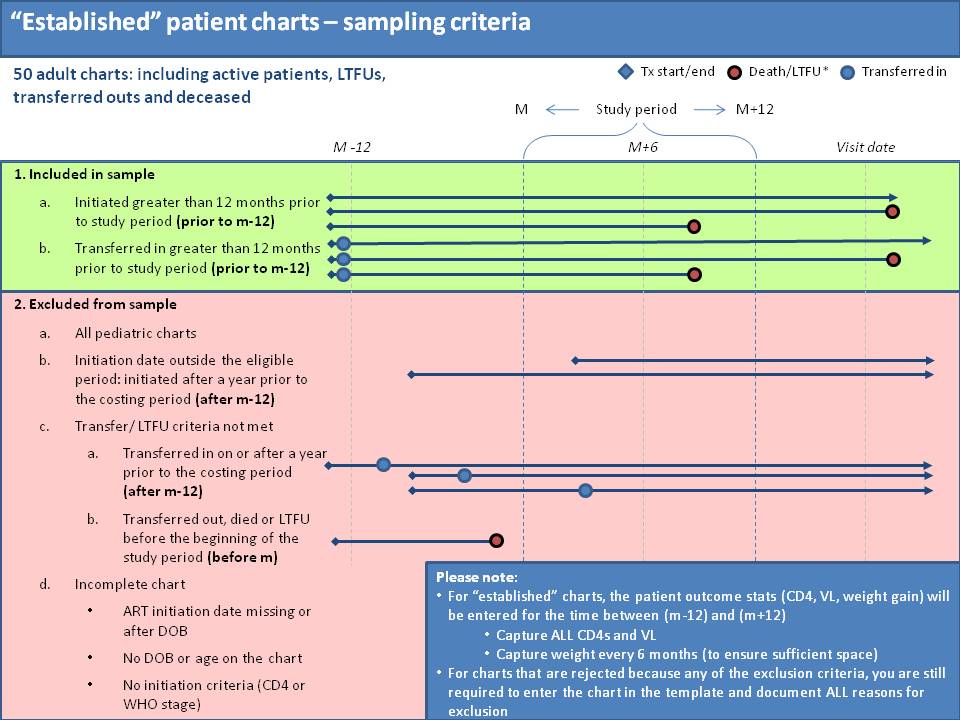
This replacement was made because the original facility was actually a private facility which was excluded from Zambian site selection. Unfortunately, this information was not provided in advance so the team was unable to exclude it from the beginning. Buchi Main was randomly selected to meet the same stratification criteria as a replacement.

# Annex 2: Definition, Standards, and Monitoring Tool for Quality Indicators

|  |  |  |  |
| --- | --- | --- | --- |
|  | Definition | Standard | Monitoring Tool |
| Environmental Factors |  |  |  |
| **Prevalence of TB in catchment** | Total number of TB cases in the catchment population at the end of the costing period | N/A | DHS (National or Provincial/ District Level) |
| **Prevalence of Malaria in catchment** | Total number of malaria cases in the catchment population at the end of the costing period | N/A | DHS (National or Provincial/ District Level) |
| **Health Service Utilization of catchment** | Percentage of the population requiring a service and accessing it | Increase in utilization in rates over time | HMIS |
| Population Characteristics at initiation |  |  |  |
| **Median baseline CD4** | Median of CD4 recorded at ART Initiation. | Increase in baseline median CD4 over time | Patient Management Information Systems, EMR, Paper Charts |
| **Median baseline WHO stage** | Median WHO Stage recorded at ART Initiation | Increase in baseline WHO Stage over time | Patient Management Information Systems, EMR, Paper Charts |
| **TB Status at Initiation** | Suspected or confirmed infection of TB | Not suspected and/or known negative | Patient Management Information Systems, EMR, Paper Charts |
| Patient Outcome |  |  |  |
| **Median CD4 after 12 months** | Median of CD4 recorded after 12 months on ART | Increase in CD4 Count | Patient Management Information Systems, EMR, Paper Charts |
| **Median VL after 12 months** | Median of VL recorded after 12 months on ART | Decrease in VL | Patient Management Information Systems, EMR, Paper Charts |
| **Migration rate (treatment failure)** | Percentage of patients failing first line ARVs | ≤ 2.6% | Patient Management Information Systems, EMR, Paper Charts |
| **Single Drug Toxicities** | Percentage of patients experiencing single drug toxicities by drug | Varies by ARV | Patient Management Information Systems, EMR, Paper Charts |
| **Attrition** | Total percentage of patients who have defaulted, stopped treatment, or died. | Continuous improvement on attrition rate | Patient Management Information Systems, EMR, Paper Charts |
| **Default** | Percentage of patients who fail to check in with the clinic after 3 months | Continuous improvement on percentage defaulting | Patient Management Information Systems, EMR, Paper Charts |
| **Stopped** | Percentage of patients who willingly stop treatment | Continuous improvement on percentage stopping | Patient Management Information Systems, EMR, Paper Charts |
| **Mortality** | Percentage of patients who die while on treatment | Continuous improvement on mortality rate | Patient Management Information Systems, EMR, Paper Charts |
| **Transfers Out/In** | Percentage of patients transferring into and out of a facility | N/A (Depends on model of care) | Patient Management Information Systems, EMR, Paper Charts |
| **Adherence** | The obedience of the patient to following drug regimen protocols | 100% | Patient Management Information Systems, EMR, Paper Charts |
| Facility |  |  |  |
| **Overall facility physical condition** | Availability: (0) = data not available, (1) = patient charts, (2) = anecdotal information, (3) = observation, (4) = data documented at facility, (5) = centrally logged data.  Quality: (1) = very poor, (2) = poor, (3) = average, (4) = good, (5) = very good.  Included factors are not examples and will be modified as informed by country observations | Availability = 5  Quality = 5 | Centralized Database, Interviews, Observations |
| **Adequate space/ Ease of patient flow** |
| **Patient wait time** |
| **Overall cleanliness** |
| **Availability of water** |
| **Availability of electricity** |
| **Ventilation in waiting rooms** |
| **Availability of basic furniture** |
| **Average Value for Facility Indicators** | Average of all of the above | 5 | Calculated Average |
| System |  |  |  |
| **Number of stock outs** | Incidence of unavailable drugs within the costing time period | 0 | Electronic Management Systems, Stock Cards, Anecdotal |
| **Availability of sample transport for labs** | Existing sample transportation system for laboratory tests, consumables, and reagents | Systematic delivery mechanisms that are low cost and reliable | Interviews, Observations |
| **Availability of lab consumables/reagents** | Adequate stock to meet demand for laboratory services | Regular supply without stock outs or wastage | Interviews, Observations |

# Annex 3: Quality Indicators Data Collection

***Patient Outcome Indicators: Median Baseline CD4, Median CD4 at 12 Months, Defaulted, Stopped, and Mortality***

1. ***Sampling frame***   
   Patient charts will be selected for new and established patients. The sampling frame will vary for each. See the images below for chart sampling.  
     
     
   
2. ***Sample size***  
   100 patients charts will be selected at random according to the sampling frame above. The teams will select 50 new patient charts and 50 established patient charts.
3. ***Data collection***Data will be collected using the data collection template in Annex 5, survey titled Quality.
   1. ***Electronic Database:*** Query database for *all* patients active on treatment including no private patient information. Because the data is electronic, *all active* patients could be queried and evaluated. The data elements required might require multiple queries to acquire necessary information depending on the database structure. These data will then merged and manipulated as required for entry into the data entry tool. The data entry tool will do basic quality/consistency checks. Beyond these checks the data will require verification against patient charts where available. The sampling strategy listed above will be utilized for this verification.
   2. ***ART Logbook/Register:*** Entries in logbooks are typically entered in chronological order using the ART initiation date of a patient. Using these dates, systematically the study teams will select patients within the sampling frame. For each selected patient, record the required data in the data collection template.
   3. ***Patient Chart Review:*** Storage of patient charts will vary by site. Some sites store chronologically by ART initiation date while others might store by patient name or number. As previously described, patient charts will be systematically randomly sampled. Where a chart does not meet the criteria, it will be replaced with the next chart in the sample which does.
   4. ***Patient Health Passport (specific to Malawi):***   
      If required data is stored with patients rather than at the facility level, then patients meeting the sampling criteria will be routinely asked to opt in to provide this information when visiting the facility. This data collection method will be established for a period of time at each relevant facility and will require training of personnel at the facility to acquire consent and fill in the data collection tool with data elements only found on the patient health passports. Other data elements can be captured for patient records kept at the facility. This method of data collection is applicable only for CD4 and possible WHO stage and will require attrition data to be captured for a different sample of patients. Additionally, Malawi has quarterly cohort reports for each facility that could potentially be used to capture attrition rates.
   5. ***Substitute Required:*** In the case that CD4 test results are not readily available, an appropriate substitute can be selected to monitor progress. Advice from clinicians and administrators at each facility and within the MoH will be taken into consideration within each country context when selecting proxy indicators. A potential example of a substitute includes WHO stage at initiation. However, capturing a proxy indicator will have additional data collection and analysis implications and will be need specific evaluation as required.

# Annex 4: Managing assumptions in the data collection process

## Overview

As a part of the facility costing data collection exercise, it is expected that a significant number of data fields will require a level of assumptions or extrapolations on the part of the data collection team or the interviewees. The distinction between ‘hard numbers’ such as receipts or expense logs and ‘soft’ numbers such as clinician opinions or assumptions made is not always clear. At one end of the spectrum, hard numbers are easily verifiable (for example, utility bills, salaries paid, or drugs purchased). In many instances assumptions are formed in the absence of hard data, or in the case of allocation of costs to facility, treatment or patient group. Without such assumptions, it is expected that the data for most facilities would be incomplete, rendering comparison between sites and distinction between patient groups difficult.

This section will provide a reference for all assumptions made in the absence of hard numbers in the facilities for each of the study teams. Establishing standardized default assumptions will ensure consistent data sets between countries and sites where data is absent or incomplete. Further, clearly defining assumptions will prove instrumental when reporting methodology back to key stakeholders once data collection has concluded.

## Defining an Assumption

The data requested in this costing exercise can be categorized into 3 types:

1. **SDA and PT allocations,** which are based on assumptions of costs allocated to the different categories, and are by definition context-specific assumptions
2. **Determinants and other questions,** which are generally closed-end questions and often have a response of “unknown” where data is not available, and are therefore less prone to ambiguity in terms of level of assumptions made
3. **Cost tables,** which aim to provide hard cost data, but may frequently require assumptions to be made to complete poor data availability

This section will focus on defining default allocations for cost tables, in order to ensure consistency between countries and sites.

## Data Types

The following data types have been identified and used during the pilot phase of the unit costing study. The most common data types and combinations of data types include:

1. **Primary data** –based only on documentation available at the facility, MoH, or other relevant source.
2. **Partial primary data (primary data + context proxies)** – based partially on documented information and partially on relevant contextual data. For example, if 6 months of utility data is documented, the other 6 months might be calculated as an average of the existing data, with adjustments up or down as relevant given the local context.
3. **Partial primary data (primary data + interview)** – based partially on documented information and partially on interviews with facility staff. For example, if 6 months of water bill data is documented, it may not be appropriate to average the existing data for the remaining 6 months as water bills often vary due to seasonality. The primary data might be supplemented with estimates from knowledgeable staff such as the administrator or the accountant.
4. **Partial primary data (primary data + facility proxies)** – based partially on documented information and partially on proxies from other facilities. For example, if the cost of a building is documented but the cost of renovations is not, it may be relevant to use renovation costs from a facility that underwent renovations at a similar time or from a facility of a similar size.
5. **Partial primary data (primary data + context proxies + interview)** – based partially on documented information and partially on relevant contextual data and interviews with facility staff. For example, laboratory equipment inventory may be managed at a facility without any record of how old the equipment is or how much was paid for it. Interviews with staff may provide additional information on the age of the equipment and contextual data may help determine the cost of the equipment.
6. **Interviews** – based on speaking with knowledgeable staff. For example, the average monthly cost of electricity or water might not be available for a particular facility, but the administrator or accountant can provide an estimate.
7. **Context proxies + Interviews** – based on a combination of relevant contextual data and interviews with knowledgeable staff. For example, for training, nationally required training may be used as a starting point supplemented with information from staff regarding whether or not more or less training was conducted at the facility.
8. **Context proxies** – based on cost data available relevant to the country or regional context. These could include salaries, where missing site-level salary data can be replaced by government scales as a proxy. Similarly, where costs for small medical equipment may not be available, a relevant proxy could be used.
9. **Facility proxies + Interviews** – based on a combination of data from similar facilities and interviews with knowledgeable staff. These could include salaries, where missing site-level salary data can be replaced by salary data from a similar facility (by size, administration, or facility type) and supplemented with interviews from the staff.
10. **Proxies from other facilities** – based on data from a similar facility. Where data is not available, information from a similar facility could be used, for example, a facility with the same population size, patient distribution, etc.
11. **Bottom-up calculations** – where procurement data cannot be found or is not reliable for ARVs, for example, calculating costs using average costs per regimen could be used as an alternative method for arriving at a per-patient cost.
12. **Other** – data that is collected using a combination of data types not identified in this list.

## Assumptions by Cost Element

### Facility Information

With no cost tables, the facility information survey assumptions should be minimal. Below are the areas where assumptions may be necessary.

1. **Dates:** For date fields requiring a specific day, in the absence of the date and month data, use 1/1/YYYY.
2. **Conversation rates:** Assume the conversion rate during the survey period. If not known, assume the conversion rate at the time the survey is completed.

### Quality

1. **ID number:** This will be pre-defined for entry into DatStat.
2. **Dates:** For date fields requiring a specific day, in the absence of the date and month data, use 1/1/YYYY

### Patient Breakdown

1. **% patients:** For all patient percent and ratio estimates, in the case of an answer containing a fraction of a person, round to the nearest whole number.
2. **Ratio of pre-ART to ART patients**: in the absence of hard numbers, informed estimates based on staff interviews will be used.
3. **Patient Breakdown Table:** In the absence of data to complete the table, the average over time will be used. Use most appropriate trend (i.e. if you have 9 months of data, you can use that for the rest of the time frame).

### Personnel

1. **Absence of hard numbers:** Any data in a given row that was not obtained via records at the facility or interviews of the facility personnel will be documented in the comments column in the grid.
   1. **Cost data:** In the absence of hard numbers for cost data, the average of the previous month’s data will be used.
2. **Personnel grid:** In the absence of sound figures, the following assumptions will be made when completing the personnel grid.
   1. **Local or expat**: assumed to be local.
   2. **Dedicated to facility**: assumed to be dedicated 100% of the time.

### ARVs

1. **Absence of hard numbers:** Any data in a given row that was not obtained via records at the facility or interviews of the facility personnel will be documented in the comments column in the grid.
2. **ARVs grid**:
   1. **Strength, line, pack size, form**: the drug attributes that are assumed to be most commonly used internationally are pre-populated in the table and can be used as a default if the details are unknown.
   2. **Weighted price**: assumed to be central level pricing figures in the absence of facility-level receipts. CHAI pricing will be used in the absence of central level pricing figures.
3. **Regimens**:
   1. **IL/2L**: assumed to be most common line used in the country when not properly documented.
   2. **# patients per regimen at beginning /end of costing period**: in the absence of hard numbers the nearest month’s patient numbers will be used.
   3. **% of total patients per regimen**: In the absence of hard patient numbers, clinician interviews can be used to inform this information. The interviewer may also use some estimates based on ARV consumption data if possible.
4. **Stock-outs:** In the absence of documented figures, number and average length of stock-outs will be estimated based on a) staff interviews or b) most recent data (monthly, quarterly, last kept records, etc).

### Labs

1. **Absence of hard numbers:** Any data in a given row that was not obtained via records at the facility or interviews of the facility personnel will be documented in the comments column in the grid.
2. **Stock-outs:** In the absence of documented figures, number and average length of stock-outs will be estimated based on a) staff interviews or b) most recent data.
3. **Labs grid**:
   1. **Number of tests per year**: in the absence of yearly totals, monthly totals will be added up to sum total lab tests per year. In the absence of unique monthly totals, average monthly totals will be used following verification of this approach with lab/facility manager.
   2. **Percent of tests allocated to HIV**: This assumption will be based on local clinical assessment of likelihood each test will be performed for an HIV patient. Total number of instances for HIV patients, taken as a percentage of total number of tests performed, will be used. In the case of lack of data on total number of tests, HIV patient visits out of total patient visits will be used. In the case of lack of utilization data, total number of HIV patients out of total patients at the facility will be used as a proxy.
   3. **Cost**: Central-level costs of consumables and reagents will be used in the absence of facility-level receipts for consumables and reagents ordered.
4. **Lab equipment grid**:
   1. **Percent of tests allocated to HIV**: This assumption will be based on local clinical assessment of likelihood each test will be performed for an HIV patient. Total number of tests per machine will be assumed to be machine capacity in the absence of number of tests performed information at the facility level. In the absence of local clinical estimates of % machine use for HIV patients, HIV patient visits out of total patient visits will be used. In the case of lack of utilization data, total number of HIV patients out of total patients at the facility will be used as a proxy.
   2. **Year machine was purchased:** In the absence of hard figures, year of the beginning of ART provision at the facility will be used. In the case of an estimate of only a decade (instead of a year), the middle year, e.g. 2005, will be used.
   3. **Unit cost (replacement)**: in the absence of timely cost figures, current local cost estimates will be used. In the absence of local cost estimates, international cost estimates will be used.
   4. **Estimated useful life at time of purchase**: in the absence of hard numbers, estimated useful life will be based on staff estimation of useful life of each machine. In the absence of staff knowledge, a default of 60 months will be applied and verified for each instance with the CHAI Lab Services Team.
   5. **Estimated lifetime cost to maintain**: in the absence of hard numbers, estimated lifetime cost to maintain will be based on staff estimation of useful life of each machine. In the absence of staff knowledge or documentation from maintenance contracts, a default of useful life years times average yearly spend on maintenance will be assumed. Average yearly spend will be obtained through interviews with CHAI lab specialists to determine ideal cost, and local experts to determine whether maintenance is actually performed as required.
   6. **Salvage value at end of depreciation period**: In the absence of hard numbers, a default of zero will be used.
5. **Outsourced tests grid:**
   1. **# tests performed per year:** monthly aggregated data will be used in the absence of total yearly data. In the absence of monthly data, any time-sensitive estimates from facility staff will be used, totaled to equal a year’s data.
   2. **% of tests allocated to HIV:** This assumption will be based on local clinical assessment of likelihood each test will be performed for an HIV patient. In the absence of local clinical estimates of % tests for HIV patients, HIV patient visits out of total patient visits will be used. In the case of lack of utilization data, total number of HIV patients out of total patients at the facility will be used as a proxy.
   3. **Cost**: Central-level costs of consumables and reagents will be used in the absence of facility-level receipts for consumables and reagents ordered.

### Opportunistic Infections

1. **OI Drugs grid:**
   1. **Type of drug:** Standardized drug types have been applied across all countries.
   2. **Pack size:** in the absence of facility-level receipts, pack size will be assumed to be the most commonly ordered pack size, available from the central level.
   3. **% allocated to HIV:** This assumption will be based on local clinical assessment of likelihood each drug will be given to an HIV patient. These data are very difficult to obtain so the focus for all study teams will be cotrimoxazole and isoniazid.
   4. **Initial stock:** In the absence of hard numbers, initial stock and final stock will be assumed to reflect the nearest record’s stock-leveldata, adjusted for rate of consumption where the nearest record is over 1 month from initial/final date.
   5. **Total received in 12 month period**: In the absence of yearly data, aggregated monthly data will be used. In the absence of aggregated monthly data, any time-sensitive data available from staff interviews will be used. In the absence of time-sensitive data, average totals received per drug over time will be used.
   6. **Weighted price**: assumed to be central level pricing figures in the absence of facility-level receipts. International pricing will be used in the absence of central level pricing figures.

