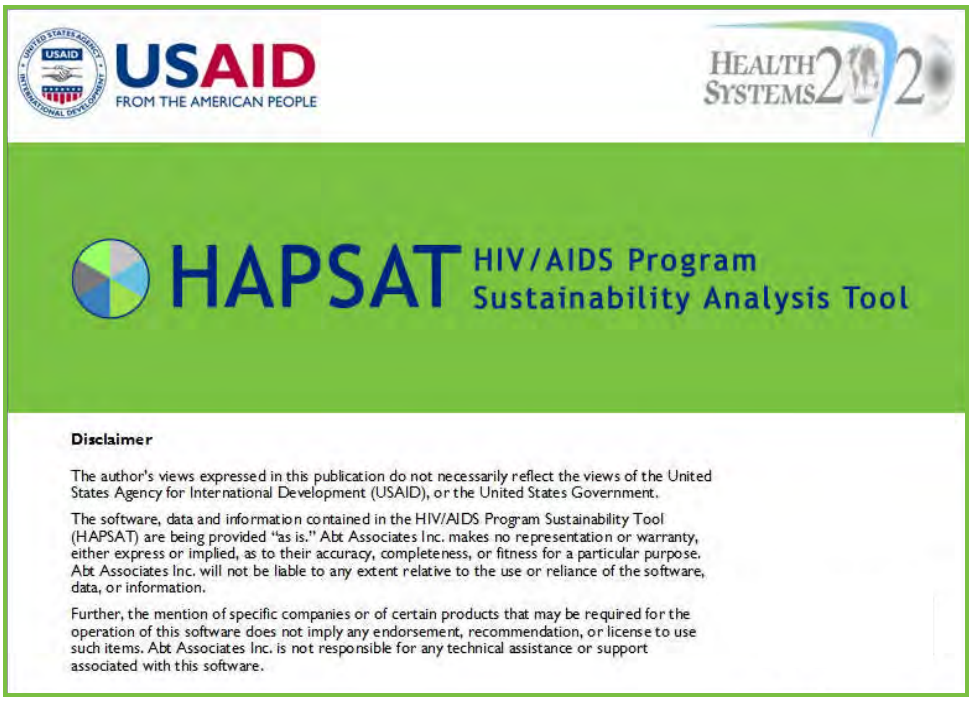
USAID
FROM THE AMERICAN PEOPLE

USING HAPSAT FOR HIV PROGRAM SUSTAINABILITY ANALYSIS

AN INTRODUCTORY GUIDE


USAID
FROM THE AMERICAN PEOPLE

HEALTH SYSTEMS 2020

HAPSAT HIV/AIDS Program Sustainability Analysis Tool

Disclaimer

The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development (USAID), or the United States Government.

The software, data and information contained in the HIV/AIDS Program Sustainability Tool (HAPSAT) are being provided "as is." Abt Associates Inc. makes no representation or warranty, either express or implied, as to their accuracy, completeness, or fitness for a particular purpose. Abt Associates Inc. will not be liable to any extent relative to the use or reliance of the software, data, or information.

Further, the mention of specific companies or of certain products that may be required for the operation of this software does not imply any endorsement, recommendation, or license to use such items. Abt Associates Inc. is not responsible for any technical assistance or support associated with this software.

HEALTH SYSTEMS 2020

April 2010

This publication was produced for review by the United States Agency for International Development.

Mission

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

April 2010

For additional copies of this report, please email info@healthsystems2020.org or visit our website at www.healthsystems2020.org/hapsat

Cooperative Agreement No.: GHS-A-00-06-00010-00

Submitted to: Bob Emrey, CTO
Scott Stewart, Senior Technical Advisor
Health System Strengthening
Sarah Bittman, Program Assistant
Health Systems Division
Office of Health, Infectious Disease and Nutrition
Bureau for Global Health
United States Agency for International Development

Recommended Citation: *Using HAPSAT for HIV Program Sustainability Analysis: An Introductory Guide.* April 2010 Bethesda, MD: Health Systems 20/20 project, Abt Associates Inc.

Abt Associates Inc. | 4800 Montgomery Lane, Suite 600 | Bethesda, Maryland 20814 |
T: 301/913-0500 | F: 301/652-3916 | www.healthsystems2020.org |
www.abtassoc.com

In collaboration with:
| Aga Khan Foundation | BearingPoint | Bitrán y Asociados | BRAC University
| Broad Branch Associates | Forum One Communications | RTI International
| Training Resources Group | Tulane University School of Public Health and Tropical Medicine

HAPSAT HIV/AIDS Program Sustainability Analysis Tool

USING HAPSAT FOR HIV PROGRAM SUSTAINABILITY ANALYSIS

AN INTRODUCTORY GUIDE

Disclaimer

The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development (USAID), or the United States Government.

The software, data and information contained in the HIV/AIDS Program Sustainability Tool (HAPSAT) are being provided "as is." Abt Associates Inc. makes no representation or warranty, either expressed or implied, as to their accuracy, completeness, or fitness for a particular purpose. Abt Associates Inc. will not be liable to any extent relative to the use or reliance of the software, data, or information.

Further, the mention of specific companies or of certain products that may be required for the operation of this software does not imply any endorsement, recommendation, or license to use such items. Abt Associates Inc. is not responsible for any technical assistance or support associated with this software.

CONTENTS

Contents v

Acronyms 1

Acknowledgments ... 3

1. CONDUCTING SUSTAINABILITY ANALYSIS WITH HAPSAT ... 4

1.1 SUSTAINABILITY ANALYSIS ... 4
1.2 WHAT IS HAPSAT? ... 4
1.3 ANALYTICAL PROCESS ... 5

2. OVERVIEW OF THE HIV PROGRAM MODEL ... 7

3. LOADING HAPSAT ... 11

3.1 STARTUP ... 11

4. USING HAPSAT ... 14

4.1 NAVIGATION ... 14
4.2 ORDER of DATA ENTRY ... 14
4.3 SETTING THE TIME HORIZON ... 15
4.4 CREATING NEW POLICY SCENARIOS ... 16
4.5 ENTERING FINANCIAL RESOURCE INFORMATION ... 16
4.6 ENTERING HUMAN RESOURCE INFORMATION ... 17
4.7 ENTERING POPULATION INFORMATION ... 18
4.8 ENTERING EPIDEMIOLOGICAL DATA ... 19
4.9 ENTERING GENERAL PARAMETERS ... 20
4.10 HIV TESTING EFFICIENCY ... 21
4.11 ENTERING POLICY SPECIFICATIONS ... 22
4.12 ENTERING UNIT COST DATA ... 23
4.13 EXAMINING OUTPUT ... 28
4.14 SAVING AND CLOSING ... 29

5. SUMMARY REMARKS ... 30

Requirements for Using this Guide

Please note that this guide is intended to be used with the release version 1.0 of HAPSAT (HAPSAT Web for Excel 2003 or HAPSAT Web for Excel 2007) which are downloadable from www.hs2020.org/hapsat

HAPSAT requires Microsoft Excel version 2003 or higher.

ACRONYMS

USAID	United States Agency for International Development
ART	Antiretroviral Therapy
ARV	Antiretroviral
ATC	AIDSTreatCost
CBO	Community-based Organization
CD4	Cluster of Differentiation 4
CDC	Centers for Disease Control
CSS	Care and Support Services
DHS	Demographic and Health Survey
DFID	UK Department for International Development
FBO	Faith-based Organization
FTE	Full-time Equivalent
GDP	Gross Domestic Product
GFATM	Global Fund for AIDS, TB, Malaria
GTZ	Gesellschaft für Technische Zusammenarbeit
HAART	Highly Active Antiretroviral Therapy
HAPSAT	HIV/AIDS Program Sustainability Analysis Tool
HIV	Human Immunodeficiency Virus
AIDS	Acquired Immunodeficiency Syndrome
IDA	International Development Association
JICA	Japan International Co-operation Agency
JSI	John Snow International
MAP	Multi-country HIV/AIDS Programme (World Bank)
MoFNP	Ministry of Finance and Nation Development
MoH	Ministry of Health
NAC	National AIDS Council
NASF	National HIV/AIDS Strategic Framework
NGO	Nongovernmental Organization
NHA	National Health Accounts
OI	Opportunistic Infections

OVC	Orphans and Vulnerable Children
PE	Post-exposure Prophylaxis
PEPFAR	President's Emergency Plan for AIDS Relief
PLHIV	People Living with HIV and AIDS
PMTCT	Prevention of Mother-to-Child Transmission
STI	Sexually Transmitted Infections
TB	Tuberculosis
UNAIDS	United Nations Joint Programme for HIV/AIDS
USAID	United States Agency for International Development
US$	US Dollar
VCT	Voluntary Counseling and Testing
WHO	World Health Organization

ACKNOWLEDGMENTS

This development of HAPSAT was funded by the Office of HIV/AIDS (OHA) within the Bureau for Global Health (GH) of the U.S. Agency for International Development (USAID). This guide was written by Dr. Stephen Resch with assistance from Dr. Elaine Baruwa and Dr. Jason Bedford.

The authors are grateful for the support provided by USAID/Washington, especially Dr. Estelle Quain and Dr. John Novak of OHA, and Ms. Karen Cavanaugh and Mr. Yogesh Rajkotia of the GH Bureau, Office of Health, Infectious Disease and Nutrition. In addition, they would like to thank Ms. Caroll Vasquez of USAID/Zambia.

1. CONDUCTING SUSTAINABILITY ANALYSIS WITH HAPSAT

1.1 SUSTAINABILITY ANALYSIS

The term "sustainability" is often used in the context of development without clear definition. Describing a program as "sustainable" generally implies that features of its design ensure its continuation without external support and without damaging long-term consequences. However, the scarcity of measures and analytical methods for assessing the sustainability of public sector health programs reveals the difficulty of operationalizing and measuring the concept of sustainability in this context.

With respect to HIV/AIDS programs in high-burden countries, sustainability analysis seeks to measure the capacity of a health system to deliver a desired set of HIV/AIDS services over time under varying levels of external commitments. The primary metric for evaluating the sustainability of an HIV/AIDS program - and the primary focus of the HAPSAT- is the gap between the resources needed (financial and human) and the resources available within the country over a specific time horizon.

