HAPSAT 2.0 SOFTWARE: HANDS-ON EXERCISE

Objectives of this document:
- Enable users to become familiar with the HAPSAT software and how to populate the tool
- Enable users to practice manipulating the output data to conduct scenario-based analyses.

Structure of this document:

Each section in this document is dedicated to a topic in HAPSAT 2.0 software, with most sections dedicated to an entire worksheet. Each section is divided into the following:
- Worksheets discussed in the section.
- Estimated time for exercise. The total estimated time for the entire exercise is 3 to 4.5 hours.
- What/Why: What are the objectives of this worksheet?
- Task: A task for the user to get hands-on practice on populating the worksheet.
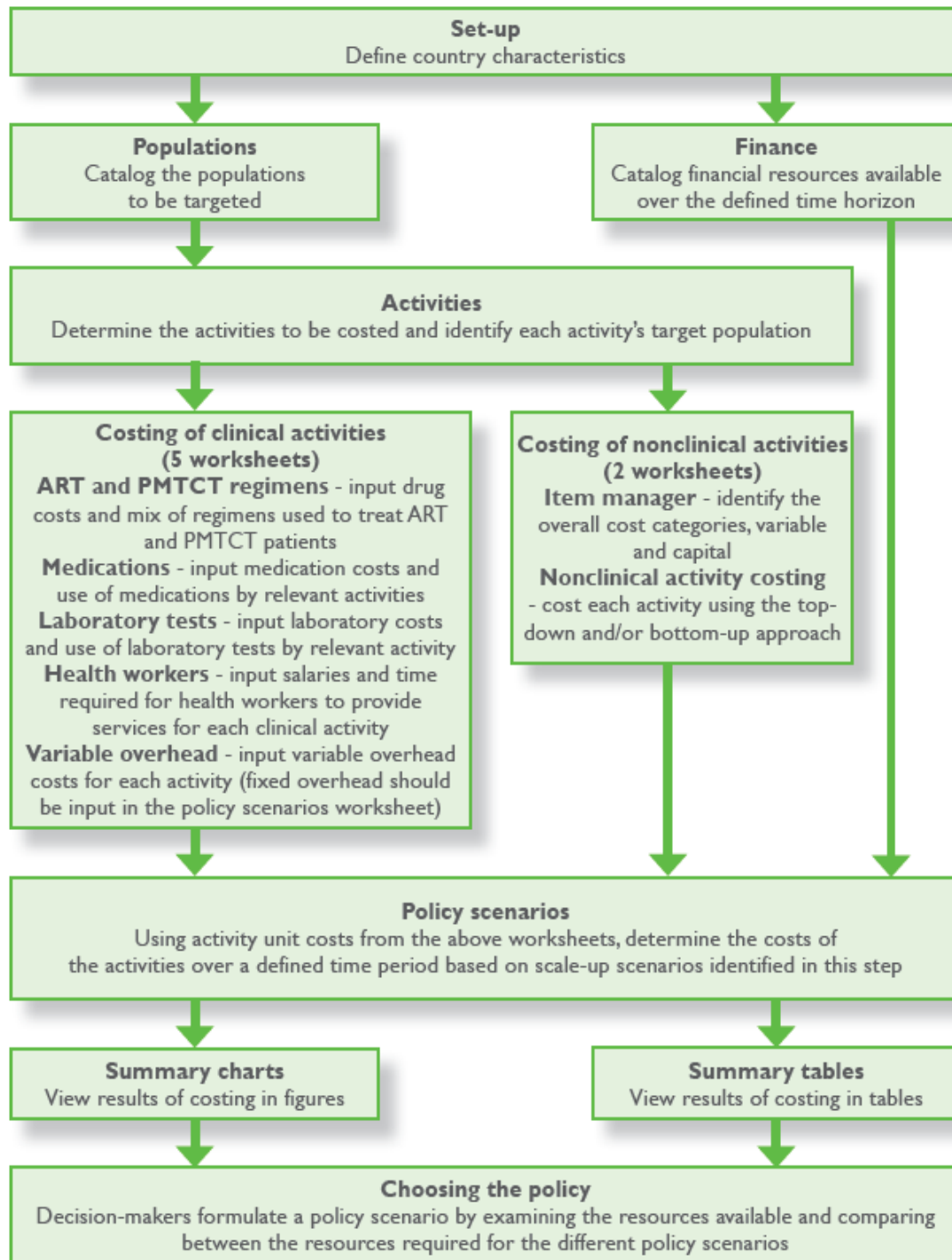- Tips and Useful Information: Additional information relevant for working on the worksheet.

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1. HAPSAT WORKFLOW

The workflow of the HAPSAT 2.0 software is illustrated in Figure 1 below where each box represents a worksheet(s) in the Excel-based software.
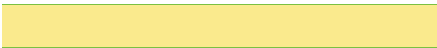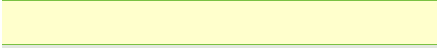
FIGURE 1 HAPSAT WORKFLOW DIAGRAM

Set-up
Define country characteristics

Populations
Catalog the populations
to be targeted

Finance
Catalog financial resources available
over the defined time horizon

Activities
Determine the activities to be costed and identify each activity's target population

**Costing of clinical activities
(5 worksheets)**
ART and PMTCT regimens - input drug
costs and mix of regimens used to treat ART
and PMTCT patients
Medications - input medication costs and
use of medications by relevant activities
Laboratory tests - input laboratory costs
and use of laboratory tests by relevant activity
Health workers - input salaries and time
required for health workers to provide
services for each clinical activity
Variable overhead - input variable overhead
costs for each activity (fixed overhead should
be input in the policy scenarios worksheet)

