

## **USER GUIDE**

# **INTEGRATED HEALTH MODEL Version 2.0**

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## About This Guide

This user guide provides an overview of and detailed instructions for the Integrated Health Needs Assessment Tool (or Integrated Health Model), whose primary purpose is to support country planners in conducting a needs assessment to achieve the health-related Millennium Development Goals (MDGs). This user guide does not explain how to conduct a MDG needs assessment itself; this and other information on MDG-based planning should be reviewed before using this guide ([www.undp.org/poverty/tools.htm](http://www.undp.org/poverty/tools.htm)).

The user guide is divided into 4 Chapters and 4 Annexes:

- Chapter 1 introduces the Integrated Health Model—its purpose, development, key features and basic structure.
- Chapter 2 provides detailed instructions on how to use the model.
- Chapter 3 discusses methods for adaptation.
- Chapter 4 offers a series of short exercises to highlight key elements of the model.
- Annex 1 summarizes key terms, acronyms and color codes
- Annex 2 lists the interventions already included in the model
- Annex 3 lists data needs and potential sources to populate the model
- Annex 4 presents health needs assessment results for select countries

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## CHAPTER 1: Introduction to the Integrated Health Model

### Purpose

Developed by the United Nations Millennium Project and the United Nations Development Programme (UNDP), the Integrated Health Model is one of a suite of Excel-based sector tools used by the MDG Support Team in UNDP to aid countries in MDG-based planning.<sup>1</sup> The primary purpose of the Integrated Health Model is to help governments estimate the total resources—human, infrastructural, commodities, financial—that are required to meet the health-related MDGs. The tool does not estimate the impacts of interventions on health outcomes or the socioeconomic impacts of ill health. The tool can assist with health systems planning, including the identification of critical capacity constraints to health systems scale-up.

The Integrated Health Model can be used for other purposes in addition to MDG-based planning. For example, users can use the tool to estimate costs for vertical programs, such as malaria or HIV/AIDS, or include more expansive sets of interventions, such as treatment for chronic conditions or mental illness (i.e., an MDG+ scenario), to allow for broader health systems planning and budgeting. Time horizons can also be altered for more flexibility.

### Context

The Integrated Health Model is not the only tool for health planning and budgeting, including that related to the MDGs. A variety of other tools exist, each with different purposes and scope, many of which estimate resources for stand-alone vertical programs, often with insufficient treatment of the health system. In contrast, the key feature of the Integrated Health Model is the coherent scale-up of integrated health services anchored in a comprehensive treatment (including costing and identification of constraints) of the health system. Moreover, the Integrated Health Model is one of the few, if only, tools that addresses all of the health MDGs simultaneously.

For reference, some of the other costing tools available include:

1. Marginal Budgeting for Bottlenecks (World Bank/UNICEF)

The Marginal Budgeting for Bottlenecks (MBB) tool was originally created to estimate the costs of maternal and child health interventions to achieve MDGs 4 and 5. In at least some countries, the model has been expanded to include interventions for MDG 6.

Costing of health systems components is also included. One of the unique features of this tool is that it estimates impacts of some of these interventions on health outcomes. One of the key differences between this tool and the Integrated Health Model is that this tool estimates only marginal, or additional, costs; the Integrated Health Model estimates total costs (i.e., funds already being spent in the health system + additional health funds required).

2. Choosing Interventions that are Cost-effective (WHO?)

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<sup>1</sup> The MDG Needs Assessment tools, including the Integrated Health Model, can be downloaded from <http://www.undp.org/poverty/tools.htm>.

This tool is intended for medium-to-long term planning and costing and covers both programme and patient costs of recommended evidence-based interventions. [Needs better description]

3. Capetown ARV Costing Model (University of Capetown School of Public Health)  
This tool is considered among the best for estimating treatment costs, including drugs and laboratory tests, for HIV/AIDS. Voluntary counseling and testing (VCT) costs can also be calculated as well as some interventions for care and support. The tool does not estimate costs for interventions related to HIV/AIDS prevention. Health system costs can be approximated, but the utility of results may be limited in the context of costing a vertical program.
4. Resource Needs for HIV/AIDS (Constella Futures Group)  
This model estimates costs of interventions for HIV/AIDS prevention, treatment, care & support as well as some health system elements. The model makes a variety of assumptions in estimating resource costs, and earlier versions of the model did not have a time horizon of sufficient length for MDG-based planning. A newer version of this model is being prepared.
5. Reproductive Health Costing Tool (UNFPA)  
This tool is designed to estimate resource requirements and costs of providing an essential package of reproductive/maternal health interventions at national- or district-level. The tool also estimates some health system costs, but the utility of results may be limited in the context of costing a vertical program. This model served as the basis of the maternal and reproductive health section in the Integrated Health Model.

## **History**

The Integrated Health Model was not developed from scratch but rather from the principles and lessons learned from other costing tools, many of which are mentioned above. In fact, some sections of the Integrated Health Model consolidate and build directly on several health costing tools created by other development partners. For example, the child health section is adapted from previously unpublished Integrated Management of Childhood Illness (IMCI) costing model developed by UNICEF and WHO. The section on maternal and reproductive health comes directly from UNFPA's Reproductive Health Costing Tool. The extended module on HIV/AIDS is based on lessons learned from the Capetown ARV Costing Model and the Futures Group model. The work on this module was done undertaken in collaboration with UNDP's Regional Service Center in Colombo and has since been endorsed by UNAIDS.

The tool has been utilized widely across sub-Saharan Africa for MDG-based planning and budgeting and is currently being rolled out in the Asia Pacific and in Latin America. Most countries have adapted the models to meet their own needs. Some of these adaptations include expansion of the model to include treatment costs for chronic diseases (e.g., cardiovascular disease, diabetes, etc.) and mental health conditions. In some countries, the Integrated Health Model has been used to validate cost estimates generated from other models, such as the MBB.

The Integrated Health Model is regularly updated to reflect ongoing lessons from country experiences.

## **Key Features**

The Integrated Health Model has the following key features:

1. Goal-based  
The model is built around user-defined coverage targets for the health system. These targets, which can be set ambitious enough to achieve the MDGs, guide the user in scaling up the health system.
2. Planning and budgeting  
Though the primary purpose of the tool is to assist in estimating resource requirements, the model also has elements to assist in planning. For example, the model links the scale-up to the health system to the scale-up of health services to promote integration and coherence. The model also helps users identify human resource constraints to help ensure enough capacity exists to scale-up health services.
3. Total costing  
The model estimates total resources—that is, the resources currently being allocated to the health system plus the additional future resources required to achieve the health MDGs. Total resource estimation is helpful in setting overall budgets. Some other health costing tools only estimate additional resource requirements.
4. Financial, not economic, costing  
The costs that are estimated are financial, not economic, costs. This means that the model only estimates costs that are monetized (e.g., costs of antiretroviral drugs or HIV/AIDS prevention programs). Opportunity costs, for example, are not estimated nor are the socioeconomic impacts of health interventions and of the underlying health conditions that are being addressed.
5. Usable and flexible  
Every effort has been taken to make the model as user-friendly and flexible as possible, as the expectation is that countries should adapt to the model to local contexts. To this end, the model can be used for subnational planning, vertical program costing and for time horizons (up to 10 years) that differ from the MDG target of 2015. Interventions can be added, modified or removed.
6. Transparent  
Assumptions are minimized and, where they occur, are explicit. All calculations occur on the same worksheets in which inputs are provided so that users can follow the model's work.

## **Scope**

The Integrated Health Model focuses on estimating resources for those services—clinical, population/outreach, and prevention—delivered by the health system to achieve the MDGs. Importantly, the model also estimates resources for the health system itself to ensure that sufficient capacity exists to deliver an integrated set of health services.

Broadly, the model covers:

- Health Systems
  - Facilities—construction, operations, maintenance, upgrading
  - Equipment, including for communication and transport
  - Human resources—salaries, pre- and in-service training
  - Commodity Supply Chain
- Child Health
  - Acute respiratory infection
  - Diarrhea
  - Treatment for malnutrition
  - Nutrient supplementation
  - Immunization
- Maternal and Reproductive Health
  - Short- and long-term contraceptives
  - Skilled birth attendance
  - Basic and comprehensive emergency obstetric care
  - Treatment for sexually transmitted infections
  - Repair of obstetric fistula
- HIV/AIDS
  - Prevention measures, including for vulnerable groups
  - Anti-retroviral therapy and associated laboratory tests
  - Care and support, such as treatment of opportunistic infections
  - Enabling environment interventions
- Malaria
  - Prevention via insecticide-treated bed nets
  - Rapid diagnostic testing
  - Treatment, including artemisinin combination therapy
- Tuberculosis
  - Treatment per Directly Observed Therapy Shortcourse (DOTS)
- Demand-side interventions
  - Conditional cash transfers
  - Transportation services and vouchers
  - Awareness campaigns via mass media and school-based initiatives
- Additional facility-based services, such as services for chronic conditions (e.g., diabetes, cardiovascular disease, etc.)
- Independent health programs, as defined by the user (e.g., integrated ITN, immunization and de-worming campaigns not based at facilities)

For a more detailed list of services for child health, maternal and reproductive health, HIV/AIDS, malaria and tuberculosis, please see Annex [X].

The Integrated Health Model itself does not include all of the interventions that are necessary to achieve the MDGs, as these interventions already exist in other MDG Needs Assessment tools. Table [X] lists the other tools and their interventions that impact health.

<b><u>Needs Assessment Tool</u></b>	<b><u>Interventions to Achieve the Health MDGs</u></b>
Water and Sanitation	<ul style="list-style-type: none"> <li>• Infrastructure to provide clean water</li> <li>• Infrastructure to provide sanitation</li> <li>• Hygiene education</li> </ul>
Agriculture and Rural Development	<ul style="list-style-type: none"> <li>• Interventions to improve agricultural productivity, which, in turn, can reduce the extent and severity of malnutrition</li> <li>• Interventions that increase rural incomes and the ability of the poor to access health services</li> </ul>
Roads	<ul style="list-style-type: none"> <li>• Transport infrastructure and services that improve links between communities and different levels of the health system</li> </ul>
Gender	<ul style="list-style-type: none"> <li>• Interventions that create an enabling environment in which women and children have greater, more reliable access to health services and enhanced ability to protect and promote their own health</li> </ul>
Education	<ul style="list-style-type: none"> <li>• School feeding programs</li> <li>• Support services to children with HIV/AIDS</li> <li>• Support services to children/orphans of parents/family members with HIV/AIDS</li> <li>• Interventions that improve literacy</li> </ul>
Energy	<ul style="list-style-type: none"> <li>• Improved cooking stoves that reduce incidence of respiratory infections</li> </ul>

## **Structure**

The Integrated Health Model is organized into a series of worksheets in Microsoft Excel. Generally, each worksheet corresponds to a major costing category in the model. For example, all of the costing for child health interventions occurs on a single worksheet entitled 'Child Health'. Table [X] lists the worksheets in the model and their purpose.

<b><u>Worksheet Name</u></b>	<b><u>Purpose</u></b>
Health Systems-Facilities & HR	<ul style="list-style-type: none"> <li>• Estimate capital and recurrent costs of facilities, equipment (including communication and transport) human resources</li> </ul>



	(salaries and in-service training) and demand-side interventions
	<ul style="list-style-type: none"> <li>• Identify potential human resource constraints to scaling up the health system</li> <li>• Determine population coverages for integrated sets of services linked to particular facility levels</li> </ul>
Pre-service Training	<ul style="list-style-type: none"> <li>• Estimate costs of pre-service training for health workers</li> </ul>
Commodity Supply Chain	<ul style="list-style-type: none"> <li>• Estimate capital and recurrent costs of a functioning commodity supply chain system for health</li> </ul>
Child Health	<ul style="list-style-type: none"> <li>• Estimate costs for treatment of child health interventions</li> </ul>
Maternal and Reproductive Health	<ul style="list-style-type: none"> <li>• Estimate costs of maternal and reproductive health interventions, including prevention of mother-to-child transmission of HIV</li> </ul>
Malaria Prevention	<ul style="list-style-type: none"> <li>• Estimate costs of insecticide-treated bed nets</li> </ul>
Malaria Treatment	<ul style="list-style-type: none"> <li>• Estimate costs of rapid diagnostic testing and malaria treatment</li> </ul>
Tuberculosis	<ul style="list-style-type: none"> <li>• Estimate costs of tuberculosis treatment per DOTS</li> </ul>
HIV Enabling Environment	<ul style="list-style-type: none"> <li>• Estimate costs of interventions to create an enabling environment for improved planning, implementation and evaluation of HIV-related policies and programs</li> <li>• Estimate costs of interventions to improve livelihoods and access to prevention and treatment for risk groups and people living with HIV/AIDS</li> </ul>
HIV Prevention	<ul style="list-style-type: none"> <li>• Estimate costs of voluntary counseling and testing (VCT) and interventions to prevent HIV infection</li> </ul>
HIV Treatment	<ul style="list-style-type: none"> <li>• Estimate costs of antiretroviral therapy and associated laboratory tests</li> </ul>
HIV Care and Support	<ul style="list-style-type: none"> <li>• Estimate costs of interventions that provide care to PLWHAs, including treatment of opportunistic infections</li> <li>• Estimate costs of interventions that support PLWHAs and vulnerable groups, such as those orphaned by HIV/AIDS</li> </ul>
Additional Facility Services	<ul style="list-style-type: none"> <li>• Estimates the costs of up to 15 additional facility-based services identified by users on the 'Health Systems-Facilities &amp; HR' worksheet. Users can also modify the costing tables on this worksheet to estimate the costs of additional services not delivered from facilities.</li> </ul>

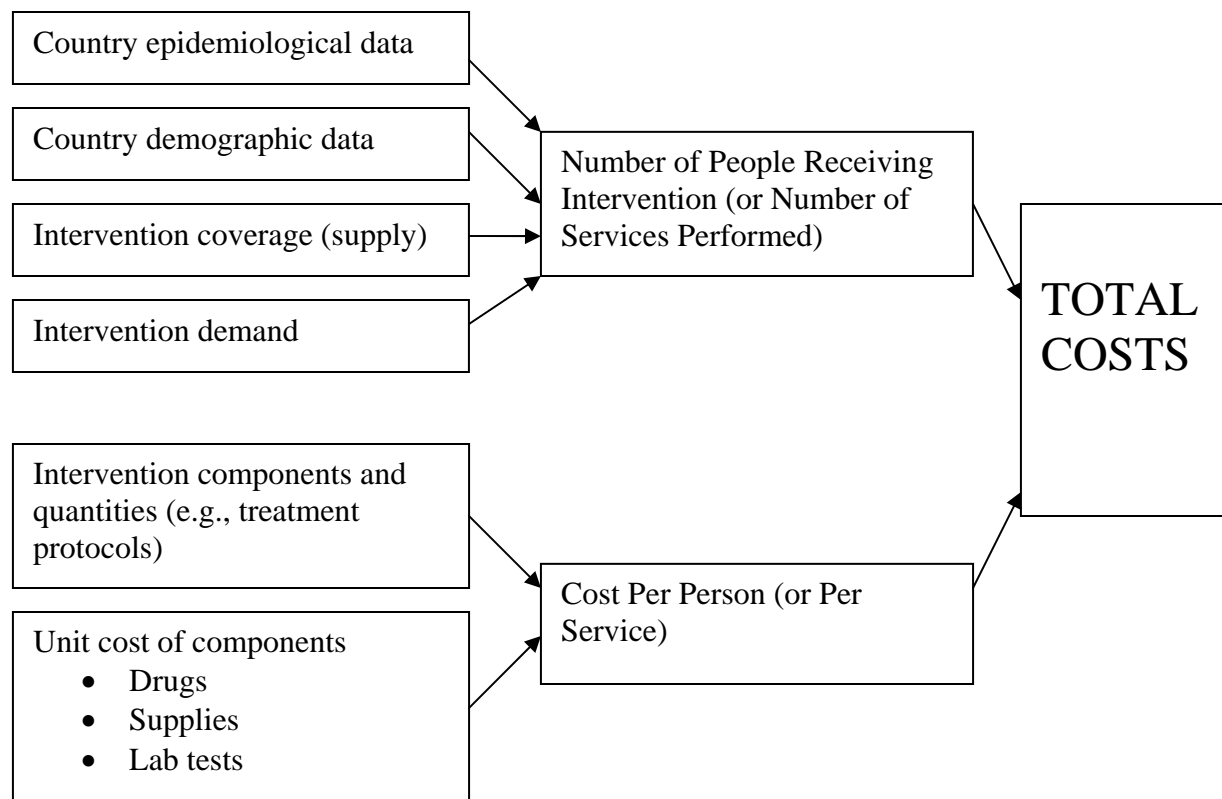
- |  |   |
|--|---|
| Independent Health Programs (5 copies) | <ul style="list-style-type: none"><li>• Estimate capital and recurrent costs of health programs that are not based at health facilities.</li></ul>  |
| Cost Summary                           | <ul style="list-style-type: none"><li>• Summarize the total and per capita cost outputs generated by the previous worksheets</li><li>• Allow users to apply a percentage mark-up to the health systems costs to account for a variety of costs that are not explicit in the model (e.g., epidemiological surveillance, financing management and accounting, monitoring and evaluation, overheads, etc.)</li></ul> |

Virtually all of the data inputs, calculations and cost estimates within a cost category (e.g., child health, etc.) occur on the same worksheet. Users do not generally need to toggle between worksheets to provide data or see results. Each worksheet is designed for the user to move from top to bottom; there are only a few circumstances where users must scroll to the right to provide data. On the services worksheet (e.g., child health, malaria, etc.), users generally provide epidemiological data at the top of the worksheet and unit cost information in the middle sections; cost outputs can be viewed at the bottom of the worksheet.