### Nutrition

1. **Absence of hard numbers:** Any data in a given row that was not obtained via records at the facility or interviews of the facility personnel will be documented in the comments column in the grid.
2. **Prevalence:** Prevalence of malnutrition in catchment will be assumed to reflect local, regional or national prevalence in the absence of hard figures.
3. **% patients receiving support:** assumed to reflect regional or national prevalence against total number of patients per type per facility in the absence of known percentages. In the absence of known prevalence, data on procurement of nutrition supplies will be used to estimate a patient percentage.
4. **Stock-outs:** In the absence of documented figures, number and average length of stock-outs will be estimated based on a) staff interviews or b) most recent data.
5. **Nutrition grid**:
   1. **Commodity, patient indication, packaging, and pack size**: these drug attributes assumed to be most commonly used internationally when not properly documented.
   2. **Initial stock**: In the absence of hard numbers, initial stock and final stock will be assumed to reflect the nearest month’s stock-level data, adjusted for rate of consumption where the nearest record is over 1 month from initial/final date.
   3. **Total received in 12 month period**: Assumed to reflect aggregated monthly figures in the absence of yearly data. In the absence of aggregated monthly data, any time-sensitive data available from staff interviews will be used. In the absence of time-sensitive data, average totals received per drug over time will be used.
   4. **Weighted price**: assumed to be central level pricing figures in the absence of facility-level receipts. International pricing will be used in the absence of central level pricing figures.

### Other Running Costs

1. **Absence of hard numbers:** Any data in a given row that was not obtained via records at the facility or interviews of the facility personnel will be documented in the comments column in the grid.
2. **Other Running Costs grid:** 
   1. **Detail, subcategory:** These cost attributes to be standardized across all countries and facilities.
   2. **Approximate monthly spend:** In the absence of facility-level receipts, estimates from staff interviews will be used.
   3. **% Allocation to HIV:** Running costs will be allocated based on size (proportion of ART clinic to entire facility), or outpatient visit proportion for those running costs that are affected by patient load.

### Buildings

1. **Rent/ownership:** Building assumed to be owned where not known.
2. **When were the buildings in the HIV clinic constructed?** Assumed to be the year the facility was constructed in the absence of data. Year of construction assumed to reflect known year, in the absence of known year, assumed to reflect middle year (e.g. 2005) of known decade.
3. **Buildings grid:** 
   1. **Detail, subcategory:** These cost attributes to be standardized across all countries and facilities.
   2. **Date completed:** In the absence of a known year, the middle year in a decade will be used (e.g. 2005).
   3. **Method to cost building**: When unit cost per square meter not calculable, the total cost of renovation, building, or project will be used.
   4. **% allocated to HIV**: the assumption employed here will be based on the percent of the total building space dedicated to the ART clinic. For the remaining space, assuming equal use by all patients, HIV patient visits out of total patient visits will be used. In the case of lack of utilization data, total number of HIV patients out of total patients at the facility will be used as a proxy.
   5. **Number of months used in past year**: assumed to be 12 in the absence of data.
   6. **Number of months of total life of building**: Assumed to be 480 in the absence of data.

### Equipment

1. **Equipment grid:** 
   1. **Equipment ID, Subcategory:** These cost attributes to be standardized across all countries and facilities.
   2. **Year of purchase:** In the absence of a known year, the middle year in a decade will be used (e.g. 2005).
   3. **Unit Cost**: When unit cost not documented in receipts at the facility, central-level equipment procurement costs will be employed. When central-level cost not known, internationally accepted figures (current market value) for the most common form of each piece of equipment will be used.
   4. **Depreciation method**: For all equipment, the default depreciation method will be smooth.
   5. **Depreciation period (years):** Assumed 10 years for all large equipment (e.g. anything larger than a microscope), assumed 5 years for all small equipment (e.g. anything smaller than a microscope).
   6. **Salvage value:** Assumed to be 0 in the absence of data.
   7. **% allocated to facility:** assumed to be 100% except in the case of shared equipment. In the case of shared equipment (e.g. vehicles), the % allocated to the facility will be based on estimates from staff.
   8. **% allocated to HIV**: the assumption employed here will be based on the percent of the total equipment used by the ART clinic. All equipment dedicated to the ART clinic will assume 100% allocation. For the remaining equipment, assuming equal use by all patients, HIV patient visits out of total patient visits will be used. In the case of lack of utilization data, total number of HIV patients out of total patients at the facility will be used as a proxy.
   9. **Leased equipment**: all categories in leased equipment table will follow assumptions enumerated above.

# Annex 5: Complete Site Survey Questions

This annex includes a detailed list of all questions to be asked at each facility.

## Survey 1: Facility Information

Facility ID \_\_\_\_\_\_\_\_\_\_\_\_

* Currency code \_\_\_\_\_\_
* Conversion rate per USD \_\_\_\_\_\_\_\_\_\_\_\_ (if required)
* Use oanda.com to calculate the average exchange over the costing period. If another exchange rate is used, document it in the text box here *(comment box)*
* Who provided input or answered questions in this survey? *\*\*This includes both the people filling out the survey (interviewers/us) and the people providing the data (interviewees/facility staff). Phone/Email are not required in DatStat but may be useful to collect\*\**

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| Name | Title | Phone | Email |
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* Please enter the source(s) used to collect the data in this survey *(comment box)*

**Basic Facility Information (NOT ART Specific)**

* Type of facility

*(Clinic, Health Center, Hospital, Other)*

* Rural or Urban?

*(Rural, Urban, Semi/Peri-urban)*

* Level of care

*(Primary, Secondary, Tertiary)*

* Please enter the coordinates of the facility's location.
  + Please enter Latitude (y): \_\_\_\_\_\_\_\_\_\_\_
  + Please enter Longitude (x): \_\_\_\_\_\_\_\_\_\_\_
* Is the facility dedicated to HIV *(Yes/no)*
* What is the population in the catchment area? *(Known: \_\_\_\_\_\_\_, Unknown)*
* What is the total number of outpatient visits in the costing year? *(Known: \_\_\_\_\_\_\_, Unknown)*
* What is the number of inpatient beds? *(Known: \_\_\_\_\_\_\_, Unknown)*
* What is the total number of inpatients admitted in the costing year? *(Known: \_\_\_\_\_\_\_, Unknown)*

**Facility Administration / Supervision and Governance Structure**

* Which of the following best describes the organization that owns this facility (not ART specific):
  + *(National MoH, District/Provincial MOH, NGO: \_\_\_\_\_\_\_\_\_\_\_, Faith-based organization, Private, Other: \_\_\_\_\_\_\_\_\_\_\_\_*
* Is this facility managed by a different organization than owns it (not ART specific)? (Yes/No)
  + If yes, Which of the following best describes the institution that manages this facility?

*(National MoH, District/Provincial MOH, NGO: \_\_\_\_\_\_\_\_\_\_\_, Faith-based organization, Private,*

*Other: \_\_\_\_\_\_\_\_\_\_\_\_\_)*

* Who appoints the facility director (not ART specific)?

(*Management Group, MOH, Donor: \_\_\_\_\_\_\_\_\_\_\_\_ Other:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown)*

* To whom does the facility director report (not ART specific)?

*(Management Group, MOH, Donor: \_\_\_\_\_\_\_\_\_\_\_\_ Other:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown)*

* Is there an elected or appointed governing board for the facility (not ART specific)? *(Elected, Appointed, N/A)*
* Who makes internal budgetary decisions for the facility (not ART specific)?

*(Management Group, Facility Director, MOH, Donor: \_\_\_\_\_\_\_\_\_\_\_\_ Other:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown)*

* On a scale of 1-10, how much influence does the facility (instead of a supporting NGO, regional/provincial MoH, etc) have over the following (1is no influence and 10 is total influence):

*Work schedules of staff at ART clinic \_\_\_\_\_\_*

*How budget is spent on ART clinic \_\_\_\_\_\_*

*The upkeep and aesthetics of the ART clinic \_\_\_\_\_\_*

* Do members of the community have formal or informal ways to contribute/comment/advise the functions of the facility such as Community/Facility Advisory Councils whether formal or informal (not specific to HIV patients or provision of ART). These “councils” would regularly communicate with personnel/leaders from the facility about issues of mutual concern. *(yes/no)*
  1. IF YES
* Which of the following functions does the community advisory council fulfill? Check all that apply and answer the corresponding questions:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Check if this is a function of this group | How many times did they do this function last month? | How many times did they do this function during the costing year? | If unknown, not documented, or functions do not exist, click box here |
| Buy items or award personnel bonuses from an available fund |  |  |  |  |
| Communicate community complaints or thanks to the facility personnel |  |  |  |  |
| Monitor the delivery of ARVs to the facility |  |  |  |  |
| Other: (Please name the function) |  |  |  |  |

* Please complete the management structure table to include information regarding meetings that were held by various supervisory groups associated with the facility.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Number of meetings in last year | Date of Last Meeting (MM/DD/YYYY) | Were minutes recorded? (Yes/No) | If unknown, not documented, or groups do not exist, click box here |
| Facility Management Team |  |  |  |  |
| Staff Meeting |  |  |  |  |
| Community/Facility Advisory Committee |  |  |  |  |
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* Does this facility or do personnel working here supervise or provide technical, financial or administrative assistance to any other lower level facility or its personnel (specifically related to provision of ART or care of HIV patients)? *(yes/no)*
  1. IF YES
     + How many other facilities do personnel from this facility supervise or support? \_\_\_\_\_\_\_\_
     + How many of these supervised facilities offer ART services? \_\_\_\_
     + What type of support does the facility provide to the supervised or supported facility? *(Administrative, Financial management, Patient management (i.e. chart maintained), M&E and data management, Supply chain management of ARVS and other supplies, Capacity management (i.e referred patients, outsourced labs, etc, Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_)*
     + Please complete the Supervision/TA table **FOR ART ONLY**. Include the type of supervision, frequency of visits during the costing year, date of last visit, and then check the boxes of the items that were left for the facility as part of the visit

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Items left for the child facility during supervisory or TA visits | | | | | |
| Name of facility RECEIVING Supervision or TA (MoH, NGO, etc – please specify in space below) | Frequency of Visits in Costing Year | Date of last Visit (MM/DD/YYYY) | Guidelines | Posters or other educational materials | Medical supplies | Non-medical supplies | Registers or forms | Other |
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* Does this facility or do personnel at this facility receive supervision or technical, financial or administrative support from another higher level facility or its personnel, or regional/zonal/national MoH (specifically related to provision of ART or care of HIV patients)? *(yes/no)*
  1. IF YES
     1. How many higher level facilities or offices supervise or support this facility? \_\_\_\_\_\_\_\_\_
     2. What type of support does the facility receive from the higher level supervising or supporting facility?   
        *(Administrative, Financial management, Patient management (i.e. chart maintained), M&E and data management, Supply chain management of ARVS and other supplies, Capacity management (i.e referred patients, outsourced labs, etc, Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_)*
     3. Please complete the Supervision/TA table **FOR ART ONLY**. Include the type of supervision, frequency of visits during the costing year, date of last visit, and then check the boxes of the items that were left for the facility as part of the visit

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Items left for the child facility during supervisory or TA visits | | | | | |
| Name of facility or org PROVIDING Supervision or TA (MoH, NGO, etc – please specify in space below) | Frequency of Visits in Costing Year | Date of last Visit  (MM/DD/YYYY) | Guidelines | Posters or other educational materials | Medical supplies | Non-medical supplies | Registers or forms | Other |
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**ART Services**

* Date ART service provision began at facility *(MM/DD/YYYY): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*
* How many hours a day is the ART clinic open on each of the days of the week?

M\_\_\_\_\_ T\_\_\_\_ W\_\_\_\_\_ TH\_\_\_\_\_ F\_\_\_\_\_ Sa\_\_\_\_\_ Su\_\_\_\_\_\_

* Does the facility receive payments for HIV services (whether from the patient or not)? *(Yes/No)*
  + IF YES
    - Which of the following services does the facility receive payments for? Please include the average amount received per patient visit for each of the categories, if known.
      * Consultation: \_\_\_\_\_\_\_\_\_\_\_\_ ARVs: \_\_\_\_\_\_\_\_\_\_\_\_
      * OIs: \_\_\_\_\_\_\_\_\_\_\_\_ No-ART Clinical care: \_\_\_\_\_\_\_\_\_\_\_\_
      * Lab Services: \_\_\_\_\_\_\_\_\_\_\_\_
      * Other: \_\_\_\_\_\_\_\_\_\_\_\_
* Do any patients have to pay fees for HIV services? *(Yes/No)*
  + IF YES
    - If patients pay fees, which of the following do they pay for? Please include the average amount paid per visit for each of the categories, if known.
      * Consultation: \_\_\_\_\_\_\_\_\_\_\_\_ ARVs: \_\_\_\_\_\_\_\_\_\_\_\_
      * OIs: \_\_\_\_\_\_\_\_\_\_\_\_ No-ART Clinical care: \_\_\_\_\_\_\_\_\_\_\_\_
      * Lab Services: \_\_\_\_\_\_\_\_\_\_\_\_
      * Other: \_\_\_\_\_\_\_\_\_\_\_\_
    - Check from the list below the types of patients that are exempt from paying fees:
      * Children
      * Pregnant women
      * Low-income (defined by country/site-specific threshold)
      * Physically/mentally disabled
      * Other (please specify) \_\_\_\_\_\_\_\_\_\_
      * No one is exempt
* Do ART staff (or the facility) receive any payments that depend on performance? *(Yes/No)*
  + IF YES
    1. When was the last time that personnel or the facility received such payments (DD/MM/YYYY)
    2. For what services do they receive payments (check all that apply and provide the estimated amount for each per patient visit):
       - Consultation: \_\_\_\_\_\_\_\_\_\_\_\_ ARVs: \_\_\_\_\_\_\_\_\_\_\_\_
       - OIs: \_\_\_\_\_\_\_\_\_\_\_\_ No-ART Clinical care: \_\_\_\_\_\_\_\_\_\_\_\_
       - Lab Services: \_\_\_\_\_\_\_\_\_\_\_\_
       - Other: \_\_\_\_\_\_\_\_\_\_\_\_
* Provide any additional comments about pay for performance of a particular facility:  *(Comment)*
* Does the facility test for HIV? *(Yes/No)*
* What is the number of ART outreach sites supported by this facility?

*(Known: \_\_\_\_\_\_\_, Unknown)*

* What HIV prevention services are provided

*(MC, PMTCT, HTC/VTC, STI, Other\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, None)*

* To whom are HIV prevention outreach services are provided? (Check all that apply)

*(Sex workers, MSM, police, Soldiers, Truck drivers, Prisoners, home counseling services, Other:\_\_\_\_\_\_\_\_\_\_\_\_)*

* Please specify primary funding sources for ART, use of funding (e.g. UNITAID/CHAI provide ARVs for peds and 2L, amounting to less than 5% of total budget), approximate share of total budget, and an approximate number of reports required based on donor requirements (i.e. if the donor requires quarterly updates plus monthly progress reports, the reports required per year = 16). Please note that the “approximate share of funding” must total to 100%.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Funding Source | Use of Funding | Approximate Share of Funding | Approximate# of reports required per year from facility to donor | Source |
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Survey 2: Patient Breakdown

Facility ID\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Who provided input or answered questions in this survey? *\*\*This includes both the people filling out the survey (interviewers/us) and the people providing the data (interviewees/facility staff). Phone/Email are not required in DatStat but may be useful to collect\*\**

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Title | Phone | Email |
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* Please enter the source(s) used to collect the data in this survey *(comment box)*
* What is the time period for patient data? *(must be 12 months: \_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_)*

**Initiations**

* \* Does the facility initiate people on ART? *(Yes/No)*
  + IF YES
    - What are the criteria for initiation for adults?

*(CD4 < \_\_\_\_, WHO Stage I-II, WHO Stage III-IV, severe OI (excluding TB), Other)*

* + - What are the criteria for initiation for children?

*(All infants < 12 months, All infants from 12-18 months, All children with WHO stage III or IV, Children less 18-35 mo (any stage) with CD4% less than:\_\_\_\_\_\_\_\_, Children less 36-54 mo (any stage) with CD4% less than:\_\_\_\_\_\_\_\_\_\_, Children greater than 60 months (any stage) with CD4 count less than:\_\_\_\_\_\_\_\_, Other (please specify):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)*

* + - What are the criteria for initiation for pregnant women?

*(CD4 < \_\_\_\_, WHO Stage I-II, WHO Stage III-IV, severe OI (excluding TB), Other)*

* + - During the costing period, did you find any patients who were eligible under the above criteria but did not start their treatment? *(yes/no)*
      * IF YES
        + Of these eligible patients who did not start immediately, how many could not start because of each of the following possible reasons:

*(Your facility had insufficient ARVs, Your facility had insufficient staff, the patient refused to start, Opportunistic illnesses made the patient too sick to start treatment, Power outages or other facility issue preventing the facility to initiate)*

* + - * + For those eligible patients whose start was delayed by insufficient drugs or personnel, how long did they have to wait to be initiated on average? *(# of weeks:\_\_\_\_)*
* Is it a requirement that patients bring a guardian or treatment buddy with them to begin treatment? *(yes/no)*
  + IF NO
    - What percentage of patients DOES bring someone with them when they begin treatment? *(\_\_\_\_\_%)*
* \* Does the number of patients initiated in a month vary by season? *(Yes/No)*
  + IF YES
    - What causes this variation?

*(Harvest, Rainy season, Holidays, Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)*

* Are you able to get monthly patient initiation data disaggregated by Adults and Pediatric? *(yes/no)*
  1. IF YES🡪 complete the disaggregated table, below
  2. IF NO 🡪 complete the aggregated table, below
* Please complete the following table which captures the number of new initiations per month within the costing period. If you are calculating these values based off of other data, please be sure to round the numbers as this table only allows WHOLE NUMBERS. If there are no patients initiated during that month, enter 0.

**DOCUMENTING ASSUMPTIONS**: Please use the following codes to identify the data types and assumptions that were made to identify each line item of ARV costs at this facility. For additional information on what each of these data types includes, please refer to the study protocol document. Use the letter of the appropriate assumption type followed by a “:” and then list the column numbers the data type refers to I .e. 1-3. If more than one data type applies to the same row but different columns, separate them by a comma and NO SPACE. Column numbers are located above each relevant column.

For example:

Coded Assumptions*: a:(1-3),d:(4-5) (translation = columns 1-3 are primary data and columns 4 and 5 are primary and facility proxies)*

Free Text Assumptions*: primary data collected from lab records, context proxies based off of data from another health center in the same district*

a: Primary

b: Primary + Context proxy (partial primary)

c: Primary + Interview (partial primary)

d: Primary + Facility proxy (partial primary)

e: Primary + Context proxy + Interview

f: Interview

g: Context proxy + interview

h: Context proxy

i: Facility proxy + Interview

j: Facility proxy

k: Bottom-up

l: Other

Disaggregated

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Patient Type | Month 1 | Month 2 | Month 3 | Month 4 | Month 5 | Month 6 | Month 7 | Month 8 | Month 9 | Month 10 | Month 11 | Month 12 | Coded Assumpt-ions | Free Text Assumptions |
| Adult |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Pediatric |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Aggregated

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Patient Type | Month 1 | Month 2 | Month 3 | Month 4 | Month 5 | Month 6 | Month 7 | Month 8 | Month 9 | Month 10 | Month 11 | Month 12 | Coded Assumpt-ions | Free Text Assumptions |
| Aggregated Patient Initiations |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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| --- |
| General Assumptions - Please include any assumptions that were not included in the table or that require additional explanations: |

* \* Which kinds of patients does this facility sometimes refer to a higher level or more specialized facility for ART initiation?