**Costing of nonclinical activities
(2 worksheets)**
Item manager - identify the
overall cost categories, variable
and capital
Nonclinical activity costing
- cost each activity using the top-
down and/or bottom-up approach

Policy scenarios
Using activity unit costs from the above worksheets, determine the costs of
the activities over a defined time period based on scale-up scenarios identified in this step

Summary charts
View results of costing in figures

Summary tables
View results of costing in tables

Choosing the policy
Decision-makers formulate a policy scenario by examining the resources available and comparing
between the resources required for the different policy scenarios

Tips and Useful Information:

The HAPSAT 2.0 software is designed to ensure the user can enter detailed epidemiological, demographic, programmatic, and costing data. The software is further designed for data to be input only once; the data will be linked and will populate other cells through fixed cell formulas. In populating the clinical and nonclinical costing components of the software, it is not necessary to input data for each step of the costing module if the user already has unit cost data.

If, for example, the user has a unit cost of antiretroviral therapy (ART) for the examined period without a cost breakdown (regimen, labor, lab, and overhead), the user can enter the unit cost directly in the table titled "FINAL UNIT COST" in the Variable Overhead worksheet. This will overwrite the fixed cell formulas, but the formulas can be easily restored by copying from rows in the same table where the formulas were not overwritten.

2. GENERAL ADVICE ON HAPSAT 2.0 SOFTWARE USE

FIGURE 2: HAPSAT 2.0 SOFTWARE CELL COLOR GUIDE

Cell color guide	
	User input, required
	User input, not required
	Read-only, do not overwrite
	Error of user input
	Error of calculated values, user should check affected inputs

- Users should refer to Figure 1 above which describes color-coding of the cells to guide users on inputting and analysing data in the HAPSAT software.

- Do NOT add/delete any lines of the software or shift tables around; this will disrupt the software calculations.

- There are dropdown lists throughout the software that you will be able to edit or add to. Above every dropdown list that can be edited is a link to the worksheet where the contents of the dropdown list are stored. To edit a dropdown list, click on the link and you will be directed to the editable version of the dropdown list. After you make your changes, you can click on the tab of the previous worksheet (at the bottom of the Excel screen) to continue working.

3. SET UP THE SOFTWARE

Worksheets discussed in the section: Setup

Estimated time for exercise: 5–10 minutes

What/Why:

This worksheet defines various country characteristics that will be necessary for software calculations.

Tasks:

- Review the software's "Cover" and "Table of Contents" pages.

- Open the software and go to the Setup worksheet.

- Define the time horizon.

  - Time horizon – the first year of the analysis for which data on reach/coverage will be input; for this task, use 2009–2015.
    Important Note: Reach/coverage data from the last three years will usually be the most relevant for assessing recent past performance

- In the "Country Name" field enter: Country X

- Input the following economic indicators, shown in Table 1, in their respective fields for Country X

TABLE 1: ECONOMIC INDICATORS FOR COUNTRY X

GNI per capita (US$)	340
Local currency unit (LCU) name	Fictional
Currency year (year of the costing data entered into this tool)	2011
Official exchange rate (LCU per US$, period average)	4200
Latest available purchasing power parity (PPP) conversion factor, GDP (LCU per international $)	1399.71
Annual inflation rate of LCU	11.70%
Annual inflation rate of U.S. dollars	1.40%

Tips and Useful Information:

- All fields in this worksheet must be populated before continuing to the other worksheets.

- The two exchange rates are relevant for conversion of the costing estimates from local currency to U.S. dollars. The official exchange rate is relevant for tradable costed items, such as drugs, and the PPP conversion factor is relevant for non-tradable costed items, such as labor.

- You can find country data on the economic indicators above using the links referenced in the tool.

4. FINANCIAL RESOURCES DEMO AND PRACTICE

Worksheets discussed in the section: Finance

Estimated time for exercise: 15–20 minutes

What/Why:

This worksheet documents all the financial resources available for the country's HIV program. It will contain available resources, which will later be compared with estimated resources needed (to be calculated in coming sections of the software) in order to perform a gap analysis for the country's HIV program.

Task:

- For this exercise, input Country X's funding sources from 2009–2015, as shown in Table 2, in the Finance worksheet:

TABLE 2: HIV PROGRAM FINANCES FOR COUNTRY X

Funding Source	2009	2010	2011	2012	2013	2014	2015
MoH AIDS program	$ 500,000	$625,000	$625,000	$625,000	$625,000	$625,000	$625,000
DFID	$ -	$ 1,120,000	$840,000	$560,000	$ -	$ -	$ -
Global Fund	$ -	$ -	$6,662,474	$ -	$5,415,177	$5,274,204	$5,565,000

Tips and Useful Information:

- For Global Fund financing:
  - A good starting point for locating the funding sources of an HIV program is section 5 in the country's most recent proposal on the Global Fund website.
  - Proposal data usually do not include the most recent funding commitments and disbursement from the Global Fund. Those can be obtained from two main sources:
    - Grant performance report
    - List of all commitments and disbursements per grant
  - HIV/TB funding can be located from TB proposals.
  - Global Fund proposal data need to be verified by the financial officers of the AIDS programs as the data might underestimate other donor funding and overestimate domestic funding. Further data can be obtained from other donor agencies.
- Future funding information for the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) or the Global Health Initiative (GHI) funding can usually only be found one year in advance from http://www.pepfar.gov/countries/cop/2010/index.htm or the Senior HIV/AIDS Advisor of the USAID Country Mission.
- The costing in HAPSAT 2.0 is calculated at the value of the currency year (see Setup worksheet). Inflation of the local currency and U.S. dollar is accounted for by converting the available funding presented in this worksheet into their inflated value in the currency year in columns Q through Z, as well as in the relevant figures and tables.