Sustainability can be broken down into three major domains: financial sustainability, organizational sustainability, and sustainability of services. Financial sustainability requires a balance of three considerations: (1) mobilization of domestic resources as much as possible to meet program costs, from both the government and private sectors, with private contributions coming primarily through risk sharing mechanisms and employers, rather than out-of-pocket; (2) minimizing dependence on external sources; (3) adequate funding for other health priorities. Financial sustainability also includes making efficient use of available resources (providing quality services at lowest cost). Organization sustainability does not lend it itself to quantification as easily as financial sustainability but can be regarded as the presence of well-functioning program management. A well functioning program should have the ability to generate accurate strategic information routinely, and have the organizational systems in place to ensure efficient delivery of high quality services. Finally, sustainability of services requires that a cadre of appropriately skilled health workers in adequate numbers is available to deliver treatment, care and prevention.

Policymakers need strategic information and analytical tools to assist with estimating the recurrent costs and non-financial resources required to support HIV/AIDS programs. It is important that these tools help policymakers quantify and visualize the medium- to long-term implications of current policy decisions. Computer models of HIV/AIDS service delivery can be used to estimate the program output expected from the utilization of financial, human, and physical resource inputs. Using model-based tools, health ministries can anticipate the resource required for achieving HIV/AIDS program goals, explore the implications of alternative service priorities and service delivery models, quantify sustainability risks associated with uncertain external funding streams and technical assistance, and stimulate plans to mitigate these risks.

1.2 WHAT IS HAPSAT?

You are probably reading this because you are interested in conducting a sustainability analysis of HIV/AIDS programs. HAPSAT, the HIV/AIDS Program Sustainability Analysis Tool, can help. HAPSAT is a Microsoft Excel-based tool for forecasting and analyzing the sustainability of HIV programs. The tool

contains a computer model of a country's HIV/AIDS program including services such as voluntary counseling and testing (VCT), prevention of mother-to-child transmission (PMTCT), antiretroviral therapy (ART), care and support services (CSS), and prevention.

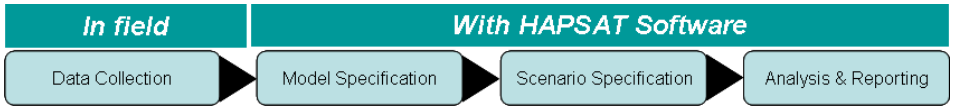
After the user has entered detailed data, he or she can generate estimates of the financial and human resources required to sustain or scale up a portfolio of HIV/AIDS services in that setting. Users can develop scenarios based on how resources are allocated and how services are delivered to estimate the impact of changes in policy, prices, and human resources.

HAPSAT calculates resource needs for an HIV/AIDS program with a user defined set of service level goals. HAPSAT also compares projected resource needs to expected resource availability and can be used to identify and report expected gaps and resource imbalances that made lead to inefficient or poor quality service delivery. As such, HAPSAT is a tool that can assist HIV/AIDS program planners with strategic decision making, goal-setting, program prioritization, and resource mobilization activities. HAPSAT can also provide useful information to policymakers seeking to develop a roadmap to program sustainability.

1.3 ANALYTICAL PROCESS

Conducting a sustainability analysis using HAPSAT can be broken down into four key steps shown in Figure 1.

FIGURE 1.1 STEPS IN CONDUCTING SUSTAINABILITY ANALYSIS



Data Collection

Data is essential for conducting a sustainability analysis. Published literature is likely to be the best source of some necessary inputs to HAPSAT models such as the rate of progression of HIV/AIDS in untreated patients. Annex A provides a summary of HAPSAT's default values. Other data is best collected from sources within the country so that the model can be tailored to accurately represent the country's HIV situation. Table 1 shows a summary list of country specific data elements that are best obtained through in-country data collection. This data should be collected before using the HAPSAT software. The **healthsystems2020/hapsat** website contains sample templates for data collection forms and instructions for collecting the necessary data that can be adapted to individual country contexts as needed. This manual assumes that the relevant data listed below has already been collected.

TABLE 1.1 KEY DATA CATEGORIES

DATA ELEMENT	POTENTIAL SOURCE
Quantity of health workers	(Health Ministry Office Survey)
Average salaries of health workers	(Health Ministry Office Survey)
HIV/AIDS service guidelines	(Health Ministry Office)
Skill mix of health care workers used to deliver HIV/AIDS	(Health Facilities Survey)

services	
ART drug regimens cost	(Health Ministry Office / Central Procurement Facility / Published Price Lists), HAPSAT Default Values
Number of patients on each ART regimen	(Health Ministry Office Survey)
List of Principal Recipients and major implementing partners	(Health Ministry Office Survey)
Amount of donor funding and internal revenue for HIV/AIDS currently and expected	(Health Ministry Office Survey, Donor Survey)
Cost of laboratory tests	(Health Ministry Office Survey, Health Facilities Survey), HAPSAT Default Values
Number of laboratories and number of working laboratory machines	(Health Ministry Office Survey, Health Facilities Survey)
Scope and scale of current HIV/AIDS services (what services provided? how many being served?)	(Health Ministry Office Survey)

Model Specification
After data is collected, the analyst uses the collected information as input data to specify a country-specific HIV program model in HAPSAT. This step usually involves calibrating the epidemiological output of the HAPSAT model to reference data sources such as UNAIDS population projections and SPECTRUM Model (Futures Institute) AIDS Impact Model projections of the countries HIV epidemic.

Scenario Specification
Then the analyst (HAPSAT user) specifies the set of alternative policy scenarios he or she is interested in evaluating. These policies are usually defined in terms of yearly target coverage level or service delivery volume in key programmatic areas. But more refined policies can include changes to laboratory monitoring guidelines, guidelines for starting ART or switching to 2nd line regimens. Once the scenarios parameters have been entered (usually in the 'Policy' worksheets), then the user can proceed with base case analysis, sensitivity analysis, and reporting results.

Analysis & Reporting
Usually more than one policy scenario is examined. The HAPSAT user will often save a copy of the workbook for each separate policy examined. HAPSAT produces a set of stock tables and graphs summarizing the results of a particular policy scenario, but all of the raw output is also available if the user wishes to create custom views of the model output.

This guide provides a guided tour through these 4 steps and illustrates the use of the HAPSAT tool in each step. The purpose of the guide is to introduce you to HAPSAT's capabilities and give you a basic understanding of how to use it. You will learn how to navigate through the software, where and how to input data, how to create policy scenarios, and how to obtain results in tables and graphs.

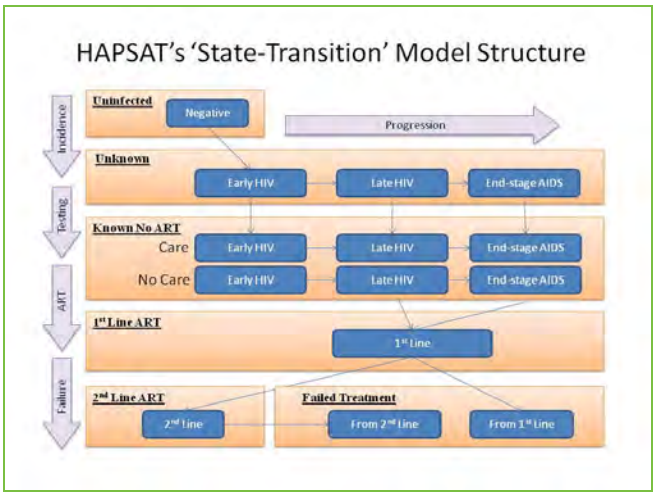
The sections that follow are intended to be read *linearly*; and, the learning experience is maximized if you directly interact with HAPSAT on your computer while reading the guide.

2. OVERVIEW OF THE HIV PROGRAM MODEL

The core feature of the HAPSAT software is a customizable HIV/AIDS Program Model. The basic structure of the model is fixed, but the user must specify a set of parameters to tailor the model to their setting of interest. Within the model, a country's population is divided among 14 mutually exclusive health states reflecting their HIV status, knowledge, and treatment situation. Those who are truly HIV-negative are assumed to have unknown status, since past negative test results do not necessarily indicate current HIV status. Those who are truly HIV-positive may or may not know their status and may or may not be eligible for ART. ART eligibility is determined by country-specific treatment guidelines. In the model, a portion of the population is categorized as ART-Eligible, even if their eligibility and status is unknown, to indicate progression of the disease. Of those HIV-positive persons who known their status and who are eligible for ART, they may or may not be receiving ART. Those receiving ART begin with 1st line regimens. A portion of individuals who fail on 1st line regimens over time due to resistance or other factors can be given a 2nd line regimen. When patients fail the last available ART regimen available to them, they move to the "treatment failure" state which represents active disease uncontrolled by ART medications.

Associated with each health state is a set of transition probabilities. For example, in each year, HIV-positive persons who are asymptomatic and do not know their status, have a probability of learning their status through VCT, a probability of progressing to symptomatic HIV (and ART-Eligibility), and a probability of dying from an unrelated cause. In the model, if the individual is female of childbearing age, she also has a probability of becoming pregnant and having a baby that may or may not be HIV infected. The main transitions are represented with arrows in Figure 2.1.

FIGURE 2.1 POPULATION HEALTH STATES IN THE HAPSAT MODEL



The HIV Program Model at the core of the HAPSAT software accommodates five categories of public sector HIV/AIDS services shown in Figure 2.3: ART, PMTCT, VCT, CSS for PLHIV including treatment of tuberculosis co-infection (TB/HIV) and STIs, and services for prevention of horizontal transmission. For each HIV/AIDS service, units of service are defined to measure the program's direct output (service volume). For example, a unit of service for ART is one patient-year of treatment (Table 2.1).