*(CD4< \_\_\_\_ WHO Stage I-II WHO Stage III-IV*

*Stable Adults Stable Children Adults with pre-existing illnesses Children with pre-existing illnesses OI-severe case TB*

*KS Complex inpatient cases Any inpatient cases*

*2nd line patients with complex cases request from patient Other:\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*No one is referred)*

* + *IF NOT ‘NO ONE IS REFERRED’*
    - How far away is the referral facility? *(\_\_\_\_\_\_\_\_km)*
* What percentage of ART patients were referred for inpatient care in the last month?

*(0-5%, 5-10%, 10-30%, 30-50%, >50%, unknown)*

**Pre-ART**

* Of monthly initiations, what percentage is migrated from Pre-ART to ART (as opposed to new patients who started ART immediately)?

*(Known: \_\_\_\_\_\_\_\_\_%, Unknown)*

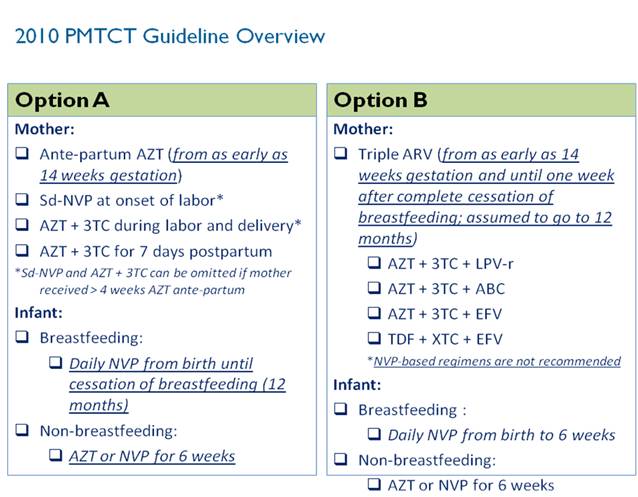
* What is the proportion of pre-ART patients that are children? i.e. What percentage of pre-ART patients are less than or equal to 15 years of age (or the cutoff in your country)?

*(Known: \_\_\_\_\_\_\_\_\_%, Unknown)*

* \* Are you able to get the exact numbers for pre-ART patients at this facility? *(Yes/No)*
  1. If NO:
     1. What is the proportion of pre-ART patients to ART patients? i.e. For every 1 ART patient, how many pre-ART patients are receiving services at the facility? Enter a decimal or whole number to denote the proportion per ART patient. This can be an estimate if actual figures are not known. The maximum value here is 10. For example, if there are 3 pre-ART patients to every 1 ART patients at the facility, enter 3 here. This will be used to calculate an approximate number of patient years for Pre-ART patients at the facility *(\_\_\_\_\_\_\_\_\_\_\_# per ART patients)*

**PMTCT**

* \* Does the facility provide PMTCT services to pregnant women? This specifically includes (but is not limited to) treatment options such as single dose NVP, AZT/3TC, AZT/NVP, HAART as prophylaxis, and/or HAART for life. *(Yes/No)*
  + IF YES
    - Does the facility follow the new 2010 PMTCT WHO guidelines? *(Yes, No, Unknown)*



* + - * *IF YES*
        + Do you have the paper guideline (request to see guideline if possible)? *(yes/no)*
    - Which drugs are commonly prescribed as part of the PMTCT program (not including HAART for life)? *(AZT, NVP, AZT-3TC, AZT-3TC-LPV/r,AZT-3TC-ABX, AZT-3TC-EFV, TDF-XTC-EFV, Other : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)*
    - How many women receive PMTCT services on average each month? *(\_\_\_\_\_\_\_\_\_\_)*
    - What regimen(s) is most commonly provided to pregnant women on HAART for life?

*(Select 3 most common regiments based off of ARV regimens)*

TDF/3TC/EFV TDF/FTC/EFV TDF/3TC/NVP TDF/FTC/NVP AZT/3TC/EFV AZT/3TC/NVP D4T/3TC/NVP D4T/3TC/EFV TDF/3TC/LPV/r TDF/3TC/ATV/r ABC/ddI/LPV/r ABC/ddI/ATV/r

ABC/ddI/IDV/r d4T/ddI/LPV/r AZT/ddI/ATV/r AZT/3TC/LPV/r Other

* + - How many women at the facility are on HAART for life? *(\_\_\_\_\_\_\_\_\_\_)*
* Are infants receiving NVP prophylaxis during breastfeeding? *(Yes/no) Comment: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

**Attrition**

* After missing how many months of treatment is a patient is considered "lost to follow up"? *(\_\_\_\_\_\_\_\_\_# of months)*
* Can you get the rates of people who are no longer on treatment (attrition) broken down by the categories: transfer, lost to follow up, stop, death? (*Yes/No)* 
  + IF NO:
    - \* What is the number or rate of people who are no longer on treatment in the most recent one year period (attrition)? *(Known Percentage\_\_\_\_\_\_\_\_\_\_%, Known Number:\_\_\_\_\_\_\_\_, Unknown)*
      1. IF KNOWN:
         1. Which categories are included in that attrition rate? *(Transfer, Default, Stop, Death)*
  + IF YES:
    - What percentage or number of ART patients have **transferred** out of the facility in the most recent year where data is available? *(Known Percentage\_\_\_\_\_\_\_\_\_\_%, Known Number:\_\_\_\_\_\_\_\_, Unknown)*
    - What percentage or number of ART patients have become **lost to follow up** at this facility in the most recent year where data is available?

*(Known Percentage\_\_\_\_\_\_\_\_\_\_%, Known Number:\_\_\_\_\_\_\_\_, Unknown)*

* + - What percentage or number of ART patients has willingly **stopped** treatment at this facility in the most recent year where data is available?

*(Known Percentage\_\_\_\_\_\_\_\_\_\_%, Known Number:\_\_\_\_\_\_\_\_, Unknown)*

* + - What percentage or number of ART patients have **died** at this facility in the most recent year where data is available?

*(Known Percentage\_\_\_\_\_\_\_\_\_\_%, Known Number:\_\_\_\_\_\_\_\_, Unknown)*

* Over which timeframe does this attrition refer to?

*(Cumulative, The costing period, By quarter:\_\_\_\_\_\_\_\_\_\_\_\_\_, by month:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Other:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)*

* \*Do you attempt to contact patients who have defaulted? *(yes/no)*
  1. IF YES
     1. The facility attempts to contact patients who have defaulted in the following ways: (check all that apply):

*Physically visit patient/guardian home*

*Call/SMS patient or guardian*

*Inquire with patient who may be a neighbor or relative*

*Other*

* \* Are there indicators available at the facility to measure early mortality (patients who die within the first several months of ART initiation)? *(yes/no)*
  1. IF YES
     1. Please enter the number of patients who have died within the parameters listed below during the costing year, if available:
        1. Within the 1st month of being initiated on ART: \_\_\_\_\_\_\_\_\_\_\_
        2. Within the 2nd month of being initiated on ART:\_\_\_\_\_\_\_\_\_\_\_
        3. Within the 3rd month of being initiated on ART:\_\_\_\_\_\_\_\_\_\_\_
        4. After the 3rd month of being initiated on ART:\_\_\_\_\_\_\_\_\_\_\_\_
* \*Do patients at this facility have access to a patient support network or expert patients to help them adhere to ART? *(Yes/No)*
  1. IF YES
     1. Does this support network focus on nutrition issues? *(Yes/No)*
     2. What percentage of patients has access to support services? \_\_\_\_\_\_\_\_%
     3. What percentage of patients utilizes the support services? \_\_\_\_\_\_\_\_\_%

**Patient Breakdown and Visit Information**

* Please complete the Patient Breakdown table.  For each patient type, enter the total patients on treatment at the facility at the end of each month. For pre-ART patients, note the number of patients registered as pre-ART at the end of each month. .  If you are calculating these values based off of other data, please be sure to round the numbers as this table only allows WHOLE NUMBERS. If there are no patients initiated during that month, enter 0.

**DOCUMENTING ASSUMPTIONS**: Please use the following codes to identify the data types and assumptions that were made to identify each line item of ARV costs at this facility. For additional information on what each of these data types includes, please refer to the study protocol document. Use the letter of the appropriate assumption type followed by a “:” and then list the column numbers the data type refers to I .e. 1-3. If more than one data type applies to the same row but different columns, separate them by a comma and NO SPACE. Column numbers are located above each relevant column.

For example:

Coded Assumptions*: a:(1-3),d:(4-5) (translation = columns 1-3 are primary data and columns 4 and 5 are primary and facility proxies)*

Free Text Assumptions*: primary data collected from lab records, context proxies based off of data from another health center in the same district*

a: Primary

b: Primary + Context proxy (partial primary)

c: Primary + Interview (partial primary)

d: Primary + Facility proxy (partial primary)

e: Primary + Context proxy + Interview

f: Interview

g: Context proxy + interview

h: Context proxy

i: Facility proxy + Interview

j: Facility proxy

k: Bottom-up

l: Other

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Patient Type | Month 1 | Month 2 | Month 3 | Month 4 | Month 5 | Month 6 | Month 7 | Month 8 | Month 9 | Month 10 | Month 11 | Month 12 | Coded Assumptions | Free Text Assumptions |
| Pre-ART |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Adult 1L |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Adult 2L |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ped 1L |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ped 2L |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|  |
| --- |
| General Assumptions - Please include any assumptions that were not included in the table or that require additional explanations: |

* Please complete the following table regarding the frequency of visits and length of visit by patient type. Frequency of Visits represents the calculated average number of visits in a year and the Length of Visits represents the calculated average time spent per visit (minutes). Please include both visits for consultations (time spent with clinical staff) and pharmacy (time spent to pick up medications). This will be used to help inform allocation calculations.

**\*\*If the frequency of visits or the length of visits varies WITHIN a patient type, please calculate the AVERAGE per patient type. Please be sure to include your assumptions in the free text assumptions column.**

EXAMPLE: If a facility has 100 Adult 1st Line patients and 50% visit the clinic monthly (12 visits per year) and 50% visit the clinic bimonthly (6 visits per year), the average frequency of visits for Adult 1st line patients would be 9 🡪 [(100\*.5\*12)+(100\*.5\*6)]/100 = 9.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Pre-ART | Adult 1L | Adult 2L | Pediatric 1L | Pediatric 2L | Free Text Assumptions |
| Frequency of Consultation Visits (avg per year) |  |  |  |  |  |  |
| Length of Consultation Visits (avg minutes per visit) |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| Frequency of Pharmacy Visits (avg per year) |  |  |  |  |  |  |
| Length of Pharmacy Visits (avg minutes per visit) |  |  |  |  |  |  |

|  |
| --- |
| General Assumptions - Please include any assumptions that were not included in the table or that require additional explanations: |

* \* Does the facility provide nurse-led treatment? *(Yes/No)*
  + IF YES
    - Have any nurses providing treatment been training on NiMART if applicable? *(yes, no, N/A)*
    - What components of ART are nurses allowed to perform (check all that apply)?

*(Staging, Initiation, Routine Clinical Monitoring, Blood draws for CD4, Other:\_\_\_\_\_\_\_\_\_\_\_\_)*

* + - What oversight does a doctor provide during nurse initiation? *(free text)*
* How are patient charts stored at this facility?

*(by Date of Birth, by Date of Initiation, in Alphabetical Order, by Patient Type (adults/peds), by Line (1st line/2nd line), by Status (active, inactive, transfer, default, etc), Other)*

* + IF OTHER
    - Please explain how patient charts are stored:

## Survey 3: ARVs

Facility ID \_\_\_\_\_\_\_\_\_\_\_\_

* Currency code \_\_\_\_\_\_
* Conversion rate per USD \_\_\_\_\_\_\_\_\_\_\_\_
* Use oanda.com to calculate the average exchange over the costing period. If another exchange rate is used, document it in the text box here *(comment box)*
* Who provided input or answered questions in this survey? *\*\*This includes both the people filling out the survey (interviewers/us) and the people providing the data (interviewees/facility staff). Phone/Email are not required in DatStat but may be useful to collect\*\**

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Title | Phone | Email |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

* Please enter the source(s) used to collect the data in this survey *(comment box)*
* What is the time period for receipt data? *(must choose a 12-month time period)\_\_\_\_\_\_\_\_\_\_\_ - \_\_\_\_\_\_\_\_\_*
* Interviewer: Does the facility have a dedicated space for ARV storage? *(Yes/No)*
* Interviewer: Is the ARV storage space an appropriate temperature (between 2-30 C for most drugs)? *(Yes/No)*
* Interviewer: Is the building infrastructure where the ARV storage space is housed in good condition? 1-very poor, 5-excellent
  + - *Please rate on a scale of 1-5. \_\_\_\_\_\_\_\_\_*
* Does it have a fridge if storing LPV/r or other drugs requiring refrigeration? *(Yes/No)*
* \* Are buffer stocks held at facility? *(Yes/No)*
  + IF YES
    - How many months of buffer stock should be held at the facility? \_\_\_\_\_\_\_\_
    - How many months of buffer stocks are present (estimate from respondent)? *\_\_\_\_\_\_\_\_\_\_*
    - Does the buffer stock ever get used because of low supply? *(Yes/No)*
* Who determines the quantity of ARVs required and places the order for the facility   
  *(Someone at the facility, Someone external to the facility such as the Central Medical Store or MoH)*
* What proportion of ARVs are typically acquired from the following sources:   
  *(National Depot, Regional/Provincial Depot, District Hospital, Neighboring Facility: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Donor: \_\_\_\_\_\_\_\_\_\_\_\_\_, Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)*
* Who manages stock levels at the costing facility?   
  *(Nurse, Pharmacist, Dispenser, Nurse Aide, Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)*
* Is this facility required to report stock levels, consumption, etc. back to the supplying site or central medical supply? *(Yes/No)*
* \* Has the facility experienced stock outs in the past year *(Yes/No)*
  + IF YES
    - How often did the facility experience stock outs in the costing year? *(\_\_\_\_\_\_\_\_\_\_)*
    - What is the average duration of a stock out in the costing year? *(\_\_\_\_\_\_\_\_\_days)*
    - What ARVs have experienced stock outs? *(Choose up to 5 from drop down lists)*
    - Does the facility acquire supplies from neighboring facilities to resupply during a stock out until orders are received? *(Yes/No)*
    - \* Have stock outs ever disrupted treatment for patients? *(Yes/No)*
      * IF YES
        + Are patients referred to another facility to collect ARVs? *(Yes/No)*
        + Are patients given smaller refills to ensure adequate stock i.e. 1 week instead of 1 month? *(yes/no)*
        + Are patients told to reduce the dose they are taking until stocks become available *(Yes/No)*
        + Are patients switched to a different regimen? *(Yes/No)*
* \* Did ARVs expire at the facility during the costing year? *(Yes/No)*
  + IF YES
    - What ARVs have expired? *(Choose up to 5 from drop down lists)*
    - How many times did this occur during the costing year *(\_\_\_\_\_\_\_\_\_\_\_\_/yr)*
    - On average, what quantity typically expires? (Please choose the most representative unit of measure and specify the quantity).

*# of pills: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,*

*# of packs:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*# of months of stock:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*approximate % of overall quantity:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*other:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

* Below is a table to capture ARV costs. Please complete the table for adult and pediatric regimens consumed per facility per month, selecting the type, strength, line, pack size, and form. At the bottom are tables for pediatric and adult regimen distribution, please fill out with as much data as is available per facility. FDCs and regimens not listed in the defaults can be filled in free text fields at the end of each grid.

**DOCUMENTING ASSUMPTIONS**: Please use the following codes to identify the data types and assumptions that were made to identify each line item of ARV costs at this facility. For additional information on what each of these data types includes, please refer to the study protocol document. Use the letter of the appropriate assumption type followed by a “:” and then list the column numbers the data type refers to I .e. 1-3. If more than one data type applies to the same row but different columns, separate them by a comma and NO SPACE. Column numbers are located above each relevant column.

For example:

Coded Assumptions*: a:(1-3),d:(4-5) (translation = columns 1-3 are primary data and columns 4 and 5 are primary and facility proxies)*