5. EPIDEMIC AND TARGET POPULATION ESTIMATES DEMO AND PRACTICE

Worksheets discussed in the section: Populations

Estimated time for exercise: 25 minutes

What/Why:

In the Populations worksheet, the user inputs the epidemic and target population estimates. These data are required when setting targets for program coverage of the universal access and past performance scale-up scenarios.

This sheet is composed of two tables: "Population Projections" and "Additional Target Populations." The first table contains standard estimates of the general population and of the HIV epidemic – *editing of these categories should be avoided*. The second table contains additional target populations that are entirely user specified based on available data. The user should feel free to edit the target population description in this table accordingly.
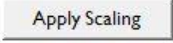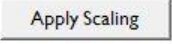
Task:

- For this exercise, input the data in Table 3 on Country X's population in the Populations worksheet:

TABLE 3: GENERAL AND HIV POPULATION DATA FOR COUNTRY X

Population Description	2009	2010	2011	2012	2013	2014	2015
Number HIV+: Child 0-14	7,505	7,951	8,389	8,776	9,102	9,385	9,623
Number HIV+: Adult 15+	44,559	45,527	46,335	47,047	47,765	48,557	49,467
Total need for ART: Child 0-14	3,516	4,545	4,665	4,844	4,993	5,132	5,285
Total need for ART: Adult 15+	9,308	17,915	19,043	20,053	21,004	21,927	22,855
General Population, age 0-14	2,152,296	2,202,364	2,250,295	2,295,916	2,339,358	2,380,704	2,418,649
General Population, age 15-24	1,011,434	1,026,770	1,043,235	1,060,965	1,081,152	1,104,490	1,131,001
General Population, age 25-49	1,629,039	1,669,329	1,708,735	1,747,015	1,784,049	1,819,944	1,854,679
General Population, age 50+	688,699	703,639	718,676	734,000	750,165	767,716	786,902
Orphans and Vulnerable Children (OVC)	15,679	17,811	20,233	22,506	24,690	26,734	28,366
Total Most-at-risk population (MARPs)	-	-	82,779	83,607	84,443	85,287	86,140

Tips and Useful Information:

- Enter target populations that you think will be relevant for every activity (clinical or nonclinical) that you plan on costing. For example, if you are targeting an activity for in-school youth, enter your estimate of the size of this population on this worksheet

- Mode of transmission studies are a good source for estimates of the number of target groups, such as men having sex with men (MSM) and commercial sex worker (CSW).

- The software provides the option of scaling up a target population based on general population growth, which is automatically calculated, in case projection data are unavailable. In the second table labeled "Additional Target Population," you can use the column labeled "Scaling," or column I, and simply select "Scale with Pop Growth" in the dropdown list of the Scaling column. The software also allows you to enter target populations manually in the case that projection data are available. To refresh scaling of population projections, make sure "Scale with Pop Growth" is selected from the dropdown list and hit the [Apply Scaling] button.

- In order to use the "Scale with Pop Growth" feature, the user must do two things first before hitting the [Apply Scaling] button: (1) Enter population data for General Population categories in the "Population Projections" table on the same sheet labeled 'Populations'. The reason is that the "Scale with Pop Growth" feature applies the scaling based on the average general population growth trend. (2) Enter population data for a specific year into columns F and G of the "Additional Target Population" table. This will be used by the scaling feature as a baseline reference figure to apply scaling across the specified time horizon.

- Epidemic estimates, such as HIV-positive population, total need of ART, and number of newly needing treatment, can be obtained from the country's Spectrum data. Usually you will be able to obtain these files from the National AIDS program office within a Ministry of Health, from the National HIV Committee, or from the local UNAIDS country representative. In the Spectrum software, these epidemic estimates can be obtained by going to Modules→AIM→Results.

- Data on population estimates by age group can also be obtained from the Spectrum software by going to Modules→DemProj→Results. If data are not available there, data will need to be obtained from Census data, frequently found online; otherwise data will need to be obtained from contacts in the HAPSAT country.

- In the second table of the Populations worksheet, if a cell in Year 1 of the target population (column J) is highlighted orange, it cautions you that the base year target population of the analysis (i.e., Year 1) does not currently equal the reference size population, which is obtained from the data in columns F & G of the Populations worksheet. In other words, you need to make sure that data inputted for the target population in Year 1 is intended to be different from the referenced target population.

6. ACTIVITIES WORKSHEET

Worksheets discussed in the section: Activities

Estimated time for exercise: 15–20 minutes

What/Why:

This worksheet catalogs the clinical and nonclinical activities that will be costed and will require general information about these activities. The software needs this information to understand the different cost components that make up this activity, ultimately to calculate a unit cost.

In the Activities worksheet there are two tables. In the first table titled "Core Clinical HIV Treatment, Care, and Prevention Activities," the user will make specifications on clinical HIV activities in columns E-H. In the second table titled "Other HIV Care, Prevention, and Mitigation Activities," the user can specify nonclinical activities in columns E-G.