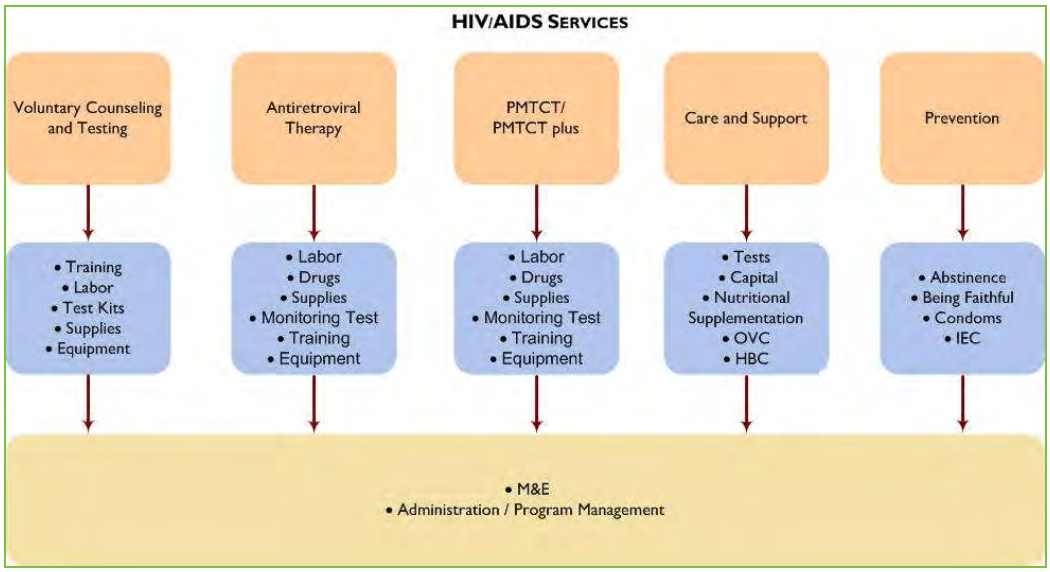
TABLE 2.1. DEFINITIONS OF UNITS OF SERVICE FOR MEASURING HIV/AIDS SERVICE VOLUME WITHIN THE HAPSAT MODEL

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

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

The resources required to provide these services are broken into three categories: financial resources (donor and government funding), human resources for service delivery (e.g. doctors, nurses, lab technicians, pharmacists, administrative staff), and physical capital (buildings, vehicles, laboratory machines).

FIGURE 2.2. HIV/AIDS PROGRAM FRAMEWORK



Note: PMTCT=Prevention of Mother-to Child Transmission, IEC=Information, Education and Communication, M&E=Monitoring and Evaluation

The HAPSAT model requires two broad categories of information (1) baseline input data to tailor the HIV Program Model to the country of interest and (2) policy scenario specifications which represent the alternatives the policymaker wishes to compare.

2.1 BASELINE SPECIFICATION

The baseline data encompasses the general parameters that represent the background context against which any program and policy design must contend and take into consideration. Baseline data can be differentiated into seven major categories:

- **Demographic** data, such as population structure, fertility rates, and mortality rates;
- **Epidemiological** data, such as HIV prevalence, infection, and symptom development rates, life expectancies, probabilities of transmission;
- **Financial** data, such as trends in donor funding and other financing sources for HIV/AIDS programs;
- **Labor** data, such as stock of health workers, recruitment and retention rates.
- **Service volume** data describing the current output of the HIV Program measured in units of service;
- **Medical** data, such as available protocols and regimens for screening, ARVs, and monitoring; and
- **Cost** data, such as human resource salaries, building, equipment, and consumables costs.

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

The medical data and cost data are used to construct and price a bill of materials for each service indicating the quantity of inputs required to produce one unit of output. This analysis includes the cost of health worker labor in the marginal cost of providing HIV/AIDS services. Although a full-time salaried worker may not cost more or less if their duties are shifted toward delivering HIV/AIDS services, there is an opportunity cost because that worker could have been delivering another important service. All variable costs were assumed to scale linearly, that is each unit costs the same amount and there no economies of scale are assumed. The costs of program management, monitoring and evaluation (M&E), and training were included as activities at the program-level common to all HIV/AIDS services.

2.2 POLICY SCENARIO SPECIFICATION

The second major category of user input covers policy scenario specification. For each year within the time horizon of the analysis, the user specifies the service volume goal for each service to be included in the HIV/AIDS program's portfolio of services. Because the structure of the HAPSAT model allows for complex interactions and feedback, service volume goals are not directly entered as a quantity of service (e.g., "100,000 persons on ART"). Instead, the user indicates the percentage of known HIV-infected patients receiving the service (e.g., the percentage of eligible for ART who are put on treatment). However, the model recalculates after every data entry, so the user can immediately see (in the same table) the impact of a parameter value on the more salient output metrics such as the number of persons on ART in a given year. Parameter values can be adjusted by the user until the model is calibrated to match the desired service volume goal.

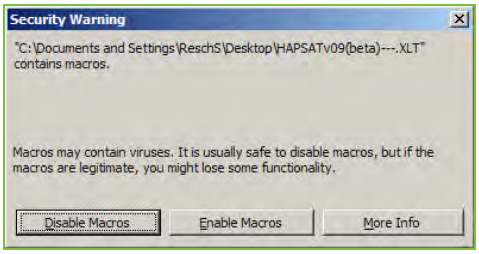
The scenario analysis functionality is used to explore specific scenarios that reflect alternative policy options, including variation in the number of people served by each category of HIV/AIDS program over time, the delivery of other closely related services such as screening and monitoring tests, and the provision of second-line ARV regimens. Scenarios can also address uncertain external factors such as the level of donor funding in future years.

3. LOADING HAPSAT

3.1 STARTUP

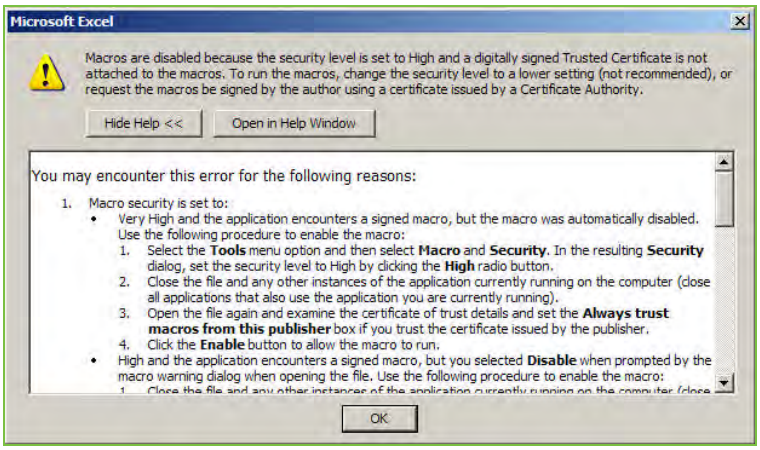
1. Locate the Excel template file 'HAPSAT1_2003.xlt' (for Microsoft Excel 2003) or 'HAPSAT1_2007.xltx' (for Microsoft Excel 2007) on your PC and double-click the icon.

2. Depending on your Microsoft Excel macro security settings, you may see a window like this:

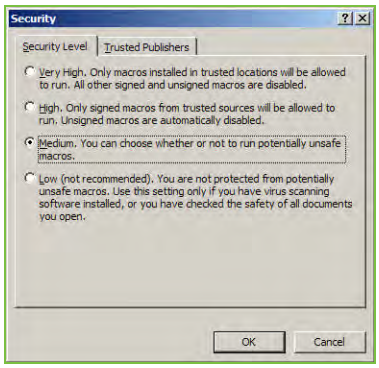


If so, click 'Enable Macros' to continue opening HAPSAT.

Alternatively, you may see a window like this:

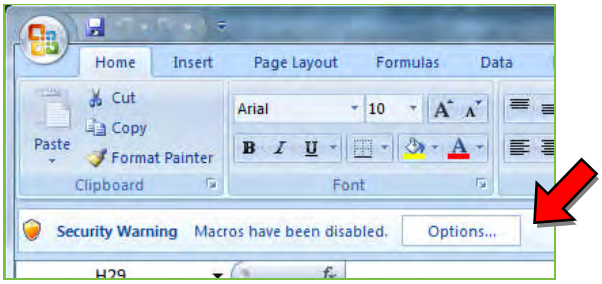


If so, click 'OK'. Then select TOOLS > Macro > Security, which will open this window:



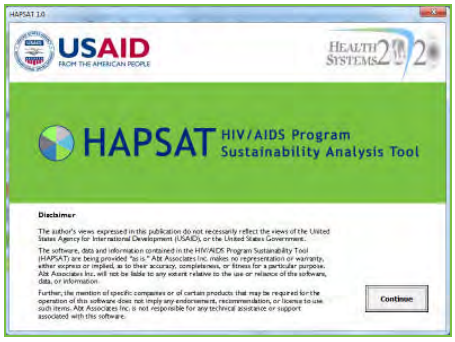
Select the 'Medium' security level. Then click 'OK', exit the Excel application and repeat Step 1.

If you are using Excel 2007, you might see a Macro warning that looks like this:

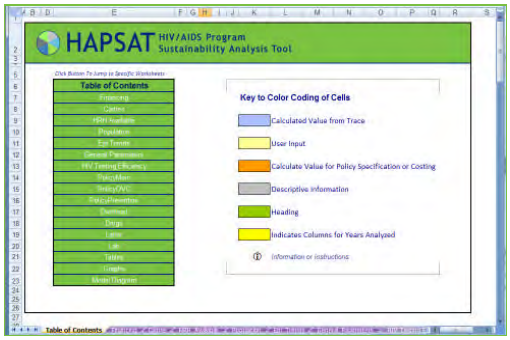


If so, click on the button that says "Options..." and when the pop-up window appears, click "Enable this content".

3. When HAPSAT opens, you will see a splash screen.

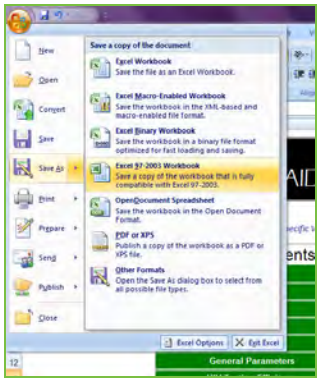


After reading the disclaimer, click 'Continue' button. After you click 'Continue' you will see the Table of Contents worksheet.



You will notice that the file is named HAPSAT1_2007.xlst or HAPSAT 1_2007.xlsm. This file is a copy of the template file. We recommend that you save this file immediately with a unique name (for example: 'HAPSAT1_NationalStrategicPlanDecisionSupport2010a.xlsx'). This is the file you will use to conduct your analyses. The original template file should remain unchanged so that it can be used to create additional 'blank' working copies of the HAPSAT tool.