Free Text Assumptions*: primary data collected from lab records, context proxies based off of data from another health center in the same district*

a: Primary

b: Primary + Context proxy (partial primary)

c: Primary + Interview (partial primary)

d: Primary + Facility proxy (partial primary)

e: Primary + Context proxy + Interview

f: Interview

g: Context proxy + interview

h: Context proxy

i: Facility proxy + Interview

j: Facility proxy

k: Bottom-up

l: Other

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | | 13 | | 14 | | 15 | | 16 | | 17 | | 18 | 19 | 20 |  |  |
| FDC | Strength | Pack | Form | Allocation to HIV (ART and not PMTCT or other) | Type | % to peds (if ‘adult/ped)) | Line | % to 2L (if mix) | Initial Stock | Packs received by month | | | | | | | | | | | | | | | | | | | | | | | Final Stock | Weighted Price | Coded Assumptions | Free Text Assumptions |
| **1** | **2** | | **3** | | **4** | | **5** | | **6** | | **7** | | **8** | | **9** | | **10** | | **11** | | **12** | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| d4T/3TC/NVP | 30/150/200mg | 60 | TABLETS |  | ADULT |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Stavudine/Lamivudine | 30/150mg | 60 | TABLETS |  | ADULT |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Zidovudine/Lamivudine/Nevirapine | 300/150/200mg | 60 | TABLETS |  | ADULT |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Zidovudine/Lamivudine | 300/150mg | 60 | TABLETS |  | ADULT |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Zidovudine/Lamivudine /Abacavir | 300/150/300mg | 60 | TABLETS |  | ADULT |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Tenofovir/Lamivudine | 300/300mg | 30 | TABLETS |  | ADULT |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Tenofovir/Lamivudine/Efavirenz | 300/300/600mg | 30 | TABLETS |  | ADULT |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Abacavir/Lamivudine | 600/300mg | 30 | TABLETS |  | ADULT |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Stavudine/Lamivudine/Nevirapine | 6/30/50mg | 60 | TABLETS |  | PEDIATRIC |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Stavudine/Lamivudine/Nevirapine | 12/60/100mg | 60 | TABLETS |  | PEDIATRIC |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Stavudine/Lamivudine | 6/30mg | 60 | TABLETS |  | PEDIATRIC |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Stavudine/Lamivudine | 12/60mg | 60 | TABLETS |  | PEDIATRIC |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Zidovudine/Lamivudine/Nevirapine | 60/30/50mg | 60 | TABLETS |  | PEDIATRIC |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Zidovudine/Lamivudine | 60/30mg | 60 | TABLETS |  | PEDIATRIC |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Zidovudine/Lamivudine/Abacavir | 60/30/60mg | 60 | TABLETS |  | PEDIATRIC |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Abacavir/Lamivudine | 60/30mg | 120 | TABLETS |  | PEDIATRIC |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Abacavir | 300mg | 60 | TABLETS |  | ADULT |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Didanosine | 125mg | 30 | TABLETS |  | ADULT |  | SECOND |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Didanosine | 200mg | 30 | TABLETS |  | ADULT |  | SECOND |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Didanosine | 250mg | 30 | TABLETS |  | ADULT |  | SECOND |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Efavirenz | 600mg | 30 | TABLETS |  | ADULT |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Lamivudine | 150mg | 60 | TABLETS |  | ADULT |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Lopinavir / Ritonavir | 200/50mg | 120 | TABLETS |  | ADULT |  | SECOND |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Stavudine | 30mg | 60 | TABLETS |  | ADULT |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Zidovudine | 300mg | 60 | TABLETS |  | ADULT |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Didanosine | 100mg |  | TABLETS |  | ADULT/PED. |  | SECOND |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Nevirapine | 200mg | 60 | TABLETS |  | ADULT/PED. |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Abacavir | 20mg / ml | 240ml | SYRUP |  | PEDIATRIC |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Abacavir | 60mg | 60 | TABLETS |  | PEDIATRIC |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Didanosine | 10mg / ml |  | SYRUP |  | PEDIATRIC |  | SECOND |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Didanosine | 25mg |  | TABLETS |  | PEDIATRIC |  | SECOND |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Didanosine | 50mg |  | TABLETS |  | PEDIATRIC |  | SECOND |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Efavirenz | 30mg / ml | 30 | SYRUP |  | PEDIATRIC |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Efavirenz | 50mg |  | TABLETS |  | PEDIATRIC |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Efavirenz | 100mg |  | TABLETS |  | PEDIATRIC |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Efavirenz | 200mg | 90 | TABLETS |  | PEDIATRIC |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Efavirenz | 200mg - scored | 90 | TABLETS |  | PEDIATRIC |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Lamivudine | 50mg / 5ml | 240ml | SYRUP |  | PEDIATRIC |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Lopinavir / Ritonavir | 80+20mg / ml |  | SYRUP |  | PEDIATRIC |  | SECOND |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Lopinavir / Ritonavir | 100/25mg | 120 | TABLETS |  | PEDIATRIC |  | SECOND |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Nevirapine | 50mg / 5ml | 240ml | SYRUP |  | PEDIATRIC |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Stavudine | 1mg / ml | 200ml | SYRUP |  | PEDIATRIC |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Stavudine | 15mg | 60 | TABLETS |  | PEDIATRIC |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Stavudine | 20mg | 60 | TABLETS |  | PEDIATRIC |  | FIRST |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Zidovudine | 50mg / 5ml | 240ml | SYRUP |  | PEDIATRIC |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Zidovudine | 60mg |  | TABLETS |  | PEDIATRIC |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Zidovudine | 100mg | 100 | TABLETS |  | PEDIATRIC |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Tenofovir | 300mg | 30 | TABLETS |  | ADULT |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |
| Zidovidine | 300mg | 60 | TABLETS |  | ADULT |  | MIX |  |  |  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |  |

|  |
| --- |
| General Assumptions: Please include any assumptions that were not included in the table above or that require additional explanations. |

* Please complete the adult patient regimen table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Adult regimens | 1L/2L | # of patients per regimen at beginning of costing period | # of patients per regimen at end of costing period | Current % of total patients per regimen |
|
| TDF/3TC/EFV |  |  |  |  |
| TDF/FTC/EFV |  |  |  |  |
| TDF/3TC/NVP |  |  |  |  |
| TDF/FTC/NVP |  |  |  |  |
| AZT/3TC/EFV |  |  |  |  |
| AZT/3TC/NVP |  |  |  |  |
| D4T/3TC/EFV |  |  |  |  |
| D4T/3TC/NVP |  |  |  |  |
| TDF/3TC/LPV/r |  |  |  |  |
| TDF/3TC/ATV/r |  |  |  |  |
| ABC/ddI/LPV/r |  |  |  |  |
| ABC/ddI/ATV/r |  |  |  |  |
| ABC/ddI/IDV/r |  |  |  |  |
| d4T/ddI/LPV/r |  |  |  |  |
| AZT/ddI/ATV/r |  |  |  |  |
| AZT/3TC/LPV/r |  |  |  |  |

* Please complete thePediatric Patient regimen table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pediatric regimens | 1L/2L | # of patients per regimen at beginning of costing period | # of patients per regimen at end of costing period | Current % of total patients per regimen |
|
| TDF/3TC/EFV |  |  |  |  |
| TDF/FTC/EFV |  |  |  |  |
| TDF/3TC/NVP |  |  |  |  |
| TDF/FTC/NVP |  |  |  |  |
| AZT/3TC/EFV |  |  |  |  |
| AZT/3TC/NVP |  |  |  |  |
| D4T/3TC/EFV |  |  |  |  |
| D4T/3TC/NVP |  |  |  |  |
| TDF/3TC/LPV/r |  |  |  |  |
| TDF/3TC/ATV/r |  |  |  |  |
| ABC/ddI/LPV/r |  |  |  |  |
| ABC/ddI/ATV/r |  |  |  |  |
| ABC/ddI/IDV/r |  |  |  |  |
| d4T/ddI/LPV/r |  |  |  |  |
| AZT/ddI/ATV/r |  |  |  |  |
| AZT/3TC/LPV/r |  |  |  |  |

|  |
| --- |
| General Assumptions: Please include any assumptions that were not included in the table above or that require additional explanations. |

1. \* Each subcategory of ARVs is allocated 100% to the ARV SDA by default. Would you like to change this allocation to include other allocations such as a percentage allocated to supply chain? *(Yes/No)*
   * IF YES
     + Please complete the SDA AllocationTable. The default is 100% in ARVs and the allocations will likely only be between ARVs and SCM

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Subcategory | ARVs | Clinical Care | Lab Services | SCM | Outreach | Training | M&E / HMIS | Facility Admin & Mgmt | Prog Mgmt and OH | Total |
| Adult Drugs | | | | | | | | | | |
| A-First Line |  |  |  |  |  |  |  |  |  |  |
| A-Second Line |  |  |  |  |  |  |  |  |  |  |
| A-Mix (Dual Use) |  |  |  |  |  |  |  |  |  |  |
| Pediatric Drugs | | | | | | | | | | |
| P-First Line |  |  |  |  |  |  |  |  |  |  |
| P-Second Line |  |  |  |  |  |  |  |  |  |  |
| P-Mix (Dual Use) |  |  |  |  |  |  |  |  |  |  |
| Adult and Pediatric Drugs | | | | | | | | | | |
| A/P-First Line |  |  |  |  |  |  |  |  |  |  |
| A/P-Second Line |  |  |  |  |  |  |  |  |  |  |
| A/P-Mix (Dual Use) |  |  |  |  |  |  |  |  |  |  |

|  |
| --- |
| General assumptions for ARV SDA allocations |

* Which NGO(s) provide technical assistance for ARV reporting, stock management, etc? Please fill in table below.

|  |  |  |  |
| --- | --- | --- | --- |
| Name of NGO | Is the TA onsite or offsite | Does the NGO have authority to influence management of the ARV stock? | How many visits have been made in the past year to provide assistance? (if offsite) |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

## Survey 4: Opportunistic Infections

Facility ID \_\_\_\_\_\_\_\_\_\_\_\_

* Currency code \_\_\_\_\_\_
* Conversion rate per USD \_\_\_\_\_\_\_\_\_\_\_\_
* Use oanda.com to calculate the average exchange over the costing period. If another exchange rate is used, document it in the text box here *(comment box)*
* Who provided input or answered questions in this survey? *\*\*This includes both the people filling out the survey (interviewers/us) and the people providing the data (interviewees/facility staff). Phone/Email are not required in DatStat but may be useful to collect\*\**

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Title | Phone | Email |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Cotrimoxazole**

* \* Is there a guideline available which specifies when an HIV positive patient (whether or not on ART) should be given CTX prophylaxis (request to see guideline if possible else respondent answer is sufficient)? (yes, no)
  + IF YES
    - Is the guideline always followed by the facility? *(yes, no (please explain): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)*
    - What percentage of patients adhere to what they should according to their clinical status and the guideline? *(known: \_\_\_\_\_\_\_, unknown)*
* Is Cotrimoxazole given to HIV patients as prophylaxis before initiating treatment? *(Yes/No)*
* Is Cotrimoxazole given to HIV patients that have initiated ART?

*(All patients when initiated, Only patients with CD4 < \_\_\_\_\_\_\_, Not given to patients at initiation,*

*Other (please explain):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)*

* Please complete the table below and fill in the percent of patients of the types specified that currently receive CTX prophylaxis at the facility. If the value is unknown, leave it blank. If the value is 0%, enter 0%.

|  |  |  |
| --- | --- | --- |
| Patient Type | On ART | HIV+ but not yet on ART (pre-ART) |
| Adults |  |  |
| Pediatric |  |  |

* What percentage of the time is Cotrimoxazole refilled with ARV refills? i.e. does the ART patient always take Cotrimoxazole with their ARVs? *(\_\_\_\_\_\_\_\_)*
* Has the facility experienced stock outs of cotrim in the costing year? *(Yes/No)*
  + *IF YES*
    - Which patients get priority for cotrim when stock is limited

*(Adults, Pediatric, Low CD4, Pregnant Women, Poorest, Other\_\_\_\_\_\_\_\_\_\_\_\_\_)*

* + - What was the duration of the stock out (in days) \_\_\_\_\_\_\_\_\_\_\_

**INH Prophylaxis**

* \* Is INH prophylaxis provided at this facility for any patient who tests positive for HIV?
  + IF No – SKIP ENTIRE SECTION
  + IF YES
    - Is there a guideline available which specifies when an HIV positive patient (whether or not on ART) should be given INH prophylaxis? *(Yes/No)*
      * IF YES
        + Is the guideline always followed by the facility? *(yes, no: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)*
        + What percentage of patients adhere to what they should according to their clinical status and the guideline? *(known: \_\_\_\_\_\_\_, unknown)*
* Is Isoniazid given to HIV patients as prophylaxis before initiating treatment (check all that apply)? *(Adults, children, neither)*
* Is Isoniazid given to HIV patients that have initiated ART?

*All patients when initiated*

*Only patients with CD4 < \_\_\_\_\_\_*

*Not given to patients at initiation*

*Other (please explain)*

* Please complete the table below and fill in the percent of patients of the types specified that currently receive INH prophylaxis at the facility. If the value is unknown, leave it blank. If the value is 0%, enter 0%.

|  |  |  |
| --- | --- | --- |
| Patient Type | On ART | HIV+ but not yet on ART (pre-ART) |
| Adults |  |  |
| Pediatric |  |  |

* What percentage of the time is Isoniazid refilled with ARV refills? i.e. does the ART patient always take Isoniazid with their ARVs? *(\_\_\_\_\_\_\_)*
* Has the facility experienced stock outs of Isoniazid in the costing period? *(Yes/No)*
  + *IF YES*
    - Which patients get priority for Isoniazid when stock is limited

*(Adults, Pediatric, Low CD4, Pregnant Women, Poorest, Other\_\_\_\_\_\_\_\_\_)*

* + - What was the duration of the stock out (in days) \_\_\_\_\_\_\_

**Treatment of Opportunistic Infections**

* Does the facility treat ANY opportunistic infections? *(Yes/No)*
* Does the facility refer patients to another facility for complicated or severe OIs? *(Yes/No)*

Please identify the five most common OIs for ART patients, whether they are treated at the facility, or referred for treatment elsewhere.

|  |  |  |  |
| --- | --- | --- | --- |
|  | What are the most common OIs for ART patients in this facility (Check all that apply) | Which OIs are treated within the facility? (check all that apply) | Which OIs are most commonly referred to another facility? (check all that apply) |
| Pneumocystis Pneumonia |  |  |  |
| Toxoplasma gondii Encephalitis |  |  |  |
| Cryptosporidiosis |  |  |  |
| Microsporidiosis |  |  |  |
| Tuberculosis |  |  |  |
| Disseminated Mycobacterium avium Complex Disease |  |  |  |
| Bacterial Respiratory Disease |  |  |  |
| Bacterial Enteric Infections (Salmonellosis, Shigellosis, Campylobacteriosis) |  |  |  |
| Bartonellosis |  |  |  |
| Syphilis |  |  |  |
| Mucocutaneous Candidiasis |  |  |  |
| Cryptococcosis |  |  |  |
| Histoplasmosis |  |  |  |
| Coccidioidomycosis |  |  |  |
| Aspergillosis |  |  |  |
| Cytomegalovirus Disease |  |  |  |
| Herpes Simplex Virus Disease |  |  |  |
| HHV-6 and HHV-7 Disease |  |  |  |
| Varicella-Zoster Virus Diseases |  |  |  |
| Human Herpesvirus-8 Disease (KS) |  |  |  |
| Human Papillomavirus Disease |  |  |  |
| Hepatitis B Virus Infection |  |  |  |
| Hepatitis C Virus Infection |  |  |  |
| Progressive Multifocal Leukoencephalopathy/JC Virus Infection |  |  |  |
| Malaria |  |  |  |
| Leishmaniasis |  |  |  |
| Isosporiasis |  |  |  |
| Other (please specify) |  |  |  |
| Other (please specify) |  |  |  |
| Other (please specify) |  |  |  |

* Please complete the following question and table to capture stock and unit cost for OI drugs. First, select the 12-month period for which stock data will be captured. In the table below, document initial stock, total receipts for the relevant 12-month period, and final stock. Allocate each drug appropriately to HIV, based on the estimated percentage of that drug used to treat ART patients.

**For example:**   
Coded Assumptions:  *a:(1-3),d:(4-5)  (translation = columns 1-3 are primary data and columns 4 and 5 are primary and facility proxies)*  
Free Text Assumptions:  *primary data collected from lab records, context proxies based off of data from another health center in the same district*

a: Primary b: Primary + Context proxy (partial primary)

c: Primary + Interview (partial primary) d: Primary + Facility proxy (partial primary)

e: Primary + Context proxy + Interview f: Interview

g: Context proxy + interview h: Context proxy

i: Facility proxy + Interview j: Facility proxy

k: Bottom-up l: Other

* What is the time period for patient data? *(must be a full 12 months)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 1 | 2 | 3 | 4 | 5 |  |  |
| Drug Name | Type of Drug | Pack Size | % Allocation to HIV | Initial Stock | Total received in 12 month period | Final Stock | Weighted Price (per pack) | Coded Assumptions | Free Text Assumptions |
| Acyclovir 200MG/tab TABLET (PO) | Antiviral |  |  |  |  |  |  |  |  |
| Acyclovir 400MG/tab TABLET | Antiviral |  |  |  |  |  |  |  |  |
| Albendazole 20MG/ml SUSPEN (PO) | Antiparasitic |  |  |  |  |  |  |  |  |
| Albendazole 400MG/tab TABLET (PO) | Antiparasitic |  |  |  |  |  |  |  |  |
| Amoxicillin-clavulanic acid 25MG+6MG/ml SUSPEN (PO) | Antibiotic |  |  |  |  |  |  |  |  |
| Amoxicillin-clavulanic acid 50MG+12MG/ml SUSPEN (PO) | Antibiotic |  |  |  |  |  |  |  |  |
| Amoxicilline 25MG/ml SUSPEN (PO) | Antibiotic |  |  |  |  |  |  |  |  |
| Amoxicilline 250MG/tab TABLET (PO) | Antibiotic |  |  |  |  |  |  |  |  |
| Amoxicilline 500MG/tab TABLET (PO) | Antibiotic |  |  |  |  |  |  |  |  |
| Amoxicilline+Clavulinic acid 625MG/cap CAP (PO) | Antibiotic |  |  |  |  |  |  |  |  |
| Amitriptyline 25MG/tab TABLET (PO) | Antidepressant |  |  |  |  |  |  |  |  |
| Amphotericin b 50MG/vial VIAL (INJ) | Antifungal |  |  |  |  |  |  |  |  |
| Ceftriaxone 1G/vial VIAL (INJ) | Antibiotic |  |  |  |  |  |  |  |  |
| Ciprofloxacin 250MG/tab TABLET (PO) | Antibiotic |  |  |  |  |  |  |  |  |
| Ciprofloxacin 500MG/tab TABLET (PO) | Antibiotic |  |  |  |  |  |  |  |  |
| Clindamycin 150MG/tab TAB (PO) | Antibiotic |  |  |  |  |  |  |  |  |
| Co-trimoxazole 40MG+8MG/ml SUSPEN (PO) | Cotrimoxazole |  |  |  |  |  |  |  |  |
| Co-trimoxazole 400MG+80MG/tab TABLET (PO) | Cotrimoxazole |  |  |  |  |  |  |  |  |
| Co-trimoxazole 100MG+20MG/tab TABLET (PO) | Cotrimoxazole |  |  |  |  |  |  |  |  |
| Co-trimoxazole 960/tab TABLET (PO) | Cotrimoxazole |  |  |  |  |  |  |  |  |
| Dapsone 100MG/tab TAB (PO) | Antibiotic |  |  |  |  |  |  |  |  |
| Dapsone 50MG/tab TABLET (PO) | Antibiotic |  |  |  |  |  |  |  |  |
| Doxycycline | Antibiotic |  |  |  |  |  |  |  |  |
| Fluconazole 10MG/ml SUSPEN (PO) | Antifungal |  |  |  |  |  |  |  |  |
| Fluconazole 100MG/tab TABLET (PO) | Antifungal |  |  |  |  |  |  |  |  |
| Fluconazole 200MG/tab TABLET (PO) | Antifungal |  |  |  |  |  |  |  |  |
| Gancyclovir | Antiviral |  |  |  |  |  |  |  |  |
| Folinic acid 10MG/tab TABLET (PO) | Other |  |  |  |  |  |  |  |  |
| Loperimide | Other |  |  |  |  |  |  |  |  |
| Metronidazole 25MG/ml SYRUP (PO) | Antibiotic |  |  |  |  |  |  |  |  |
| Metronidazole 250MG/cap CAP (PO) | Antibiotic |  |  |  |  |  |  |  |  |
| Penicillin, g sodium 10MU/vial VIAL (INJ) | Antibiotic |  |  |  |  |  |  |  |  |
| Pyridoxine 50MG/tab TAB (PO) | Antituberculosis |  |  |  |  |  |  |  |  |
| Pyrimethamine 25MG/tab TABLET (PO) | Antimalarial/toxoplasmosis |  |  |  |  |  |  |  |  |
| Ethambutol | Antituberculosis |  |  |  |  |  |  |  |  |
| Isonaizid 100MG/tab TAB (PO) | Antituberculosis |  |  |  |  |  |  |  |  |
| Isonaizid 300MG/tab TAB (PO) | Antituberculosis |  |  |  |  |  |  |  |  |
| Pyrazinamide | Antituberculosis |  |  |  |  |  |  |  |  |
| Rifampin | Antituberculosis |  |  |  |  |  |  |  |  |
| Streptomycin | Antituberculosis |  |  |  |  |  |  |  |  |
| Vincristine | Other |  |  |  |  |  |  |  |  |
| Morphine | Other |  |  |  |  |  |  |  |  |
| RHZE 150/75/400/275 | Antituberculosis |  |  |  |  |  |  |  |  |
| RHZ 60/30/150 | Antituberculosis |  |  |  |  |  |  |  |  |
| RHE 150/75/275 | Antituberculosis |  |  |  |  |  |  |  |  |
| RH 150/75 | Antituberculosis |  |  |  |  |  |  |  |  |
| RH 60/30 | Antituberculosis |  |  |  |  |  |  |  |  |
| Condoms | Other |  |  |  |  |  |  |  |  |

|  |
| --- |
| General Assumptions: Please include any assumptions that were not included in the table above or that require additional explanations. |