### **Costing Methodology**

Almost all of the cost calculations in the model follow a unit costing approach. For example, the cost of doctors' salaries in the health systems worksheet is calculated by multiplying the number of doctors needed by the annual average salary of a doctor. The calculation of health service costs on the service worksheets is similar. The number of people receiving a service is multiplied by the cost per person of the service. In turn, these two variables are constituted by a variety of underlying data: demographic and epidemiological information; coverage targets and scale-up paths; user demand for health services; unit costs of drugs, supplies and staff; and treatment protocols.

Figure [X] illustrates the relationship among these variables in calculating costs.



One of the unique features of the Integrated Health Model is that all of the facility-based health services derive their intervention coverage inputs from the user-defined scale-up of the health system. For example, coverage rates for treatment of uncomplicated malaria come from the coverage rates of the level(s) of the health system responsible for treating uncomplicated malaria. In this way, the scale-up of health services is inextricably linked to the scale-up of the health system to ensure that there is sufficient capacity to deliver services. Also, coherence and integration across services is promoted. For example, if the level of the health system that treats uncomplicated malaria also provides treatment of uncomplicated diarrhea in children, then the coverage rates for uncomplicated malaria and uncomplicated diarrhea will be the same.

Many of the interventions in the model have synergistic effects. For example, the scale-up of insecticide-treated bed nets for malaria prevention should lower malaria incidence and malaria treatment costs. The model does not automatically account for most of these synergies; users must make the adjustments manually. The model does, however, automatically account for the effects of rapid diagnostic testing for malaria on malaria treatment costs.

Similarly, the model does not account for the downstream effects of interventions that are housed in other needs assessment tools. For example, user must manually account for decreases in diarrhea incidence due to increased provision of clean water and sanitation. Accounting for these inter-model effects may be more challenging, as it requires coordination across sector working groups and often line ministries.

### Data Needs & Sources

The Integrated Health Model requires a large amount of data, which falls into the following broad categories per Figure [X]: epidemiological and demographic data; treatment protocols and unit costs. The model loads some epidemiological and demographic data automatically upon country selection. This data comes mostly from large databases maintained by UNFPA and WHO that have been copied into the model itself. Users should review all data inputs and change if necessary. To the extent possible, data sources should be recorded.

The model also contains a separate worksheet of proxy data for a variety of HIV/AIDS interventions.

The following sources may be helpful in locating data<sup>2</sup>:

1. Epidemiological and Demographic Data
  1. WHO Global Health Atlas: <http://globalatlas.who.int/>
  2. Demographic and Health Surveys: <http://www.measuredhs.com/>
  3. WHO Core Health Indicators: [http://www.who.int/whosis/database/core/core\\_select.cfm](http://www.who.int/whosis/database/core/core_select.cfm)
2. Treatment Protocols
  - Ministry of Health
  - WHO, UNICEF and UNFPA publications
3. Unit Cost of Drugs, Supplies
  - International Drug Price Indicator Guide 2006: <http://erc.msh.org/mainpage.cfm?file=1.1.htm&module=dmp&language=english>
  - Clinton Foundation HIV/AIDS Initiative: <http://www.clintonfoundation.org/pdf/chai-arv-price-list-050807.pdf>

For a complete list of the model's data needs, please see Annex 3.

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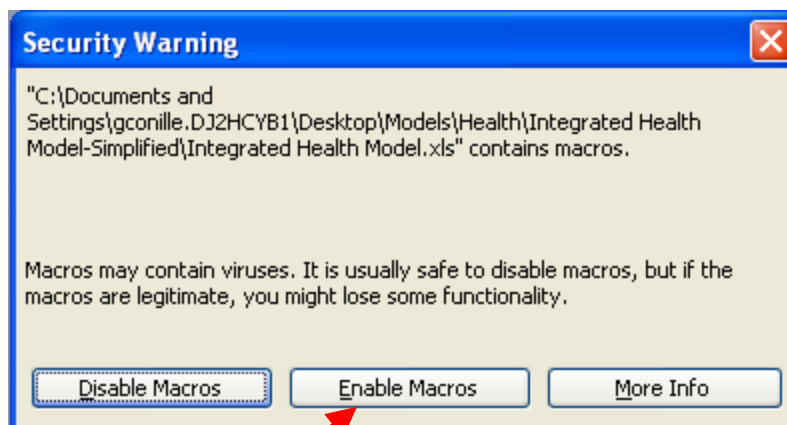
<sup>2</sup> Please note that web links may cease to function or change over time. All links were functioning at the time of this guide's latest revision.

## CHAPTER 2: Using the Model

### Getting Started

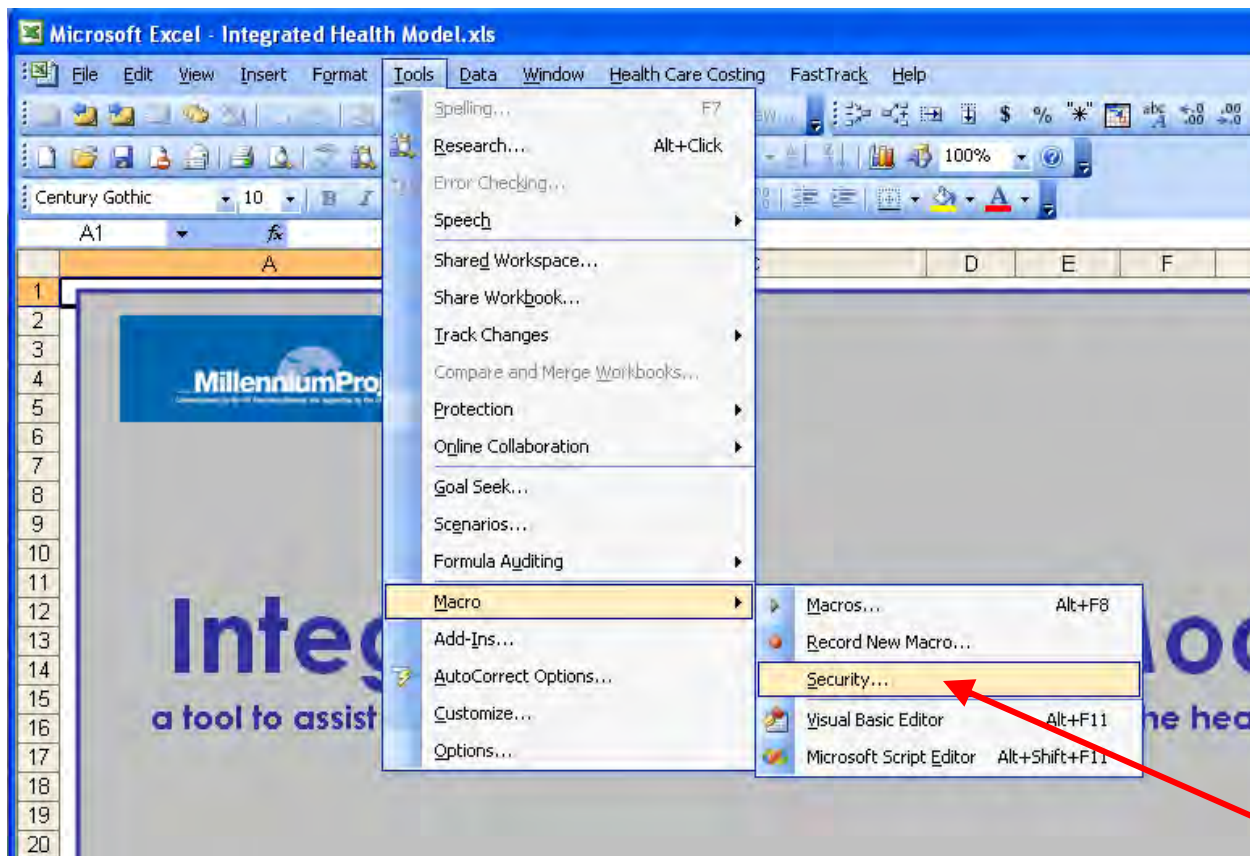
The latest version of the Integrated Health Model and user guide can be downloaded at [www.undp.org/poverty/tools.htm](http://www.undp.org/poverty/tools.htm). The file is available in both zipped (approx 3 MB) and unzipped versions (approx 10 MB). The original file name is 'Integrated Health Model.xls.' Users should maintain an unaltered master copy of this file and input data/make changes in a separate copy with a different file name, such as 'Integrated Health Model-working copy.xls'. Microsoft Excel is required to open and run the model.

When opening the file, users may see a screen that asks if users want to enable or disable macros (Figure X).

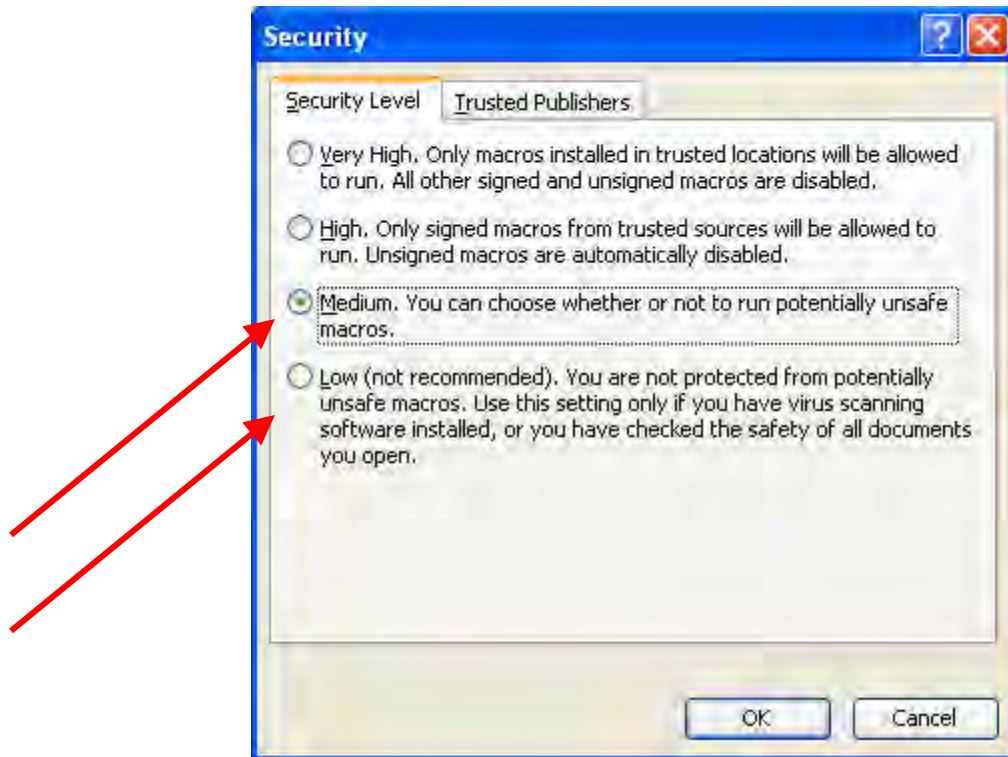


Click on 'Enable Macros.' Macros must be enabled in order to use the model.

If users do not see the pop-up window and instead go directly to the model's cover page, Excel may have automatically enabled or disabled macros depending on the macro security setting. In order to ensure that the macro security setting is set low enough to allow utilization of macros, select 'Tools' on the menu bar, then click on 'Macros' and then 'Security' (Figure X).



After clicking on security, a pop-up window will appear that asks user to change the security setting (Figure X). Security should be set at 'Medium' or 'Low.' Medium will ask users to enable or disable macros each time the Excel file is opened (Figure X, previous page). Low will automatically enable macros every time the file is opened.



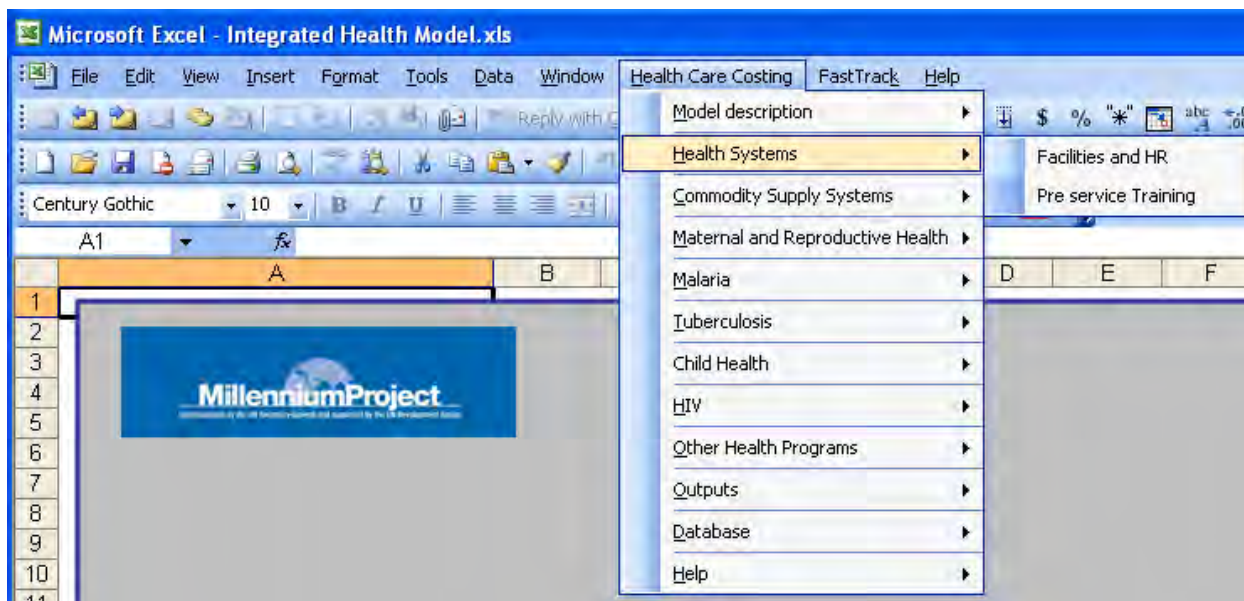
For a new macro security setting to take effect, users must save the file, close the file and re-open the file.

## Navigation

The Integrated Health Model is made up of a number of worksheets.<sup>3</sup> When opening the original file, only one worksheet—the model cover page—will open. In order to navigate between the other worksheets in the model, users can use the navigation tool, which can be found by selecting ‘Health Care Costing’ on the menu bar. A drop-down menu will appear (Figure X). Selections from this menu will direct the user to the corresponding worksheet. It may be useful to begin work on the ‘Health Systems-Facilities and HR’ worksheet, as this sheet determines much of the service coverage rates for the other worksheets.<sup>4</sup>

<sup>3</sup> See the section entitled ‘Structure’ in Chapter 1 for a description of the worksheets.

<sup>4</sup> See the section entitled ‘Costing Methodology’ in Chapter 1 for a more detailed description.



## Color Codes

To help make the model easier to use, a color scheme was created [Table X].

<b>Yellow Cell, Red Font</b>	Data input, exogenous variable (i.e., user must provide data)
<b>Yellow Cell, Blue Font</b>	Data input, endogenous variable (i.e., interim calculation, assumption or value loaded from an internal database). Users should review these data and modify as necessary.
<b>White Cell, Black Font</b>	Data output or calculation. Generally, these should not be changed.

Cells that are shaded yellow are data input cells. These cells either have red font or blue font. Red font signifies that the data input is an exogenous variable; that is, users must provide this data in order to run the model accurately. Blue font signifies an endogenous variable, perhaps as an interim calculation or assumption, or that the input is loading from database contained within the model. Usually, a cell with blue font has an underlying formula. Data with blue font should be carefully reviewed by users for accuracy and changed if necessary. When making changes, the underlying formula will need to be overwritten with an actual data value.

Cells that are white contain interim calculations or outputs and generally should not be modified. Users should only be change white cells if users have sufficient knowledge of the model's function and must do so for adaptation to national or subnational contexts.

## Using the Worksheets

### *Health Systems-Facilities and HR*

This is perhaps the most important worksheet in the model not only because the health system generally constitutes the single greatest cost factor in an MDG Needs Assessment but also



because this sheet serves as an ‘anchor’ in setting coverage rates for the health services found in subsequent worksheet. The purpose of the worksheet is three-fold:

- Estimate capital and recurrent costs of facilities, equipment (including communication and transport) human resources (salaries and in-service training) and demand-side interventions
- Aid in health system planning by linking facility expansion to coverage targets and by identifying potential human resource constraints
- Determine population coverage rates for integrated sets of services linked to particular facility levels

The worksheet begins with the selection of general model parameters: country name and planning horizon. The country name can be selected from a drop-down menu by selecting on cell B2 (Figure X).

	A	B
1		
2	<b>Country</b>	Zambia
3		Uzbekistan
4	<b>Start Year</b>	Vanuatu
5	<b>End Year</b>	Venezuela
6		Vietnam
7	<b>Model Warnings</b>	Western Sahara
		Yemen
		Zambia
		Zimbabwe

Some demographic and epidemiological inputs are automatically loaded into various parts of the model based on the country selection. These inputs can be identified by the yellow shading with blue font. If a country name does not appear or users want to engage in subnational planning, two options are available:

1. This is the preferred option. Write the name of the country or name of the subnational unit (e.g., district) in cell B1 and ignore the name that appears in cell B2 wherever that name is repeated in the model. Note that data that load automatically are based on the actual name that appears in B2, so users will have to be sure to modify these data inputs where necessary.
2. A new name can be written directly in cell B2 by selecting cell B2, then selecting ‘Data’ on the menu bar, then selecting ‘Validation.’ In the pop-up box that appears, find the drop-down menu under ‘Allow’ and change the value from ‘List’ to ‘Any Value.’ Click ‘OK’ to close the pop-up box. Now cell B2 will accept any name that users wish to provide. User should note that all of the subsequent demographic and epidemiological inputs that are linked to cell B2 will appear as errors in the model. Users will have to provide these data manually in order for the model to run.