4. In order to begin an analysis, you must first create an analysis file. The new analysis file is just a copy of the HAPSAT workbook you just opened in step one. Use the Office Menu in Excel 2007 or File menu in Excel 2003 to select the command 'Save As…' Please be sure to give it a meaningful name and be sure it is unique so that you do not overwrite other analysis files you have saved previously.



4. USING HAPSAT

4.1 NAVIGATION

You will notice several worksheet tabs at the bottom of the screen. Each worksheet is a section of the tool. You can navigate between sections of the model using either the 'Table of Contents' or the worksheet tabs. On every worksheet in the upper left corner is a link back to the **Home** sheet where table of contents is located.

The tool contains the sections described in Table 4.1 after the **Home** sheet.

TABLE 4.1 WORKSHEETS IN THE HAPSAT TOOL

WORKSHEET	DESCRIPTION
Financing	Data on projected donor and domestic funding and human resource supply
Cadres	The categories of health workers in the health workforce
HRH Available	Then size and dynamics of the health workforce for HIVAIDS
Population	Population trends
Epi Trends	HIV/AIDS Epidemiological trends
General Parameters	Economic, Demographic, and HIV-related parameters
HIV Testing Efficiency	A module for modeling the relationship between testing volume and the probability of testing positive
Baseyear ART	Data regarding the level of HIV/AIDS treatment in the baseline year of the model (the first year of the burn-in period)
PolicyMain	Main policy variables for key clinical interventions (Diagnosis, PMTCT, ART, CSS)
PolicyOVC	Policy variables for mitigation programs serving orphans and vulnerable children
PolicyPrevention	Policy variables for prevention programs other than PMTCT
Overhead	Assumptions regarding costs shared with non-HIV programs
Drugs	Drug regimen details and costs
Labor	Labor input per unit of service
Lab	Laboratory test per unit of service
Tables	Output tables
Graphs	Output graphs
Model Diagram	Schematic diagram of the HAPSAT simulation model

4.2 ORDER OF DATA ENTRY

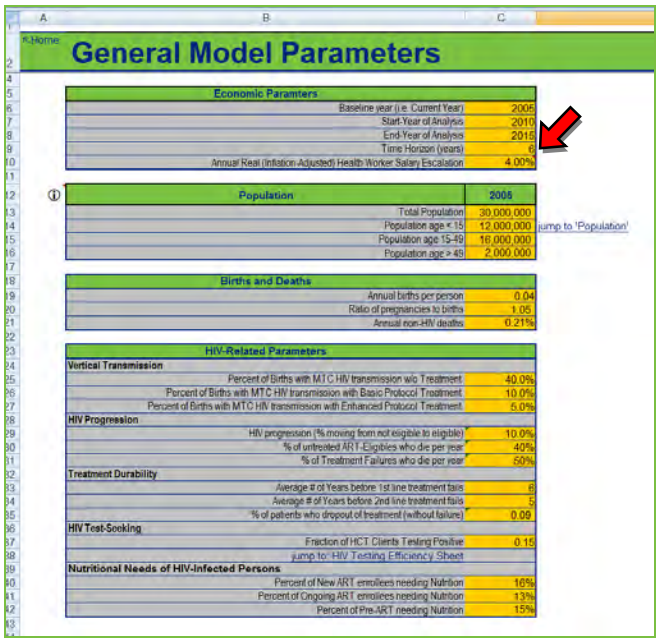
It is recommended that data be entered into HAPSAT in the order that the worksheets appear in the workbook, moving from left to right. **Financing**, **Cadres**, **HRH available**, **Population**, **Epi Trends,** with the exception of **General Parameters** which should be completed first. Usually the data entered here is the same for all policy scenarios that will be considered later. The **HIV Testing Efficiency**

sheet can be skipped unless there is country-specific data regarding the current level of HIV testing and the positivity rate of HIV tests (that fraction of all tests that newly identify a case). The model calibration can be completed next, and this will involve entering data on **Policy Main** and adjusting parameters on **Epi Trends** and **General Parameters** sheets in order to achieve good model fit. Good model fit will be indicated by closely matching HAPSAT output and projections from a reference epidemiological model like SPECTRUM (Futures Institute, Glastonbury, CT). The **Policy Main** sheet is important here, because the during the calibration, the service delivery levels (number on treatment) for ART should be set to match those used as inputs to the AIDS Impact Model in SPECTRUM. After model calibration (or before), data on resource use and unit costs can be entered in the **Overhead**, **Drugs**, **Labor**, and **Lab** worksheets. The model is then ready for policy scenario analysis. Usually the first scenario is a baseline 'maintain' scenario simulating the continuation of current HIV/AIDS program's service delivery levels over some defined time horizon between 3 and 7 years (usually 5 years).

A guiding principle of HAPSAT development was to make all modeling assumptions as transparent and modifiable as possible. Therefore, if you wish, you can examine all the raw model calculations on the worksheet called **Trace**, which the interested user may want to explore.

4.3 SETTING THE TIME HORIZON

HAPSAT can be used for analysis of HIV/AIDS program sustainability over a 3 to 10-year time horizon. In HAPSAT, time is divided into a historical period and a forward-looking future period. The historical period, know as a 'burn-in' period is usually 3 years in duration. Thus, the user would enter the historical service delivery levels (for the burn-in period) and the current service delivery levels (for the analytical time horizon) on the three policy worksheets (**Policy Main**, **Policy OVC**, and **Policy Prevention**). Explicitly modeling the recent past allows for better calibration of the model to country-level data. The future period is the "analytical time horizon". This is the time period for which you will be analyzing HAPSAT outputs. Usually the analytic time horizon is often the next 5 years from the time the analysis is being conducted, but it can be shorter or longer. For example, in the figure below, the model starts in year 2005. That is the first year for which data on the HIV/AIDS Program will be needed. The burn-in period is from 2005 to 2009, inclusive. The analytical time horizon is 6 years in length from 2010 to 2015, inclusive.



General Model Parameters

Economic Paramters	
Baseline year (i.e. Current Year)	2005
Start-Year of Analysis	2010
End-Year of Analysis	2015
Time Horizon (years)	6
Annual Real (Inflation-Adjusted) Health Worker Salary Escalation	4.00%

Population	2005
Total Population	30,000,000
Population age < 15	12,000,000
Population age 15-49	16,000,000
Population age > 49	2,000,000

jump to 'Population'

Births and Deaths	
Annual births per person	0.04
Ratio of pregnancies to births	1.05
Annual non-HIV deaths	0.21%

HIV-Related Parameters	
Vertical Transmission	
Percent of Births with MTC HIV transmission w/o Treatment	40.0%
Percent of Births with MTC HIV transmission with Basic Protocol Treatment	10.0%
Percent of Births with MTC HIV transmission with Enhanced Protocol Treatment	5.0%
HIV Progression	
HIV progression (% moving from not eligible to eligible)	10.0%
% of untreated ART-Eligibles who die per year	40%
% of Treatment Failures who die per year	50%
Treatment Durability	
Average # of Years before 1st line treatment fails	6
Average # of Years before 2nd line treatment fails	5
% of patients who dropout of treatment (without failure)	0.09
HIV Test-Seeking	
Fraction of HCT Clients Testing Positive	0.15
jump to 'HIV Testing Efficiency Sheet'	
Nutritional Needs of HIV-Infected Persons	
Percent of New ART enrollees needing Nutrition	16%
Percent of Ongoing ART enrollees needing Nutrition	13%
Percent of Pre-ART needing Nutrition	15%

4.4 CREATING NEW POLICY SCENARIOS

The HAPSAT workbook can only hold one policy scenario at a time. Therefore, it is recommended that a user saves a copy of the workbook for each unique scenario, making sure to give it a meaningful name.

4.5 ENTERING FINANCIAL RESOURCE INFORMATION

The financial resource envelope is the amount of money expected to be available for the time horizon being analyzed. This information is entered on the **Financing** worksheet. It is only necessary to enter this information for the years of the analytical time horizon. In the figure shown below, this is the period 2010-2015. In each row of the financial resources matrix, separate sources of funds can be tracked. You can include up to 20 funding sources. You can enter a label for source in the 'Funder' column. You should also enter a "1" in the 'Include in Analysis' column. If, in some analyses, you wish to omit a source, you can enter a "0" in this column. This feature allows you to toggle on and off particular funding sources, either because they are uncertain, or because the analysis is being done from a particular funders perspective. In the first column of the matrix, "Fraction of funds to which Implementing Partner and Donor (IP&D) overhead should be applied", you can enter a number between 0 and 100% to reflect whether the funding source is an Implementing partner or a Donor providing direct service delivery. These sources may have overhead costs that local organizations do not have. The amount of this overhead is set on the **Overhead** worksheet. At this point, you are simply identifying whether IP&D overhead should apply for particular funding sources.

Home

Financial Resources

	BASEYEAR	Year 1	Year 2	Year 3	Year 4	Year 5
	2005	2010	2011	2012	2013	2014
Included in Analytic Time Horizon (Yes = 1)		1	1	1	1	1

Fraction of funds to which IP&D overhead should be applied	Include in Analysis (1=Yes)	Funder	2010	2011	2012	2013	2014
0%	1	Domestic Sources	$10,000,000	$10,000,000	$10,000,000	$10,000,000	$10,000,000
100%	1	Bilateral	$22,000,000	$22,000,000	$22,000,000	$22,000,000	$22,000,000
100%	1	GFATM	$40,000,000	$40,000,000	$40,000,000	$40,000,000	$40,000,000
0%	0						
0%	0						
0%	0						
0%	0						
0%	0						
0%	0						
0%	0						
0%	0						
0%	0						
0%	0						
0%	0						
0%	0						
0%	0						
0%	0						
0%	0						
0%	0						
0%	0						
		Total in US Dollars	$72,000,000	$72,000,000	$72,000,000	$72,000,000	$72,000,000

4.6 ENTERING INFORMATION ABOUT HUMAN RESOURCES

Information on human resources is entered on the next two worksheets called **Cadres** and **HRH Available**. On the **Cadres** worksheet, you first enter General Assumptions about labor including 'Work Weeks per Year' and 'Work Hours per Week'. This is used to calculate the total hours worked in a year in a full time job. In a later worksheet, the time required to provide services will be calculated and compared to the labor time available.