* Each subcategory of OI Drugs is allocated equally to patient types.
* Therefore, all costs for this cost element will be equal per patient per year for all patients. Would you like to change those allocations?
  + IF YES:
    - Please fill out the table below according to patient type allocations at this facility.
    - If a line is left blank and there is cost data for the subcategory, then the default PT allocation will be used.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Subcategory | Pre-ART | Adult 1L | Adult 2L | Pediatric 1L | Pediatric 2L | Total | Free Text Assumptions |
| Antiviral |  |  |  |  |  |  |  |
| Antiparasitic |  |  |  |  |  |  |  |
| Antibiotic |  |  |  |  |  |  |  |
| Antidepressant |  |  |  |  |  |  |  |
| Antifungal |  |  |  |  |  |  |  |
| Antimalarial/toxoplasmosis |  |  |  |  |  |  |  |
| Antituberculosis |  |  |  |  |  |  |  |
| Cotrimoxazole |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |

|  |
| --- |
| General Assumptions: Please include any assumptions that were not included in the table above or that require additional explanations. |

* Please allocate OIs to SDA

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Subcategory | ARVs | Clinical Care | Lab Services | SCM | Outreach | Training | M&E / HMIS | Facility Admin & Mgmt | Prog Mgmt and OH | Total | Free Text Assumptions |
| Antiviral |  |  |  |  |  |  |  |  |  |  |  |
| Antiparasitic |  |  |  |  |  |  |  |  |  |  |  |
| Antibiotic |  |  |  |  |  |  |  |  |  |  |  |
| Antidepressant |  |  |  |  |  |  |  |  |  |  |  |
| Antifungal |  |  |  |  |  |  |  |  |  |  |  |
| Antimalarial/toxoplasmosis |  |  |  |  |  |  |  |  |  |  |  |
| Antituberculosis |  |  |  |  |  |  |  |  |  |  |  |
| Cotrimoxazole |  |  |  |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |  |  |  |

|  |
| --- |
| General Assumptions: Please include any assumptions that were not included in the table above or that require additional explanations. |

## Survey 5: Nutrition

Facility ID \_\_\_\_\_\_\_\_\_\_\_\_

* Currency code \_\_\_\_\_\_
* Conversion rate per USD \_\_\_\_\_\_\_\_\_\_\_\_
* Use oanda.com to calculate the average exchange over the costing period. If another exchange rate is used, document it in the text box here *(comment box)*
* Who provided input or answered questions in this survey? *\*\*This includes both the people filling out the survey (interviewers/us) and the people providing the data (interviewees/facility staff). Phone/Email are not required in DatStat but may be useful to collect\*\**

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Title | Phone | Email |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

* Please enter the source(s) used to collect the data in this survey *(comment box)*

Nutrition Program

* Is there an integrated nutrition program at the facility for children? (i.e. at minimum patients are referred between the nutrition program and HIV program and the nutrition program tests for HIV is suspected) *(Yes/No)*
* Is there an integrated nutrition program at the facility for adults? (i.e. at at minimum patients are referred between the nutrition program and HIV program and the nutrition program tests for HIV is suspected) *(Yes/No)*
* Who pays for nutrition supplement?

(*MoH, NGO, UN or UN Agency:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Other:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ,Unknown)*

* \* Are clinicians and personnel within the facility trained on nutritional treatment guidelines?

*(None, Some, All)*

* IF SOME - Are nutritional guidelines available at this facility?

*(Yes, No, Sometimes - please explain:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)*

* What is prevalence of Severe Acute Malnutrition in catchment population?

*(known\_\_\_\_\_\_\_\_\_%, unknown)*

* What is prevalence of Moderately Acute Malnutrition in catchment population?

*(known\_\_\_\_\_\_\_\_\_%, unknown)*

* What percentage of HIV+ Adult pre-ART patients receive nutritional support?

*(Known: \_\_\_\_\_\_\_\_\_\_\_\_\_\_%, Unknown)*

* What percentage of HIV+ Adults on ART receive nutritional support?

*(Known: \_\_\_\_\_\_\_\_\_\_\_\_\_\_%, Unknown)*

* What percentage of HIV+ pediatric pre-ART patients receive nutritional support?

*(Known: \_\_\_\_\_\_\_\_\_\_\_\_\_\_%, Unknown)*

* What percentage of HIV+ pediatric patients on ART receive nutritional support?

*(Known: \_\_\_\_\_\_\_\_\_\_\_\_\_\_%, Unknown)*

Nutrition Commodities

* What types of nutritional supplements are provided at the facility?

*(RUTF, FBF, Supplementary food, BP-5 CompactFood, BP-100 MedicFood, F75 Starter Formula, F100 Catch-up Formula, THM-100 (as F100), Peanut Butter, Multivitamins, Macronutrients, Other :\_\_\_\_\_\_\_\_\_)*

* \* Have there been any stock outs or shortages of nutritional supplement in the costing year?  *(Yes/no)*
  + IF YES
    - Which patients get priority for nutritional supplement when stock is limited

*(Adults, Pediatric, Low CD4, Pregnant Women, Poorest, Other\_\_\_\_\_\_\_)*

* + - Please list the number of days that each of the following nutritional products were out of stock:

*RUTF\_\_\_\_\_\_\_\_\_ Supplementary food\_\_\_\_\_\_\_\_\_\_\_*

*BP-5 CompactFood\_\_\_\_\_\_\_\_\_\_ BP-100 MedicFood\_\_\_\_\_\_\_\_\_\_\_\_*

*F75 Starter Formula\_\_\_\_\_\_\_\_\_\_\_ F100 Catch-up Formula\_\_\_\_\_\_\_\_\_\_*

*THM-100 (as F100\_\_\_\_\_\_\_\_\_\_\_ Peanut Butter\_\_\_\_\_\_\_\_\_\_\_\_*

*Multivitamins\_\_\_\_\_\_\_\_\_\_ Macronutrients\_\_\_\_\_\_\_\_\_\_\_\_*

*FBF\_\_\_\_\_\_\_\_\_ Other\_\_\_\_\_\_\_\_\_*

* What is the time period for patient data? *(must be 12 months: \_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_)*
* Please complete the following grid related to stock and costs of therapeutic and supplementary foods. Only complete for items that exist at the facility and provide a unit (pack size) and weighted unit price for the specified pack size.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |  |  |
| Commodity Name | Patient Indication | Packaging | Pack Size | % Allocation to HIV | Initial Stock | Total Received in 12 month period | Final stock | Weighted price (unit cost) | Coded Assumptions | Free Text Assumptions |
| RUTF/Plumpy Nut | Adult/ped | Sachet |  |  |  |  |  |  |  |  |
| FBF (eg corn, wheat, soy) | Adultped | Sachet |  |  |  |  |  |  |  |  |
| Supplementary food (cereal, pulp) | Adult/ped | Other |  |  |  |  |  |  |  |  |
| BP-5 CompactFood | Adult/ped | Box |  |  |  |  |  |  |  |  |
| BP-100 MedicFood | Adult/ped | Box |  |  |  |  |  |  |  |  |
| F-75 Starter Formula | Ped | Sachet |  |  |  |  |  |  |  |  |
| F-100 catch-up formula | Ped | Sachet |  |  |  |  |  |  |  |  |
| THM-100 (as F-100) | ped | other |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

|  |
| --- |
| General Assumptions |

Each subcategory of nutrition is allocated equally to patient types by default. Therefore, all costs for this cost element will be equal per patient per year for all patients.

Would you like to change these allocations? *(Yes/no)*

* + IF YES:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Subcategory | Pre-ART | Adult 1L | Adult 2L | Pediatric 1L | Pediatric 2L | Total | Free Text Assumptions | | Adult |  |  |  |  |  |  |  | | Pediatric |  |  |  |  |  |  |  | | Adult/Pediatric |  |  |  |  |  |  |  | | |  | | --- | |  | |

* Please complete the SDA Allocation Table

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Subcategory | ARVs | Clinical Care | Lab Services | SCM | Outreach | Training | M&E / HMIS | Facility Admin & Mgmt | Prog Mgmt and OH | Total | Free Text Assumptions |
| Adult |  |  |  |  |  |  |  |  |  |  |  |
| Pediatric |  |  |  |  |  |  |  |  |  |  |  |
| Adult/Pediatric |  |  |  |  |  |  |  |  |  |  |  |

## Survey 6: Laboratory

Facility ID \_\_\_\_\_\_\_\_\_\_\_\_

* Currency code \_\_\_\_\_\_
* Conversion rate per USD \_\_\_\_\_\_\_\_\_\_\_\_
* Use oanda.com to calculate the average exchange over the costing period. If another exchange rate is used, document it in the text box here *(comment box)*
* Who provided input or answered questions in this survey? *\*\*This includes both the people filling out the survey (interviewers/us) and the people providing the data (interviewees/facility staff). Phone/Email are not required in DatStat but may be useful to collect\*\**

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Title | Phone | Email |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

* Please enter the source(s) used to collect the data in this survey
* Please enter the 12 month timeframe for labs.  This is the year for which labs cost and volume data is captured \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \* Are ANY lab tests outsourced? *(Yes/No)* 
  1. *(IF YES, sample transport questions AND external labs questions will be asked later)*
* \* Does the facility have a laboratory onsite? *(Yes/No)*
  + IF YES
    - \* Does the facility perform CD4 and/or VL onsite? *(yes/no)*
      * *IF YES*
    - \* Do you currently have a backlog for CD4 or VL tests i.e. are you able to complete the full load of sample requisitions for these tests sent in a single day? *(yes/no)*
      * *IF YES*
        1. Why is there a backlog*?*

*(Already at capacity, understaffed, lack of reagents, broken machines, no electricity, - CHECK ALL)*

* + - Who provides reagents and consumables for CD4 tests?

(*MOH, PEPFAR, GFATM, Other donor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,*

*Other:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown)*

* \* Have there been any stock outs or shortages of consumables or reagents for CD4 tests during costing year?  *(Yes/no)*
  + - * IF YES
        + Which patients get priority for CD4 tests when stock is limited

*(Adults, Pediatric, Low CD4, Pregnant Women, Poorest, Other\_\_\_\_\_\_)*

* + - * + What was the duration of the stock out or shortage*\_\_\_\_\_\_\_ days*
        1. Are CD4 tests referred to another facility or NRL for testing during stock outs or shortages? *(Yes/No/ Unknown)*

Sample Transport

* \* Are ANY lab tests outsourced? *(previously answered above)*
  + - IF YES 🡪
      * Which tests do you outsource? (*VL, CD4, Other:\_\_\_\_\_\_\_\_\_\_)*
      * Does the facility have to pay for sample transportation? *(Yes/No)*
      * \* Does the facility provide its own sample transportation? i.e. send facility staff on public transport or other vehicle? *(Yes/No)*
        + IF YES

How much does each roundtrip cost? This should include any cost not already captured elsewhere. For example, if the vehicle used for sample transport is captured in Other Equipment or the fuel for that vehicle is in Other Running Costs, then they should not be included here.  *($)\_\_\_\_\_\_\_\_\_\_\_\_*

\* How often are samples transported whether by the facility or by the sample transportation network? *(\_\_\_\_\_\_\_\_# of trips per week)*

*IF >0*

Please identify the facilities where tests are outsourced.  For each selected facility, please include the average number of days it takes before results are returned to the facility.

district lab *(\_\_\_\_\_\_\_\_\_\_# of days)*

*District* hospital *(\_\_\_\_\_\_\_\_\_# of days)*

NRL *(\_\_\_\_\_\_\_\_# of days)*

Other *(\_\_\_\_\_\_\_\_# of days)*

Is the facility charged directly or charged against a budget for labs sent to either a district lab or NRL. For example, in RSA, the NHLS holds a budget for each facility which it “charges” tests? *(Yes/No/Unknown)*

**Internal Lab Tests**

|  |  |
| --- | --- |
| Adult HIV screening (rapid HIV test) | Hematology: Full Blood Count |
| Adult HIV tiebreak/confirmatory test (e.g. ELISA) | Hematology: White Blood Cell |
| Infant (EID) DNA PCR test | Chemistry: Blood Sugar/glucose |
| CD4 count Lab-Based test | Chemistry: Cholesterol/Triglycerides |
| DBS (Dry Blood Spot) test | Viral Load:RNA PCR Assay (Roche) |
| ALT Liver Enzyme test | Viral Load: bDNA Assay (Bayer) |
| Kidney Function Tests : Creatinine | RPR- Syphilis |
| Hematology: HgB- Hemoglobin | DNA PCR: Toxoplasmosis |

* Please complete the following table and document the total volume of lab tests, by type, performed within the facility annually for ART patients within the facility. Therefore, if the facility runs labs for other smaller sites, only include the number of test for patients at this site. For internal labs, unit cost captured here should only include the cost of reagents and consumables. Overheads, personnel, etc will be captured in the other cost elements for this facility.

\*\*FOLLOWING THIS LABS COST TABLE, TOP DOWN DATA WILL BE CAPTURED FOR CD4 AND VL (I.E. TOTAL COST OF REAGENTS AND CONSUMABLES FOR THE YEAR). THOSE DATA WILL BE AGGREGATED AND DIVIDED BY THE TOTAL NUMBER OF TESTS TO DETERMINE THE TOP-DOWN COST PER TEST FOR CD4 AND VL.

THE UNIT COSTS ENTERED IN THE TABLE BELOW ARE ON A PER-TEST BASIS AND ESSENTIALLY CALCULATED BOTTOM-UP (I.E. NOT ACCOUNTING FOR WASTAGE, ETC). THEREFORE, IF COST PER TEST IS ENTERED FOR CD4 AND VL HERE, BE SURE TO DOCUMENT ASSUMPTIONS THOROUGHLY SO IT CAN BE COMPARED TO TOP-DOWN COST DATA APPROPRIATELY.

FOR EXAMPLE, IF THE TOP-DOWN COST FOR CD4 IS 60USD AND THE COST PER TEXT LISTED IN THE TABLE BELOW IS 10USD, THE ASSUMPTIONS DOCUMENTED WILL BE CRITICAL TO UNDERSTAND THE DIFFERENCE IN THE CALCULATED COST\*\*

**DOCUMENTING ASSUMPTIONS**: Please use the following codes to identify the data types and assumptions that were made to identify each line item of lab costs at this facility. For additional information on what each of these data types includes, please refer to the study protocol document. Use the letter of the appropriate assumption type followed by a “:” and then list the column numbers the data type refers to I .e. 1-3. If more than one data type applies to the same row but different columns, separate them by a comma and NO SPACE. Column numbers are located above each relevant column.

For example:

Coded Assumptions*: a:(1-3),d:(4-5) (translation = columns 1-3 are primary data and columns 4 and 5 are primary and facility proxies)*

Free Text Assumptions*: primary data collected from lab records, context proxies based off of data from another health center in the same district*

a: Primary

b: Primary + Context proxy (partial primary)

c: Primary + Interview (partial primary)

d: Primary + Facility proxy (partial primary)

e: Primary + Context proxy + Interview

f: Interview

g: Context proxy + interview

h: Context proxy

i: Facility proxy + Interview

j: Facility proxy

k: Bottom-up

l: Other

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |  |  |
| Test Name | # test performed/year | % of tests allocated to HIV | Unit cost or cost of components | Cost consumables per 100 tests | Cost reagents per 100 tests | Unit cost per test | Price charged to patient per test | Coded Assumptions | Free Text Assumptions |
| TESTS TO FACILITATE INITIAL DIAGNOSIS: | | | | | | | | |  |
| Adult HIV screening (rapid HIV test) |  |  |  |  |  |  |  |  |  |
| Adult HIV tiebreak/confirmatory test (e.g. ELISA) |  |  |  |  |  |  |  |  |  |
| TESTS FOR PEDIATRIC DIAGNOSIS: | | | | | | | | | |
| Infant (EID) DNA PCR test |  |  |  |  |  |  |  |  |  |
| Tests to stage/monitor the patient | | | | | | | | | |
| CD4 count Lab-Based test |  |  |  |  |  |  |  |  |  |
| CD4 Percentage (Peds) |  |  |  |  |  |  |  |  |  |
| TESTS TO MONITOR THE PATIENT: | | | | | | | | | |
| ALT Liver Enzyme test |  |  |  |  |  |  |  |  |  |
| Kidney Function Tests : Creatinine |  |  |  |  |  |  |  |  |  |
| Hematology: HgB- Hemoglobin |  |  |  |  |  |  |  |  |  |
| Hematology: Full Blood Count |  |  |  |  |  |  |  |  |  |
| Hematology: White Blood Cell |  |  |  |  |  |  |  |  |  |
| Chemistry: Blood Sugar/glucose |  |  |  |  |  |  |  |  |  |
| Chemistry: Cholesterol/Triglycerides |  |  |  |  |  |  |  |  |  |
| Others(Please specify): |  |  |  |  |  |  |  |  |  |
| Others(Please specify): |  |  |  |  |  |  |  |  |  |
| Others(Please specify): |  |  |  |  |  |  |  |  |  |
| VIRAL LOAD TESTS: | | | | | | | | | |
| Viral Load: (RNA PCR or bDNA Assay) |  |  |  |  |  |  |  |  |  |
| TESTS FOR COMMON OIS: | | | | | | | | |  |
| RPR- Syphilis |  |  |  |  |  |  |  |  |  |
| DNA PCR: Toxoplasmosis |  |  |  |  |  |  |  |  |  |
| Others(Please specify): |  |  |  |  |  |  |  |  |  |
| Others(Please specify): |  |  |  |  |  |  |  |  |  |
| Others(Please specify): |  |  |  |  |  |  |  |  |  |
| Others(Please specify): |  |  |  |  |  |  |  |  |  |

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| General Assumptions: Please include any assumptions that were not included in the table above or that require additional explanations. |

* CD4 and VL - Complete the table below for data from the same cost period as selected for the rest of this survey. For allocation to facility, be sure to allocate only the amount of the cost that is associated with tests done for patients on treatment at this facility. 100% by default unless the facility runs test for other facilities. The reagents and consumables provided are examples. Please complete the table for all appropriate reagents and consumables for the machines available.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 1 | 2 | 3 | 4 | 5 |  |  |
| Cost Element – CD4 | Type | Pack Size | Initial Stock | Receipts | Final Stock | Unit Cost | % Allocated to facility | Coded Assumptions | Free Text Assumptions |
| BD FACS Count-CD3/4 Reagent Kit | Reagent | 50 |  |  |  |  |  |  |  |
| BD FACS Count-CD4 % Reagent | Reagent | 50 |  |  |  |  |  |  |  |
| BD FACS Count-FacsClean | Consumable | 5 |  |  |  |  |  |  |  |
| BD FACS Count-FacsRinse | Consumable | 5 |  |  |  |  |  |  |  |
| BD FACS Count-FacsFlow | Consumable | 20 |  |  |  |  |  |  |  |
| BD FACS Count-Thermal Paper | Consumable | 1 |  |  |  |  |  |  |  |
| BD FACS Count-Control Kit | Control | 50 |  |  |  |  |  |  |  |
| BD Vacutainer Tube, Plastic, 4mL, Lavender, K2 EDTA 7.2mg | Consumable | 1000 |  |  |  |  |  |  |  |
| BD Vacutainer Needle with Pre-Attached Holder, 21 Gauge, 1.25" | Consumable | 100 |  |  |  |  |  |  |  |
| BD Vacutainer One-Use Holder | Consumable | 50 |  |  |  |  |  |  |  |
| BD Vacutainer Ribbed Pediatric Tube Adapter | Consumable | 10 |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 1 | 2 | 3 | 4 | 5 |  |  |
| Cost Element – VL | Type | Pack Size | Initial Stock | Receipts | Final Stock | Unit Cost | % Allocated to facility | Coded Assumptions | Free Text Assumptions |
| MultiTEST CD3/CD8/CD45/CD4 with TruCOUNT Tube | Reagent | 5 |  |  |  |  |  |  |  |
| Cobas TaqMan (CTM48) - Ampliprep Wash Buffer 5L | Consumable | 288 |  |  |  |  |  |  |  |
| Cobas TaqMan (CTM48) - SPU 24x12 | Consumable | 432 |  |  |  |  |  |  |  |
| Cobas TaqMan (CTM48) - K Tips (432) | Consumable |  |  |  |  |  |  |  |  |
| Cobas TaqMan (CTM48) - K Tubes (1152) | Consumable | 1152 |  |  |  |  |  |  |  |
| Cobas TaqMan (CTM48) - 1ml Tips - Filtered (100) | Consumable | 1000 |  |  |  |  |  |  |  |
| Cobas Ampliprep - Reagent Cassettes (48) | Reagent | 48 |  |  |  |  |  |  |  |
| Cobas Ampliprep - Ampliprep Wash Buffer 2L | Consumable | 2 |  |  |  |  |  |  |  |
| Cobas Ampliprep - Amplicor Wash Buffer 2L | Consumable | 2 |  |  |  |  |  |  |  |
| Cobas Ampliprep - D-Cups 840 | Consumable | 840 |  |  |  |  |  |  |  |
| Cobas Ampliprep - A-Rings 24 | Consumable | 24 |  |  |  |  |  |  |  |
| Cobas Ampliprep - SPU 288 | Consumable | 288 |  |  |  |  |  |  |  |

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| General Assumptions: Please include any assumptions that were not included in the table above or that require additional explanations. |

* Please complete the following table and document the lab equipment at this facility.