Users can define any start and end year they wish (cells B4 and B5) provided that the period does not exceed nine years. If the period exceeds nine years, an error message will appear requesting users to change the value in the cells.

A small header called ‘Model Warnings’ appears in cell A7. The following three rows (rows 8-10) will provide warnings pertaining to major planning inconsistencies that may arise in the model based on data users provide on this worksheet. When they appear, the warnings are self-explanatory. The warnings are only meant to alert users to potential inconsistencies. The model does not correct potential problems automatically; users must do this manually.

The rest of the worksheet is organized into 14 collapsible sections. To open or close any section, click on the + or – symbol on the left of the worksheet. To close all the sections, click on the ‘1’ in the top left corner of the worksheet. To open all sections, click on the ‘2.’ Inputs are required for Section 1-8 and 13 only. The remaining sections are intermediate calculations and/or outputs.

1. Population. This section asks for population projections for the planning horizon. These population projections only need to be supplied one time in the model; they will be used across all of the worksheets. If a country is selected from the drop-down menu in cell B2, the name of that country will appear in cell A14 and population projections will automatically load from a database of projections obtained from UNFPA in 2004. This is why cells B14 through K14 are in yellow with blue font. Users can replace these projections with their own, but by doing so, the data will no longer change as different countries are selected. Users can also type over cell A14 if they wish to add a new country name or a subnational unit (per option #1 on the previous page). If a new country or subnational unit is provided in cell B2 (per option #2 on the previous page), then errors in the form of ‘#N/A’ will occur (Figure X). This problem is easily overcome by directly replacing the ‘#N/A’ error with the population projections for the relevant region.

1 2	A	B	C	D	E
1					
2	<b>Country</b>	Zanzibar			
3					
4	<b>Start Year</b>	2007			
5	<b>End Year</b>	2015			
6					
7	<b>Model Warnings</b>				
8					
9					
10					
11					
-	<b>1. Population</b>				
.		2007	2008	2009	2010
.	Zanzibar	#N/A	#N/A	#N/A	#N/A
15					

2 Facility Names and Catchment Sizes. The purpose of section 2 is to reflect the structure of the health system in the model. The first table asks for the names of the different facility levels in the health system. Note that these cells are shaded yellow with red font, which means the user must provide this information. The user can define up to 7 levels of facilities and they must be placed in order from lowest level facilities to highest. Administrative facilities, such as district health

offices, can also be defined if slots remain after including all facilities that provide health services.

The remaining tables in this section ask users for the catchment sizes of each of the facility service levels found within each facility level. Users should familiarize themselves with these terms and concepts before continuing in the model, as an accurate representation of the health system is necessary for the model to generate accurate, valid cost outputs. These terms can be found in Annex 1 and are repeated in Table X below.

Term or Concept	Definition/Description
Facility or Facility Level	The actual facility structure or collection of facility structures that provide a defined set of services (e.g., health posts, health centers, district hospitals etc.).
Facility Service Level	The first, lowest level of the health system to provide a suite of health services (e.g., primary care services that occur at a health post would be known as a health post service level). If the health centre is the lowest level at which basic emergency obstetric care (BEmOC). In this case, BEmOC would then form part of the health centre facility service level. Higher level facilities likely provide the services of lower level facilities (e.g., a district hospital would provide services unique to a hospital as well as primary care or outpatient services of a health post and a health centre). In this case, a higher level facility would contain multiple <i>facility service levels</i> (e.g., the district hospital would have a district hospital facility service level AND a health centre facility service level AND a health post facility service level).
Catchment Size	Catchment size is the average number of people who are or potentially would be served by a SINGLE health facility. Because facilities have multiple facility service levels, the model asks for the catchment sizes for facilities by facility service level.

To illustrate these concepts, imagine a very simple health system with only 3 facility levels: health post, health centre and district hospital. The catchment size for a stand-alone health post is 5,000. Figure X illustrates how this information would appear in the model. The health post has only one facility service level with yellow cells, as it is the lowest level in the health system and can only have only facility service level.

16	<b>2. Facility Names and Catchment Sizes</b>				
17	<b>Facility Names (Place from lowest to highest level)</b>				
18	<b>Health Post</b>				
19	<b>Health Centre</b>				
20	<b>District Hospital</b>				
21					
22					
23					
24					
25					
26	<b>Health Post</b>				
27	<b>Catchment Sizes for Facility Service Levels</b>				
28		<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
29	<b>Health Post</b>	<b>5,000</b>	<b>5,000</b>	<b>5,000</b>	<b>5,000</b>
30	Health Centre	0	0	0	0
31	District Hospital	0	0	0	0
32	0	0	0	0	0
33	0	0	0	0	0
34	0	0	0	0	0
35	0	0	0	0	0

Now suppose that on average 20,000 people fall within the catchment of any given health centre, and an average of 100,000 fall within the catchment of any given district hospital. Figure X illustrates what the subsequent tables in this section might look like.

37	<b>Health Centre</b>					
38	<b>Catchment Sizes for Facility Service Levels</b>					
39		<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
40	Health Post	<b>5,000</b>	<b>5,000</b>	<b>5,000</b>	<b>5,000</b>	<b>5,000</b>
41	<b>Health Centre</b>	<b>20,000</b>	<b>20,000</b>	<b>20,000</b>	<b>20,000</b>	<b>20,000</b>
42	District Hospital	0	0	0	0	0
43	0	0	0	0	0	0
44	0	0	0	0	0	0
45	0	0	0	0	0	0
46	0	0	0	0	0	0
47						
48	<b>District Hospital</b>					
49	<b>Catchment Sizes for Facility Service Levels</b>					
50		<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
51	Health Post	<b>5,000</b>	<b>5,000</b>	<b>5,000</b>	<b>5,000</b>	<b>5,000</b>
52	Health Centre	<b>20,000</b>	<b>20,000</b>	<b>20,000</b>	<b>20,000</b>	<b>20,000</b>
53	<b>District Hospital</b>	<b>100,000</b>	<b>100,000</b>	<b>100,000</b>	<b>100,000</b>	<b>100,000</b>
54	0	0	0	0	0	0
55	0	0	0	0	0	0
56	0	0	0	0	0	0
57	0	0	0	0	0	0

Note that the health centre has two rows shaded yellow, as the health centre is likely composed of TWO facility service levels: the health post service level and the health centre service level. The model needs to know, then, how many people on average are served by each of these distinct facility service levels. The model assumes that the catchment size for the health post service level at a health centre is the same as that for a stand-alone health post, namely 5,000.

That is why this value is in blue font. Users can replace this value if necessary. For instance, if a health centre does not provide any health post-level services, then the appropriate value for cell B40 is 0. This number could also be higher than that for stand-alone health posts, as health centre could be located in more densely populated areas. In this example, the district hospital has THREE facility service levels: health post, health centre and district hospital. Each of these requires a catchment size.

Any tables for which a facility level has not been defined by the user should have zeroes for all catchment sizes.

For ease, the model assumes that the catchment size is constant over time, but users can alter the catchment size in any year. The model will then assume that all subsequent years will have the same catchment size, unless users continue to make adjustments.

**3 Facility Service Standards.** The purpose of this section is to tell the model what services are offered at what facility level. The left-hand column lists many of the health services required to meet the MDGs, including blank spaces at the bottom of the list where users can define and add up to 15 additional facility-based services. The facility levels defined by the user appear across the top. For each service, users should place a 1 in the column corresponding to the lowest level facility that first offers that particular service. The 1 serves merely as a placeholder, or check mark; it does not refer to a quantity. After putting a 1 in the appropriate column, all remaining cells in that row should be left blank. Higher level facilities, of course, may provide the service as well, and the model will already recognize this fact if these higher level facilities have a nonzero catchment size for the appropriate lower facility service level (see Section 2). By scrolling to the right, users may alter service standards for subsequent years, which the model initially assumes will be the same as the start year.

Figure X below provides an example of how this table might appear using the simplified health system from Section 2.

	A	B	C	D	E	F	G	H
102								
103	<b>3. Facility Service Standards</b>							
104				2007				
105	Put a 1 in each cell corresponding to the lowest facility level that provides that service.			Type of Facility that Provides the Service				
106	Service	Health Post	Health Centre	District Hospital	0	0		
107	<b>Child Health (≥ 2 months)-Primary Care</b>							
108	Acute Respiratory Infection	1						
109	Diarrhea	1						
110	Fever (non-malarious, non-measles)	1						
111	Measles	1						
112	Ear Infection	1						
113	Malnutrition	1						
114	Anemia	1						
115								
116	<b>Child Health (≥ 2 months)-Referral Care</b>							
117	Acute Respiratory Infection							
118	Severe Pneumonia			1				
119	Very Severe Pneumonia/Disease			1				
120	Pleura Effusion and Empyema			1				
121	Severe Asthma			1				
122	Viral Croup			1				
123	Diphtheria			1				
124	Pertussis			1				

In this example, primary care services for children older than 2 months occur first at the health post facility level, and referral care services occur first at the district hospital facility level. In

Section 2, health centres and district hospitals had nonzero catchment sizes for the health post service level, so the model recognizes that primary care health services for children will also occur at health centres and district hospitals. There is no need to place a 1 in the columns for these higher facility levels, and doing so will not affect any subsequent calculations.

4. Human Resources and Facility Staffing Standards. The purpose of this section is three-fold: (1) define the human resource cadres and their initial stock; (2) estimate projected capacity of human resources and (3) define facility staffing standards. In the first table in this section entitled ‘Initial Stock of Human Resources,’ users can define up to 42 different cadres of health workers, including administrative and support staff if desired. Users should also input the quantity of each type of health worker that will be employed by the health system by the end of the chosen start year.

The table to the right, called ‘New Human Resources Per Year,’ asks users for the projected number of additional staff that are brought into the health system from completion of pre-service training. These figures become inputs to the ‘Pre-service training’ worksheet so that pre-service training costs can be calculated in order to achieve the desired output of trained staff. **[NEED TO REWORK THESE TABLES These new entrants to the health system may come from a variety of sources. Health staff that have recently completed pre-service training and are taking jobs in the health system would be included here. Alternatively, a country may have a variety of health workers employed in other sectors of the economy, including working for international and national civil society organizations, who are already trained and could be brought back into the health system. Clearly, the projected inflow of additional health workers will depend on salaries and other incentives, which are established in the following section.]**

Next, users should continue scrolling to the right. In cell AC204, users will provide the projected outflow of health workers in each year. This is represented by a generic attrition rate that is applied to all health staff for every year. A value of 5% means that in any given year, 5% of that year’s stock of health workers will leave the health system. This loss is a composite of many causes: death, emigration, loss to other sectors of the economy, etc. Salaries and other retention incentives as well as expansion of antiretroviral therapy could affect the attrition rate.

Just below the attrition rate is a table entitled ‘Total Stock of Human Resources Based on Initial Stock and Projected Capacity,’ beginning in cell AB207. This table is purely an output table that provides the total projected capacity of each type of health worker based on the previous inputs provided by the user: initial stock, additional health workers from pre-service training and the generic attrition rate. This is the projected capacity table that the model will reference to see if the user-defined expansion of the health system has sufficient human resource capacity. Users can modify this table if necessary; for example, users may wish to raise the capacity by virtue of being able to hire trained health staff who may unemployed or working in other sectors of the economy.

The last series of tables in this section begin in cell A253. These are the facility staffing tables. In these tables, users tell the model how many of each type of health worker should be present at each type of facility. Unlike the service standard table in Section 3, the numbers in these tables refer to actual quantities. Users can change staffing standards in future years by scrolling to the

right and changing the relevant tables. The staffing standard tables are used by the model to calculate how many health workers are required as the health system expands. The model makes this calculation by multiplying the total number of each type of health facility in each year by the staffing standard for each facility. This provides the total need. If this need exceeds the capacity, a model warning will appear at the top of the worksheet, but the model will still provide cost estimates based on the need, not the capacity. If the initial stock of health workers exceeds the need for the start year or subsequent years, the model will estimate costs for the initial stock. It will not remove extra staff from the health system.

5. Unit Cost-Human Resources. In this section, users provide the average annual salary and in-service training costs per health worker. In-service training costs are expressed as a percentage of salaries, but users can also directly input the in-service training costs in column D. If this is done, however, the user will need to manually make this adjustment for all future years by scrolling to the right. Other types of recurrent incentives are not explicitly addressed in these tables, but users could add them to either the salary or in-service training costs and note the addition.

6. Unit Cost-Facility and Equipment. The tables in this section ask users for the average cost per year of constructing, equipping, operating/maintaining, rehabilitating and upgrading facilities. Like with human resources, these costs are expressed on a per unit basis (e.g., average cost of constructing a single health post, etc.). In this model, facilities can only be upgraded by one level. Referral equipment for transportation and communication are dealt with at the end of this section and should not be included in the table entitled ‘Cost of Equipping New Facility Units.’

7. Facilities Scale-up. This is the section in which users expand the health system according to user-defined population coverage rates. This section determines the coverage rates for most of the individual health services that appear on subsequent worksheets.

The first table called ‘% of Population Covered by Facility SERVICE Levels’ asks users for population coverage rates at baseline and for future years for each facility service level. It is important for users to fully understand the difference between facility service level and a facility (see Section 2). If, for example, stand-alone health posts covered 50% of the population at baseline and higher level facilities, such as health centres and district hospitals, provided health post-level services the correct population coverage rate at baseline for the health post SERVICE level must be more than 50%. Users must account for those higher level facilities that provide the lower level services. Generally, coverage targets for those facility service levels that provide the suite of services related to the health MDGs should be 100% by 2015. The scale-up path between baseline and the target should be carefully considered, reflecting any insurmountable capacity constraints that may exist in the initial years (e.g., bottlenecks in human resource output from pre-service training).

The next table called ‘Number of Facilities Needed’ is shaded white and is, therefore, only an output table. This table calculates the number of facilities that are needed to achieve the coverage rates defined by the user in the previous table. The table makes this calculation based on 3 variables already provided by the user: population coverage rates, average catchment size per facility (section 2) and population (section 3). This table serves only as a guide to the user in

expanding the health system so that the expansion of health facilities is directly linked to established goals in service coverage.

Moving down the worksheet, the following table entitled ‘Total Number of Facilities’ asks users for the actual initial stock of facilities by the end of the start year. This table compares the actual count data with the baseline figure calculated by the previous table to see if the two figures match. If they match, the cell in column E will turn green and say ‘YES.’ If they do not match, the cell in column E will turn red and say ‘NO.’ This matching is essentially a data triangulation exercise. If columns B and D do not match, then the count data in column B needs to be adjusted and/or the data in cells B447-B453 need adjustment (or the catchment size information for each facility service level in Section 2). The data that are most likely in need of adjustment are cells B447-B453, as users may have underestimated the coverage rates at baseline for facility SERVICE levels. Figure X provides an example of such a situation.

	A	Italic	B	C	D	E
445	<b>% of Population Covered by Facility SERVICE Levels</b>					
446			<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
447	Health Post Services		65%	65%	65%	65%
448	Health Centre Services		60%	60%	60%	60%
449	District Hospital Services		50%	50%	50%	50%
450	Services		0%	0%	0%	0%
451	Services		0%	0%	0%	0%
452	Services		0%	0%	0%	0%
453	Services		0%	0%	0%	0%
454						
455	<b>Number of Facilities Needed</b>					
456	<b>Facility Name</b>		<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
457	Health Post		1,206	1,226	1,246	1,267
458	Health Centre		301	306	311	317
459	District Hospital		61	62	63	64
460		0	0	0	0	0
461		0	0	0	0	0
462		0	0	0	0	0
463		0	0	0	0	0
464						
465						
466	<b>Total Number of Initial Facilities (these numbers should closely match cells B448-B454; if not, then data inputs should be adjusted)</b>					
467	<b>Facility Type</b>		<b>2007</b>	<b>Matching cell</b>	<b>Value of Matching Cell</b>	<b>Check?</b>
468	Health Post		1,300	B457	1206	NO
469	Health Centre		330	B458	301	NO
470	District Hospital		61	B459	61	YES
471		0	0	B460	0	YES
472		0	0	B461	0	YES
473		0	0	B462	0	YES
474		0	0	B463	0	YES

Note that the model will use the actual count data provided in cells B468-474 as the initial stock of facilities in the event that the values in columns B and D do not match.

The subsequent tables ask for similar count data for the following: number of facilities in need of rehabilitation, number of facilities with functional referral equipment and number of facilities with referral equipment in need of rehabilitation. Note that facilities in need of rehabilitation are considered by the model to be providing services, just as a fully functional facility. Therefore,



facilities in need of rehabilitation should also be included in the initial count of facilities in cells B468-474. Facilities that are in such a dilapidated state so as to not be able to provide any services are not included in the initial count or in the number of facilities in need of rehabilitation; repairing these facilities should be considered construction of a new facility.

Beginning in cell A506, users will provide the actual expansion of the health system by indicating how many facilities will be built and how many will be upgraded from one level to the next immediate level. Based on this information and the initial stock, the table entitled ‘Total Number of Facilities’ in A526 calculates the total number of facilities that are providing service in each year. This is the number that the model will use in calculating costs and determining actual facility service coverage rates.