Next, you will enter the category names for each cadre, and their average annual salary. This salary amount should include the monetary value of any benefits such as health insurance, pension, etc.

Options

Health Worker Cadres for HIV

Specify the country-specific names for the health worker cadres delivering HIV care. Optionally, you can specify a broader "Cadre Group" that comprises a mix of individual cadres

Jump to: Labor
Jump to: HRH Available

Average Annual Salary should include full compensation for work including benefits, bonuses, incentives, etc.

General Assumptions	
Work Weeks per Year	44
Work Hours per Week	35
Hours/person year	1540

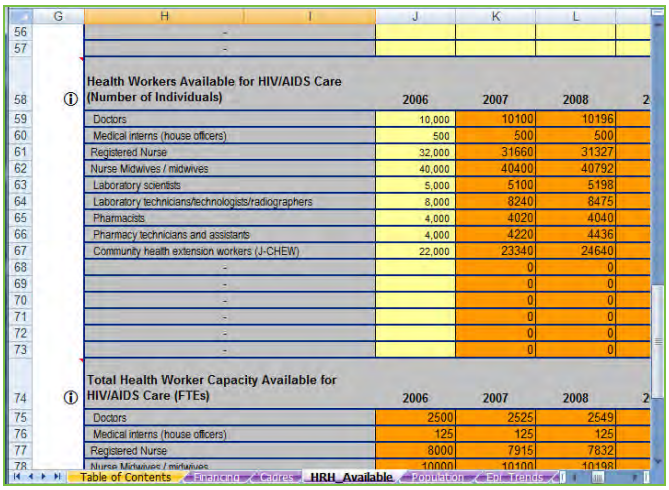
Cadre Group Names				
Group 1	Group 2	Group 3	Group 4	Group 5
MD & HO	Nursing	Laboratory	Pharmacy	

Cadre Names and Salaries	
Cadre Name	Average Annual Salary
Doctors	$ 10,000
Medical interns (house officers)	$ 5,000
Registered Nurse	$ 5,000
Nurse Midwives / midwives	$ 4,500
Laboratory scientists	$ 8,000
Laboratory technicians/technologists/radiographers	$ 3,500
Pharmacists	$ 9,000
Pharmacy technicians and assistants	$ 5,000
Community health extension workers (J-CHEW)	$ 2,500
Cadre Group Name	Average Annual Salary
MD & HO	$ 8,750.00
Nursing	$ 4,750.00
Laboratory	$ 5,000.00
Pharmacy	$ 6,333.33
	$

Skill Mix of Cadre Groups				
MD & HO	Nursing	Laboratory	Pharmacy	
74%				
26%				
	50%			
	50%			
		33%		
		67%		
			33%	
			67%	
100%	100%	100%	100%	0%

Labor can be categorized by health worker cadre or by broader health worker groups, depending on the level of detail provided by in-country data. If entering data by health worker group, a skill-mix assumption is required. For example, in the screenshot shown above, the 'Nursing' group is Group #2

and it is comprised of both the registered nurse cadre and the midwives cadre in equal portions. The average annual salary for this 'nursing' group is a weighted average of the average annual salary of the individual cadres in the group. Later, the labor inputs for particular services can be entered in labor hours for individual cadres or for the larger group, depending on the data available.



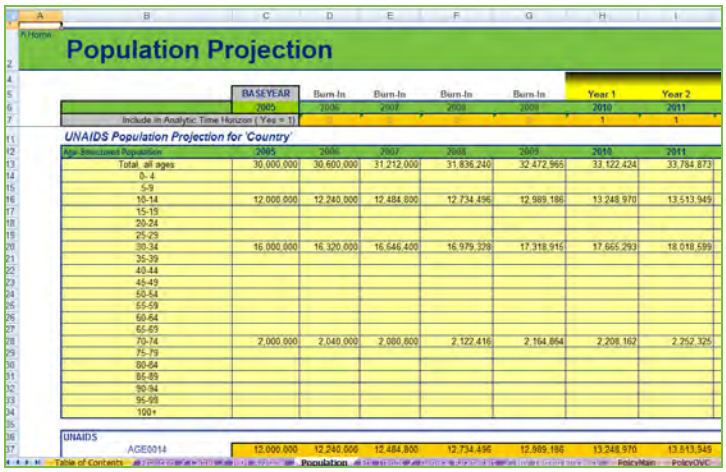
	G	H	J	K	L
56		-			
57		-			
58	ⓘ	Health Workers Available for HIV/AIDS Care (Number of Individuals)	2006	2007	2008
59		Doctors	10,000	10100	10196
60		Medical interns (house officers)	500	500	500
61		Registered Nurse	32,000	31660	31327
62		Nurse Midwives / midwives	40,000	40400	40792
63		Laboratory scientists	5,000	5100	5198
64		Laboratory technicians/technologists/radiographers	8,000	8240	8475
65		Pharmacists	4,000	4020	4040
66		Pharmacy technicians and assistants	4,000	4220	4436
67		Community health extension workers (J-CHEW)	22,000	23340	24640
68		-		0	0
69		-		0	0
70		-		0	0
71		-		0	0
72		-		0	0
73		-		0	0
74	ⓘ	Total Health Worker Capacity Available for HIV/AIDS Care (FTEs)	2006	2007	2008
75		Doctors	2500	2525	2549
76		Medical interns (house officers)	125	125	125
77		Registered Nurse	8000	7915	7832
78		Nurse Midwives / midwives	10000	10100	10198

The next worksheet is called **HRH_Available**. On this worksheet, you will enter data on the number of health workers available over time. The cadres initial size is entered for the first year of the burn-in period, 2006, starting in cell J59. You can model growth or reduction of cadres through recruitment of new health workers and attrition from the workforce in the sections starting with row eleven.

An important aspect of sustainability is that program continuation or scale-up does not jeopardize the desired quality and quantity of other services. In row 42, you can also enter the fraction of health worker labor that is available for HIV/AIDS treatment and care. The purpose of this is to ensure that the labor resource envelope (that is labor available for use in delivering HIV/AIDS services) does not include labor needed for other types of health care. Data on the current allocation of health workers to health priorities will help inform this section.

4.7 ENTERING POPULATION INFORMATION

The **Population** worksheet allows you to enter population projection data from UNAIDS in 5-year age categories. At a minimum, data should be entered on the population size in 3 categories: Age 0 to 14, Age 15 to 49, and Age 50 or greater. HAPSAT will only directly use the information for the Base Year. For future years, population level will evolve endogenously within the model to follow HIV/AIDS epidemiological trends as predicted by the epidemiological parameters. The user can compare the HAPSAT population projection to the UNAIDS reference projection in order to ensure HAPSAT is reasonably well calibrated. One should not make this comparison until all of the HAPSAT parameters affecting population size are entered. Additionally, one should not expect an exact match, since the HAPSAT does not model demography with the complexity of the tools used to produce UNAIDS projections and because the policy scenarios defined by the user may appropriately deviate from the assumptions underlying the reference population projections.



4.8 ENTERING EPIDEMIOLOGICAL DATA

The **Epi Trends** worksheet can be a challenging worksheet to complete. Being able familiar with all its sections is the best way to start so if you are using a computer with a small screen, be sure to scroll right in order to see the four calibration plots first as these illustrate the goal of this worksheet.

In the first table on this sheet, you will enter the Reference HIV epidemic projections. In most countries, this information will be available from analyses done with the SPECTRUM AIDS Impact Model (Futures Institute, Glastonbury, CT USA). There are six indicators that can be used for calibration, shown below:

• Reference HIV Prevalence
• Reference New Infections
• Reference AIDS Deaths
• Reference Need for ART
• Reference Newly Need ART
• Reference ART Coverage

In the next table in the worksheet, you will not enter any data, but you will see the HAPSAT model's current estimate of these same indicators. In calibration, you will adjust parameters in the tables on the **Epi Trends** worksheet, the **General Parameters** worksheet, and the **Policy Main** worksheet, in order to achieve a close match with the Reference projections. Particular attention should be paid to matching closely during the years of the analytic time horizon. Mismatch in the first few years of the burn-in period is not a large concern - in fact, one purpose of the burn-in period is to allow discontinuities associated with the starting of the HAPSAT model in the middle of an epidemic (rather than from the year of the first infection) to smooth out before the analytical time horizon is reached.

The tables starting at row 35 contain model parameters related to the HIV (and TB) epidemic. These are modeling parameters that should correspond to country-specific data where possible. However, the user of HAPSAT may have to adjust these parameters within a reasonable range in order to achieve a good fit to the reference epidemic projections.

Most applications of HAPSAT rely on visual calibration using the plots on the right of the **Epi Trends** worksheet. However, for interested users, at the bottom of the worksheet there are tables containing calculations quantifying the deviation of HAPSAT from Reference projections using sum of squared errors (SSE). The relative weight of each indicator can be set by the user, and adjustments to model parameters can be tested to see if they reduce the total weighted SSE.

4.9 ENTERING GENERAL PARAMETERS

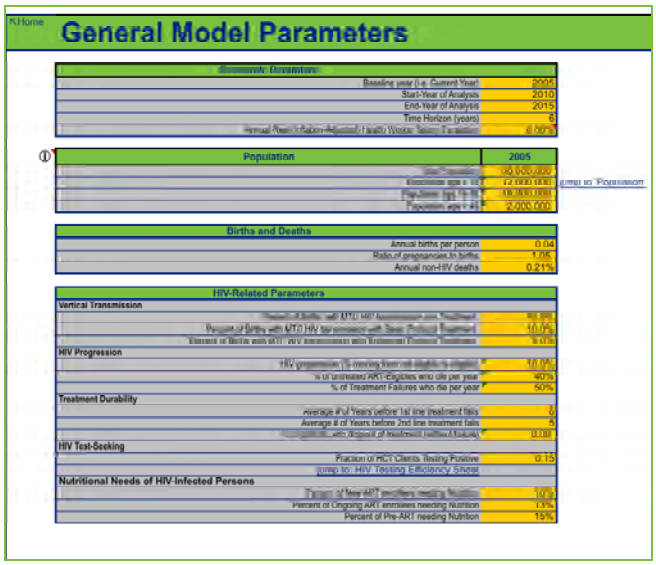
On the **General Parameters** tab, the user will enter parameters for birth rate and non-HIV death rate. The birth rate should be entered as the number of births per person in the population per year. Sometimes indicators of fertility count only women in the denominator. In these cases, the indicator will have to be adjusted before including it in HAPSAT. HAPSAT output on the **Trace** worksheet can be examined to be sure that the absolute number of births is correct.