Service Delivery Area and Activity (columns E and F) – In these columns, the user identifies and inputs the various activities for clinical and nonclinical activities. The user selects the Service Delivery Area (SDA) from the dropdown menu and then fills out the activity description in the next column. The user can add more SDAs by simply clicking ⭧Edit SDAs near the top of both tables in column E, which will direct the user to another sheet where he/she can add to the dropdown list.

ARV Regimen Selection (column G of the clinical activities table) – This is where the user will specify the clinical activities related to the antiretroviral (ARV) regimen provided to patients, if applicable.

Target Population for Activity (column H for clinical activities table and column G for nonclinical activities table) – This is where the user will specify the relevant target population for each clinical activity that will appear in a dropdown list. These target populations are taken from the data inputted by the user in the Populations sheet.

Once all the information for the activities has been populated, the user can proceed to the following five sheets in the software where resource inputs for clinical activities will be identified and costed.

Box 1: Service Levels

1. Activity – Defined by users. It should include a clear and concise description of the service provided and the unit in which it is measured (people, condoms, etc.). Activity is the equivalent of indicator in PEPFAR and Global Fund programmatic reporting.

2. Service delivery area – Each activity must be classified into an SDA from the dropdown list. The list can be modified (see link on cell E6). The SDAs are based on those of PEPFAR (http://www.pepfar.gov/documents/organization/81097.pdf) and the Global Fund (http://www.theglobalfund.org/en/me/guidelines_tools/?lang=en).

3. Programmatic area – Each SDA must be classified into a programmatic area. The dropdown list cannot be modified.

Tasks:

- Add a new clinical activity to the "Core Clinical HIV Treatment, Care and Prevention Activities" table. The details of the new clinical activity to be added are as follows:
  - Service Delivery Area: Counseling and testing
  - Activity: HIV counseling and testing (HCT)
  - ARV Regimen Selection: N/A
  - Target Population for Activity: Pregnant women

- Add a nonclinical activity to the "Other HIV Care, Prevention, and Mitigation Activities" table. The details of the new clinical activity to be added are the following:
  - Service Delivery Area: Female CSWs
  - Activity: CSW reached with behavior change communication (BCC)
  - Target Population for Activity: Female CSWs

- Add a nonclinical activity to the "Other HIV Care, Prevention, and Mitigation Activities" table. The details of the new clinical activity to be added are the following:
  - Service Delivery Area: Support for orphans and vulnerable children (OVC)
  - Activity: Educational support for OVCs

- Target Population for Activity: OVCs

Tips and Useful Information:

- The core clinical activities (upper table in the worksheet) are costed and modeled in a more structured way through the refined costing modules. The other activities (lower table in the worksheet) have greater flexibility regarding the level of detail at which they are costed.

- The first 12 activities in the core clinical activities (top table in worksheet) should not be deleted.

7. DRUG AND LAB RESOURCE INPUTS FOR CLINICAL ACTIVITIES

Worksheets discussed in the section: ART and PMTCT Regimens, Medications, and LaboratoryTestCosts

Estimated time for exercise: 20–30 minutes

What/Why:

These three worksheets quantify medication and commodities, including their unit costs, which are needed to perform a set clinical activity. Information can usually be obtained from drug and commodities quantification data, which the AIDS program should be able to provide.

The ART and PMTCT Regimens worksheet is broken down into two sections: "Regimens" and "Regimen Mix" (located to the right of the "Regimens" table). In the "Regimens" table, input the base unit cost for drugs used in each type of clinical services. These data will be used for calculating the resource input costs for an activity's unit of service. For example, a unit of ART service would be one year's treatment for a patient, a unit of prevention of mother-to-child transmission (PMTCT) service would be treatment for one pregnancy (which can include the postnatal period), and a unit of HCT service would be one counseling and testing episode for one person.

Once all the drugs that are used in the clinical activities have been specified, the user will specify the regimen mix for each clinical activity (i.e., the user specifies the proportion in which the drug is used as a treatment option for the clinical activity). This information is placed in the "Regimen Mix" table of the ART and PMTCT Regimens worksheet.

The Medications and LaboratoryTestCosts worksheets deal with different sets of information but are similarly structured. Each cost item and its unit costs are specified in the table on the left, while the user will specify the number of medication or laboratory units that are needed for one unit of the appropriate clinical activities (listed on top row) to be performed in the table on the right. For example, the user would assign two units for CD4 count if this test is conducted twice a year on each person on ART in the examined country.

Tasks:

- In the ART and PMTCT Regimens worksheet, input the base unit cost for each drug presented in Table 4.

TABLE 4: PRICES OF 1ST AND 2ND ADULT ARV REGIMENS IN COUNTRY X

Subactivity	Drug Abbreviated Name	Unit	Units per Day	Unit Cost	Daily Cost	Yearly Cost
ART 1st line	AZT 300mg+3TC 150mg+NVP 200mg	1 tablet	2	$0.21	$ 0.4140	$ 151.11
	AZT 300mg+3TC 150mg	1 tablet	2	$0.16	$ 0.3193	$ 116.56
	EFV 600mg	1 tablet	1	$0.29	$ 0.2917	$ 106.46
ART 2nd line	LPV/r 200mg/50mg	1 tablet	4	$0.33	$ 1.3200	$ 481.80
	TDF 300mg	1 tablet	1	$0.28	$ 0.2750	$ 100.38
	ddI 200mg	1 tablet	2	$0.37	$ 0.7340	$ 267.91

- Input the figures in Table 5 on the distribution of ARVs among the target population in the ART and PMTCT Regimens worksheet. Assume that 2010 distribution of ARVs can be used for future distributions (i.e., for years 1 through 10).