The next table, ‘Total Number of Facilities Left to Be Built’, compares the previous table, ‘Total Number of Facilities,’ with the earlier table in this section called ‘Number of Facilities Needed’ by subtracting the latter from the former. A positive number in any given year means that the expansion of the health facilities by that year is insufficient to meet the population coverage goal for that year, which the user provided in the first table in this section. A negative number means that more facilities exist in a given year than required by the population coverage target. This table is only meant to serve as a guide to the user. If the number of facilities that exist in the target year exceeds or falls below that required by the population coverage target, a red warning will appear below the table as well as at the top of the worksheet.

8. Total Catchment Size Based on Facility Scale-up Path. This is mostly a calculation and output section in which the total catchment size for a given facility service level is calculated based on previous user-defined inputs—the average catchment size for facility service levels (section 2) and the number of total facilities in the health system (section 7). This section serves as the link to the subsequent service worksheets by defining the catchment sizes—and, therefore, coverage rates—for individual health services. In the event that users have built more facilities than required to cover the entire population, this section caps the catchment size to the population of the given year. This ensures that the cost estimates for individual health services (e.g., drugs, supplies, etc.) do not include extra people who do not really exist. While users will generally not need to make changes to this section, users should review the calculations in the yellow-shaded cells and make any necessary adjustments to the total catchment size of each facility service level if absolutely necessary, perhaps if serious staffing shortfalls in the initial year reduce the reach of certain facility service levels.

Sections 9-12 are calculations and users need not examine these unless they wish to know step-by-step what the model is doing. Section 12 simply restates the calculations from the ‘Pre-service Training’ worksheet.

13. Demand Creation Costs. This section estimates the costs of a variety of possible interventions to raise awareness and increase demand and access to the health system. These interventions include the following: mass media campaigns, community-based awareness campaigns, school-based awareness programs, conditional cash transfers, which is subdivided into general transfers and transfers for purposes of transportation.

- Mass media campaigns

Only two data inputs are required: Number of annual mass media campaigns or events (C1241) and the cost per campaign or event (C1242). These two variables are multiplied together to yield a total cost in cell B1298.

- Community-based awareness campaigns [this section in the model was completed by a consultant and requires serious revision—the independent health program sheets are better suited for conducting this costing]
- School-based awareness [similarly, this needs to be redone]
- Conditional cash transfers

Users can estimate the costs of up to 3 different conditional cash transfer programs, including the management costs of such programs, if desired. Users should define the conditional cash transfer (e.g., cash incentives for pregnant women and mothers for routine antenatal and children check-ups) in cells A1259-1261 and define the percentage of the population meant to receive the transfer in each year. The model allows users to separate the conditional cash transfer into two parts, one for transportation and one for other, general cash transfers. The cost for each in any given year should be expressed as the annual cost of the transfer per person receiving the transfers. Therefore, if a conditional cash transfer pays expectant mothers, who constitute 7% of the total population, \$1 for every visit (\$0.75 for transportation and \$0.25 as an added incentive) to a clinic for an antenatal check-up, and the average expectant mother receiving the transfer makes 4 trips, then the value of the cash transfer should be \$3 for transportation transfers (row 1264) and \$1 for general transfers (row 1269). Figure X illustrates this example as it would appear in the model.

1256	Conditional Cash Transfers				
1257	Percent of total population receiving				
1258		2007	2008	2009	2010
1259	Antenatal Check-ups	7%	7%	7%	7%
1260	Condition 2	0%	0%	0%	0%
1261	Condition 3	0%	0%	0%	0%
1262					
1263	Value of transportation cash transfer (per person receiving transfer)				
1264	Antenatal Check-ups	\$3.00	\$3.00	\$3.00	\$3.00
1265	Condition 2	\$0.00	\$0.00	\$0.00	\$0.00
1266	Condition 3	\$0.00	\$0.00	\$0.00	\$0.00
1267					
1268	Value of incentive cash transfer (per person receiving transfer)				
1269	Antenatal Check-ups	\$1.00	\$1.00	\$1.00	\$1.00
1270	Condition 2	\$0.00	\$0.00	\$0.00	\$0.00
1271	Condition 3	\$0.00	\$0.00	\$0.00	\$0.00
1272					

If one or the other is not applicable, users can put a zero in the corresponding cell/row. Cells B1274-1276 ask for management costs for each conditional cash transfer program as a percentage of the overall cost of each program.

**14. Health System Costs-Summary.** This section lists the total and per capita costs for the health system components calculated on this page as well as the pre-service training costs calculated on the ‘Pre-service Training’ worksheet. This values also link to the overall ‘Cost Summary’ worksheet, where users can see the summary total and per capita costs for all of costs calculated in the model.

**Pre-service Training** [this sheet needs to be re-organized and perhaps a reconceptualization as part of a larger revisiting of the way in which HR is presented in the model]

This worksheet estimates the costs of recurrent pre-service training costs for all of the health staff defined by the user on the ‘Facilities and HR’ worksheet. This worksheet does not include the costs of investments required to expand the training capacity to produce more trained health staff each year. These investments would have to be manually added by users to the overall cost summary at the bottom of the worksheet.

This worksheet has three sections.

**1. Key Inputs.** This is the only section that requires input from users. Figure X provides a sample illustration of what a completed table could look like. Costs of general and specialty training (columns F and G) should be provided on an annual, per health worker basis. Column J asks users to estimate the capacity of the pre-service training system; that is, what is the maximum number of a given health worker that the training system can produce each year.

4 1. Key Inputs										
		General training type	Years of General training	Years of specialty training	Cost of general training in year 2007	Cost of specialty training in year 2007	Annual increase in cost of general training	Annual increase in cost of specialty training	Annual specialist training capacity (max number of students per year)	Specialist training capacity comments
5	Staff									
6	Gynecologist/Obstetrician	Medical School	4	3	\$5,000	\$10,000	5%	5%	10	
7	Surgeon	Medical School	4	5	\$5,000	\$8,000	7%	5%	15	
8	Internal Medicine Specialist	Medical School	4	3	\$5,000	\$7,500	4%	5%	15	
9	Pediatrician	Medical School	4	3	\$5,000	\$7,000	4%	5%	40	
10	Anesthesiologist	Medical School	4	5	\$5,000	\$6,800	4%	5%	10	
11	General Practitioner	Medical School	4	0	\$5,000	\$6,600	4%	5%	20	
12	Dentist	None	0	4	\$0	\$6,400	4%		20	
13	Pharmacist	None	0	4	\$0	\$6,200	4%		20	
14	Laboratory Specialist	None	0	2	\$0	\$6,000	4%		20	
15	Medical Assistant	None	0	2	\$0	\$5,800	4%		20	
16	Qualified Nurse	Nursing School	4	0	\$4,000	\$5,600	4%	5%	20	
17	Qualified Midwife	None	0	2	\$0	\$5,400	4%		20	
18	Anesthesia Assistant	None	0	3	\$0	\$5,200	4%		20	
19	X-Ray Technician	None	0	2	\$0	\$5,000	4%		20	
20	Pharmacist Technician	None	0	2	\$0	\$4,800	4%		20	
21	Operating Nurse	Nursing School	4	1	\$4,000	\$4,600	4%	5%	20	

If users select a number greater than this value in the ‘New Resources Per Year’ table on the ‘Facilities and HR’ worksheet, then an error message will appear in Column L. The model will still estimate the costs of the user inputs, even if they exceed the capacity cap; it is up to the user to account for the necessary investments and/or policy changes that would allow the capacity constraint to be relaxed. [Need to remove, modify Column K-does not make sense]

**2. Intermediate Calculations.** This section takes the data inputs from this worksheet as well as the number of additional staff entering the health system from the ‘New Resources Per Year’ table on the ‘Facilities and HR worksheet’ to generate cost estimates for pre-service training. Users do not need to provide inputs into this section.

**3. Cost Summary.** This section summarizes the cost estimates generated in section 2, divided among costs for specialty training and general training, either medical or nursing.

## *Commodity Supply Chain Systems*

The purpose of this worksheet is to estimate the costs of a comprehensive commodity supply chain system, which is essential to a functioning health system. Specifically, the worksheets estimates costs for facilities (construction, rehabilitation, equipment and operations & maintenance), human resources (salaries and in-service training), transportation equipment (purchase, repair, operations & maintenance) and equipment for monitoring and communications. The worksheet does not estimate costs for underlying infrastructure, such as roads and an electric grid.

The worksheet is modeled closely on the ‘Facilities and HR’ worksheet. This worksheet, however, is much simpler as the facilities involved do not provide overlapping health services or require the concept of a catchment size.

The worksheet as 12 collapsible sections. Only Sections 1-7 require inputs from the user.

1. Population. This section has only one table that takes the population figures directly from the ‘Facilities and HR’ worksheet. The user does not need to change this information.

2. Unit Costs-Facilities. In the first table, entitled ‘Cost of constructing new facilities,’ users should define up to 7 different facility types within the commodity supply chain system in cells A20-26. These may include central, regional and district storage facilities, as well as storage facilities at hospitals and a central administrative office. Users should include facility types that may not exist at baseline but are planning to built within the planning timeframe. Users should provide the average cost of building a single new facility in the appropriate cells. The remaining tables in this section also ask users for similar unit cost information.

3. Unit Costs-Vehicles for Transportation of Goods. In the first table, entitled ‘Cost of Purchasing New Transportation Equipment,’ users should provide the average cost in each year of fully outfitting a single facility of each type with its transportation equipment needs. In the next table, ‘Cost of Repairing Old Transportation Equipment,’ users should input the average cost in a given year of repairing transportation equipment per facility for only those facilities that have equipment that need repair.

4. Unit Costs-Equipment for Monitoring and Communications. This section follows the previous section exactly but applies to monitoring and communication equipment.

5. Human Resources and Facility Staffing Standards. [this section in the model needs to be revisited] This section is modeled closely on the human resources section in the ‘Facilities and HR’ worksheet. In the first table, called ‘Initial Stock of Human Resources,’ users define up to 10 different types of staff in the commodity supply chain system. These could include supervisors, technicians, supply loaders, drivers, managers, etc. In this table, users should also provide the actual quantity of each type employed in the system by the end of the start year (cells B178-187).

In the table immediately to the right, users should provide the number of additional staff of each type that *will* be added to the supply chain system in each subsequent year (Column E) as well as the percentage of staff that *will* be lost in each subsequent year.

The next table to the right, called ‘National Level,’ is an output table based on the previous inputs in this section: initial stock, additional staff and attrition.

In the tables below, users provide the staffing standards for each type of facility; that is, the average number of each type of staff at a single facility. Like in the similar section in the ‘Facilities and HR’ worksheet, this data is multiplied in this worksheet by the total number of each type of facility to estimate the total number of staff needed. This number is then compared with the actual outputs from the table ‘National Level’ of this section. The maximum value between these two is used as the estimate for total staff for costing purposes.

6. Unit Cost-Human Resources. This section requires user inputs for annual salary and in-service training costs for each type of staff. Users can change this information for subsequent years by scrolling to the right.

7. Facilities Scale-up. This section is closely modeled on the similar section in the ‘Facilities and HR’ worksheet but is much simpler as population coverage rates are not required. Like throughout the model, users only need to provide inputs to those cells that are shaded yellow.

Section 8-11 are intermediate calculations. Users do not need to provide any inputs.

12. Commodity Supply Chain System Cost. This section summarizes the total and per capita costs calculated on this worksheet. These costs also link to the larger ‘Cost Summary’ worksheet at the end of the model.

### *Maternal & Reproductive Health*

The purpose of this worksheet is to estimate the costs of providing a suite of maternal and reproductive health services that are critical to achieving the MDGs. The worksheet has 24 collapsible sections, with the first 23 sections requiring some degree of user inputs. The worksheet is organized similarly to the other services worksheets (e.g., malaria treatment, etc.). The first section requires epidemiological and demographic data with the following sections covering the health services themselves and requiring mostly unit cost information. The final section is the cost summary for the worksheets.

1. Demographic and Epidemiological Inputs. The purpose of this section is to gather national-level (or at whatever level is relevant for the planning exercise) epidemiological and demographic data that is relevant for maternal and reproductive health. Most of the demographic data load automatically upon country selection. These data come from a UNFPA database that has been integrated into the model. The database itself can be accessed using the navigation tool on the menu bar ‘Health Care Costing.’ Users should carefully review these data and modify as necessary.

Users have three options in determining the crude birth rate. Users can use projections from the UN Population Division database that is loaded into the model or define the birth rate themselves. Users can also elect to use Bongaart’s computed CBR, a modeling technique developed by UNFPA to estimate the effects of the expansion of access to contraceptives on crude birth rate projections. If this option is selected, the crude birth rate will then be linked directly to user-defined inputs for contraceptive use. Bongaart’s formula is included in a separate collapsible section at the end of the worksheet if users wish to examine the methodology.

	A	B	C	D	E	F	G	H
32								
33	<b>HIV Prevalence Among Pregnant Women</b>	17%	17%	17%	17%	17%	17%	17%
34	<b>Number of HIV+ Pregnant Women</b>	83,112	83,785	84,455	85,116	85,752	86,355	86,907
35		Select Crude Birth Rate Method <input type="radio"/> Bongaart's Computed CBR <input checked="" type="radio"/> Crude Birth Rate (UNPD Projection) <input type="radio"/> User Defined Crude Birth Rate						
36	<b>Crude Birth Rate (per 1000 pop)</b>							
37	<b>User Defined Crude Birth Rate (per 1000 pop)</b>	30	30	30	30	30	30	30
38	<b>Crude Birth Rate (per 1000 pop)</b>	40	39	39	39	38	38	38
39	<b>Number of Births</b>	479,722	483,606	487,472	491,288	494,960	498,440	501,630
40								

Most of the epidemiological data required in this section also loads automatically from UNFPA databases based on country selection. These data should all be reviewed for accuracy.

**2. Family Planning – Short-term Methods.** The purpose of this section is to estimate the costs of short-term family planning methods, such as oral contraceptives and condoms. This table is essentially an expanded version of a template that is used for the calculation of costs for nearly all of the health services. This is a key table, therefore, for users to fully understand.

The first subsection, entitled ‘Catchment Size,’ simply repeats information that has already been provided on the ‘Facilities and HR’ worksheet. It reminds users of what facility service level is responsible for providing short-term family planning methods and what the catchment size is for that facility service level. The catchment size will vary as users select different rates of expansion of the health system. This subsection also calculates the percentage of the population covered by dividing the catchment size by the population. Uniquely for family planning, users can elect what subpopulations of women are eligible for family planning devices, excluding emergency contraceptives: all women of reproductive age or only married women of reproductive age (Figure X). Emergency contraceptives are automatically applied to all women of reproductive age.

108 2. Family Planning - Short term methods				
109				
110	2007	2008	2009	2010
111 <b>Catchment Size</b>				
112 Relevant Facility Service Level	Health Post	Health Post	Health Post	Health Post
113 Total Catchment for Facility Service Level	8,455,000	8,455,000	8,455,000	8,455,000
114 Population Size	12,056,046	12,255,595	12,460,948	12,673,174
115 Service Coverage as % of Population	70%	69%	68%	67%
116 Select population to receive Family Planning Devices (excl. emergency contraceptives)	<input checked="" type="radio"/> Use All Women of Reproductive Age <input type="radio"/> Use Married Women of Reproductive			
117				
118				
119 <b>Number of WRA in Catchment</b>				
120 WRA in Catchment as % of Catchment Population	24%	23%	24%	24%
121 Number of WRA in Catchment	2,000,518	1,967,945	2,021,140	2,030,406
122				
123 <b>Number of Married WRA in Catchment</b>				
124 Married WRA in Catchment as % of WRA in Catchment	58%	58%	58%	58%
125 Number of Married WRA in Catchment	1,168,586	1,149,558	1,180,632	1,186,045
126				

The next 2 subsections—‘Number of WRA in Catchment,’ ‘Number of Married WRA in Catchment’—ask for demographic information at the catchment level rather than the national (or larger relevant planning unit) level as in section 1. The model asks for this information because if the health system has not yet achieved significant coverage of the population, especially in the first few years, the epidemiological and demographic characteristics of the covered population in the catchment may differ significantly from the larger population. The model assumes no difference, which is why cells in rows 120 and row 124 are in blue font, but users should carefully review this information and change accordingly. This particular point is probably most relevant for malaria, where there is a strong spatial distribution of risk.

The subsection entitled ‘Population using contraceptives’ is like many of the other service sections in this and other worksheets. It is essentially asking what percentage of those people eligible to receive a service actually access or receive the service. Multiple barriers to access may exist, and it is important, therefore, for health planners to devise strategies to relax demand-side constraints and improve health care access. For family planning, not every woman eligible for a family planning device will actually seek one out. The data in cell B133 is the sum of the percentage of women using any contraceptive method (UNPD Database 2005) and the estimated unmet need, which comes from a database of multiple sources, mostly demographic and health surveys. Users should change this value as necessary, noting that by doing so, the data will no longer load automatically upon country selection.

The next subsection called ‘Method Mix’ asks users for the percentage of all contraceptive users that use each type of contraceptive, both short- and long-term contraceptives. These data load automatically from an internal database but should be reviewed for accuracy. The percentages in each column in this subsection should sum to at least 100%. The sum could exceed 100% since it is possible for women to use more than one contraceptive method at the same time.

In the subsection called ‘Unit Cost of Short-term Methods,’ users must provide the cost of each short-term family planning method in terms of the cost per user per couple year protection. This essentially means the average annual cost per user. For male condoms, for instance, the average annual cost per user would be based on the total number of male condoms used in a year per

multiplied by the cost of a single condom. The costs for the other methods would follow a similar methodology.