In most countries, an estimate of the crude death rate is known. The reciprocal of life expectancy can be used as a rough measure of death rate. In countries with large generalized HIV epidemics, the crude death rate should be adjusted, to remove HIV deaths. This adjustment is necessary because HIV deaths are governed by other parameters in HAPSAT and therefore already accounted for over the time horizon. The non-HIV death rate will be unaffected by HIV policies.

On this worksheet, the user can also enter data regarding the effectiveness of PMTCT interventions. In HAPSAT, up to two levels of PMTCT interventions can be modeled, such as single-dose Nevirapine at delivery or antenatal combination therapy. The two levels are generically labeled Basic PMTCT and

Enhanced PMTCT, but the user can specify any protocol for each (later on in the **Drugs** worksheet.) In the third section of the General Parameters worksheet, the user enters the probability of vertical transmission if no PMTCT is provided and the probabilities of transmission for Basic and Enhanced PMTCT. HAPSAT does not explicitly track breastfeeding practices, so the contribution of breastfeeding to vertical transmission in a particular country should be included in the parameters specified here. In other words, the probability of vertical transmission with no PMTCT should assume country-specific patterns of breastfeeding.

Another key parameter set on the **General Parameters** worksheet is the durability of ART regimens, which measures how long, on average, a patient will respond to first-line, and second-line, regimens, respectively. These can be based on country-specific experiences with ART. These estimates should not include treatment dropout since the dropout rate is modeled separately.



On the **General Parameters** worksheet, the user can also specify the positivity rate of the HIV testing program. In many settings, the fraction of tested individuals who test positive is higher than the prevalence rate in the setting because HIV-infected persons are more likely to get tested. Usually this is because persons seek testing upon having symptoms or a suspected exposure, or because testing was provider-initiated based on known risk factors. In the screenshot, it is showing that 15% of all persons tested test positive although the prevalence in this example is around 9%.

4.10 HIV TESTING EFFICIENCY

As discussed in the previous section, HIV-infected persons are more likely to get tested, and therefore HIV testing programs find more cases than they would if they simply tested members of the population at random. However, as HIV testing is scaled up, its case-finding efficiency declines. For example, if only 1% of the population is tested per year in a population with 5% HIV prevalence, perhaps 10-15% of HIV tests from a voluntary counseling and testing program would be positive. If that program were to scale up to testing 5% of the population per year, the additional people tested will be less likely to have HIV, since more will have already been found. Likewise, a robust PMTCT program that tests the majority of pregnant women will find cases at a rate approximating the prevalence of HIV among pregnant women. And, if sustained over time, the case-finding rate will drop further since most prevalent cases will have

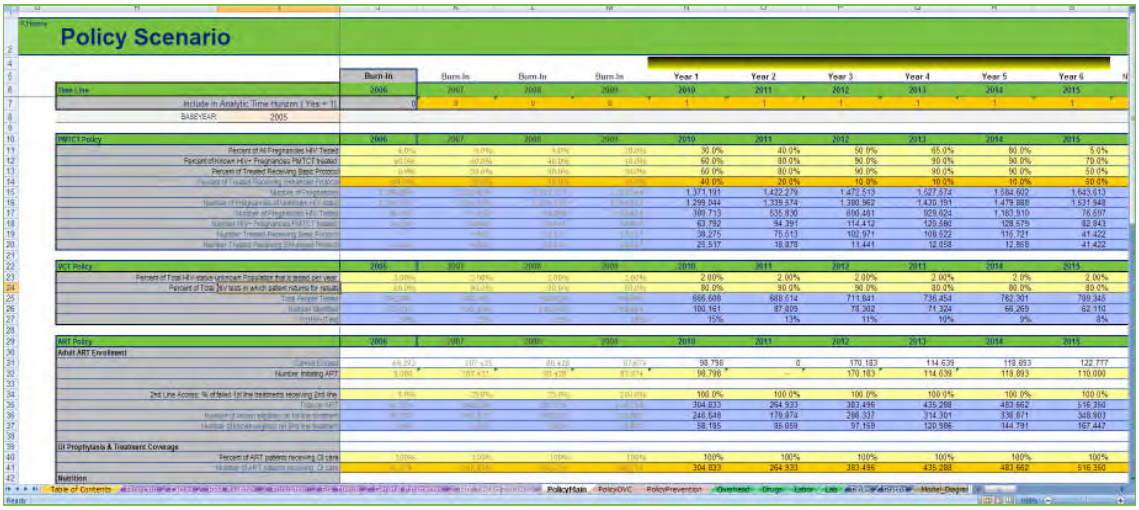
already been detected. On the **HIV Testing Efficiency** worksheet, you can adjust HAPSAT's assumptions about the relationship between HIV Testing program scale and its case-finding rate.

4.11 ENTERING POLICY SPECIFICATIONS

POLICY MAIN SHEET

Scrolling down from the top of the **Policy Main** worksheet, the user will find input cells arranged in data tables for PMTCT, VCT, ART, Care and Support for non-ART patients, and TB/HIV program areas. This is the key workbook for specifying policy targets. For each programmatic area the target service delivery level for each year is entered by the user. It is necessary to enter historical data as accurately as possible for the burn-in period in order to improve calibration to country situation. However, any values can be entered for the analytical time horizon. Note that while it is possible to model a policy of shutting off enrollment of new ART cases, it is not possible to model *disenrolling* persons from ART. For example, a policy which 'shuts off' all ART in a particular year, is not feasible. If you are interested in modeling policy scenarios with these features, please contact HS 2020's HAPSAT support team for assistance.

In each section, the user input cells are highlighted in yellow. To aid in policy specification, directly below the user input row are blue rows containing intermediate output related to the user input. For example, in the VCT Policy section, the user enters 'Percent of Total HIV-status-unknown Population that is tested per year' in row 23. In rows 25 and 26, HAPSAT shows the number of persons tested and then number of cases identified, corresponding to the users input. Note that this output is not only dependent on the user input in row 23, but also many other parameters in the model. So for example, the numbers in row 25 will also change somewhat when the user adjusts the PMTCT policy (row 11) since this will affect the number of HIV cases remaining undetected and available for the VCT program to find.



Under the ART section, in addition to the number of person targeted for treatment, the user also enters information about Pre-ART care and other care services for those on ART such as nutritional support.

POLICY OVC SHEET

On the **Policy OVC** sheet, there is a matrix for entering the description of the OVC program. In each row, a particular category of OVC service can be recorded. The user can either define a unit of service and a unit cost for each OVC service category, or simply record the dollar amount budgeted for each category. The choice presented in the OVC worksheet will depend on data availability and the focus of the analysis. If an analysis requires that the user break down education interventions into line items such as uniforms, tuition, books etc, with a different number of children receiving each, the HAPSAT can accommodate this level of detail.

POLICY PREVENTION SHEET

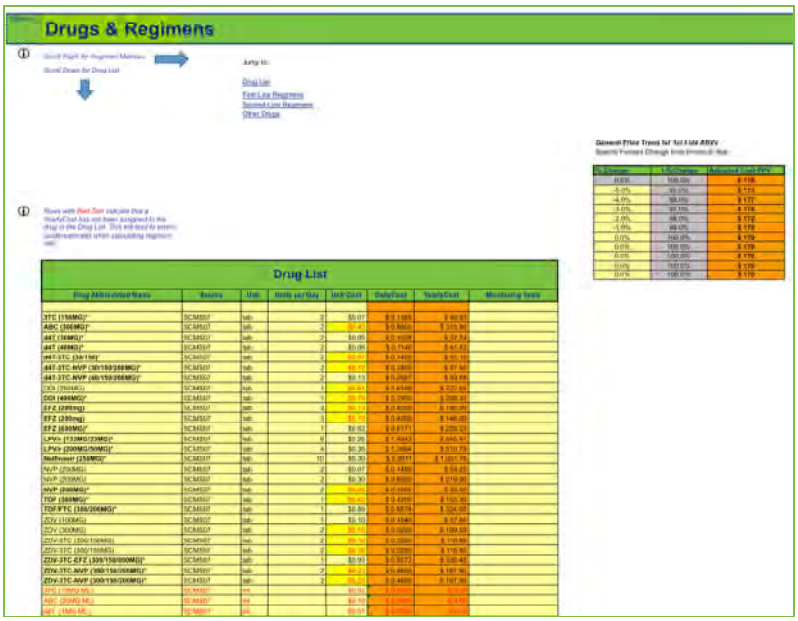
On the **Policy Prevention** sheet, there is a matrix for entering the description of the prevention programs. In each row, a particular category of prevention service can be recorded including peer outreach, community mobilization programs, condom provision, STI management, blood safety and male circumcision. The user can either define a unit of service and a unit cost for each prevention service category, or simply record the dollar amount budgeted for each category. The choice will depend on data availability and the focus of the analysis. Other tools such as the GOALS tool in SPECTRUM or the Resource Needs Model (Futures Institute, Glastonbury, CT USA) can be used to estimate resource needs and impact of prevention programs. In the current version of HAPSAT, the Prevention policy is included in order to track financial resources in this programmatic area, but the health impact (effectiveness) of prevention is not modeled.