TABLE 5: DISTRIBUTION OF 1ST AND 2ND ARV REGIMENS IN COUNTRY X IN 2010

Sub-activity	Drug Abbreviated Name	% of patients in sub-activity provided with the regimen
ART 1st line	AZT 300mg+3TC 150mg+NVP 200mg	48
	AZT 300mg+3TC 150mg	26
	EFV 600mg	26
ART 2nd line	LPV/r 200mg/50mg	40
	TDF 300mg	30
	ddI 200mg	30

- For the following two exercises, we will practice with only the LaboratoryTestCosts worksheet, in which you will input data on HCT. Use the following information from a country's HCT program on HCT testing kits to fill out the LaboratoryTestCosts worksheet:

  - The first test used for every patient is the Determine testing kit, which costs US$0.8 per test. Those patients that are tested positive are confirmed with SD Bioline (unit cost of $0.8 per test). If tested negative, patients are then tested with Unigold for confirmation (unit cost of $1.6 per test).

- Moving on to the next table on the right, use the information provided in the following on a country's HCT program to determine the number of units required for each test for the average HCT patient:

  - The supply management team assumes that all patients will be given the Determine test; 10 percent of those taking the Determine test will test positive and will confirm with the SD Bioline test. Of those 10 percent taking the SD Bioline test, only 2 percent will need a tie-breaker test using Unigold. Remember: The actual number of those receiving HCT is not required here, because in this worksheet you are calculating the proportion of those who receive HIV testing that require a given HIV test.

Tips and Useful Information:

- The ART and PMTCT Regimens worksheet requires that you input the different drugs grouped by clinical activity, as denoted by column D. The Regimen Summary table at the top of the worksheet summarizes the yearly cost for each clinical activity.

- This worksheet asks for drug unit costs per year, which means that if you have the cost for one dose, you will need to multiply this by the number of doses a patient will take in one year.

- If you are costing drugs for sexually transmitted infection (STI) treatment and diagnosis, for example, assume you have the following information: *Two doses of Drug X (@ $0.70/dose) are required to treat one STI episode. This STI episode will affect 66 percent of women (ages 15–49) 2 times a year. 52.5 percent of the population (ages 15–49) are female.*

- In the Medications worksheet, you will need to input the drug cost (table on the left). The following is an illustrative example of the type of input calculations that may be required for the ART and PMTCT Regimens, Medications, and LaboratoryTestCosts worksheets: We will define the medication unit as doses required for one patient-year. The drug will cost $2.80/ patient-year because the patient is expected to experience two episodes. In the next table on the right, you are asked for the number of these medications required per unit of service for all STI patients. You know that this will affect 66 percent of the female population, ages 15–49. However, your target population for STI treatment will be total population, ages 15–49. For the number of drug X units required per unit of STI service, you will input 0.347 (or 66%*52.5% to weight the need of this medication).

- On this worksheet, in tables located from columns D to S, you will specify all the regimens used for each line of ART (and PMTCT). Each line (1st, 2nd, and 3rd) of ART has its own table, allowing for its own combination of regimens to be in use. HAPSAT combines the information in the ART tables to calculate and average cost per patient-year for ARVs for each line of treatment. This is summarized in the table at the top of the worksheet in columns E to S.

8. ART NEED BY LINE

Worksheets discussed in the section: ART and PMTCT Regimens

Estimated time for exercise: 10 minutes

What/Why:

On the top right of the ART and PMTCT Regimens worksheet (located in AG2-AI8), the user will find a table in which estimates of the progression of patients through treatment groups can be inputted, where each treatment group is receiving a specific ART regimen or treatment line. This is necessary to calculate the "need" for ongoing 1st line treatment, 2nd line treatment, and 3rd line treatment. The following is a snapshot of the input for the ART need by line.

HIV Treatment Response Parameters	
These parameters are used to estimate the progression of patients through 'lines' of ART. They are used to calculate the 'need' for ongoing 1st-line treatment, 2nd line treatment, and 3rd line treatment	
pDie in Y1 of ART	0.21
pDie in Y2+ of ART	0.05
Probability Move from First to Second Line	0.025
Probability Move from Second to Third Line	0.01

Task:

- For this training, use the default values.

Tips and Useful Information:

- These parameters can be obtained from the ART program or from the ART quantification reports.

9. HUMAN RESOURCE INPUTS DEMO AND PRACTICE

Worksheets discussed in the section: HealthWorkers

Estimated time for exercise: 20–30 minutes

What/Why:

The HealthWorkers worksheet quantifies the human resources need and determines the added cost of labor to maintain and scale up clinical HIV services. It is composed of two tables: one on the left, which defines costs associated with each health cadre, and one on the right, which defines the amount of time required for each health cadre to provide a unit of service to a patient per year.

As a default, we assigned health worker labor assumptions as 44 working weeks per year, 40 hours per week. The number of working hours/days/weeks should be changed to reflect local labor rules.

In the cost table, the user must select from the dropdown list in column C, Group, to signify to the software that the entries for this row will be a cadre group. Otherwise, if the user is entering an individual cadre, the selection in column C should be "Individual." When "Individual" is selected, that health cadre must be grouped into its respective cadre group in column H.

The user should specify the proportion of time that each health cadre spends in providing direct health services, that is, time spent directly with the patient, rather than performing administrative work.