**DOCUMENTING ASSUMPTIONS**: Please use the following codes to identify the data types and assumptions that were made to identify each line item of lab equipment costs at this facility. For additional information on what each of these data types includes, please refer to the study protocol document. Use the letter of the appropriate assumption type followed by a “:” and then list the column numbers the data type refers to I .e. 1-3. If more than one data type applies to the same row but different columns, separate them by a comma and NO SPACE. Column numbers are located above each relevant column.

For example:

Coded Assumptions*: a:(1-3),d:(4-5) (translation = columns 1-3 are primary data and columns 4 and 5 are primary and facility proxies)*

Free Text Assumptions*: primary data collected from lab records, context proxies based off of data from another health center in the same district*

a: Primary

b: Primary + Context proxy (partial primary)

c: Primary + Interview (partial primary)

d: Primary + Facility proxy (partial primary)

e: Primary + Context proxy + Interview

f: Interview

g: Context proxy + interview

h: Context proxy

i: Facility proxy + Interview

j: Facility proxy

k: Bottom-up

l: Other

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 1 | 2 | 3 | 4 | 5 |  |  |
| Name of Lab Machine | Choose type of machine | # Units (Quantity) | Replacement cost and maintenance | % Allocated to facility | % Allocated to HIV | # Days machine out of service in costing year | Coded Assumptions | Free Text Assumptions |
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| General Assumptions: Please include any assumptions that were not included in the table above or that require additional explanations. |

* \* Total aggregated labs costs are allocated equally to patient types. Therefore, all costs for this cost element will be equal per patient per year for all patients. Would you like to change those allocations?
  + IF YES:
* Please allocate internal labs to patient types

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Subcategory | Pre-ART | Adult 1L | Adult 2L | Pediatric 1L | Pediatric 2L | Total | Free Text Assumptions |
| Tests to facilitate initial diagnosis |  |  |  |  |  |  |  |
| Tests for pediatric diagnosis |  |  |  |  |  |  |  |
| Tests to Stage / Monitor the Patient |  |  |  |  |  |  |  |
| Test to Monitor the Patient |  |  |  |  |  |  |  |
| Viral Load Tests |  |  |  |  |  |  |  |
| Tests for Common OIs |  |  |  |  |  |  |  |

* Please complete the SDA Allocation table using the following:

1.       **ARVs** – includes costs only explicitly associated with ARVs.  Here, it is disabled.

2.       **Clinical Care** – includes all costs associated with the treatment of ART patients excluding ARV and laboratory service costs. Clinical care includes any patient interactions related to treating specific ailments and evaluating patient status.

3.       **Laboratory Services** – includes all expenses related to laboratory services including collecting samples, running samples, and providing results of tests to facilities and patients. Does not include supply chain or other external costs for labs.

4.       **Supply Chain** – includes all supply chain costs for drugs, labs, equipment, buildings, etc that can be directly tied to and are incurred by the facility. Does not include centralized supply chain costs. Supply chain covers procurement, distribution, receiving, warehousing, and inventory management.

5.       **Outreach Programs** – includes all costs associated with outreach programs. These programs are defined as clinical support, counseling, or mentoring activities/services provided directly to patients or to other (lower-level) facilities.

6.   **Training** - includes all costs associated with training facility personnel that is not captured in the training cost element.

7.       **M&E and HMIS** – includes all costs associated with data capture, reporting, information systems and calculations.

8.       **Facility Administration and Management** – includes all facility level management and overhead costs.

9.       **High-level Administration and Management** – includes all costs above the facility (i.e provincial/regional) required as part of health system and ministry offices. This SDA should be captured to the highest level above the facility as possible with specification of what level of data was available and what was not.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Subcategory | ARVs | Clinical Care | Lab Services | SCM | Outreach | Training | M&E / HMIS | Facility Admin & Mgmt | Prog Mgmt and OH | Total | Free Text Assumptions |
| Tests to facilitate initial diagnosis |  |  |  |  |  |  |  |  |  |  |  |
| Tests for pediatric diagnosis |  |  |  |  |  |  |  |  |  |  |  |
| Tests to Stage / Monitor the Patient |  |  |  |  |  |  |  |  |  |  |  |
| Test to Monitor the Patient |  |  |  |  |  |  |  |  |  |  |  |
| Viral Load Tests |  |  |  |  |  |  |  |  |  |  |  |
| Tests for Common OIs |  |  |  |  |  |  |  |  |  |  |  |

**External Labs**

* Please complete the following table and document the total volume of lab tests, by type, sent outside the facility annually.

\*\*FOLLOWING THIS LABS COST TABLE, TOP DOWN DATA WILL BE CAPTURED FOR CD4 AND VL (I.E. TOTAL COST OF REAGENTS AND CONSUMABLES FOR THE YEAR). THOSE DATA WILL BE AGGREGATED AND DIVIDED BY THE TOTAL NUMBER OF TESTS TO DETERMINE THE TOP-DOWN COST PER TEST FOR CD4 AND VL.

THE UNIT COSTS ENTERED IN THE TABLE BELOW ARE ON A PER-TEST BASIS AND ESSENTIALLY CALCULATED BOTTOM-UP (I.E. NOT ACCOUNTING FOR WASTAGE, ETC). THEREFORE, IF COST PER TEST IS ENTERED FOR CD4 AND VL HERE, BE SURE TO DOCUMENT ASSUMPTIONS THOROUGHLY SO IT CAN BE COMPARED TO TOP-DOWN COST DATA APPROPRIATELY.

FOR EXAMPLE, IF THE TOP-DOWN COST FOR CD4 IS 60USD AND THE COST PER TEXT LISTED IN THE TABLE BELOW IS 10USD, THE ASSUMPTIONS DOCUMENTED WILL BE CRITICAL TO UNDERSTAND THE DIFFERENCE IN THE CALCULATED COST\*\*

**DOCUMENTING ASSUMPTIONS**: Please use the following codes to identify the data types and assumptions that were made to identify each line item of lab costs at this facility. For additional information on what each of these data types includes, please refer to the study protocol document. Use the letter of the appropriate assumption type followed by a “:” and then list the column numbers the data type refers to I .e. 1-3. If more than one data type applies to the same row but different columns, separate them by a comma and NO SPACE. Column numbers are located above each relevant column.

For example:

Coded Assumptions*: a:(1-3),d:(4-5) (translation = columns 1-3 are primary data and columns 4 and 5 are primary and facility proxies)*

Free Text Assumptions*: primary data collected from lab records, context proxies based off of data from another health center in the same district*

a: Primary

b: Primary + Context proxy (partial primary)

c: Primary + Interview (partial primary)

d: Primary + Facility proxy (partial primary)

e: Primary + Context proxy + Interview

f: Interview

g: Context proxy + interview

h: Context proxy

i: Facility proxy + Interview

j: Facility proxy

k: Bottom-up

l: Other

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |  |  |
| Test Name | # test performed/year | % of tests allocated to HIV | Unit cost or cost of components | Cost consumables per 100 tests | Cost reagents per 100 tests | Unit cost per test | Price charged to patient per test | Coded Assumptions | Free Text Assumptions |
| TESTS TO FACILITATE INITIAL DIAGNOSIS: | | | | | | | | |  |
| Adult HIV screening (rapid HIV test) |  |  |  |  |  |  |  |  |  |
| Adult HIV tiebreak/confirmatory test (e.g. ELISA) |  |  |  |  |  |  |  |  |  |
| TESTS FOR PEDIATRIC DIAGNOSIS: | | | | | | | | | |
| Infant (EID) DNA PCR test |  |  |  |  |  |  |  |  |  |
| Tests to stage/monitor the patient | | | | | | | | | |
| CD4 count Lab-Based test |  |  |  |  |  |  |  |  |  |
| CD4 Percentage (Peds) |  |  |  |  |  |  |  |  |  |
| TESTS TO MONITOR THE PATIENT: | | | | | | | | | |
| ALT Liver Enzyme test |  |  |  |  |  |  |  |  |  |
| Kidney Function Tests : Creatinine |  |  |  |  |  |  |  |  |  |
| Hematology: HgB- Hemoglobin |  |  |  |  |  |  |  |  |  |
| Hematology: Full Blood Count |  |  |  |  |  |  |  |  |  |
| Hematology: White Blood Cell |  |  |  |  |  |  |  |  |  |
| Chemistry: Blood Sugar/glucose |  |  |  |  |  |  |  |  |  |
| Chemistry: Cholesterol/Triglycerides |  |  |  |  |  |  |  |  |  |
| Others(Please specify): |  |  |  |  |  |  |  |  |  |
| Others(Please specify): |  |  |  |  |  |  |  |  |  |
| Others(Please specify): |  |  |  |  |  |  |  |  |  |
| VIRAL LOAD TESTS: | | | | | | | | | |
| Viral Load: (RNA PCR or bDNA Assay) |  |  |  |  |  |  |  |  |  |
| TESTS FOR COMMON OIS: | | | | | | | | |  |
| RPR- Syphilis |  |  |  |  |  |  |  |  |  |
| DNA PCR: Toxoplasmosis |  |  |  |  |  |  |  |  |  |
| Others(Please specify): |  |  |  |  |  |  |  |  |  |
| Others(Please specify): |  |  |  |  |  |  |  |  |  |
| Others(Please specify): |  |  |  |  |  |  |  |  |  |
| Others(Please specify): |  |  |  |  |  |  |  |  |  |

|  |
| --- |
| General Assumptions: Please include any assumptions that were not included in the table above or that require additional explanations. |

* CD4 and VL - Complete the table below for data from the same cost period as selected for the rest of this survey. For allocation to facility, be sure to allocate only the amount of the cost that is associated with tests done for patients on treatment at the facility where the tests originated. The reagents and consumables provided are examples. Please complete the table for all appropriate reagents and consumables for the machines available.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 1 | 2 | 3 | 4 | 5 |  |  |
| Cost Element – CD4 | Type | Pack Size | Initial Stock | Receipts | Final Stock | Unit Cost | % Allocated to facility | Coded Assumptions | Free Text Assumptions |
| BD FACS Count-CD3/4 Reagent Kit | Reagent | 50 |  |  |  |  |  |  |  |
| BD FACS Count-CD4 % Reagent | Reagent | 50 |  |  |  |  |  |  |  |
| BD FACS Count-FacsClean | Consumable | 5 |  |  |  |  |  |  |  |
| BD FACS Count-FacsRinse | Consumable | 5 |  |  |  |  |  |  |  |
| BD FACS Count-FacsFlow | Consumable | 20 |  |  |  |  |  |  |  |
| BD FACS Count-Thermal Paper | Consumable | 1 |  |  |  |  |  |  |  |
| BD FACS Count-Control Kit | Control | 50 |  |  |  |  |  |  |  |
| BD Vacutainer Tube, Plastic, 4mL, Lavender, K2 EDTA 7.2mg | Consumable | 1000 |  |  |  |  |  |  |  |
| BD Vacutainer Needle with Pre-Attached Holder, 21 Gauge, 1.25" | Consumable | 100 |  |  |  |  |  |  |  |
| BD Vacutainer One-Use Holder | Consumable | 50 |  |  |  |  |  |  |  |
| BD Vacutainer Ribbed Pediatric Tube Adapter | Consumable | 10 |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 1 | 2 | 3 | 4 | 5 |  |  |
| Cost Element – VL | Type | Pack Size | Initial Stock | Receipts | Final Stock | Unit Cost | % Allocated to facility | Coded Assumption | Free text assumption |
| MultiTEST CD3/CD8/CD45/CD4 with TruCOUNT Tube | Reagent | 5 |  |  |  |  |  |  |  |
| Cobas TaqMan (CTM48) - Ampliprep Wash Buffer 5L | Consumable | 288 |  |  |  |  |  |  |  |
| Cobas TaqMan (CTM48) - SPU 24x12 | Consumable | 432 |  |  |  |  |  |  |  |
| Cobas TaqMan (CTM48) - K Tips (432) | Consumable |  |  |  |  |  |  |  |  |
| Cobas TaqMan (CTM48) - K Tubes (1152) | Consumable | 1152 |  |  |  |  |  |  |  |
| Cobas TaqMan (CTM48) - 1ml Tips - Filtered (100) | Consumable | 1000 |  |  |  |  |  |  |  |
| Cobas Ampliprep - Reagent Cassettes (48) | Reagent | 48 |  |  |  |  |  |  |  |
| Cobas Ampliprep - Ampliprep Wash Buffer 2L | Consumable | 2 |  |  |  |  |  |  |  |
| Cobas Ampliprep - Amplicor Wash Buffer 2L | Consumable | 2 |  |  |  |  |  |  |  |
| Cobas Ampliprep - D-Cups 840 | Consumable | 840 |  |  |  |  |  |  |  |
| Cobas Ampliprep - A-Rings 24 | Consumable | 24 |  |  |  |  |  |  |  |
| Cobas Ampliprep - SPU 288 | Consumable | 288 |  |  |  |  |  |  |  |

|  |
| --- |
| General Assumptions: Please include any assumptions that were not included in the table above or that require additional explanations. |

* \* Total aggregated labs costs are allocated equally to patient types. Therefore, all costs for this cost element will be equal per patient per year for all patients. Would you like to change those allocations?
  + IF YES:
* Please allocate internal labs to patient types

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Subcategory | Pre-ART | Adult 1L | Adult 2L | Pediatric 1L | Pediatric 2L | Total | Free Text Assumption |
| Tests to facilitate initial diagnosis |  |  |  |  |  |  |  |
| Tests for pediatric diagnosis |  |  |  |  |  |  |  |
| Tests to Stage / Monitor the Patient |  |  |  |  |  |  |  |
| Test to Monitor the Patient |  |  |  |  |  |  |  |
| Viral Load Tests |  |  |  |  |  |  |  |
| Tests for Common OIs |  |  |  |  |  |  |  |

* Please allocate external lab costs to SDA

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Subcategory | ARVs | Clinical Care | Lab Services | SCM | Outreach | Training | M&E / HMIS | Facility Admin & Mgmt | Prog Mgmt and OH | Total | Free Text Assumption |
| Tests to facilitate initial diagnosis |  |  |  |  |  |  |  |  |  |  |  |
| Tests for pediatric diagnosis |  |  |  |  |  |  |  |  |  |  |  |
| Tests to Stage / Monitor the Patient |  |  |  |  |  |  |  |  |  |  |  |
| Test to Monitor the Patient |  |  |  |  |  |  |  |  |  |  |  |
| Viral Load Tests |  |  |  |  |  |  |  |  |  |  |  |
| Tests for Common OIs |  |  |  |  |  |  |  |  |  |  |  |

* Please complete the table on TA that is provided for the labs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name of NGO / TA Provider | Is the TA onsite or offsite? | Do they require permission from the MoH to provide assistance? | Do they change / establish laboratory practices? i.e. how samples are run, M&E, etc? | How many visits have been made in the past year to provide some type of lab TA? (Offsite TA only) |
|  |  |  |  |  |
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## Survey 7: Other Equipment / Medical Equipment

Facility ID \_\_\_\_\_\_\_\_\_\_\_\_

* Currency code \_\_\_\_\_\_
* Conversion rate per USD \_\_\_\_\_\_\_\_\_\_\_\_
* Use oanda.com to calculate the average exchange over the costing period. If another exchange rate is used, document it in the text box here *(comment box)*
* Who provided input or answered questions in this survey? *\*\*This includes both the people filling out the survey (interviewers/us) and the people providing the data (interviewees/facility staff). Phone/Email are not required in DatStat but may be useful to collect\*\**

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| --- | --- | --- | --- |
| Name | Title | Phone | Email |
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* Please enter the source(s) used to collect the data in this survey *(Comments box)*
* Who generally pays for medical equipment? This includes large labs machines used to run samples for various diagnostic tests.

*(MoH, PEPFAR, GFATM, Provincial MoH, District MoH, NHLS, Donor:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown)*

* Who generally pays for non-medical equipment (e.g. vehicles, computers)? This includes larger items with a useful life greater than one year rather than smaller less-expensive items such as gauze or gloves.

*(MoH, PEPFAR, GFATM, Donor:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown)*

* Who has the authority to buy equipment for the ART Clinic?

*(Facility Director, District/Regional MoH, Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, ART Clinic Coordinator Unknown)*

* Who has the authority to repair equipment for the ART Clinic?

*(Facility Director, District/Regional MoH, Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, ART Clinic Coordinator, Unknown)*

* \* Is equipment regularly maintained?  *(Yes/No)* 
  + IF YES
    - Who pays for maintenance?

*(MoH, PEPFAR, GFATM, Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown)*

* \* Does the facility require critical medical or other equipment that it does not currently have?
  + Describe why this equipment is needed and why it has not been purchased or made available

|  |  |
| --- | --- |
| OTHER and MEDICAL EQUIPMENT |  |
| Biomicroscope | **Hemocytometer** |
| Apparatus for testing for hemostasis | **Hysterectomy kit** |
| Bench-top centrifuge | **IUD kit** |
| Binaural stethoscope | **Kline agitator** |
| Binocular microscope | **Lovibond comparator** |
| Binocular microscope (mixed power source - electricity & solar) | **Magnetic Stirrer** |
| Blood pressure meter | **Maxillo-facial surgery kit** |
| Caesarian section kit | **Micro centrifuge for hematocrit** |
| Cardiotocograph | **Minor ophthalmology surgical kit** |
| Delivery table | **Norplant kit** |
| Electric or manual centrifuge | **Obstetrical/Gynecological examination lamp** |
| Electro-cauterization kit | **Ophthalmoscope** |
| Electrolyte analyser | **Otoscope** |
| ELISA tools (washer, reader, printer) | **Pelvimeter** |
| Examination lamps | **Refrigerator** |
| Examination table | **Semi Automatic Spectrophotometer** |
| Fetal stethoscope | **Sonograph** |
| Flow cytometer | **Spectrophotometer for hematology and biochemi** |
| Freezer | **Sterilizer for medical equipment** |
| Generator/battery | **Stethoscope** |
| Gynecological examination lamp | **Thermometer (Consultations)** |
| Gynecological table | **Vaginal speculum kit** |

* Below is a grid to be completed for the equipment that has been purchased within the facility and another grid to be completed for the equipment that has been leased at the facility. Scroll up to review the list of possible equipment and note in the table below the equipment that is used by this facility as well as cost, units, and allocations. Please fill out each line completely.