4.12 ENTERING UNIT COST DATA

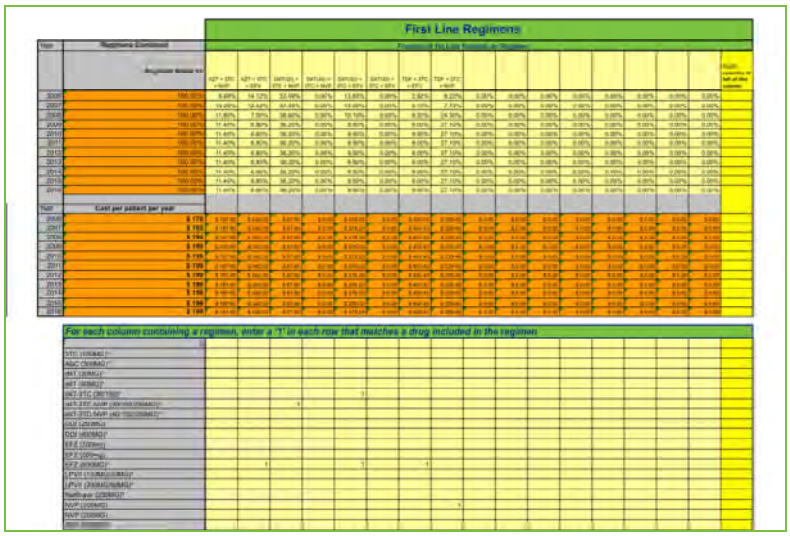
DRUGS SHEET

The **Drugs** worksheet can be reached from the Table of Contents. The top left hand corner of this worksheet contains a Sheet Menu that link to various sections of the sheet. These sections can also be reached by scrolling down (for the Drug List table) or scrolling to the right (for the 1st, 2nd, PMTCT and Care and Support Service Drugs.) Because the sheet is quite large, you may find the navigational hyperlinks useful for jumping to particular sections.

There are tables for a Drug List, and for specifying 1st and 2nd line drug regimens. Individual (or fixed dose combination) drugs are listed in the drug list along with their unit cost. The Drug List is populated with some default data. Drug List columns include key information describing dosage, pack size, and unit cost. These data are used for calculating the annual cost of each drug regimen. It is also possible to indicate a trend in the price level of drugs over time.



Regimens are constructed from items in the drug list. Up to 15 first-line regimens can be specified. The user indicates the fraction of patients on each regimen in each year. For example, if there is a policy introducing a switch from d4T based first line regimens to TDF based first line regimens, the user can specify the increasing fraction of patients on TDF regimens and decreasing fraction of patients on d4T based regimens.



Scrolling further right, you will see the matrix for first-line regimens, and then second-line regimens, and then other drugs (for PMTCT and care and support). Specific instructions for adding and deleting drugs, creating drug regimens and adding commodities for care and support services (e.g. nutritional commodities) are given in Table 4.2.

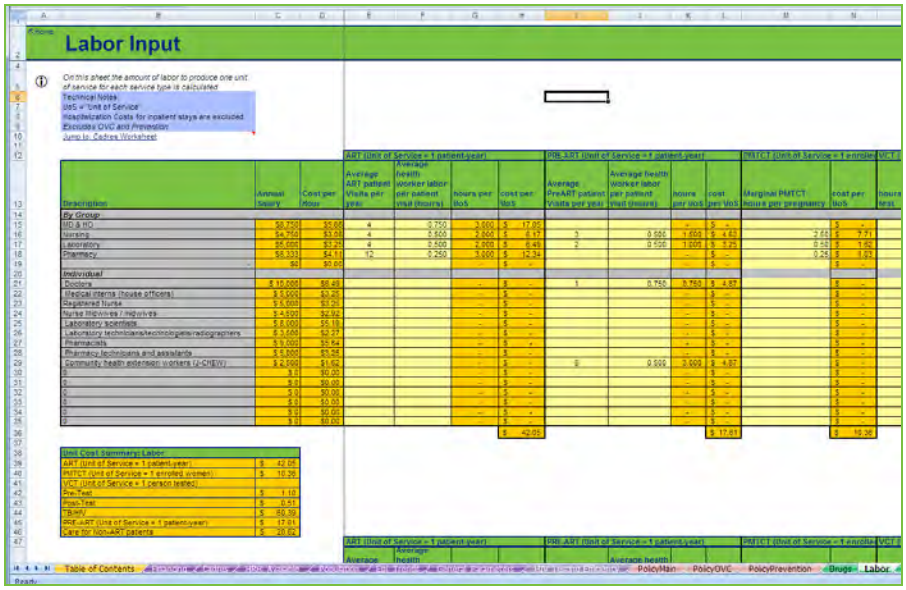
TABLE 4.2 DRUG LIST FUNCTIONS

Function	Instructions
Add a Drug	First unprotect the worksheet. Then select the entire row above the bottom row of the drug list and copy it. Right click the Row number of the copied row and select "Inser Copied Cells". Once the new row has been inserted, re-protect the worksheet.
Delete a Drug	First, verify that the drug to be removed is not part of any 1st and 2nd line regimens. Right click the Row number of the row containing the drug to be removed and select "Delete".
Creating Drug Regimens	To create a new drug regimen, first be sure that all the individual components of the regimen appear in the **Drug List**. Then click the appropriate drug regimen table from the Sheet Menu. There is room for up to 10 regimens in the 1st Line Regimen table, up to 5 regimens in the 2nd Line table, a basic and an enhanced regimen in the PMTCT table and several non-ART care and support drugs. Regimens are arranged in columns. For example, to create a regimen containing a fixed-dose combination of ZDV/3TC/EFV, place a "1" in the column labeled Reg. 1 where the row corresponds to ZDV/3TC/EFV as shown in the screenshot directly below this table. To create a regimen containing TDF/FTC as a combination pill and EFV as a separate pill, place a 1 in the column labeled Reg. 2 in the row TDF/FTC and EFV (see Screenshot below). HAPSAT will calculate the annual price of the regimen based on the cost information in the **Drug List**. In this example, Reg. 1 costs $167.90 and Reg. 2 costs $342.03. The last step is to specify what proportion of patients on 1st line ART are using each regimen. In this example, 6.89% are using Reg. 1 and 14.2% are using Reg. 2. The weighted average 1st line regimen cost is $176 per patient-year.
Adding Care and Support	Care and support drugs may be added as "regimens" in the same was a drug regimen. For example, by adding the commodity "PreArt Nutritional Support Package" to the Drug List and a "1" beside that commodity under **the Care and Support Drug** table, the cost of providing that package to the percentage of Pre-ART patients coverd can be included in the anlaysis.

LABOR SHEET

The **Labor** sheet is where the user enters the amount of labor required for each unit of service. For example, the amount of hours of doctor and nursing time required for caring for one ART patient for one year, on average. The labor hours can either be entered for individual cadres or for cadre groups. HAPSAT will use the salary data supplied on the **Cadres** worksheet to compute the unit cost of labor. For example, data regarding the number of labor hours for each unit of HIV service are then entered in the yellow cells. Two pieces of data are required for each category of labor for each type of service. In the example below the an ART patient makes on average 4 visits per year where they see some combination of Medical Doctor/House Officer (MD/HO), nursing staff, laboratory staff (a possible mix of laboratory scientists and technicians). In addition, an ART patient sees pharmacy staff (a possible mix of

pharmacists, pharmacy technicians and dispensers), presumably to fulfill their prescriptions, twelve times a year. At each visit, the average time spend with the MD/HO is 45 minutes (entered as 0.75 of an hour), 30 minutes with nursing staff, (entered as 0.5 of an hour), 30 minutes with laboratory staff and 15 minutes (entered as a 0.25 of an hour) with pharmacy staff.). The total labor cost of one patient-year of ART is $42.05.

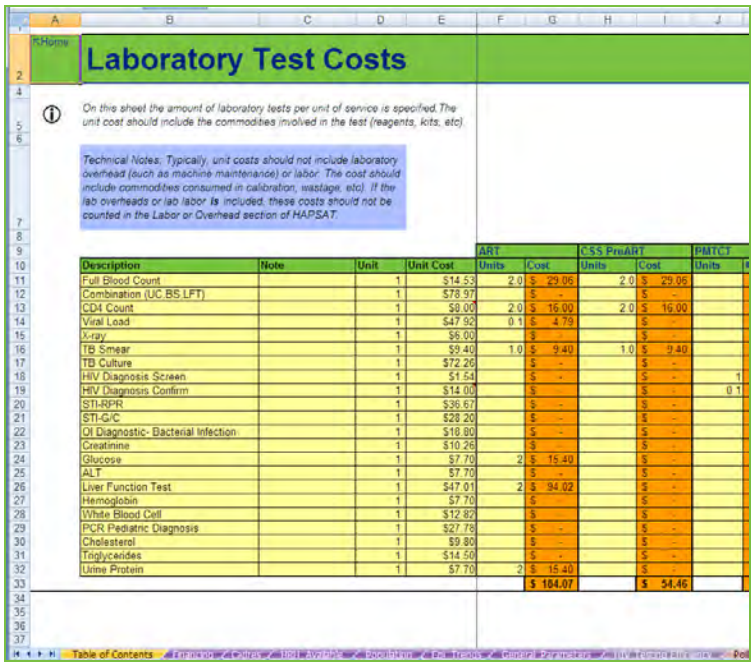


The same information is required for the other services include in the program such as Pre-ART patient, TB/HIV care, counseling sessions and PMTCT (where only the additional time spent with a provider is counted rather than all the care dispensed at a prenatal care visit.). A table of unit labor costs for each service is provided below the data entry table.

LABS SHEET

On the **Lab** worksheet, the user enters the laboratory tests associated with units of HIV/AIDS service. In the example shown below, the lab test cost for ART is $184.07 per patient-year. In the Description column of the Lab Test Costing table, the user enters the name of each lab test. Any relevant notes can be added in the next column. The number of required units of each test is entered in the Units column. Usually this is just "1" when tests are specific in whole units.[1]. Enter the unit cost of the test in the Unit Cost column. Then in the remaining columns to the right, enter the number of tests utilized for each unit of service. A total lab test cost per unit of services is calculated in the bottom summary row. This cost should include all the direct costs associated with producing the test, except for labor *if* laboratory labor is being tracked as an HRH cadre (i.e. if laboratory work is included in the labor costs on the Labor worksheet).

[1] In some cases, users may wish to specify test components (such as a single sputum smear), and then indicate that 2 or 3 of these components are required to make a single test.



Laboratory Test Costs

On this sheet the amount of laboratory tests per unit of service is specified. The unit cost should include the commodities involved in the test (reagents, kits, etc).