Once all related health cadres and their costs are inputted, the user moves on to the right table. For each service type (e.g., PMTCT Treatment, HIV Testing, as listed on the top row), the user will input the number of events or visits that occur within one unit of service (Row 6) and the amount of time (in hours) that each health cadre will devote per event/visit for that service.

For example, if PMTCT treatment requires at least five antenatal clinic visits per pregnancy, each of which lasts 15 minutes with a Registered Nurse, then the input in that table under the "PMTCT Treatment" column (column R) will be 5 (visits) for Row 6 and 0.25 (hours per visit) for Row 9.

Tasks:

- Table 6 describes the different health cadres in the examined country, the Average Annual Compensation, the Number of Health Workers [full-time employees (FTE)] available for HIV care, and the proportion of their time they spend on direct service provision. Enter the information in this table into the HealthWorkers worksheet. Be sure to select "Individual" from the dropdown in column C of the HealthWorkers worksheet as these entries are for individual cadre types and not grouped cadre types.

- Group health cadres into their respective cadre groups as follows and enter the cadre groups into the software:
  - Doctors and community health officers (CHO) into physicians
  - State-registered nurses (SRN), state-enrolled nurses (SEN), maternal child health (MCH) aides, midwifes, and nursing aides into nursing
  - Laboratory technicians into lab staff
  - Pharmacists into pharmacy staff
  - Counselors (paid) into counselors
  - Home-based care providers into outreach workers.

TABLE 6: CADRE TYPES AND CHARACTERISTICS

Cadre Name	Average Annual Compensation (in local currency)	Number of Health Workers (FTE) available for HIV care	Fraction Direct Service Provision
Doctor	2,000.00	6	70%
Community Health Officer (CHO)	1,700.00	1	70%
State-registered nurse (SRN)	1,200.00	3	70%
State-enrolled nurse (SEN)	1,000.00	6	80%
MCH Aide	700.00	60	80%
Midwife	1,000.00	3	80%
Nursing Aide	800.00	30	80%
Laboratory Technician	1,500.00	1	70%
Pharmacist	1,500.00	30	60%
Counselors (paid)	800.00	6	80%
Home-based care providers	800.00	6	80%

- According to the guidelines, a 1st line ART patient is expected to visit the clinic four times a year. Enter the number of visits in the appropriate cell of the "Labor Required for Each Clinical Activity" table within this sheet.

  Important Note: The user inputs labor required for each clinical activity per unit of service. The unit of service is defined by the user and should be consistent with the other costed components of the software. For simplicity, it is best to use service per patient-year, as resulting costs are by year.

- Enter the number of visits required for one HCT session in the appropriate cell of the "Labor Required for Each Clinical Activity" table within this sheet.

- According to the guidelines, ART patients need to be seen first by a nurse and then by a medical doctor. There are no guidelines on who should provide HCT. Data from the facility-based survey show the minutes spent with each cadre for ART and HCT and are presented in Table 7.

- With the information from Table 7, calculate the average time an ART patient should visit a cadre, taking into account the guidelines and the facility-based survey. Calculate the equivalent average for HCT.

TABLE 7: AVERAGE TIME (IN MINUTES) A CADRE INVESTS IN ONE ART PATIENT VISIT AND IN ONE HCT SESSION, BY CLINIC

	ART 1st line patient					HCT session				
	Clinic 1	Clinic 2	Clinic 3	Clinic 4	Clinic 5	Clinic 1	Clinic 2	Clinic 3	Clinic 4	Clinic 5
Medical Doctor	40	22	14	15						
Nurse (SEN)		15	24	32		22	12	14	32	
Counselors					45					18

Tips and Useful Information:

- In the column titled "Type of Entry," you will define whether a cadre entered is an individual cadre entry, or whether you wish to create a cadre group, to which two or more existing individual cadres can be categorized. Grouping into cadre groups is particularly useful when the staffing "mix" for providing a service varies across sites. For example, if a senior nurse is expected to perform the same duties as a medical doctor, according to the treatment guidelines, the nurse

should be in the same cadre group. The data can be obtained from service delivery guidelines and from interviews. Data should NOT be obtained from observational data, as tasks are frequently carried out by an inappropriate cadre (e.g., HCT by doctor, or ART by MCH aide). The user can edit the types of cadre groups as shown in Column H of the HealthWorkers worksheet.

Important Note: The option to cost cadres by group is at the discretion of the user whose decision to use this function may depend on available data, ease of costing, and other factors.

- In column D of the first table, if the information you are entering is an individual cadre, then the cadre name should be manually entered. If the information you are entering is for a cadre group, then you should select a cadre group from the dropdown list in column D.

- Values for the *Average Annual Compensation* column should include all the compensation that a health worker receives, not only the worker's salary. Such figures are obtained from interviews with human resource officers.

- *Parent Cadre Group* column is where each cadre will be classified to a cadre group. The criterion for classification is explained above.

- *Fraction of Parent Cadre Group* represents the proportion of a given cadre within a specific cadre group. The total per group should equal 100 percent. For example, if registered nurses and nursing assistants perform the same tasks in HIV services, then they can be included in one group. If there are 20 registered nurses and 80 nursing assistants, then their fraction of parent cadre group will be 20/(20+80)=20% and 80/(20+80)=80%, respectively.

- The *Number of Health Workers (FTE) Available for HIV Care* is required for knowing the program's human resources capacity for delivering clinically based HIV services. For example, if the program has 10 doctors trained in provision of HIV services (information can be obtained through Human Resources for Health (HRH) records), and, on average, these doctors allocate 20 percent of their time to HIV services (information can be obtained through observational data), the user should enter 2:10*20%=2 doctors.