**3. Family Planning-Long-term Methods.** This section mirrors almost exactly section 2. The reason it is treated separately from section 2 is because long-term family planning methods could be offered at a different service level, which could entail a different total catchment and different demographic characteristics of the population within the catchment. The other major difference between this section and section 2 is that long-term devices can last more than one year and may need replacement (cells B255-256). Also, some people who have long-term devices in any given year may not need them the following year, which has consequences for overall coverage rates among women of reproductive age (row 234). In the unit cost subsection, the average cost of each long-term device or procedure should be provided. For procedures, such as sterilization, the unit cost should only include the cost of drugs, supplies and other items that are consumed on a per person basis during the procedure (e.g., any administered drugs, gloves, etc.). The costs of human resources, facilities and equipment should already be included in the ‘Facilities and HR’ worksheet.

Sections 4-23 follow nearly identical formats. Each section estimates the costs for the service in the section title, and each section has the same basic structure. Figure X depicts the section for postpartum hemorrhage, a major killer of women in childbirth, as an example.

497 <b>11. Postpartum Hemorrhage</b>					
498					
499					
		2007	2008	2009	2010
500	<b>Catchment Size</b>				
501	Relevant Facility Service Level	Health Centre	Health Centre	Health Centre	Health Centre
502	Total Catchment for Facility Service Level	<b>7,820,000</b>	<b>7,820,000</b>	<b>7,820,000</b>	<b>7,820,000</b>
503	Population Size	12,056,046	12,255,595	12,460,948	12,673,174
504	Service Coverage as % of Population	65%	64%	63%	62%
505					
506	<b>Number of Births in Catchment</b>				
507	Crude Birth Rate in Catchment (per 1000 pop)	<b>40</b>	<b>39</b>	<b>39</b>	<b>39</b>
508	Number of Births in Catchment	311,166	308,577	305,918	303,150
509					
510	<b>Number of Postpartum Hemorrhages in Catchment</b>				
511	Postpartum Hemorrhages as % of Catchment Births	<b>5.1%</b>	<b>5.1%</b>	<b>5.1%</b>	<b>5.1%</b>
512	Number of Postpartum Hemorrhages in Catchment	15,888	15,756	15,620	15,479
513	Effective Coverage, as % of All Postpartum Hemorrhages	65%	64%	63%	63%
514					
515	<b>Number of Cases Utilizing Care</b>				
516	% Demand	<b>80%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>
517	Number of Users	12,710	12,605	12,496	12,383
518	Utilization, as % of All Postpartum Hemorrhages	52%	51%	51%	50%
519					
520	<b>Costs</b>				
521	Cost Per Postpartum Hemorrhage Event	<b>\$ 41.24</b>	<b>\$ 41.24</b>	<b>\$ 41.24</b>	<b>\$ 41.24</b>
522	Total Cost	\$ 524,181	\$ 519,820	\$ 515,341	\$ 510,678

The first subsection, entitled ‘Catchment size,’ repeats the facility service level and catchment size information for the particular service. This information was already determined on the ‘Facilities and HR’ worksheet and need not be changed, unless users have very strong reasons why the catchment size for a particular service needs to be altered. The next subsection(s) require demographic and/or epidemiological parameters for the given population. Like in previous



sections, the model's assumption is that these catchment-level parameters are the same as the parameters at the larger, country level in section 1. Users should change these parameters, however, as necessary. The next subsection usually asks for the percentage demand for the service among people eligible to receive the service. The data for the start year is usually in red font to indicate that this variable must be provided by the user. The final subsection asks for unit cost information. This cost is the average cost of providing the service to a single patient or recipient of the service. This cost should only include drugs, supplies and other items that are used and essentially consumed on a per patient basis. The cost of human resources, facilities, equipment, etc., has already been calculated on the health systems worksheets.

24. Cost Summary. This section allows users to apply a cost mark-up for international and domestic shipping and wastage. If users elect to estimate the cost of a commodity supply chain system in the model, then at least the shipping mark-up should be reduced or eliminated to avoid duplication. The cost mark-ups are uniformly applied to each of the costs estimated for the services on this worksheet. The rest of this section summarizes the total and per capita cost estimates for each service with the cost mark-ups included.

### *Malaria Prevention*

The malaria prevention worksheet estimates the costs of providing insecticide-treated bed nets. It has four sections.

1. Demographic and Epidemiological Inputs. The only input required in this section is the percentage of the total population that is at-risk for malaria. The at-risk population includes those at risk both perennially and seasonally.

2. Epidemiological Inputs at Facility Catchment Level. This section is organized much like the corresponding sections in other service worksheets. The first subsection repeats facility service level and total catchment estimates from the 'Facility and HR' worksheet. The second subsection asks for the percentage of the *catchment* population that is at risk for malaria. If the catchment population has a different malaria risk than the larger, national population, this number should be changed. In the third and final subsection, users should provide the percentage of those at risk for malaria in the catchment (and are, therefore, eligible for a bed net) that actually receive a bed net. This percentage is not meant to reflect the percentage of people who actually use a bed net properly, but rather the percentage of people who actually receive a bed net, regardless of how they use it. This is because this worksheet is meant to estimate financial costs of bed net distribution rather than the impacts of proper use.

3. Characteristics and Unit Costs for Insecticide-Treated Bed Nets. The purpose of this section is to collect a variety of data that is necessary to estimate the cost of bed net provision. The first step is for the user to define the insecticide treated net(s) that will be provided (Figure X). Users can choose among two broad categories of nets: long-lasting nets and set packed nets. Long-lasting nets do not require annual retreatment with an insecticide and are now recommended by WHO. Set packed nets require annual retreatment, which can be cumbersome and reduce the efficacy of the net. Up to 3 nets can be selected for each category. The first two slots in each category are drop-down menus with a list of different types of nets from an WHO malaria

commodity guide published in 2004. The shape, size and material of the net all have important consequences. For example, different homes may be able to better accommodate conical versus rectangular nets, and polyethylene nets tend to last longer than polyester nets, reducing replacement costs. The third slot is blank so that users can define a different kind of net that may not appear in the drop-down menus.

	A	B	C	D	E	F	G
34		<b>3. Characteristics and Unit Costs for Insecticide-treated Bed Nets</b>					
35							
36		<b>Mosquito Net Selection</b>			<b>Unit Cost</b>		
37		<b>Net</b>	<b>Kit</b>	<b>Price</b>	<b>Int'l Shipping &amp; Wastage Mark-up</b>	<b>Domestic Shipping &amp; Wastage Mark-up</b>	<b>Price (adj.)</b>
38		<b>Long-lasting Insecticide-treated Net (LLITN-recommended)</b>					
39		150x180x160cm (HxLxW), polyester, 100 den.	N/A	\$ 4.80	+15%	+15%	\$ 6.24
40		None	N/A	\$ -	+15%	+15%	\$ -
41		(other)	N/A		+15%	+15%	\$ -
42							
43		<b>Set Packed Net (net+insecticide kit)</b>					
44		None	None	\$ -	+15%	+15%	\$ -
		150x180x160cm (HxLxW),75 den.	Itamethrin Kit	\$ -	+15%	+15%	\$ -
		150x190x180cm (HxLxW),100 den.	phacypmethrin	\$ -	+15%	+15%	\$ -
		150x190x180cm (HxLxW),75 den.		\$ -	+15%	+15%	\$ -
		Conical, 1250x250cm, 100 den.					
		Conical, 1250x250cm, 75 den.					
		Conical, 850x220cm, 100 den.					
		Conical, 850x220cm, 75 den.					
		None					

In column C, users select the type of insecticide for retreatment of nets. This is only applicable to the set packed nets. For the nets in the drop-down menu, the price will automatically load in column D, but users should provide another price if different. Columns E and F allow users to apply a mark-up for international and domestic shipping and wastage to yield an adjusted net price in Column G. In column I, users should provide the total number of nets that are already distributed in the country. Column J asks for the net mix; that is, if multiple nets are distributed, what percentage of the total nets would each constitute. The sum of this column should be 100%. In column F, the expected life of the net should be provided, and column L asks for the average number of people sleeping under a net. This number can include a decimal (e.g., 1.2) if most nets, for example, sleep only one person but some sleep 2.

**4. Cost calculations.** This section includes the detailed cost calculations that the worksheet undertakes and presents the cost summary at the end. This table includes estimates of the number nets failing or needing replacement from the previous year (row 64). In the first few year, the model assumes that this value is roughly the current stock (I39) divided by the expected life of the net, which essentially assumes a constant scale-up rate of bed nets for the years prior to the start year. Users should feel free to change this value. For instance, the entire current stock of nets may have been distributed only one year before and most of them do not require replacement, so this number will be lower. The rows shaded in blue-green provide the estimate of the number of each type of net that must be purchased in each year. Total and per capita cost estimates appear at the bottom of this section.

### *Malaria Treatment*

The malaria treatment worksheet estimates costs of rapid diagnostic tests and treatment for uncomplicated and complicated malaria. It has six collapsible sections, with the first five sections requiring the majority of the data inputs.

1. Demographic and Epidemiological Inputs. This section asks for national-level epidemiological data on the incidences of malaria and fever as well as the distribution of malaria cases. The second subsection, entitled ‘Malaria cases,’ asks for a variety of data in order to differentiate between reported and actual malaria cases. Users must provide data for reported malaria cases, which includes both laboratory confirmed and unconfirmed, but suspected, cases of malaria. Next, users should provide the percentage of reported malaria cases that are actually confirmed by a diagnostic test (row 16). Only baseline data for this row is required; future years should not be changed, as a later section in this worksheet will address the scale-up of diagnostic testing. In row 18, users should provide the percentage of unconfirmed malaria cases that are believed to actually be malaria and not simply fever at baseline only; users should not change this value for subsequent years. When combined, these data can be used to calculate an actual malaria incidence in row 19. Malaria incidence may fluctuate from year to year and should decrease as malaria prevention measures are scaled-up. The model does not automatically account for these effects; users must account for them manually either by changing the value in row 15 (reported malaria cases) or by changing the actual malaria incidence in future years in row 19.

The third subsection called ‘Fever Cases’ uses the inputs from the previous section to calculate the fever incidence, including fevers that occur because of malaria infection. Generally, this number should be at least as high—and probably higher—than the actual and reported malaria incidence. A calculation of fever incidence is important in understanding how many cases should receive diagnostic tests and how many people should be treated presumptively for malaria when testing is unavailable.

The fourth subsection called ‘Disease Profile-% Distribution of Cases’ asks for the percentage of reported malaria cases that are believed to be falciparum (row 27) or non-falciparum (row 30) malaria. This distinction is requested because generally falciparum cases are more likely to become severe and require more intensive, expensive treatment. In some situations, users may not be able to meaningfully distinguish between falciparum and non-falciparum malaria. In this case, users can ignore the rows for non-falciparum malaria by putting zeros in the relevant rows. In rows 28 and 29, users should provide the percentage of falciparum cases that require 2<sup>nd</sup> line treatment and the percentage that become severe. Similar information is required for non-falciparum cases in rows 31 and 32. Rows 33 and 34 ask for the percentage of all severe cases (falciparum and non-falciparum combined) that require and do not require blood transfusions.

2. Rapid Diagnostic Testing. This section follows a similar structure to many of the analogous sections on this worksheet and in other worksheets. The first subsection repeats catchment information that is determined on the ‘Facilities and HR’ worksheet. The second subsection called ‘Number of Fevers in Catchment’ asks for the estimated incidence of fever in the catchment (row 58). The model assumes that this incidence is the same as the incidence at the national level provided in section 1. Users should change this information if necessary. The third subsection requires the percentage of incident fevers in the catchment (and, therefore, eligible for

a test) that actually seek out and receive a rapid diagnostic test (row 63). Based on these inputs, the model calculates the total number of users of rapid diagnostic tests (C64). If rapid diagnostic tests are the primary means of diagnostic testing, then this calculation should closely match the number of users accessing testing based on data provided in section 1. If not, then the data inputs the lead to these two values should be reviewed for accuracy. The fourth and final subsection requires users to provide the average unit cost per person receiving a rapid diagnostic test. This number should only include the cost of consumed supplies, not the cost of human resources, facilities and other equipment.

3. Treatment-Uncomplicated Malaria. This section estimates the costs of treatment for uncomplicated malaria. It consists of two tables, the first that uses the epidemiological and unit cost inputs to estimate costs. The second table, which can be found by scrolling to the right, allows users to select the percentage of patients receiving different drugs and cost of treatment each patient with a particular drug or drug combination.

In the first table, much of the epidemiological inputs are assumed to the same as the data provided in sections 1 and 2. Users may need to modify this data only if the facility service level for treatment of uncomplicated malaria differs from the facility service level for rapid diagnostic testing. In the third subsection called ‘Number of Fevers Seeking/Receiving Treatment,’ users should provide the percentage demand for treatment among all patients treated with 1<sup>st</sup> and 2<sup>nd</sup> line drugs. The data in the subsection entitled ‘Unit Cost of Treatment’ come from the calculations of the 2<sup>nd</sup> table to the right.

This 2<sup>nd</sup> table falls under the header Section 3a. A variety of drugs commonly used for treatment of malaria are listed in column N. Users can change these drug names as necessary. In column O, users provide the cost of treatment a patient with a given drug or drug combination. These calculation depends on the cost per pill and the exact treatment protocol for a drug or drug combination. In the subsequent columns, users must specify the percentage of patients receiving each drug or drug combination. It is important to remember that certain populations may need be restricted in their drug choice. For example, WHO generally recommends treatment with sulfadoxine + pyremethamine for pregnant women with uncomplicated malaria. In many places in Africa, chloroquine is no longer effective due to growing choleroquine resistant malaria parasites and artemisinin combination therapy is increasingly becoming recommended standard of care. The sum of each column should be at least 100%. The number can exceed 100% in case some patients receive more than one drugs as part of their 1<sup>st</sup> or 2<sup>nd</sup> line regimen. One example is the administration of paracetamol as adjunct therapy for fever. The information provided in these tables is used to calculate the average cost of treating patients with 1<sup>st</sup> and 2<sup>nd</sup> line therapies for falciparum and non-falciparum infections, starting in cell C112.

Sections 4 and 5 follow the exact same format to estimate costs of treatments for severe malaria. Much of the table should be self-explanatory based on users previous experience with similar tables in this and other worksheets. One difference to underscore is that these tables ask for the percentage of cases that become severe AND are successfully referred. This is in recognition of the fact that some cases that become severe do not actually receive successful referrals to higher levels of the health system. Like in section 3, these sections also have tables to the right to help

users estimate the costs of treatment per patient. Users can modify the list of drugs and supplies as necessary.

**6. Cost Summary.** This section allows users to uniformly apply to all cost estimates a mark-up for international and domestic shipping and wastage. This section also summarizes the total and per capita costs, with the mark-ups, that are estimated on this worksheet. These costs link to the ‘Cost Summary’ worksheet at the end of the model.

### *Tuberculosis Treatment*

The tuberculosis treatment worksheet estimates the costs of tuberculosis (TB) treatment per DOTS and DOTS+. The worksheet has only two sections, both of which require inputs.

**1. Demographic and Epidemiological Inputs.** In this section, users provide national-level inputs, such as the incidence of tuberculosis per 100,000 people and the distribution of cases. In terms of case distribution, this section first asks for the percentage of cases that are new and recurrent (rows 17 and 18), as a typical treatment course for tuberculosis may fail the first time owing to a variety of factors, such as drug-resistant tuberculosis, poor adherence to medication, or insufficient diagnosis, treatment and follow-up. Row 18 is automatically calculated based on input to row 17. Estimates for DOTS+ cases, which are usually people with drug-resistant tuberculosis, are also required, as these cases are generally more expensive to treat (rows 22 and 23). Moreover, some people may have special medical concerns that require special treatment (row 19). Estimates of the number of case contacts with positive results from Purified Protein Derivate (PPD) are also required so that other people with potential exposure to the tuberculosis bacterium are identified for medical care (rows 20 and 21).

**2. Total Costs.** This section is similar to the cost estimation tables on other service worksheets. The first subsection, ‘Catchment Size,’ summarizes outputs from the ‘Facilities & HR’ worksheet. Users can alter the catchment size for tuberculosis treatment if necessary. For example, the actual catchment size (row 38) for tuberculosis treatment may be less than the catchment size for the facility service level that is meant to provide tuberculosis treatment because a significant number of existing facilities lack appropriate diagnostic equipment, human resources or drugs and supplies.

The next subsection, ‘Number of TB Cases in Catchment,’ requires users to provide the incidence of TB cases in the catchment (row 43). The model assumes that the incidence in the catchment is the same as that in the entire country. This is why the font is blue. Users should review and change this information as necessary. Users will also have to manually account for the effects of TB treatment and other TB prevention measures that could reduce the incidence of the disease in future years.

In the subsection entitled ‘Number of TB Cases Seeking/Receiving Treatment,’ users provide the percentage of TB cases in the catchment that actually receive care (row 48). This estimate of demand could be influenced by a variety of factors, including the unavailability of proper diagnostic testing such that cases are not identified and subsequently treated. The demand

estimate is one of the few purely exogenous variables in this section, which is why the input is red (C48).

Beginning in ‘Unit Cost of TB Treatment (Per Person),’ users indicate the unit cost of the drugs and supplies in order to provide effective treatment for the listed classification of patients. The cost estimates should be on a per patient basis and include only those items that are actually consumed in treatment (e.g., antibiotics, nutrition supplementation, other supplies, etc.). Users may also elect to include the consumable portions of diagnostic tests here—and duly note as such in the model—although most of the diagnostic costs, such as microscopes and human resources, will likely be included in the health systems cost estimates. Note that the unit costs for certain types of cases may be exactly the same (e.g., the cost of treating new and recurring cases with DOTS+ may be identical).

‘Cost Mark-ups’ is the final subsection that requires user inputs. Here users may choose to increase the total cost estimates by a percentage mark-up to account for international and domestic shipping and wastage. Some of these figures may need to be adjusted if the costs of a commodity supply chain system are estimated in detail.