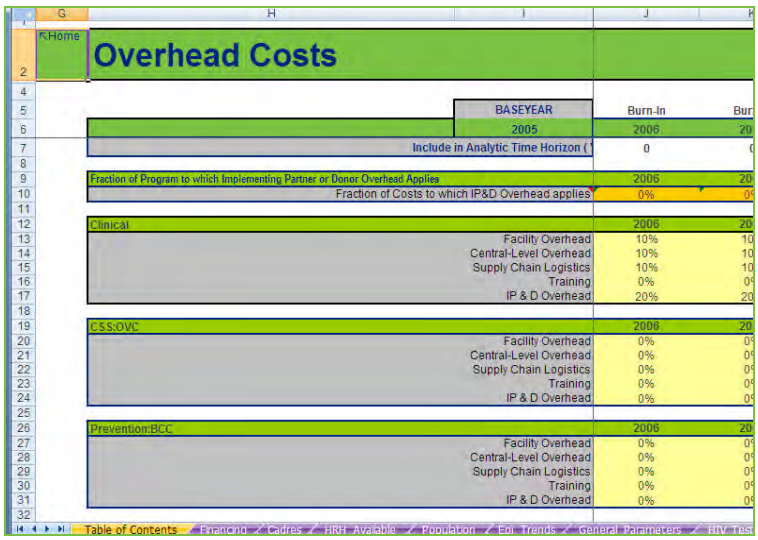
Technical Notes: Typically, unit costs should not include laboratory overhead (such as machine maintenance) or labor. The cost should include commodities consumed in calibration, wastage, etc). If the lab overheads or lab labor is included, these costs should not be counted in the Labor or Overhead section of HAPSAT.

				ART		CSS PreART		PMTCT
Description	Note	Unit	Unit Cost	Units	Cost	Units	Cost	Units
Full Blood Count		1	$14.53	2.0	$ 29.06	2.0	$ 29.06	
Combination (UC BS LFT)		1	$78.97		$ -		$ -	
CD4 Count		1	$8.00	2.0	$ 16.00	2.0	$ 16.00	
Viral Load		1	$47.92	0.1	$ 4.79		$ -	
X-ray		1	$6.00		$ -		$ -	
TB Smear		1	$9.40	1.0	$ 9.40	1.0	$ 9.40	
TB Culture		1	$72.26		$ -		$ -	
HIV Diagnosis Screen		1	$1.54		$ -		$ -	1
HIV Diagnosis Confirm		1	$14.00		$ -		$ -	0.1
STI-RPR		1	$36.67		$ -		$ -	
STI-G/C		1	$28.20		$ -		$ -	
OI Diagnostic- Bacterial Infection		1	$18.80		$ -		$ -	
Creatinine		1	$10.26		$ -		$ -	
Glucose		1	$7.70	2	$ 15.40		$ -	
ALT		1	$7.70		$ -		$ -	
Liver Function Test		1	$47.01	2	$ 94.02		$ -	
Hemoglobin		1	$7.70		$ -		$ -	
White Blood Cell		1	$12.82		$ -		$ -	
PCR Pediatric Diagnosis		1	$27.78		$ -		$ -	
Cholesterol		1	$9.80		$ -		$ -	
Triglycerides		1	$14.50		$ -		$ -	
Urine Protein		1	$7.70	2	$ 15.40		$ -	
					$ 184.07		$ 54.46	

OVERHEADS SHEET

HIV/AIDS Programs have several shared ('joint') costs for resource use that are shared across several programmatic areas of the HIV/AIDS program, such as program management and monitoring and evaluation costs. There are also shared costs that are shared with non-HIV/AIDS services. For example, the operational costs for a clinic (utilities, janitorial services, maintenance, rent, vehicles, etc) are not unique to the HIV/AIDS programs delivered in the clinic since the clinic probably treats patients with many ailments other than HIV as well.

On the **Overheads** sheet, the user specifies a 'percentage markup' for several types of shared costs. If a country has conducted a resource tracking study such as National Health Accounts or National AIDS Spending Assessment, this data can be used to inform the inputs on this sheet.



Overhead Costs

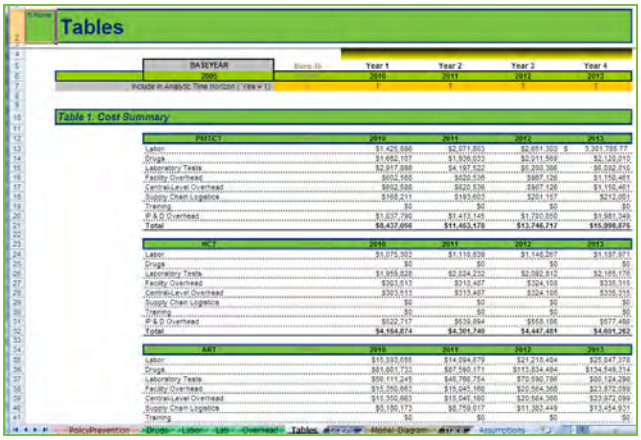
	BASEYEAR	Burn-In	Bur
	2005	2006	20
Include in Analytic Time Horizon (		0	0
Fraction of Program to which Implementing Partner or Donor Overhead Applies		2006	20
Fraction of Costs to which IP&D Overhead applies		0%	0
Clinical		2006	20
Facility Overhead		10%	10
Central-Level Overhead		10%	10
Supply Chain Logistics		10%	10
Training		0%	0
IP & D Overhead		20%	20
CSS:OVC		2006	20
Facility Overhead		0%	0
Central-Level Overhead		0%	0
Supply Chain Logistics		0%	0
Training		0%	0
IP & D Overhead		0%	0
Prevention:BCC		2006	20
Facility Overhead		0%	0
Central-Level Overhead		0%	0
Supply Chain Logistics		0%	0
Training		0%	0
IP & D Overhead		0%	0

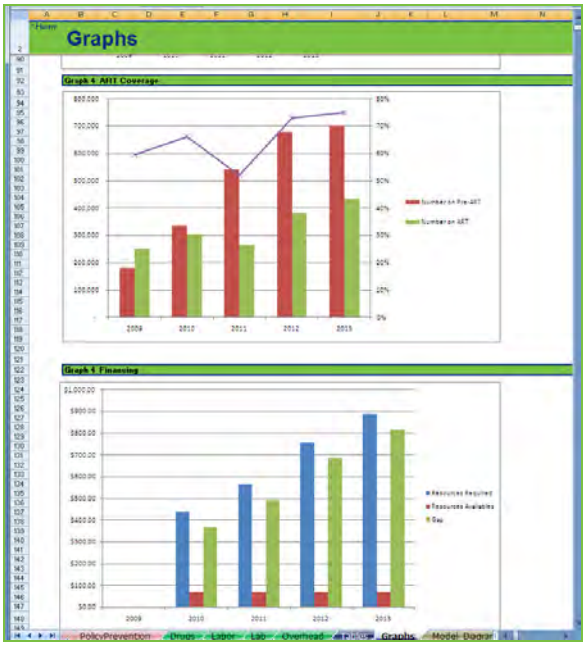
4.13 EXAMINING OUTPUT

The worksheets for **Tables** and **Graphs** provide the output of HAPSAT. The included tables report resource use by programmatic area and broken down by input category as well.

There are a set of included graphs that show program impact, the breakdown of resource use by programmatic area and input category, as well as projected resource gaps. Note that the data for the included graphs is found in the same worksheet to the right of the graph.

Of course the user can construct additional tables and graphs, since the software is Excel-based. Often, in HAPSAT projects, several HAPSAT Workbooks will be used, each containing a unique policy scenario, and summary tables and graphs will be constructed by the analyst in a separate workbook that draws output data from each policy scenario workbook.





4.14 SAVING AND CLOSING

1. To save the analysis file, select File > Save As... as you would with any Excel file. The original template file will be preserved and can be used to generate new analysis files. To keep working on an analysis file you previously saved, just click on the file's icon directly (don't click on the template file icon).

5. SUMMARY REMARKS

Hopefully, this introductory guide through the HAPSAT workbook has given you a feel for using HAPSAT and stimulated your interest in tools for HIV sustainability analysis. Several support resources are being developed and will be found on www.hs2020.org/hapsat

Thank you.

Please feel free to direct questions to info@hs2020.org

ANNEX A

CURRENT EPIDEMIOLOGY/POLICY SCENARIO

The following parameters are required to determine the size and rate of growth of the HIV + population. These parameters are taken from the literature, usually from epidemiological studies conducted in Sub-Saharan Africa where possible, for example from the Rakai studies in Uganda.

Percent of Births with MTC HIV transmission w/o Treatment	39.0%	Volmink J, Siegfried N, Merwe L, Brocklehurst P. Antiretrovirals for reducing the risk of mother-to-child transmission of HIV infection. Cochrane Database of Systematic Reviews, Issue 2, 2009
Percent of Births with MTC HIV transmission with Treatment	10.0%	Volmink J, Siegfried N, Merwe L, Brocklehurst P. Antiretrovirals for reducing the risk of mother-to-child transmission of HIV infection. Cochrane Database of Systematic Reviews, Issue 2, 2009
HIV progression (% moving from not eligible to eligible)	12.5%	Ghys PD, Zaba B, Prins M. Survival and mortality of people infected with HIV in low and middle income countries: results from the extended ALPHA network AIDS 2007, 21 (suppl 6):S1–S4 Isingo R, Zaba B, Marston M, et al. Survival after HIV infection in the pre-antiretroviral therapy era in a rural Tanzanian cohort AIDS 2007, 21 (suppl 6):S5–S13 Survival of HIV-infected treatment-naive individuals with documented dates of seroconversion in Rakai, Uganda Lutaloa T,Grayb RH, Wawerb M, et al. AIDS 2007, 21 (suppl 6):S15–S19
Average # of Years before 1st line treatment fails	7	Ledergerger B, Egger M, et al. Clinical progression and virological failure on highly active antiretroviral therapy in HIV-1 patients: a prospective cohort study. Lancet (1999) 353:863-68 Mortality of HIV-1-infected patients in the first year of antiretroviral

		therapy: comparison between low-income and high-income countries The Antiretroviral Therapy in Lower Income Countries (ART-LINC) Collaboration and ART Cohort Collaboration (ART-CC) groups Lancet 2006; 367: 817–24
Average # of Years before 2nd line treatment fails	7	Sterne JAC, Hernan MA, et al. Long term effectiveness of potent antiretroviral therapy in preventing AIDS and death: a prospective cohort study Lancet (2005) 366:378-84