**DOCUMENTING ASSUMPTIONS:** Please use the following codes to identify the data types and assumptions that were made to identify each line item of ARV costs at this facility. For additional information on what each of these data types includes, please refer to the study protocol document. Use the letter of the appropriate assumption type followed by a “:” and then list the column numbers the data type refers to I .e. 1-3. If more than one data type applies to the same row but different columns, separate them by a comma and NO SPACE. Column numbers are located above each relevant column.

**For example:**

Coded Assumptions: *a:(1-3),d:(4-5) (translation = columns 1-3 are primary data and columns 4 and 5 are primary and facility proxies)*

Free Text Assumptions*: primary data collected from lab records, context proxies based off of data from another health center in the same district*

a: Primary

b: Primary + Context proxy (partial primary)

c: Primary + Interview (partial primary)

d: Primary + Facility proxy (partial primary)

e: Primary + Context proxy + Interview

f: Interview

g: Context proxy + interview

h: Context proxy

i: Facility proxy + Interview

j: Facility proxy

k: Bottom-up

l: Other

Purchased Equipment

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 1 | 2 | 3 | 4 | 5 |  |  |
| Equipment Description | Sub-category | Replacement cost with maintenance | # Units (Quantity) | % Allocated to facility | % Allocated to HIV | # Days out of service in costing year | Coded Assumption | Free Text assumption |
| Fridge (ARVs) |  |  |  |  |  |  |  |  |
| Fridge (other uses) |  |  |  |  |  |  |  |  |
| Stethoscope |  |  |  |  |  |  |  |  |
| Thermometer |  |  |  |  |  |  |  |  |
| Adult Scale |  |  |  |  |  |  |  |  |
| Baby Scale |  |  |  |  |  |  |  |  |
| Vehicle used as ambulance |  |  |  |  |  |  |  |  |
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| --- |
| General Assumptions - Please include any assumptions that were not included in the table or that require additional explanations: |

Leased Equipment

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 1 | 2 | 3 | 4 | 5 |  |  |
| Equipment Description | Sub-category | Replacement cost with maintenance | # Units (Quantity) | % Allocated to facility | % Allocated to HIV | # Days out of service in costing year | Coded Assumption | Free Text Assumption |
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| --- |
| General Assumptions - Please include any assumptions that were not included in the table or that require additional explanations: |

* \* Total aggregated equipment cost is allocated equally to patient types. Therefore, all costs for this cost element will be equal per patient per year for all patients. Would you like to change those allocations?
  + IF YES

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Subcategory | Pre-ART | Adult 1L | Adult 2L | Pediatric 1L | Pediatric 2L | Total | Free Text Assumption |
| Vehicles |  |  |  |  |  |  |  |
| Information Technology |  |  |  |  |  |  |  |
| Communications |  |  |  |  |  |  |  |
| Supplies and Equipment |  |  |  |  |  |  |  |
| Furniture |  |  |  |  |  |  |  |
| Utility Equipment |  |  |  |  |  |  |  |
| Med / Lab Equipment |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |

* Please complete the SDA allocation table for equipment

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Subcategory | ARVs | Clinical Care | Lab Services | SCM | Outreach | Training | M&E / HMIS | Facility Admin & Mgmt | Prog Mgmt and OH | Total | Free Text Assumption |
| Vehicles |  |  |  |  |  |  |  |  |  |  |  |
| Information Technology |  |  |  |  |  |  |  |  |  |  |  |
| Communications |  |  |  |  |  |  |  |  |  |  |  |
| Supplies and Equipment |  |  |  |  |  |  |  |  |  |  |  |
| Furniture |  |  |  |  |  |  |  |  |  |  |  |
| Utility Equipment |  |  |  |  |  |  |  |  |  |  |  |
| Med / Lab Equipment |  |  |  |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |  |  |  |

* Please list any other comments, assumptions, or information that has not been included elsewhere in this survey:

## Survey 8: Buildings

Facility ID \_\_\_\_\_\_\_\_\_\_\_\_

* Currency code \_\_\_\_\_\_
* Conversion rate per USD \_\_\_\_\_\_\_\_\_\_\_\_
* Use oanda.com to calculate the average exchange over the costing period. If another exchange rate is used, document it in the text box here *(comment box)*
* Who provided input or answered questions in this survey? *\*\*This includes both the people filling out the survey (interviewers/us) and the people providing the data (interviewees/facility staff). Phone/Email are not required in DatStat but may be useful to collect\*\**

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| Name | Title | Phone | Email |
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* Please enter the source(s) used to collect the data in this survey *(comments box)*
* Does the ART Clinic own or pay rent on buildings?

*(Own, Pay Rent, Donor provided: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, A combination of above: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Other:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown)*

* When were the buildings in the ART clinic constructed?

*(Known Date (MM/DD/YYYY):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Known Year: \_\_\_\_\_\_\_\_, Estimated Year :\_\_\_\_\_\_\_\_\_)*

* If /known, who paid for the construction?

*(MoH, PEPFAR, GFATM, Other Donor:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Other:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown)*

* Have any renovations been done to the ART Clinic during the last 3 years (renovations include major structural improvements/changes that would not be considered routine maintenance)? *(yes/no)*
* \* Are facilities regularly maintained? *(Yes/No)*
  + IF YES
    - Who pays for the maintenance?

*(MoH, PEPFAR, GFATM, Other Donor: \_\_\_\_\_\_\_\_\_\_\_\_\_, Other : \_\_\_\_\_\_\_\_\_\_\_\_, Unknown)*

* Complete buildings table to capture building and or rental costs. Please complete the table for 1 or more buildings, components of buildings (i.e. a new wing constructed or a renovation to an existing building), or rent paid. Each building or component of the building should be listed on each line in the table. Specify how the cost data is being captured for each line item:
* Itemized / Component / Rent: Select this option if the cost data is for a specific component of a building or if the cost data is capturing monthly rent
* Total building cost: Select this option if the cost entered is the entire cost of one or many buildings used for HIV treatment
* By square meter: Select this option if the cost entered refers to cost per square meter of a building and also enter the number of square meters in the appropriate column
* Rent: Select this option if the building is rented. Enter a value for monthly rent in Cost per unit measured

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Building/ Component/ Renovations/ Structures/etc | Date Completed (YYYY) | Method to cost building | # of M2 | Cost per unit measured | % Allocated to HIV | # of months used in past year | # of months of total life of building | Funded by: | Coded Assumption | Free text assumption |
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* \* Total aggregated building cost is allocated equally to patient types. Therefore, all costs for this cost element will be equal per patient per year for all patients. Would you like to change those allocations?
  + If YES

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Subcategory | Pre-ART | Adult 1L | Adult 2L | Pediatric 1L | Pediatric 2L | Total | Free text assumption |
| Total Building Cost |  |  |  |  |  |  |  |

* Please complete the SDA allocation table for building costs

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Subcategory | ARVs | Clinical Care | Lab Services | SCM | Outreach | Training | M&E / HMIS | Facility Admin & Mgmt | Prog Mgmt and OH | Total | Free text assumption |
| Total Building Cost |  |  |  |  |  |  |  |  |  |  |  |

## Survey 9: Other Running Costs

Facility ID \_\_\_\_\_\_\_\_\_\_\_\_

* Currency code \_\_\_\_\_\_
* Conversion rate per USD \_\_\_\_\_\_\_\_\_\_\_\_
* Use oanda.com to calculate the average exchange over the costing period. If another exchange rate is used, document it in the text box here *(comment box)*
* Who provided input or answered questions in this survey? *\*\*This includes both the people filling out the survey (interviewers/us) and the people providing the data (interviewees/facility staff). Phone/Email are not required in DatStat but may be useful to collect\*\**

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| Name | Title | Phone | Email |
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* Please enter the source(s) used to collect the data in this survey*(comment box)* :

*This section aims to capture running costs for the facility. These might typically include utilities, security, regular maintenance, cleaning services, etc. For running costs such as electricity and water, the data collector is requested to check if these facilities are actually working by turning on a light switch or opening a tap.*

* Who pays these expenses?

*(Paid by facility, Paid by regional/national MOH, Donor, Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown)*

* Does the ART Clinic have water? *( 1 - low to 10 - high) \_\_\_\_\_\_\_*

1 = No water, 5 = Clean water regularly available/minor outages, 10 = Water always available/no outages

* Does the ART Clinic have electricity? *( 1 - low to 10 - high) \_\_\_\_\_\_\_\_*

1 = No electricity, 5 = Regular electricity with limited outages and adequate to run needed equipment, 10 = Electricity always available/no outages

* \* Did the ART Clinic experience service cuts of electricity or water during the costing year? *(Yes/No)*
  + IF YES
    - How frequently (water)*(# per month) \_\_\_\_\_\_\_\_*
    - How frequently (electricity)*(# per month) \_\_\_\_\_\_\_\_*
* Does the ART Clinic have soap for use by staff (sometimes, always, never)
* Does the ART Clinic have gloves for use by the staff? (sometimes, always, never)
* What is the time period for this costing data? (must be 12 months) \_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Please complete the table for other running costs

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | 1 | 2 |  |  |
| Detail | Subcategory | Cost Incurred in Costing Year | % Allocation to HIV | Coded Assumption | Free text assumption |
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| General Assumptions - Please include any assumptions that were not included in the table or that require additional explanations: |

1. \* Each subcategory of other running costs is allocated equally to patient types. Therefore, all costs for this cost element will be equal per patient per year for all patients. Would you like to change those allocations? *(yes/no)*
   * IF YES

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Subcategory | Pre-ART | Adult 1L | Adult 2L | Pediatric 1L | Pediatric 2L | Total | Free text assumption |
| Non-clinical supplies |  |  |  |  |  |  |  |
| Clinical Supplies |  |  |  |  |  |  |  |
| Building (maintenance, upkeep, etc) |  |  |  |  |  |  |  |
| Transport |  |  |  |  |  |  |  |
| Utilities |  |  |  |  |  |  |  |
| Administration / Systems |  |  |  |  |  |  |  |
| Miscellaneous |  |  |  |  |  |  |  |

1. Please complete the SDA Allocation table for other running costs

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Subcategory | ARVs | Clinical Care | Lab Services | SCM | Out-reach | Training | M&E / HMIS | Facility Admin & Mgmt | Prog Mgmt and OH | Total | Free text assumption |
| Non-clinical supplies |  |  |  |  |  |  |  |  |  |  |  |
| Clinical Supplies |  |  |  |  |  |  |  |  |  |  |  |
| Building (maint, upkeep, etc) |  |  |  |  |  |  |  |  |  |  |  |
| Transport |  |  |  |  |  |  |  |  |  |  |  |
| Utilities |  |  |  |  |  |  |  |  |  |  |  |
| Administration / Systems |  |  |  |  |  |  |  |  |  |  |  |
| Miscellaneous |  |  |  |  |  |  |  |  |  |  |  |

## Survey 10: Personnel

Facility ID \_\_\_\_\_\_\_\_\_\_\_\_

* Currency code \_\_\_\_\_\_
* Conversion rate per USD \_\_\_\_\_\_\_\_\_\_\_\_
* Use oanda.com to calculate the average exchange over the costing period. If another exchange rate is used, document it in the text box here *(comment box)*
* Who provided input or answered questions in this survey? *\*\*This includes both the people filling out the survey (interviewers/us) and the people providing the data (interviewees/facility staff). Phone/Email are not required in DatStat but may be useful to collect\*\**

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* Please enter the source(s) used to collect the data in this survey *(comment box)*
* Who pays for base salaries for ART staff?

(*Facility Manager, ART Coordinator, District MoH, Regional/Provincial MoH, National MoH,*

*Donor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown)*

* Who pays for bonuses, top ups for ART staff?

(*Facility Manager, District MoH, Regional/Provincial MoH, National MoH,*

*Donor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown, N/A)*

* Who pays for Insurance or other benefits for ART staff?

(*Facility Manager, ART Coordinator, District MoH, Regional/Provincial MoH, National MoH,*

*Donor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown, N/A)*

* Who makes hiring and firing decisions at the facility for ART staff?

(*Facility Manager, ART Coordinator, District MoH, Regional/Provincial MoH, National MoH,*

*Donor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown)*

* Who makes promotion and job assignment decisions for ART staff?

(*Facility Manager, ART Coordinator, District MoH, Regional/Provincial MoH, National MoH,*

*Donor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown)*

* Who is the decision-maker on bonuses for ART staff?

(*Facility Manager, ART Coordinator, District MoH, Regional/Provincial MoH, National MoH,*

*Donor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown, N/A)*

**ART Clinic (Coordinator)**

* How many years have you been working with ART? \_\_\_\_\_\_
* How many years have you been working with ART at this facility? \_\_\_\_\_\_
* Who determines work schedule assignments for the ART clinic?

(*Facility Manager, ART Coordinator, District MoH, Regional/Provincial MoH, National MoH,*

*Donor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, Unknown, N/A*)

* In what ways are staff rewarded for high performance – check all *(bonus, time off, verbal recognition, preferred rotation, certificate, training, other \_\_\_\_\_\_\_)*
* How many times in the costing year did you reward staff? \_\_\_\_\_\_\_\_
* Do you have any problems with staff that aren’t performing up to your standard? *(Yes, No)*
  + *IF YES*
    - What do you do in those instances

(*verbal warning, written warning (to MoH), docking pay, less desirable work hours/schedule(rotation), termination, other \_\_\_\_\_\_\_\_\_\_)*

* + - How many times in the costing year did you take any such actions? \_\_\_\_\_\_\_\_\_\_\_\_
* \* How often does the clinical staff at this facility operate on a rotational basis? This refers to staff that have been assigned to the ART clinic as an FTE for a period of time. This does not refer to staff that work in the ART clinic periodically due to a continuously rotating schedule. This question refers to staff that are rotated periodically to learn new areas, to help with knowledge transfer, and/or to ensure adequate staffing in undesirable locations such as very rural facilities *(Always, Sometimes, Never)*
  + IF SOMETIMES or ALWAYS,
    - Check the specific cadres that rotate and indicate how long they work at the ART clinic prior to rotating:

*Medical Doctors \_\_\_\_\_\_\_*

*Medical/Clinical Officers \_\_\_\_\_\_\_*

*Registered Nurses \_\_\_\_\_\_\_*

*LP Nurses \_\_\_\_\_\_\_*

*Auxiliary Nurse \_\_\_\_\_\_\_*

*Community/Rural Health Wkr \_\_\_\_\_\_\_*

*HIVAIDS Nurse \_\_\_\_\_\_\_*

*Nursing Assistant \_\_\_\_\_\_\_*

*Health Educator \_\_\_\_\_\_\_*

*Social Worker \_\_\_\_\_\_\_*

*Counselors*  *\_\_\_\_\_\_*

**Training**

* What proportion of doctors and nurses working in HIV receive any HIV-specific training before they are employed? *\_\_\_\_\_\_\_\_\_%*
* What proportion of doctors and nurses receives in-service training on HIV treatment? \_\_\_\_\_\_\_\_\_*%*
* What percentage of doctors and nurses at the facility have ever received HIV training (whether they treat HIV patients or not)?  *\_\_\_\_\_\_\_\_\_%*
* Do *all* *personnel* (doctors, nurses, and others) involved with the treatment of HIV patients receive in-service training? *(Yes/No)*
* How frequent are HIV-specific trainings conducted? These could be refreshers in treatment protocols, ARV management, DBS testing, other in-service or even non-routine trainings, etc.

*(Never, monthly, quarterly, annually, as needed:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, other:\_\_\_\_\_\_\_\_\_\_\_\_)*

* IF ANYTHING OTHER THAN “Never”
  + How frequent are the HIV specific trainings *(\_\_\_\_\_\_\_\_\_ per year)*
  + Who provides the trainings? *(MoH, UN Organization: \_\_\_\_\_\_\_\_\_\_, Partner organization: \_\_\_\_\_\_\_\_\_\_\_\_\_\_, Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, unknown)*
  + Is training used as an incentive for personnel involved with the treatment of HIV patients? (i.e. high-performing individuals are provided more opportunities to attend trainings) *(Yes/No)*
* Please complete the tables for all personnel partially or fully dedicated to the facility. There is one table for direct personnel and one table for indirect personnel. Where possible, please complete each component of the fully loaded salary per person (including bonus, overtime, payroll tax, and insurance). Each staff member should be listed on each line in the table, with specification for personnel category selected.

**DOCUMENTING ASSUMPTIONS**:  Please use the following codes to identify the data types and assumptions that were made to identify each line item of ARV costs at this facility.  For additional information on what each of these data types includes, please refer to the study protocol document.  Use the letter of the appropriate assumption type followed by a “:” and then list the column numbers the data type refers to I .e. 1-3.  If more than one data type applies to the same row but different columns, separate them by a comma and NO SPACE.  Column numbers are located above each relevant column.

For example:

Coded Assumptions*:  a:(1-3),d:(4-5)  (translation = columns 1-3 are primary data and columns 4 and 5 are primary and facility proxies)*

Free Text Assumptions*:  primary data collected from lab records, context proxies based off of data from another health center in the same district*

a: Primary

b: Primary + Context proxy (partial primary)

c: Primary + Interview (partial primary)

d: Primary + Facility proxy (partial primary)

e: Primary + Context proxy + Interview

f: Interview

g: Context proxy + interview

h: Context proxy

i: Facility proxy + Interview

j: Facility proxy

k: Bottom-up

l: Other

**Direct Personnel**

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|  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |  |  |
| Local Staff Title  (1) | Staff Type  (2) | # FTE | Local or Expat | % of time dedicated to facility | %time dedicated to HIV | Annual Base Salary | Bonus (or top ups) | Over-time | Payroll Taxes (paid by facility) | Insurance | Housing | Other | Major Funding source(s) for compensation | % of total compensation is from major funder specified | % of time on adherence counseling | Coded assumptions | Free text assumption |
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**Indirect Personnel**

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|  |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |  |  |
| Local Staff Title | Staff Type | # FTE | Local or Expat | % of time dedicated to facility | %time dedicated to HIV | Annual Base Salary | Bonus (or top ups) | Over-time | Payroll Taxes (paid by facility) | Insurance | Housing | Other | Major Funding source(s) for compensation | % of total compensation/funding | Coded assumption | Free text assumption |
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| General Assumptions - Please include any assumptions that were not included in the table or that require additional explanations:   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Local Staff Title | Staff Type | # Staff | Pre-ART | Adult 1L | Adult 2L | Pediatric 1L | Pediatric 2L | Total | Free Text assumptions | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | |

* Please complete the table for patient allocation for Direct Personnel

* Please complete the table for patient allocation for Indirect Personnel

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| Unique ID | Staff Type | # Staff | Pre-ART | Adult 1L | Adult 2L | Pediatric 1L | Pediatric 2L | Total | Free Text Assumption |
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* Please complete the table for SDA allocations for Direct Personnel

SDA Allocations

* **ARVs** – includes costs only explicitly associated with ARVs.
* **Clinical Care –** includes all costs associated with the treatment of ART patients excluding ARV and laboratory service costs. Clinical care includes any patient interactions related to treating specific ailments and evaluating patient status.
* **Laboratory Services** – includes all expenses related to laboratory services including collecting samples, running samples, and providing results of tests to facilities and patients. Does not include supply chain or other external costs for labs.
* **Supply Chain** – includes all supply chain costs for drugs, labs, equipment, buildings, etc that can be directly tied to and are incurred by the facility. Does not include centralized supply chain costs. Supply chain covers procurement, distribution, receiving, warehousing, and inventory management.
* **Outreach Programs** – includes all costs associated with outreach programs. These programs are defined as clinical support, counseling, or mentoring activities/services provided directly to patients or to other (lower-level) facilities.
* **M&E and HMIS** – includes all costs associated with data capture, reporting, information systems and calculations.
* **Facility Administration and Management** – includes all facility level management and overhead costs.
* **High-level Administration and Management** – includes all costs above the facility (i.e provincial/regional) required as part of health system and ministry offices. This SDA should be captured to the highest level above the facility as possible with specification of what level of data was available and what was not.