- *Fraction Direct Service Provision* is where you input the proportion of working hours for direct service provision as opposed to management and administrative tasks. This can be obtained from the facility-based surveys.

- *Caution*: When costing labor for an activity, you cannot cost time for both a specific cadre group and an individual cadre within that specific cadre group. Doing so will overestimate the labor costs.

10. VARIABLE OVERHEAD WORKSHEET FOR CLINICAL ACTIVITIES

Worksheets discussed in the section: Variable Overhead

Estimated time for exercise: 5–15 minutes

What/Why:

In this worksheet, the overhead costs for clinical activities will be specified as a percentage of the calculated unit cost for each year. This worksheet shows what the unit cost will be with overhead over the time horizon once the user has input the overhead percentage.

The first two columns (columns D and J) list the clinical activities and their calculated unit costs based on the last five worksheets. In columns K to O, the user specifies the percentage of *variable* overhead costs for each activity.

The user will also be able to specify *fixed* overhead for clinical activities in the Policy Scenario Set worksheet.

Task:

For this example, apply a Variable Overhead for Facility Level of 10 percent.

11. COSTING OF NONCLINICAL SERVICES DEMO AND PRACTICE

Worksheets discussed in the section: ItemManager and Non-ClinicalActivityCosting

Estimated time for exercise: 40 minutes

What/Why:

In this section of the software, users will be able to cost nonclinical activities based on data that may be obtained from key informant interviews, costing exercises, and other materials. The costing of nonclinical services can be done using the top-down or the bottom-up method depending on available data. If the top-down method is used, then data such as overall expenditure, overhead, and number of beneficiaries reached are necessary inputs. If the bottom-up method is used, then data on the components to providing the service and its costs are necessary inputs.

The costing of nonclinical services covers two worksheets: ItemManager and Non-ClinicalActivityCosting.

The ItemManager worksheet captures characteristics of items, including whether the item is a capital investment or not. If it is a capital cost, the user must specify how many years the item is useful. All capital costs are required to be entered into the ItemManager worksheet. The user is further requested to specify the Currency Conversion Method. As previously explained, the official exchange rate should

be used for tradable items, such as drugs, while PPP should be used for nontradable items, such as labor and buildings.

The Non-ClinicalActivityCosting worksheet captures the bottom-up and top-down cost of nonclinical activities. Before applying either or both of these costs, the user is required to input the category, SDA, activity, and target population. Each line should be devoted to one item associated with the activity. Thus, there will most likely be multiple lines of different items that all make up the required resources to perform the specific nonclinical activity. Four types of nonclinical activity costs are presented in Box 2.

Box 2: Type of Costs

In the HAPSAT software the user has to define the cost type of each item. An item can be a variable or fixed cost. A variable cost increases in direct proportion to activity scale of coverage. For example, food packages increase in direct proportion to those beneficiaries on nutritional support. Fixed costs are for items whose costs do not change with activity scale of coverage. For example, there is a need for one nutritional coordinator for the nutritional services, regardless of the number of beneficiaries of this service. A fixed or variable cost item can be further categorized to recurrent or capital costs. Recurrent costs last less than one year; capital costs last for more than one year. In the HAPSAT software, each item can be categorized into four types:

1. Variable-recurrent, e.g., food packages, annual refresher training, salaries, and/or incentives for outreach workers

2. Variable-capital, e.g., one-off seed capital in income-generating activities, one-off training

3. Fixed-recurrent, e.g., service coordinator

4. Fixed-capital, e.g., buildings

When an activity is composed from both variable and fixed costs, its total cost in the Policy Scenario worksheet will be composed from the fixed cost and from the number of units to be reached (e.g., people on ART) multiplied by the variable unit cost.

Tasks:

- For this exercise, we will cost two activities: CSWs reached with BCC and educational support for OVC.

- BCC outreach for CSWs requires a peer educator, which costs US$900 per year (including salary, travel expenses, and training). Each peer educator reaches 80 CSW, 12 times a year. Every CSW receives BCC material and condoms worth US$50 per year. Implementer overhead is 30 percent of the total cost of all items. To calculate the unit cost, input the data in the bottom-up costing section of the Non-ClinicalActivityCosting worksheet.

- *Hint*: Since we are using the bottom-up approach, all costs should be broken down to "per person reached." For the peer-educator cost, a peer educator can reach 80 people per year (regardless of the number of times the educator reaches each individual), so the number of peer-educator units per person reached will be 1/80.

    Box 3 below provides examples of costing approaches.

- Educational support for OVC in the examined country includes school fees of US$20 per term (three terms per year), scholastic materials at the cost of US$8 per term, a uniform at the cost of US$14 per year, and a desk and chair at the cost of US$70. The desk and chair are useful for six years. The OVC coordinator costs US$1,200 per year, and only one coordinator is required, independent of the number of OVC reached (fixed cost). Implementer overhead is 20 percent. Input the data in the bottom-up costing section of the Non-ClinicalActivityCosting worksheet and calculate the unit cost.

Tips and Useful Information:

- Top-down costing is the division of the budget of a given service by the number of people reached by the service. In the HAPSAT model you need to input the reach, direct cost, and overhead cost. The unit cost is then calculated by the software.