### *Child Health*

The child health worksheet estimates the costs of many primary and referral health services per Integrated Management of Childhood Illness for newborns (< 2 months) and children between 2 months and 5 years of age. With 49 collapsible sections, this is one of the largest worksheets in the model. The worksheet follows the structure of many of the other service worksheets (e.g., maternal and reproductive health, malaria, etc.), with all but the last section requiring inputs from users. Sections 42-48 are divided first into the two different age groups considered and within each age group, the primary care service is listed first, followed by the referral level services for the given condition, before moving on to the next primary care service.

1. Demographic and Epidemiological Inputs. This section requires the most epidemiological information of any worksheet. The first four subsections ask users for national-level demographic information, the first being the absolute number of children between the ages of 2 months and 5 years (row 16). This row is in blue font because the estimates load automatically from internal databases based on the country selected. Users should review this information and change as necessary. Users do not need to provide the crude birth rate in row 19, as this information is taken from the maternal and reproductive health worksheet to ensure consistency in data use. In this subsection, however users must provide the percentage of newborns who survive to 2 months. This is an exogenous variable. As newborn interventions in this worksheet are scaled up over time, users will have to manually adjust this figure to account for increased newborn survival in future years. Similarly, in row 26, users should input the percentage of newborns who survive to 1 year. This percentage should not be more than the percentage of newborns surviving to 2 months (row 21). Users will also have to adjust this percentage in future years to account for the expansion of interventions, including those that appear in other needs assessment tools (e.g., improved water and sanitation, increased use of improved cooking stoves, etc.), that will reduce child mortality.

The next major subsection asks users for national-level epidemiological data for children between 2 months and 5 years of age. Broadly, these data fall into three groups: overall incidence for a given illness, distribution of case types within a given illness category, and the percentage of primary cases that require referral. While the model assumes that these values are static over time, this is not likely, especially in the context of scaled up service delivery, including those interventions that do not fall traditionally within the health sector. For example, row 31 asks users for the incidence of acute respiratory infection per child per year. This number could very well be above 1, as children can experience the same illness multiple times in the same year even with successful treatment. This value may change over the planning period for a variety of reasons, which users must account for manually. Beginning in row 35, users provide a percentage distribution of primary cases; cases are classified broadly as cough or cold, pneumonia and severe pneumonia. If users wish to use fewer sub-classifications for a given illness, they can simply place a zero in the appropriate cells and no cost will be generated for that particular sub-classification. Users can also change the names of the sub-classifications. In row 39, users input the percentage of primary cases that require referral to a higher level of the health system. In rows 42-49, users then provide a case distribution for the referral cases. This process is repeated for diarrhea (beginning row 66), fever that is not due to malaria or measles (beginning row 95), measles (beginning row 125), ear infection (beginning row 139), malnutrition (beginning row 153), and anemia. The model also requires national-level data for percentage of children in this age group who need supplementation with vitamin A, zinc and iodine.

Similar types of national-level epidemiological data are required for children under 2 months. For bacterial infection (row 203), diarrhea (row 228) and low birth weight (row 257), users must provide overall incidence, case distribution and referral needs.

Moving down the worksheet, users must also provide estimates for the percentage of newborns needing the first vaccination round for DPT (row 271), polio (row 278) and hepatitis B (row 285). These values may be less than 100% as newborns may not all survive long enough for their first shot. Because these particular vaccinations require multiple administrations with various intervals between them, users must also provide a percentage drop-off rate after the 1<sup>st</sup> and 2<sup>nd</sup> shots. Other immunizations are included in this model—yellow fever, Hib, BCG and measles—but because they generally require only a single administration, no data are required in this section.

2. Child Health (>2 months)-Primary Care-Acute Respiratory Infection. This table follows the structure of many of the other tables on other service worksheets. The first subsection, ‘Catchment Size,’ repeats the facility service level and catchment size for the primary care of ARI.

The next subsection, ‘Number of Children Between 2 months and 5 years,’ asks users for the percentage of the total population that falls within this particular age group. This value (row 316) is assumed to be equal to the percentage calculated in first section based on national-level data. Users should change this value, however, if the catchment demographics differ from the nation as a whole.

Next, users provide the catchment-level incidence for acute respiratory infections per child per year (row 320). The default assumption, which users can change, is that the incidence within the catchment is the same as the national incidence provided in section 1.

Users must provide the percentage demand for primary care of ARI in row 325. This value is in red because it is an exogenous variable; it is not derived from any other inputs or databases.

In the subsection called ‘Distribution of Cases,’ which begins in row 329, users input the percentage distribution of cases within the catchment as well as the percentage requiring referral. While the model assumes that these data mirror national-level data in section 1—hence the blue font—users should change if necessary.

The final input required is unit cost information beginning in row 364. Similar to the unit cost for other treatment services, these data are expressed as an average per patient treated and should only include those drugs and supplies that are actually consumed in the treatment process. Some of these patients will also be referred to higher levels of the health system, but they may still receive medical care at the primary level and this should be reflected in the unit cost. For example, all patients with severe pneumonia may need to be referred, but at the primary level, following diagnosis, they may be given certain treatment or support care before receiving referral-level care. The unit costs, therefore, should reflect the cost of these services at the primary level. The referral-level costs will be estimated in subsequent sections of this worksheet.

3. Child Health (> 2 months)-Referral Care-Severe Pneumonia. This section estimates the costs of those referral cases that are classified as severe pneumonia. The only difference in the first subsection, ‘Catchment Size,’ is the addition of an extra row called ‘Service Coverage, as % of referred cases covered by referral-level catchment’ (row 391). The values in this row are meant to express what percentage of primary cases that need referral are actually covered by the referral-level catchment. The row is in blue font to reflect that the model calculates this value automatically by dividing the referral-level catchment size by the primary-level catchment size, with a maximum value of 100%, to give an estimate of the percentage of cases needing referral that are actually covered. Users should change this value as necessary, for some referred patients may seek out referral level care even if they do not fall within the conventional catchment of referral-level facility. If severe pneumonia is only treated at the primary level, then users should place a zero in this row and referral costs will not be generated.

The next subsection, ‘Number of Cases Covered by Catchment,’ is mostly an output section based on inputs already provided. The number of cases requiring referral from the primary level (row 394) is an output from section 2, and row 395 simply multiplies this number by the row 391 to give an estimate of the number of cases requiring referral that are actually covered.

In ‘Number of Cases Seeking Care,’ users must provide the percentage of referred cases that are covered by the referral-level catchment that actually seek and receive care (row 399). Users should take care to ensure that demand isn’t counted twice in this section. In row 391, for example, users may have already accounted for the demand in manually adjusting service coverage. Ideally, users should endeavor to keep coverage (supply) separate from utilization (demand) as this may help in identifying important strategies to alleviate demand-side



constraints. Row 391 attempts to capture how many people *could* receive services and row 399 reflects how many *actually* receive services.

In the final subsection called ‘Costs,’ users must provide the unit cost of treatment for severe pneumonia (row 404).

Sections 4-37. These sections follow closely sections 2 and 3. Users should apply the same principles in using these sections.

38. Childhood Immunization, Nutrient Supplementation & Growth Monitoring-DPT 1,2,3. This section estimates costs for the sequence of DPT shots. The first subsection, ‘Catchment Size,’ repeats facility service level and catchment information that was determined on the ‘Facilities & HR’ worksheet.

The next subsection, ‘Number of Children Needing Shots,’ is meant to capture catchment-specific epidemiological data. The model assumes that the crude birth rate in row 1616 is the same as that at the national-level in section 1, but users can modify these and other data as necessary. The percentage of newborns requiring a first shot (row 1616) as well as the drop-off rates following the first and second shots (rows 1618 and 1620, respectively) are similarly assumed to be the same as national-level data in section 1, but users can change as necessary.

Users are also asked for the percentage of covered children actually receiving vaccinations in row 1626. Because much of the demand-side issues are captured in the inputs in the previous subsection, especially in calculating drop-off rates, users may prefer to make this value 100%.

In the final subsection, ‘Costs,’ users provide the average cost per patient of the first, second and third inoculations. The costs is only for the inoculation and other consumed supplies and should not reflect health system costs, such as human resources, which are estimated on the ‘Facilities & HR’ worksheet.

Sections 39-44. These sections follow section 38 closely. Users should apply the same logic of section 38 to these sections. If one or more vaccinations are delivered partly or wholly through independent health programs or campaigns, then users should use the ‘Independent Health Programs’ worksheets to estimate the total costs of the programs.

45. Childhood Immunization, Nutrient Supplementation & Growth Monitoring-Vitamin A. This section estimates the costs of vitamin A supplementation. If vitamin A is delivered independently of health facilities, users should consider using the ‘Independent Health Programs’ worksheets instead.

The first subsection, ‘Catchment Size,’ repeats the relevant facility service level and catchment size for vitamin A supplementation.

The next subsection, ‘Number of Children (2mos-5 years) with vitamin A deficiency reflects the need at the catchment level. The model assumes that the inputs in rows 1839 and 1840 are the same as the values at the national level from section 1, but users should change as necessary.

Users may also elect to distribute vitamin A to a different age group entirely, which can be reflected by providing the population size of the relevant group within in the catchment in row 1839.

In the following subsection ‘Number Seeking Care,’ users must provide the percentage of people covered within the catchment that actually seek and receive vitamin A supplementation.

Similarly, user must provide the unit cost of vitamin A supplementation on a per recipient per year basis (row 1850). If the average recipient receives supplementation more than once per year, then these multiple costs must be reflected in the unit cost calculation.

46-48. These sections closely follow the section on vitamin A supplementation. Therefore, users should use section 45 as a guide in completing these sections.

49. Cost Summary. This section summarizes the cost outputs calculated in sections 2-48. Users can apply percentage mark-ups to the cost outputs in this section to account for international and domestic shipping and wastage. The percentages are summed and applied uniformly to all cost outputs in all years. If the costs of a commodity supply chain system is calculated, then these percentage mark-ups, particularly for domestic shipping, should be decreased to avoid double counting.

### *HIV Enabling Environment*

This worksheet estimates the costs of a variety of interventions to promote an enabling environment to support programs and policies to combat HIV/AIDS. These interventions focus on different groups. In some cases, the interventions are targeted at capacity building and knowledge gathering in government, in some cases to promote legal and policy reforms. In others, the interventions are targeted at people living with HIV/AIDS (PLWHAs) and other vulnerable groups to support their livelihoods and protect their rights.

The worksheet has 15 collapsible sections, with each section corresponding to a unique intervention. Unlike other service sheets, none of these interventions are linked to the facility-based expansion of the health system on the ‘Facilities & HR’ worksheet, as these services are not clinical in nature. Users must specify their own independent coverage rates, targets and scale-up paths for each intervention. Within each intervention category, users generally have considerable flexibility in defining a number of specific interventions and coverage rates.

The list of intervention categories appears at the top of the worksheet. Users can select and de-select categories as appropriate by clicking on the check box in column A. De-selecting an intervention will remove its cost outputs from the total cost at the bottom of the worksheet.

1. Review/develop/amend intellectual property laws to allow the application of TRIPS safeguards and flexibilities. This intervention category allows users to define and estimate costs of a variety of activities aimed at creating the capacity for utilization of TRIPS safeguards and flexibilities. These safeguards and flexibilities could be used by government to gain access to more, cheaper antiretroviral drugs. In the first subsection, ‘Define Intervention,’ users can

specify up to nine different activities. In the next subsection, ‘Number of Interventions Per Year,’ users input the number of each defined activity that will take place in each year of the planning period. In ‘Unit Cost of Intervention,’ users provide the average cost of each activity. For example, if the first activity is commissioning baseline studies, then users would provide the average cost of a baseline study that would be undertaken in each applicable year. The total cost is calculated by multiplying the number of each activity in each year by the unit cost each activity in the same year.

Sections 2-8. These sections follow the exact same format as section 1. Users should refer to section 1 for assistance in using these sections.

9. HIV/AIDS Training for Law Enforcement Officials and Judges. This section estimates the costs of a HIV/AIDS training program for law enforcement officials and judges. This section allows users to estimate costs in three ways: costs per trainee (e.g., materials and supplies), costs per training session (e.g., equipment, rent, electricity, etc.) and cost of trainers.

In the first subsection called ‘Workforce Information,’ users provide the number of law enforcers and number of judges in the country (rows 344 and 345, respectively).

The next section, ‘Coverage Targets,’ requires the starting coverage and coverage target in the end year, expressed as a percentage of the total law enforcers or judges to receive a one-time training program or recurring training program. A recurring training program is one that every covered person receives at least once per year. If only one type of program will be used, then users can place a zero for the start and end coverage to effectively eliminate the other program type. The starting coverage may be greater than zero percent for any type of program if some law enforcers or judges have already been received HIV/AIDS training.

In ‘Coverage Scale-up,’ the model automatically assumes a linear rate of scale-up of coverage for one-time and recurring training programs. Users can modify this rate of increase manually.

The subsequent section called ‘Number of People Receiving Training Program’ contains both inputs and outputs. Users should review and modify the values for the number of law enforcers and judges receiving one-time only training programs (rows 370 and 373, respectively), as the calculated values do not account for influx of new officials and attrition of existing officials. The number of officials receiving recurring training is purely an output reflecting the number of officials covered by a recurring training program.

Users indicate how many recurring training programs each covered person receives each year in rows 377 and 378. If, for example, a judge is meant to receive 2 HIV/AIDS training programs each year, then users should put 2 in the appropriate cells.

In the subsection ‘Number of People Per Training,’ users indicate how many law enforcers and judges participate in each training program. This information is used to calculate how many individual training programs, or sessions, are necessary to achieve the user-defined coverage targets (subsection ‘Total Number of Trainings’).

The model estimates the costs of trainers for the programs. In the subsection called ‘Number of Trainers Needed for Each Training Session,’ users indicate how many paid trainers are needed per training session. If only one paid trainer is needed, then users should put 1 in the relevant cells.

Salaries trainers may give multiple training programs in a single year. Users can reflect this situation in the subsection ‘Number of Trainings Given Per Trainer Per Year.’

The final input subsections all ask unit cost information for each major cost component of the training program (rows 411-427). Users can effectively remove any of these cost components by placing a zero in the relevant cells.

The final subsection called ‘Total Costs by Program’ sums the different cost components estimated in this section: trainee costs, training session costs and trainer costs. The grand total for all program types appears in row 453.

Sections 10-13. These sections follow the format of section 1 closely. Users should refer to instructions for section 1 for guidance on completing these sections.

14. Provide affordable legal support for PLHIV. This section follows the same principles of previous sections. In the subsection for unit costs, which should be entered on a per person per year basis, users should be sure to account for the fact that a PLHIV may access legal services multiple times per year.

15. Other Programs. This section allows users to define and estimate costs for any other programs or interventions to support an enabling environment that do not fall under any of the established intervention categories on this worksheet. The section follows section 1 closely and user should refer to the instructions for section 1 for guidance.

The cost summary at the bottom of the worksheet lists the total costs per intervention category on this worksheet by a year. A chart also represents the total costs of all enabling environment interventions per year so that users can visualize yearly changes in estimated costs. A pie chart also appears at the bottom of the worksheet that depicts the percentage distribution of enabling environment interventions by the intervention categories.

### *HIV Prevention*

This worksheet estimates the costs of major HIV prevention interventions. The worksheet is organized into 16 collapsible sections, each corresponding with one prevention interventions, and inputs are required in each. Similar to the ‘Enabling Environment’ worksheet, this worksheet has no links to the ‘Facilities & HR’ worksheet. Consequently, the user must provide all coverage data.

The list of intervention categories appears at the top of the worksheet. Users can select and de-select categories as appropriate by clicking on the check box in column A. De-selecting an intervention will remove its cost outputs from the total cost at the bottom of the worksheet.

1. HIV Prevention Among Sex Workers. This worksheet estimates the costs of an HIV prevention program targeted at commercial sex workers. The major cost components are male and female condoms as well as the costs of counselors/outreach workers who may deliver other services, such as behavior change communication.

In the first subsection, users input the initial population of sex workers as well as the annual growth rate (C26 and C27, respectively). The number of sex workers is calculated in row 28, which users can modify if necessary. Row 29 is an output row based on data provided in cell C32. Users should only review and modify this row after providing the requested data in C32.

In the next subsection, ‘Frequency,’ users provide the average number of commercial sex acts per worker per year (C32). This value is used to calculate the total number of commercial sex acts (row 29), which users can modify if necessary. Cell C33 asks for a condom wastage rate. Users should express this as a percentage increase to the number required in each year to account for wastage. Users put the contact rate of a counselor/outreach worker in cell C34.

The subsection called ‘Coverage’ asks users for baseline and target coverage rates for four variables. The model allows users to include the condom coverage for sex workers not reached by a counselor/outreach worker in row 41. If condoms are only distributed by counselors, users can set the values in this row to 0.

In ‘Unit Costs,’ users provide the average unit cost per counselor per year as well as the cost per male and female condom distributed. If counselors distribute other materials or commodities apart from condoms, these could be included in the unit costs. Users would need to calculate the cost of the total quantity of these supplies that a single counselor distributes on average in a year and add it to the counselor salary in the appropriate cells. Users should note the addition.

The subsection entitled ‘Results’ is an output section. Users should not change the outputs in this section.

The subsection called ‘Costs’ lists the cost estimates for the major components of the program—counselors, male condoms and female condoms—as well as total program costs in the final row.

2. HIV Prevention Among Men Who Have Sex With Men. This section follows the same format as section 1 except that female condoms are not included. Consequently, users should refer to section 1 for guidance on this section.