**Direct Personnel**

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| Local Staff Type | Staff Type | # of Staff | ARVs | Clinical Care | Lab Services | SCM | Out-reach | Training | M&E / HMIS | Facility Admin & Mgmt | Prog Mgmt and OH | Total | Free Text Assumptions |
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**Indirect Personnel**

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| Local Staff Type | Staff Type | # of Staff | ARVs | Clinical Care | Lab Services | SCM | Out-reach | Training | M&E / HMIS | Facility Admin & Mgmt | Prog Mgmt and OH | Total | Free Text Assumptions |
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* Please complete the Training table for all training that took place during the costing year

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| Training Name | Onsite/ Offsite | Initial/ Ongoing | Clinical/ Non-Clinical | # facility staff attending | # of days | % to HIV | Per diem | cost of training per person per day of training (venue, materials, trainer, etc) | Cost per night of lodging | # of years training is good for (ALWAYS “1” FOR ONGOING) | Assign SDA | Patient type (if specific, otherwise use ‘all’) | Coded Assumptions | Free Text Assumptions |
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## Survey 11: Quality

Facility ID \_\_\_\_\_\_\_\_\_\_\_\_

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**Basic Patient Info**

* ID Number (This number does not necessarily need to be an ART-assigned number but it will uniquely identify the patient within DatStat. See patient participant list for this facility) \_\_\_\_\_\_\_\_\_\_
* Is this patient record/chart eligible for data extraction: (yes/no)
  + IF NO
    - Select Reason for rejection
      * Patient initiated > 12 PRIOR to the start of the costing period
      * Patient is a transfer in
      * Initiated > 6 months AFTER the start of the costing period
      * No date of birth
      * No initiation date or initiation date recorded is after DOB
      * No initiation criteria – either CD4 or WHO stage
      * No follow-up indicator for living patients (at least one of CD4 follow-up, VL follow-up, weight follow up)
* Date of Birth (MM/DD/YYYY) \_\_\_\_\_\_\_\_\_\_\_
* Gender *(Male/Female/Unknown)*
* Occupation

*(Farmer, Housewife, Business, Government, Student, Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, unknown)*

**Initiation**

* Date of Initiation (MM/DD/YYYY) \_\_\_\_\_\_\_\_\_
* TB Status at initiation *(Yes/No/Unknown)*
* Has this person ever had a positive TB sputum? *(Yes/No/Unknown)*
* Height \_\_\_\_\_\_\_ (cm), *not documented*
* Weight \_\_\_\_\_\_\_ (kg), *not documented*
* Was a CD4 test done at initiation? *(Yes/No)*
  + IF YES
    - Date of CD4 test (MM/DD/YYYY) \_\_\_\_\_\_\_\_\_\_\_
    - CD4 result (or % if the patient is <5 years old)\_\_\_\_\_\_\_\_\_\_\_
* Was VL done at initiation? (Yes/No)
  + IF YES
    - Date of VL test at Initiation (MM/DD/YYYY): \_\_\_\_\_\_\_\_
    - Result of VL \_\_\_\_\_\_\_\_
* WHO Status at Initiation *(Stage I, Stage II, Stage III, Stage IV, N/A)*
* Was CTX given at initiation? *(Yes/No)*
* Initial regimen/formulation (Select from a drop-down)

*TDF/3TC/EFV TDF/FTC/EFV TDF/3TC/NVP TDF/FTC/NVP AZT/3TC/EFV AZT/3TC/NVP D4T/3TC/NVP D4T/3TC/EFV TDF/3TC/LPV/r TDF/3TC/ATV/r ABC/ddI/LPV/r ABC/ddI/ATV/r*

*ABC/ddI/IDV/r d4T/ddI/LPV/r AZT/ddI/ATV/r AZT/3TC/LPV/r*

*Other*

**Patient Outcome**

In the table below, record **ALL** CD4s, VLs, and Weights including the dates for each that were done AFTER initiation which has already been captured. For columns where there is no value (i.e. a CD4 blood draw is recorded but the result is not available, leave the cell blank). Record the tests and weights in chronological order.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date of CD4 Blood Draw / Weight / VL blood draw (MM/DD/YYYY) | CD4 Result (leave blank if unknown) | Count or Percent | Weight | VL |
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|  |  |  |  |  |

* Date of Last Visit (MM/DD/YYYY) \_\_\_\_\_\_\_\_
* Current weight (kg) *(Known* \_\_\_\_*\_\_, Unknown)*
* Date of current weight \_\_\_\_\_\_\_\_\_\_\_\_\_
* Current Regimen/Formulation

*TDF/3TC/EFV TDF/FTC/EFV TDF/3TC/NVP TDF/FTC/NVP AZT/3TC/EFV AZT/3TC/NVP D4T/3TC/NVP D4T/3TC/EFV TDF/3TC/LPV/r TDF/3TC/ATV/r ABC/ddI/LPV/r ABC/ddI/ATV/r*

*ABC/ddI/IDV/r d4T/ddI/LPV/r AZT/ddI/ATV/r AZT/3TC/LPV/r*

*Other*

* How many scheduled appointments were there in the costing year? *Known\_\_\_\_\_\_\_\_\_\_, Unknown*
* For how many scheduled appointments was the patient >= 7 days late, including missed appointments? *Known\_\_\_\_\_\_\_\_\_\_, unknown*
* Patient Outcome

*(Alive and on ART, Transferred, Defaulted, Stopped, Died, Unknown)*

* Date of Patient Outcome, if any (MM/DD/YYYY) \_\_\_\_\_\_\_\_\_\_\_

# Annex 6: Descriptive Analysis Data Tables

The tables below are intended to provide a picture of the basic outputs and calculations of the cost data collected during the study. These tables are only illustrative and do not provide a comprehensive picture of all possible descriptive analyses that will be conducted.

## Total Cost Per Patient Per Year

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Input Cost Category** | **Pre-ART** | **Adult 1L** | **Adult 2L** | **Pediatric 1L** | **Pediatric 2L** | **All Patients** |
| **Direct Running Costs** |  |  |  |  |  |  |
| Direct Personnel |  |  |  |  |  |  |
| ARVs |  |  |  |  |  |  |
| Other Drugs |  |  |  |  |  |  |
| Lab Supplies |  |  |  |  |  |  |
| **Total Direct Running Costs** |  |  |  |  |  |  |
| **Indirect Running Costs** |  |  |  |  |  |  |
| Indirect Personnel |  |  |  |  |  |  |
| Other Running Costs |  |  |  |  |  |  |
| **Total Indirect Running Costs** |  |  |  |  |  |  |
| **Investment Costs** |  |  |  |  |  |  |
| Buildings |  |  |  |  |  |  |
| Medical Equipment |  |  |  |  |  |  |
| Non-medical Equipment |  |  |  |  |  |  |
| Training |  |  |  |  |  |  |
| TA |  |  |  |  |  |  |
| **Total Investment Costs** |  |  |  |  |  |  |
| **Overheads** |  |  |  |  |  |  |
| Off-site Overhead |  |  |  |  |  |  |
| **Total Overheads** |  |  |  |  |  |  |
| **GRAND TOTAL** |  |  |  |  |  |  |

## Total Cost Per Patient Per Year by SDA

*Note: The SDA table below represents the total cost per patient per year, however, the same table can be created for each individual cost element to determine how much each SDA contributes to cost per patient for a single cost element. For example, this table in the personnel cost category could illustrate how much personnel cost can be attributed to clinical care versus outreach, etc. Because this table looks the same for each cost element, it is displayed here only once but it will be created in the excel model and used in descriptive analysis for each individual cost element.*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Service Delivery Area** | | | **Pre-ART** | **Adult 1L** | **Adult 2L** | **Pediatric 1L** | **Pediatric 2L** | **All Patients** |
| ARVs | |  |  |  |  |  |  |  |
| Clinical Care | |  |  |  |  |  |  |  |
| Lab Services |  |  |  |  |  |  |  |  |
| SCM |  |  |  |  |  |  |  |  |
| Outreach |  |  |  |  |  |  |  |  |
| Training | |  |  |  |  |  |  |  |
| M&E / HMIS | | |  |  |  |  |  |  |
| Facility Admin and Mgmt | |  |  |  |  |  |  |  |
| Prog Mgmt and OH | | |  |  |  |  |  |  |
| **Total** | | |  |  |  |  |  |  |

## Personnel

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Staff Type** | **All Patients** | **Pre-ART** | **Adult 1L** | **Adult 2L** | **Peds 1L** | **Peds 2L** |
| Direct Personnel |  |  |  |  |  |  |
| Indirect Personnel |  |  |  |  |  |  |
| **Total** |  |  |  |  |  |  |

## ARVs

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Per Patient Per Year** | | | | | | **Total Cost** | | |
| **Category** | **All Patients** | **Pre-ART** | **Adult 1L** | **Adult 2L** | **Pediatric 1L** | **Pediatric 2L** | **ARVs** | **SCM** | **Total** |
| **Adult Drugs** |  |  |  |  |  |  |  |  |  |
| A - First Line |  |  |  |  |  |  |  |  |  |
| A - Second Line |  |  |  |  |  |  |  |  |  |
| A - Mix (Dual Use) |  |  |  |  |  |  |  |  |  |
| **Pediatric Drugs** |  |  |  |  |  |  |  |  |  |
| P - First Line |  |  |  |  |  |  |  |  |  |
| P - Second Line |  |  |  |  |  |  |  |  |  |
| P - Mix (Dual Use) |  |  |  |  |  |  |  |  |  |
| **Adult/Ped Mixed** |  |  |  |  |  |  |  |  |  |
| A/P - First Line |  |  |  |  |  |  |  |  |  |
| A/P - Second Line |  |  |  |  |  |  |  |  |  |
| A/P - Mix |  |  |  |  |  |  |  |  |  |
| **Total** |  |  |  |  |  |  |  |  |  |

## Laboratory

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Per Patient Per Year** | | | | | | **Total Cost** | | |
| **Laboratory Test Categories** | **All Patients** | **Pre-ART** | **Adult 1L** | **Adult 2L** | **Pediatric 1 L** | **Pediatric 2L** | **Lab Services** | **SCM** | **Total** |
| Tests to facilitate initial diagnosis |  |  |  |  |  |  |  |  |  |
| Tests for pediatric diagnosis |  |  |  |  |  |  |  |  |  |
| Tests to stage/monitor the patient |  |  |  |  |  |  |  |  |  |
| Tests to monitor the patient |  |  |  |  |  |  |  |  |  |
| Tests for common OIs |  |  |  |  |  |  |  |  |  |
| **Total** |  |  |  |  |  |  |  |  |  |

## Opportunistic Infection Drugs

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Per Patient Per Year** | | | | | | **Total Cost** | | |
| **Category** | **All Patients** | **Pre-ART** | **Adult 1L** | **Adult 2L** | **Pediatric 1L** | **Pediatric 2L** | **Clinical Care** | **SCM** | **Total** |
| Antiviral |  |  |  |  |  |  |  |  |  |
| Antiparasitic |  |  |  |  |  |  |  |  |  |
| Antibiotic |  |  |  |  |  |  |  |  |  |
| Antidepressant |  |  |  |  |  |  |  |  |  |
| Antifungal |  |  |  |  |  |  |  |  |  |
| Antimalarial / toxo |  |  |  |  |  |  |  |  |  |
| Antituberculosis |  |  |  |  |  |  |  |  |  |
| Cotrimoxazole |  |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |  |
| **Total** |  |  |  |  |  |  |  |  |  |

## Nutrition

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Per Patient Per Year** | | | | | | **Total Cost** | | |
| **Category** | **All Patients** | **Pre-ART** | **Adult 1L** | **Adult 2L** | **Pediatric 1L** | **Pediatric 2L** | **Clinical Care** | **SCM** | **Total** |
| Adult |  |  |  |  |  |  |  |  |  |
| Pediatric |  |  |  |  |  |  |  |  |  |
| Adult / Pediatric |  |  |  |  |  |  |  |  |  |
| **Total** |  |  |  |  |  |  |  |  |  |

## Equipment

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Per Patient Per Year** | | | | | | **Total Cost** | | |
| **Category** | **All Patients** | **Pre-ART** | **Adult 1L** | **Adult 2L** | **Pediatric 1L** | **Pediatric 2L** | **Clinical Care** | **SCM** | **Total** |
| Vehicles |  |  |  |  |  |  |  |  |  |
| Info Tech |  |  |  |  |  |  |  |  |  |
| Communications |  |  |  |  |  |  |  |  |  |
| Supplies and Equip |  |  |  |  |  |  |  |  |  |
| Furniture |  |  |  |  |  |  |  |  |  |
| Utility Equipment |  |  |  |  |  |  |  |  |  |
| Med / Lab Equip |  |  |  |  |  |  |  |  |  |
| Specialized Lab |  |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |  |
| **Total** |  |  |  |  |  |  |  |  |  |

## Buildings

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Per Patient Per Year** | | | | | | **Total Cost** | | | | | | | |
| **Category** | **All Patients** | **Pre-ART** | **Adult 1L** | **Adult 2L** | **Pediatric 1L** | **Pediatric 2L** | **Clinical Care** | **Lab Services** | **SCM** | **Outreach** | **Training** | **M&E / HMIS** | **Facility Admin & Mgmt** | **Prog Mgmt and OH** |
| Buildings |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Total** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

## Other Running Costs

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | **Per Patient Per Year** | | | | | | **Total Cost** | | | | | | | | | |
| **Category** | | **All Patients** | | **Pre-ART** | **Adult 1L** | **Adult 2L** | **Pediatric 1L** | **Pediatric 2L** | **Clinical Care** | **Lab Services** | | **SCM** | **Outreach** | **Training** | **M&E / HMIS** | **Facility Admin & Mgmt** | **Prog Mgmt and OH** | **Total** |
| Non-clinical Supplies | |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |
| Clinical Supplies | |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |
| Building (maint, etc) | |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |
| Security | |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |
| Utilities | |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |
| Admin/Sytems | |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |
| Miscellaneous | |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |
| **Total** | |  | |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |

## Training

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Per Patient Per Year** | | | | | | **Total Cost** | | | | | | | | |
| **Category** | **All Patients** | **Pre-ART** | **Adult 1L** | **Adult 2L** | **Pediatric 1L** | **Pediatric 2L** | **Clinical Care** | **Lab Services** | **SCM** | **Outreach** | **Training** | **M&E / HMIS** | **Facility Admin & Mgmt** | **Prog Mgmt and OH** | **Total** |
| Training |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Total** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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1. See for example Menzies et al., AIDS, 2011. [↑](#footnote-ref-1)
2. These data are analyzed in a manuscript by Elliot Marseille, Mark Giganti, Albert Mwango, Angela Chisembele-Taylor, James G. Kahn, Lloyd Mulenga and Jeffrey S. A. Stringer entitled “Taking ART to Scale: The Cost-Effectiveness of Antiretroviral Therapy in 45 Clinical Sites in Zambia” (no date). [↑](#footnote-ref-2)
3. The six private facilities include 4 urban clinics, 1 urban hospital and 1 rural clinic. [↑](#footnote-ref-3)
4. Discussions with the CIDRZ are under way to determine the feasibility and cost of disaggregating the collected data into intervals, so that one could distinguish the costs and the patient-years in each of the years that each facility has delivered ART services. [↑](#footnote-ref-4)
5. This enumeration is tentative, based on an initial attempt to categorize questions before the data is available. As the data is analyzed, we expect that some questions will be revealed to overlap with others, while some not yet identified here will emerge as useful indicators of one of these categories of determinants. [↑](#footnote-ref-5)
6. This section of the protocol borrows heavily from a draft protocol under preparation by Sergio Bautista of the INSP. [↑](#footnote-ref-6)
7. We are grateful to Elliot Marseille, Mark Giganti, Albert Mwango, Angela Chisembele-Taylor, James G. Kahn, Lloyd Mulenga, Jeffrey S. A. Stringer for making available the data from their forthcoming paper, Taking ART to Scale: The Cost-Effectiveness of Antiretroviral Therapy in 45 Clinical Sites in Zambia.” This is the same data that we use in Section 4 as the basis for the analysis of statistical power. [↑](#footnote-ref-7)
8. Figure 8 is an illustrative application of data envelopment analysis which incorporates many simplifying assumptions. In particular, for this illustrative application no attempt has been made to correct the output measure for quality or complexity. A variety of techniques are available for adjusting data envelopment analysis for complexity and quality, which we will deploy when we apply this method to the data collected under this protocol. [↑](#footnote-ref-8)
9. The average costs can also be predicted for a hospital with the opposite quality and complexity characteristics. In this simple linear model all the information to construct those adjusted average cost estimates is available in Figures 9 and 10. [↑](#footnote-ref-9)
10. Sophisticated methods of quality measurement which our large representative sample prevent us from using include rigorous collection of multiple lab test results, time-and-motion studies of provider interactions with patients and focus-group studies of patient attitudes towards their treatment and their providers. See for example Das, J. and P. J. Gertler (2007). "Variations in practice quality in five low-income countries: a conceptual overview." Health Affairs **26**(3): 296-309. [↑](#footnote-ref-10)
11. An even more general measure of ART performance would include the facility’s service to people who are eligible for ART and reside within the facility’s catchment area, but never present themselves for diagnosis and treatment. Because the systematic inclusion of these people in the analysis would require household surveys of the population surrounding each facility, we largely exclude this public health dimension of facility performance from the scope of our inquiry. [↑](#footnote-ref-11)
12. The category “failure to remain in treatment” can be decomposed into loss-to-follow-up and mortality. [↑](#footnote-ref-12)
13. The crudest approach would be to assume that average cost per patient-month is the same for newly initiating and continuing patients. Under this assumption, we can apply the share of newly initiated patient-months to total costs in order to infer the costs of the newly initiated patients. A better alternative would be to use a few questions regarding the relative intensity of care between continuing and newly initiated patients to derive an inflation factor which could be applied to the costs of continuing patient-months. [↑](#footnote-ref-13)
14. In the following exposition all patients are assumed to be adults. [↑](#footnote-ref-14)
15. The variance-covariance matrix of the five residuals is singular and cannot be inverted. [↑](#footnote-ref-15)