- Bottom-up costing is an ingredients approach that quantifies the inputs required to produce a service and the cost of each of these inputs. You are required to input the different items contributing to the cost of the activity. For each item, you will need to specify the type of cost (see box 1), the number of units required per year, and the item unit cost. For example, if the salary of an outreach worker is US$1,200, the item unit cost will be US$1,200. Assuming the worker serves 100 beneficiaries per year, the unit required per year for one person reached will be 1/100 (0.01). The annual unit cost of the item for one person reached will then be 0.01*US$1,200=US$12. To reach one beneficiary over a one-year period with the examined service, US$12 will be attributed to the salary of the health worker.

12. POLICY SCENARIO WORKSHEET AND TARGET SETTING

Worksheet discussed in the section: Policy Scenario

Estimated time for exercise: 20–35 minutes

What/Why:

The Policy Scenario worksheet uses the unit costs calculated from the data in the previous worksheets and the target populations specified for the clinical and nonclinical activities. The software will take this information and populate the tables in this worksheet to prepare the user for target setting for each activity in the specified time horizon. As the user specifies targets over the time horizon based on selected policy scale-up scenarios, the software will calculate the estimated yearly costs for each activity based on the set targets for each year. Box 4 presents descriptions of target-setting policy scenarios.

Box 4: Descriptions of Target-setting Scenarios

Past Performance – This scenario takes the average trend from the "Results" period and applies the trend forward, bounded by the upper target.

Maintain Results – There are two types of Maintain Results scenarios the user can apply. The "Maintain reach" scenario keeps the target at the same number of people over the time horizon. The "Maintain coverage level" scenario keeps the target at the same percentage of the target population over the time horizon.

Universal Access – There are two types of Universal Access scenarios the user can apply. The "linear" scale-up scenario to Universal Access determines the necessary coverage increases needed in each year in order to scale-up to Universal Access by the desired year. The "lagged" scale-up scenario to Universal Access is similar to the "linear" scenario except that in the first year the coverage increase is at 60% of the coverage increase in the "linear" scenario and in the last year the software determines the necessary coverage increase to meet universal access by the desired year.

Custom – This scenario is a user-specified scale-up.

Important Note: Users can specify the type of target-setting scenario on the PolicyScenarios worksheet in the table located from D34:E7.

Tasks:

- Input the figures from

- Table 8: Historical Reach of Target Population
  of Various Activities from 2009–2011 into the Policy Scenario Set #1 worksheet, columns J, K, and L, and apply the scale-up scenario based on past performance.

- For Policy Scenario Set #2, use the same figures and activities in

- Table 8 to calculate the scale-up scenario for universal coverage. To select these scenarios, you can either pick from the dropdown list within each activity's scale-up table or select the master scenario desired in boxes H2-I9 and hit the "Apply Master Scenario Profile to All Services" button.

- In order to use the past performance scenario, you must provide historical reach data for at least two years and specify that it is "Historical" or "Future" projection data in rows J9-S9 for the

respective years. The AIDS program provided historical data on the reach of the target population in 2009–2011 of four activities, as detailed in

- Table 8.

TABLE 8: HISTORICAL REACH OF TARGET POPULATION OF VARIOUS ACTIVITIES FROM 2009–2011

Activity	2009	2010	2011
Adults currently on 1st line ART	2,000	2,500	3,000
Number of HCT sessions	1,000	15,000	18,000
Number of OVC receiving educational support	500	800	1,200
Number of CSW reached with outreach activities	-	-	-

Tips and Useful Information:

- You can have two target scenarios per service. The most common scenarios are scale-up based on past performance and scale-up to achieve universal access. In the latter, a linear increase between latest result and universal access target is first calculated, and then the projected increase of first year target is decreased by 60 percent, while the increase in the fifth year is adjusted upward to achieve universal coverage. Universal coverage usually entails 80-percent coverage.

- The universal access scenario will always scale up the population reached to 80 percent by the end of the projection time frame. If you would like to customize coverage for a specific activity, then you can manually input the percentage of coverage desired for the respective activities.

13. TASK-SHIFTING OR QUALITY ASSURANCE SCENARIO FOR THE HIV/AIDS HEALTH WORKFORCE

Estimated time for exercise: 15–20 minutes

What/Why:

In a case in which the country being modeled suffers from a shortage of human resources, the user can model scenarios of the health workforce requirements to help address shortages in human resources.

Important Note: The HAPSAT software must be completely populated, and this includes the Policy Scenario worksheet, before the modeling scenarios of the health workforce can be done.

Tasks:

- The HAPSAT country suffers from an acute shortage of highly skilled health workers. You were asked by the stakeholders to come up with a task-shifting solution. After reviewing the literature, you conclude that ART treatment can be provided solely by nurses and HCT provided by counselors.

- Make a copy of the HAPSAT file that you have worked from and rename this file to indicate that it is the task-shifting scenario. In the HealthWorkers worksheet, modify the data on changes to the

health workforce required in this new file to reflect the task-shifting information above.

- You can compare the results of the health workforce requirements and the budget changes across both files. How many FTE of medical doctors and FTE of nurses were saved due to this task shifting? How many new HIV counselors are required?

Tips and Useful Information:

- It is important to keep a detailed account of the HRH scenarios that you've modeled for each clinical activity. Make use of the "Notes" columns in the software to keep an accurate account of the information that you have input into the software.

Recommended citation: Katz, Itamar and Wendy Wong. December 2011. HAPSAT 2.0 Software: Hands-on Exercise. Bethesda, MD: Health Systems 20/20 project, Abt Associates Inc.