3. HIV Prevention Among Injecting Drug Users. This section estimates the costs of a variety of services for injecting drug users: harm reduction, counseling and testing, community outreach and peer education, clean needles and syringes, drug substitution, and condoms. This section also follows the format of section 1, to which users may refer for guidance on completing this section. Users should note that every service does not need to be included if irrelevant. To remove a service, users should simply set coverage baselines and targets to 0%.

Sections 4-8. These sections estimate costs for other vulnerable groups, three of which can be defined by users in cells B7-B9. These sections are a simplified version of section 1, and users may refer to section 1 for guidance.

9. Workplace Programs. This worksheet estimates the costs of providing HIV prevention services in the workplace. The services included in this section are peer education, treatment for sexually transmitted infections (STIs), and condom distribution. Because cost estimation for STI treatment is already included in the ‘Maternal and Reproductive Health’ worksheet, users should take care not to double count costs. It may be that the demand for facility-based STI treatment is below 100% and that STI treatment in the workplace fills a critical access gap. In this case, users would estimate costs of STI treatment in both places.

The first subsection, ‘Population Characteristics,’ asks users for the labor participation rates for males and females (C317 and C318). The labor participation rate is the percentage of the relevant adult population (e.g., adult males, not all males) that is engaged in employment. In this case, users should select the percentage of the population engaged in employment that would be eligible for an HIV prevention program in the workplace. In cell C321, users indicate the number of sex acts that an average employed person engages in with a regular sex partner. The model uses the term regular sex partner to refer to non-commercial sex acts, as these can be estimated in section 1 of this worksheet. If a program for commercial sex workers is not included in national HIV prevention programs, then users could use this cell to include commercial as well as regular sex acts. Overall, users must take care to ensure that certain costs are not double counted.

In the next subsection, ‘Population,’ users provide the population of adult males and females. The labor force is calculated in row 328.

In the ‘Coverage’ subsection, users provide the coverage baselines, targets and scale-up paths similar to other sections of this worksheet.

The next subsection, ‘Unit Costs,’ requires users to input the average unit cost per year per recipient for each service. The average recipient may need multiple peer education sessions, STI treatments and condoms in a year, and this fact should be included in the unit cost inputs.

10. Condom Provision. This section estimates the costs of providing condoms for the prevention of HIV. Because condom interventions are already included in multiple places in this worksheet, as well as for family planning purposes on the ‘Maternal and Reproductive Health’ worksheet, users should be careful not to double count costs. This section focuses on covering male sex acts, as presumably this would therefore cover women as well. If users want to include female condoms, then this would need to be reflected in the unit cost by taking a weighted average of the costs of male and female condoms distributed.

11. Voluntary Counseling and Testing. This worksheet estimates the costs of voluntary counseling and testing, a critical component of any comprehensive response to HIV/AIDS. This section estimates the costs of the actual tests as well as the salaries and training costs for counselors. The costs of facilities and equipment should already be estimated on the ‘Facilities and HR’ worksheet. Consequently, these costs are not included here.

In the first subsection, ‘VCT Need,’ users provide the number of people in need of VCT (row 392) as well as the average number of times an eligible person needs to access VCT services per year (row 393).

In ‘Coverage Targets,’ users indicate the coverage baseline and target for VCT as the % of VCT services that are needed that are actually provided.

Users can change the scale-up rate of coverage in the subsection called ‘Coverage Scale-up.’

In ‘Number of Counselors for VCT Services Delivered,’ users indicate the number of VCT services provided per counselor per year (row 406) in order to calculate the number of counselors required in row 407. Users should also indicate the number of counselors that will require pre- and in-service training in rows 408 and 409, respectively. The input for pre-service training should account for the turnover in counselors over time.

In the next subsection called ‘Unit Cost of VCT Service,’ users input the average cost of an HIV test (row 412) as well as the average annual salary/incentives per counselor (row 413) and average cost of pre- and in-service training per counselor per year (rows 414 and 415).

12. Mass Media Campaigns. This section estimates the cost of mass media campaigns for HIV prevention by multiplying the cost of each campaign by the number of campaigns conducted each year.

13. Blood Safety. This section estimates the costs of screening units of blood for HIV in order to ensure safe blood transfusions. In calculating the unit costs, users should include only those elements of the screening process that are actually consumed if costs of equipment, facilities and human resources have already been included in the ‘Facilities and HR’ worksheet. If these health systems costs have not been included in this worksheet, users should account for them in this section by including them in the unit cost.

14. Post-exposure Prophylaxis. This section estimates the costs of provision of post-exposure prophylaxis kits for the prevention of HIV. The format is similar to other sections in this worksheet.

15. Safe Medical Injection. This section estimates the costs of providing auto-disabled syringes to prevent the re-use of syringes that can spread HIV. These costs may already be included in the cost of providing immunization and other services in this model, so users must be mindful of potential for double counting.

16. Youth Education of HIV/AIDS. This section estimates the costs of training primary school teachers, secondary school teachers and peer educators in HIV prevention messages. Users should be sure not to double count this intervention here if it is already include in the education needs assessment tool. The number of teachers and peer educators should account for turnover over time.

## *HIV Treatment*

This worksheet estimates the costs of treatment for HIV/AIDS. It consists of two major cost components: antiretroviral therapy (ART) and the laboratory tests associated with patient monitoring and antiretroviral therapy. Because these services are likely facility-based this worksheet is more similar to service worksheets for malaria and child health instead of the other HIV-related worksheets. This means that coverage rates are based on the scale-up of facilities on the 'Facilities & HR' worksheet instead of independently determined by the user.

The worksheet is organized into 3 collapsible sections, each requiring user inputs.

The list of intervention categories appears at the top of the worksheet. Users can select and de-select categories as appropriate by clicking on the check box in column A. De-selecting an intervention will remove its cost outputs from the total cost at the bottom of the worksheet.

1. Demographic and Epidemiological Inputs. This section asks users for national-level demographic and epidemiological data relevant to HIV treatment. The population data in row 9 comes from the 'Facilities & HR' worksheet, so users do not need to change it. In row 11, users should input the number of people living with HIV/AIDS (PLWHAs). Users must provide this data for the start year, which is shaded red. Subsequent years are shaded blue to reflect the fact that users can either input the future numbers of PLWHAs directly or they can estimate an annual growth rate in row 12 that will then automatically calculate the projections in row 11. If users input the projections directly in row 11, then row 12 cannot be used later unless users re-enter the correct formulas into row 11. The projections of PLWHAs should reflect an understanding of changes in future incidence, which can be influenced by strong HIV prevention measures, as well as the effects of effective antiretroviral therapy on the longevity of PLWHAs.

In rows 14 and 15, users enter the percentage of PLWHAs in need of ART who are adults and children, respectively. It is important to note that not all PLWHAs are in need of ART at any given time. WHO has provided guidance on when PLWHAs should initiate therapy in the course of their disease, and users should draw from this information and national policies in determining what percentage of PLWHAs are in need of ART. Distinguishing between adults and children is important because HIV tends to progress at a different pace in children and many antiretroviral drugs are available in pediatric formulations that carry different unit costs.

2. Antiretroviral Therapy. This section estimates the costs of antiretroviral drugs to treat HIV. This section follows the structure of many other sections on other service worksheets, such as those for malaria treatment.

The first subsection, 'Catchment Size,' summarizes key inputs already provided by the users on the 'Facilities and HR' worksheet. For example, the lowest facility service level that provides ART is listed in row 25 and the total catchment size of that facility service level appears in row 26. Users can get a sense of what this means in terms of population coverage in row 28.

The second subsection, 'Number of Adults and Children in Need of ART in the Catchment,' requires epidemiological data specific to the catchment that the facility service level covers in



each year. In row 31, users enter the total number (adults and children) of PLWHAs in the catchment. The model assumes that this number is the same as the facility level service coverage (row 28) multiplied by the total number of PLWHAs in the entire country (row 11). If this is not the case, especially if PLWHAs travel from other catchment areas without antiretroviral drugs to those facilities with drugs, users should modify the data by directly typing over the cells. Similarly, the model assumes in rows 32 and 33 that the percentages of adults and children living with HIV/AIDS who need ART in the catchment are the same percentages for the nation as a whole. Users can change this information as necessary.

In the third subsection, ‘Number of Adults and Children Accessing ART in the Catchment,’ asks users for the percentage of adult and children in need of ART who actually seek out and receive ART. This demand-side component can depend on the extent of auxiliary support programs, such as home-based care, which may help refer patients to facilities for monitoring and treatment and help ensure continuity of care. It is important to note that this demand-side percentage does not depend on whether or not patients actually take their drugs at home. Once the drug has passed from the pharmacy or health facility to the patient, the financial cost has been borne regardless of whether or not the patient takes all of his or her pills.

The subsection called ‘Regimen Distributions’ requires the percentage distribution of adults and children receiving ART on different treatment regimens. Some adults and children may have exhausted first- and second-line treatment options and be on regimens that provide only incomplete control of HIV (rows 52 and 56, respectively).

The final subsection that requires user inputs is called ‘ART Costs (per person per year).’ In this subsection, users provide the average annual cost per patient receiving different treatment regimens (e.g., first-line, second-line and failing/salvage therapy). The different regimens will likely contain patients on different combination of antiretroviral medicines. Therefore, the unit cost for each regimen will be a weighted average of these different combinations.

3. Laboratory Tests. This worksheet estimates the costs of providing laboratory tests to monitor disease progression in PLWHAs as well as the effects of antiretroviral therapy. Users have the option to include the costs of the equipment as well, if these equipment costs are not already included in the ‘Facilities & HR’ worksheet.

In the first subsection, ‘Define Lab Tests,’ users can choose up to 13 different laboratory tests by typing the names in the appropriate cells. Users should only include those laboratory tests that are provided (or requested by providers) at the same lowest facility service level. The model assumes that they are all provided at the same facility service level.

The second subsection, ‘Catchment Size,’ repeats the facility service level responsible for providing all of the laboratory tests listed in subsection 1. This information was already provided by the user on the ‘Facilities & HR’ worksheet and does not need to be changed.

In the third subsection, users indicate the number of PLWHAs in the catchment (row 124) as well as the percentage of PLWHAs in the catchment that require each type of test in each year (rows 125-137). This percentage is based on *need* not actual utilization or demand. For those

laboratory tests associated with antiretroviral therapy, this information should be informed by the data provided in section 2 of this worksheet, as some laboratory tests are performed based on which antiretroviral drugs patients are receiving.

In the subsection entitled ‘Average # of Tests Needed Per PLWHA Per Year in Catchment,’ users indicate how many of each type of test are required for each PLWHA receiving the given test. A number of tests, including CD4 counts and viral loads, are recommended multiple times in a single year.

In the next subsection, users input the percentage demand among PLWHA in need of each type of test (rows 170-183).

In ‘Unit Costs of Tests (Recurrent or Per Use),’ users enter the average unit cost of providing each type of test. This cost should only reflect those cost elements that are used up each time a test is given. It should not include equipment or human resource costs, as these should already appear in the ‘Facilities & HR’ worksheet.

If users have not reflected all of the HIV-related laboratory equipment costs in the ‘Facilities & HR’ worksheet, the next subsection allows users to specify those costs in the subsection beginning row 216. Users should also indicate how many units of equipment will be purchased in each year. If users do not wish to use this section, then the cells should be left with zeroes or blank spaces.

In the following subsection, ‘Unit Cost of Machine,’ users indicate the average unit cost of purchasing the laboratory equipment identified in the previous subsection.

### *HIV Care & Support*

This worksheet estimates the costs of interventions that provide care and support to PLWHAs. It has 6 collapsible sections. Each section requires user inputs.

This structure of the worksheet is very similar to the ‘HIV Prevention’ and ‘HIV Enabling Environment’ worksheets. Like in those worksheets, users must specify an independent coverage rate and scale-up path for each of the interventions for HIV care and support.

The list of intervention categories appears at the top of the worksheet. Users can select and de-select categories as appropriate by clicking on the check box in column A. De-selecting an intervention will remove its cost outputs from the total cost at the bottom of the worksheet.

1. Treatment of Opportunistic Infections and HIV-related Illnesses. This section estimates the costs of the drugs and other supplies that are necessary to treat opportunistic infections and other HIV-related illnesses in PLWHAs. In the first subsection, ‘Define Opportunistic Infections/Illness,’ users can identify up to 15 such conditions whose treatment costs will be estimated in this section. Examples may include skin lesions, fungal infections and toxoplasmosis. Users should be careful not to double count treatments that occur elsewhere in the model. For example, tuberculosis is a pervasive opportunistic infection in PLWHAs, but if

users already account for tuberculosis treatment for PLWHAs in the ‘Tuberculosis’ worksheet, then users should not include tuberculosis in this section.

The second subsection, ‘Incidence of Infections/Illness Among PLHIV (per 1000),’ asks users for the incidence per 1,000 PLWHA of the infections defined in subsection 1.

In the fourth subsection, ‘Coverage Targets,’ users input the percentage of PLWHAs with each defined illness that is receiving treatment for the illness at baseline (C68-82). In the adjacent column, users provide the target treatment coverage in the end year. Users should note that the coverage rates here refer to the percentage of PLWHAs that are actually receiving care, not just the percentage that falls within the reach of the health system. Therefore, the service demand component, which appears separately in other worksheets, is bundled in this particular estimate. Beginning in row 84, the model calculates a linear scale-up path for coverage between the rates at baseline and in the end year. Users can change the calculated values in interim years as necessary. Users should link the scale-up path to the capacity of the health system to deliver the defined services.

In the subsection ‘Unit Cost of Treatment,’ users input the average cost of treatment for a person receiving treatment. If health system costs for these treatments (e.g., human resources, facilities, equipment, etc.) are already included on the ‘Facilities & HR’ worksheet, then in this subsection users should include only those supplies that are consumed on a per patient basis, such as drugs.

2. Nutritional Support. This section estimates the costs of different nutritional items provided to PLWHAs, such as fortified flour. This section follows the same format as section 1, and users should refer to section 1 for guidance on completing this section. Users have the opportunity in section 3 to also estimate the costs of those nutritional items and other supplies that may be delivered through a home-based care program. Consequently, users should be careful to only account for the relevant nutritional items in one place.

3. Homebased Care (HBC). This section estimates the costs of a homebased care program to support PLWHAs. This section is very detailed, including a variety of cost components: salary/wages, pre- and in-service training, medicines and supplies for HBC providers and their supervisors; and transportation reimbursements and/or equipment (e.g., bicycles). If users choose, they could also use one of the ‘Independent Program’ worksheets to estimate the costs of an HBC program.

In the first subsection, ‘Demand for Homebased Care,’ users indicate the percentage of PLWHAs who want to participate in an HBC program in row 345. For a variety of reasons, such as potential stigma and social exclusion by having one’s HIV positive status known by others by visiting with an HBC provider, not all PLWHAs will likely wish to participate.

In the following subsection, ‘Coverage for PLHIV Desiring Homebased Care,’ users input the percentage of PLWHAs who want to participate in a HBC program that will be reached by an HBC program. Users provide this percentage for the start year and end year in row 351. In row 354, the model calculates a linear expansion of coverage between the start and end years, but users can modify this scale-up path as necessary.

The subsection called ‘HBC Providers’ asks users for the number of PLWHA clients that a single HBC provider will serve each year (row 359). These data are used to calculate the number of HBC providers that are required to achieve the coverage rate in a given year. In row 361, users indicate how many HBC providers will receive pre-service training in each year. This value should account for turnover of staff over the planning period. In row 362, users indicate the average number of in-service training sessions that an HBC provider will receive each year.

In the following subsection, ‘Frequency of HBC Provider Visits to Clients,’ users indicate the average number of visits that an HBC provider makes to each client per month (row 366) as well as the number of transportation equipment to purchase in each year for HBC providers (row 370). Many existing HBC programs provide bicycles to HBC providers.

The next subsection called ‘Accompanied Referrals,’ asks users for the average number of accompanied referrals that a single HBC provider makes each month. These data are important because accompanied referrals are a critical step in ensuring timely, continuous access to care, especially when PLWHAs are ill or tired. Accompanied referrals may carry costs to HBC providers that can be captured in this section.

In the subsection ‘Supervisors of HBC Providers,’ users indicate the average number of HBC providers that are supervised by a single HBC supervisor (row 378). These data are used to calculate the number of supervisors required for a well-managed HBC program. Users also indicate how many HBC supervisors will undergo pre-service training in each year (row 380). These values should reflect staff turnover over the period. Finally, users input the average number of in-service trainings each HBC supervisor will receive in each year (row 381).

In the subsection, ‘Frequency of Supervisor Visits to HBC Providers,’ users indicate the average number of visits per month that a supervisor makes to each HBC provider under his or her supervision (row 385). In row 389, users input the total number of transportation equipment that are purchased in each year for HBC supervisors.

The subsection called ‘Unit Costs,’ provides a good deal of flexibility in estimating costs for the HBC program. For example, some unit costs, such as average annual salaries/wages, are expressed on a per HBC provider or HBC supervisor basis. Other costs are estimated on the basis of each visit to a client by a HBC provider or each visit to a HBC provider by a HBC supervisor. Users also have leeway to define 3-4 extra items to be estimated. Users should be mindful not to double count certain costs, such as medicines and supplies.

Sections 4-6 follow a very similar structure as sections 1 and 2. Users can refer to the guidance on section 1 for assistance in completing these sections.

#### *Additional Facility Services*

This is a single worksheet that estimates the costs of additional facility-based health services identified by the user in Section 3 of the ‘Facilities and HR’ worksheet. It is composed of 16 sections. The first 15 are identical costing tables in which users provide data relevant to the

identified service. The costing tables follow a structure very similar to costing tables on other worksheets in the model. The final section is a summary of cost outputs for this worksheet.

1. Additional Service 1. The section header will change to reflect the user input to the appropriate line of Section 3 on the ‘Facilities and HR’ worksheet. The first subsection entitled ‘General Information’ repeats facility service level information in the same fashion as other costing tables.

In the second subsection called ‘Catchment Demographic Inputs,’ users first define the population in the catchment that the service will target (cell A14). If the entire catchment population will be targeted, users could type ‘Total Catchment Population’ or equivalent in the cell. In row 15, users indicate the size of the population identified in the catchment. If it is the total population, then users can simply type in the data from row 9.

Users provide catchment-level epidemiological data in the third subsection called ‘Epidemiological Inputs.’ In row 18, users indicate the incidence or prevalence per 100 people (whichever is most relevant for the service in question) of the condition for which the service is meant. Users can also specify up to 7 subtypes of the condition beginning in row 22-28. Later, users will specify unit costs for each subtype identified. If users only wish to identify a single condition rather than subtypes of a condition, then in row 22, they can simply type the name of the general condition and insert 100% as a value for the row.

In the fourth subsection, ‘Utilization Inputs,’ users indicate what percentage of eligible cases of each subtype actually demands the service.

Finally, in the fifth subsection called ‘Unit Costs (per case subtype per year)’ users indicate the per person per year cost of providing the service to each case subtype. Based on these inputs, the model will calculate total costs, per capita costs and average per capita costs for the service.

Sections 2-15. These sections are identical to the first section. Users should refer to the instructions above for the first section for guidance.

Cost Summary. This section summarizes the costs estimated on this worksheet in the same format as other worksheets. Users can elect to apply a percentage mark-up to the costs to account for international and domestic shipping and wastage.

### *Other Health Programs*

In recognition of the fact that many critical health services are not delivered through facilities, but rather via independent health programs, the model includes five worksheets that allow users to define and estimate costs for such programs. These worksheets can be found on the navigation drop-down menu under ‘Other Health Programs.’ Each of the five worksheets is an exact copy of the others. Therefore, only the ‘Program 1’ worksheet will be described. Users can refer to this guidance in completing the other worksheets.

In cell C2 at the top of the 'Program 1' worksheet, users provide the name of the health program whose costs will be estimated on the worksheet. The rest of the worksheet is divided into 7 collapsible sections. Sections 1-5 require user inputs. Sections 6 and 7 are only cost calculations and outputs and should not be altered by users.

Section 1. Target Population and Coverage. The purpose of this section is to calculate the total number of people who will receive services via the health program as well as the total number of patient visit or contacts, if applicable, with the health program. To make this calculation, this section requires four categories of inputs: (1) the size of each targeted subpopulation, (2) the program coverage from the start year to end year, (3) the demand for the program by the targeted subpopulations, and (4) the number of contacts/visits per year by a single person utilizing the program.

In the first table, 'Define Target Populations and Size,' users define which populations will receive services via the program. Up to six populations can be identified. Multiple populations could be targeted by a single program. For example, a childhood immunization campaign may also deliver certain antenatal services. In this instance, the defined populations might be children under 1 year of age as well as pregnant women. These populations should be discrete. For example, a vaccination program for children may be coupled with universal bed net distribution for the entire population. In this example, the identified populations would be children under 1 and the total population less the number of children under 1. Once the populations have been identified, the size of the population over the planning period should be entered into the relevant cells.

The second table, 'Program Coverage: Baseline, Target,' asks users for the percentage of each population identified in the first table that will be covered by the program in the start and end years. Users should be mindful that there should likely be some degree of coherence among these values for multiple populations if these populations really are meant to be simultaneously served by a single program. Like with most of the facility-based health services, coverage in this table refers to the percentage of people who have access to the program if they desire it. It does not reflect actual utilization. This demand-side data comes later in this section.

In the third table, 'Program Coverage: Scale-up,' the model automatically calculates a linear scale-up path between the start and end years. Users should modify the values for these interim years as necessary.

In the table called 'Demand for Program,' users indicate the percentage of people covered by the program that actually demand, or utilize, the program. Demand could vary considerably among different targeted populations.

The final input table is 'Number of Contacts/Visits Per Year to the Program Per Person Utilizing the Program.' In this table, users enter the average number of contacts a single person belonging to each identified population makes to the program. These data are only necessary if users wish to estimate certain costs on the basis of patient visits.

2. Human Resources. The purpose of this section is to estimate the number of direct service providers and the management staff required for the program. This section also estimates the number of pre- and in-service training sessions required for both direct service providers and the management staff.

The first table in this section is called ‘Define Service Providers and Ratio of a Target Population Size or Total Contacts/Visits of Target Population per Service Provider.’ Essentially, this table allows users to identify the types of direct service providers in the health program and indicate how many people, or contacts with people, that each direct service provider makes in a year. Users first define up to 8 different service providers in cells B85-92. Examples may include volunteers, bed net distributors, nurses, etc. In column C, users select which of the identified target populations from section 1 should be used as the basis for estimating how many service providers are necessary. For example, if the number of nurses required is based on how many children need to be reached with vaccination, then children under 1 should be selected from the drop-down menu. If a bed net distributor is also part of the program and is meant to reach every member of the population, then ‘Total’ should be selected from the drop-down menu. Here total refers to the sum of the all of the identified populations in section 1. This is why each group identified must be discrete; otherwise, double counting would occur. In column D, users indicate whether the population size or the number of patient contacts for the population selected in Column C will be used as the basis for determining how many service providers are required. For example, if users want to estimate the number of nurses required based on how many actual vaccinations are given rather than the number of children a nurse sees each year—this could be the case where high level of childhood HIV require more frequent vaccination—then users should select ‘Total Contacts/Visits’ from the drop-down menu in Column D. In the remaining cells in columns E through N, users indicate how many of the value selected in columns C and D are covered by each direct service provider.

Figure X below illustrates what a completed table might look like. In this example, the user has decided to calculate the number of nurses required in terms of the number of contacts/visit that a single nurse makes to children under 1 each year. In this case, the nurse makes 1000 contacts with children under 1 each year. In some cases, these contacts will be with the same children (i.e., a child is seen more than once during the year). The calculation for an ITN distributor illustrates the other possibility. In this example, the user has elected to estimate the number of distributors required by the program in terms of the number of people (‘Population Size’) of the total population. In this case, an average ITN distributor reaches about 4000 people per year. In general, users may find it easiest to work in terms of number of people rather than number of contacts. If so, the value in column D should be left at ‘Population Size.’ Note that the model will return error messages in subsequent tables for any cells in this table that contain a zero due to the inability to divide by zero. Therefore, all cells should contain a positive number, even for blank rows. So, in the Figure X below, all the blanks rows with zeroes should be changed to a positive number. Users can be sure to not cost these blank rows by putting zeros in the corresponding cells in the unit cost section.

A	B	C	D	E	F	G	H
<b>2. Human Resources</b>							
<b>Define Service Providers and Ratio of a Target Population Size or Total Contacts/Visits of Target Population per Service Provider</b>							
	<b>Target Pop</b>	<b>Reference Ratio</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	
<b>Nurse</b>	<b>Children &lt; 1</b>	<b>Total Contacts/Visits</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>	
<b>ITN Distributor</b>	<b>Total</b>	<b>Population Size</b>	<b>4000</b>	<b>4000</b>	<b>4000</b>	<b>4000</b>	
<b>Other</b>	<b>Total</b>	<b>Population Size</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>Other</b>	<b>Total</b>	<b>Population Size</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>Other</b>	<b>Total</b>	<b>Population Size</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>Other</b>	<b>Total</b>	<b>Population Size</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>Other</b>	<b>Total</b>	<b>Population Size</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>Other</b>	<b>Total</b>	<b>Population Size</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	

The next table requiring user inputs is called ‘Define Managerial, Administrative and Support Staff and Ratio of Service Providers to Such Staff.’ This table is essentially a simplified version of the first table in this section. In column B, users can identify up to 16 managerial or administrative staff. In column C, users choose which service provider population will serve as the basis for estimating the number of the given managerial or administrative staff that are required. For example, if the number of managers is based on the number of nurses in the program, then users would choose nurse from the drop-down menu in column C. In the remaining cells, users indicate the ratio of the service provider selected in column C to the managerial/administrative staff identified in column B. For example, if there is one program manager for every 20 nurses, then users would input 20 in the relevant cells.

Beginning in row 144 under the header ‘Pre-service and In-service Training for Service Providers,’ users provide data to estimate the number of pre- and in-service sessions that is required for every direct service provider and managerial/administrative staff member. In the first two tables beginning in rows 148 and 159, respectively, users indicate the percentage of direct service providers requiring pre- and in-service training in each year. If users do not wish to estimate these costs, users can enter zero in all of the cells in these tables.

In the next two tables in rows 170 and 181, users indicate how many of each direct service provider are covered by an individual pre- and in-service training session.

In the next two tables (rows 192 and 203) users indicate how many individual pre- and in-service training sessions are required on average each year for each type of direct service provider. Together, these data lead to an estimate of the number of pre- and in-service training sessions that are required each year.

Beginning in row 234 under the header ‘Pre-Service and In-service Training for Managerial, Administrative and Support Staff,’ users repeat the same process for managerial/administrative staff.

**3. Transportation and Communication Equipment.** In this section, users indicate how many total transportation devices are in use in a program as well as those that will be purchased and rehabilitated. Beginning in the table called ‘Define Transportation Device and Total Number Needed Each Year for Program,’ users can define up to 16 different types of transportation equipment (B392-407). In the remaining cells in this table, users should indicate the total number of units of equipment of each type that will be part of the program. Users should only include



those units that will incur operational costs (e.g., fuel). Therefore, it may not include equipment in various states of disrepair if these units do not incur operational costs.

In the following table called ‘Number of Transportation Devices to Purchase Each Year,’ users indicate the number of new unit of each type of transportation device that will be purchased. This information will be multiplied by the unit capital cost provided later to generate a total capital cost for new transportation devices.

In the next table beginning row 428, users indicate how many transportation devices will be rehabilitated or repaired in each year. This is important because some equipment may become damaged or fall into disrepair during the course of the health the program. These data are combined with the unit cost of rehabilitation of transportation devices provided later to generate estimates for the cost of rehabilitating transportation devices. Finally, these inputs should be aligned with the total number of functional devices (i.e., those that occur operational costs) that are entered in the first table of this section.

This same process is repeated for communication devices beginning in row 447.

4. Commodities, Supplies and Medicines Delivered. The purpose of this section is to calculate the total number of units of commodities and supplies that are delivered through the health program. The first table is the only input table, and it closely mirrors the first table of section 2. Users can refer to this section for detailed guidance. Essentially, users can define up to 20 different commodities and supplies that will be delivered through the health program (cells C508-527). Next, users indicate the percentage of either (a) the population size or (b) the number of contacts/visit to the health program (column D) for each targeted population (selected in column C) that will receive each identified commodity (column B). The same commodity would appear more than once if multiple targeted populations are meant to receive the commodity. If all program recipients are meant to receive a commodity, then users should select ‘Total’ in the drop-down menu in column C.

5. Unit Costs. In this section, users enter the average unit cost per year of each cost component that is estimated in this worksheet. Each table indicates the unit cost that should be provided at the top of the table.

6. Total Costs. This section calculates the costs based on the inputs in the previous sections. User should not make changes to this section except in the event users wish to add a percentage mark-up to the costs of commodities and supplies to account for international and domestic shipping and wastage. This percentage mark-up can be entered in cells C1018-1037 and D1018-1037.

7. Total Costs (Summary). This section summarizes the total costs for each cost category in this worksheet. Users should not make changes. These outputs link to the ‘Cost Summary’ worksheet, where users can view the cost outputs for all the worksheets in the model.

### *Cost Summary*

This worksheet summarizes the cost outputs from all of the worksheets in the model. The costs are presented as total costs as well as in per capita terms. In row 19, users can apply a percentage mark-up to direct supply costs, salaries and in-service training (i.e., recurrent expenditures) to account for general health systems strengthening (e.g., administration, management, epidemiological surveillance, etc.).

Users can also easily see the impact of different worksheets on overall costs by selecting and de-selecting the check marks that appear in column A.

### *Graphs*

[There is an error here in Visual Basis that needs to be reviewed]

### *Database*

The database worksheets can be selected from the navigation menu called 'Health Care Costing' from the menu bar. The worksheet entitled 'Database' lists all of the different databases that are used in the model where the model automatically loads data. Users should not alter this information, as it is preferable that users simply alter the inputs on the relevant worksheets themselves.

The second worksheet is called 'HIV/AIDS Reference Data' that provides a variety of proxy data that may be helpful to users in completing the HIV/AIDS worksheets.

## **CHAPTER 3: Adapting the Model**

Some countries may not wish to estimate resources for the entire suite of services that appears in the model while others may want to add new services, such as those for chronic conditions like diabetes, cardiovascular disease and cancer. The Ministry of Health in Rwanda, for example, successfully added a variety of mental health services to the model when the government estimated the costs of its national development strategy in early 2007. Since health challenges and priorities clearly vary among and within countries, the Integrated Health Model is designed to be adapted to different country and sub-national contexts. This chapter explains how users can make some of the most common modifications.

### **Removing Interventions**

Countries may wish to remove certain health services from the model for a variety of reasons. For example, some countries may not have certain underlying health challenges, such as malaria. Primary modes of HIV transmission also may differ considerably among countries and regions, requiring different sets of HIV prevention services.

Users have many ways to remove interventions fairly easily. To remove *sets* of interventions corresponding to an entire worksheet (e.g., all malaria treatment interventions, etc.), the easiest way to remove the intervention set is to go to the ‘Cost Summary’ worksheet and de-select the checked boxes in column A that corresponds to each intervention set. By selecting the checked boxes, the cost for the corresponding row is set to zero and thereby removed from the total cost calculated by the model.

Removing individual interventions is also straightforward. The easiest way to remove an individual intervention is to find the table for that intervention on the relevant worksheet and input a zero for the unit cost. This will make the cost for that intervention zero and thereby remove it from the total cost calculated by the model. For example, if users wanted to eliminate rapid diagnostic testing services for malaria, users would go to the ‘Malaria Treatment’ worksheet, find the table for rapid diagnostic tests (beginning row 48) and input a zero for the unit cost in row 69.

### **Changing Interventions**

In addition to eliminating interventions, users may wish to change interventions for two primary reasons: (1) to reflect the country-specific name of a service or (2) to add a new facility-based intervention that follows a similar costing structure as the original intervention. In the case of (1), users simply type over the existing name of the service in section 3 of the ‘Facilities and HR’ worksheet, replacing it with the new name. For example, if users wanted to rename ‘uncomplicated malaria’ to ‘simple malaria,’ they would enter the new name in cell A204 on the ‘Facilities and HR’ worksheet.

Users may also follow these steps in the case of (2). In this situation, users do not wish to estimate costs for the original intervention at all and instead want to replace it with a brand new intervention. For example, if a country does not have malaria, it could use the malaria prevention

and treatment service lines and costing tables to estimate costs for a completely different condition. Users should keep in mind, however, that the costing structure and many of the titles on the other worksheets will not change. The original costing structure may not align with the structure needed to estimate costs for the new service. Consequently, this process is only recommended for those users who are very familiar with the model and Excel.

### **Adding Interventions**

Users may wish to add new interventions to the model to reflect country-specific health priorities beyond those included in the MDGs. The model is designed to allow users to easily add up to 15 additional facility-based health services. Instructions on how to utilize this feature can be found in the previous chapter for the worksheets entitled ‘Facilities and HR’ and ‘Additional Health Services.’

Users can also use the costing tables on the ‘Additional Health Services’ worksheet to estimate costs for services that are not facility-based. To do this, users should go to the ‘Additional Health Services’ worksheet, locate an unused costing section and type the name of the service in the section header. Next, users should de-link the service from a facility service level and specify an independent coverage scale-up path. To do this, users should input the number of people covered by the service in the yellow-shaded cells in the row called ‘Total Catchment for Facility Service Level.’ Two rows down users can see what these inputs mean in terms of total population coverage in the row entitled ‘Service Coverage as Percentage of Total Population.’ The rest of the costing table should be completed normally, following instructions in the previous chapter for the worksheet ‘Additional Health Services.’

### **De-linking Interventions from Facilities**

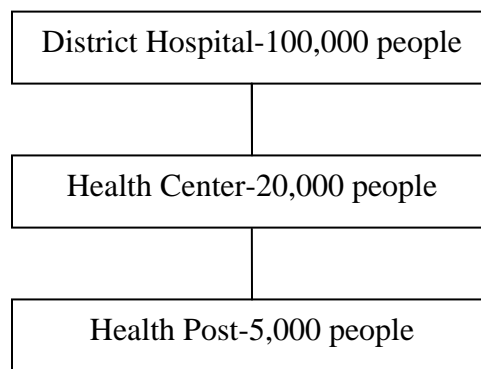
Users may also wish to de-link some of the original services listed in Section 3 on the ‘Facilities and HR’ worksheet from facilities if the services are delivered independently of a facility. An example could be malaria prevention via distribution of insecticide-treated bed nets. If ITNs are distributed wholly or partly independently of health facilities, then users can apply the same instructions in the previous paragraph to the costing table on the ‘Malaria Prevention’ worksheet. This same process can be applied to other services. Alternatively, users can also estimate the costs of such independent programs by utilizing one of the ‘Health Program’ worksheets; instructions for using these sheets appear in the previous chapter. This may be a better alternative, particularly if the multiple services are delivered through a single, integrated mechanism.

## CHAPTER 4: Exercises

This chapter provides three exercises in a sample country to reinforce key concepts introduced in the user guide and help users practice utilizing the tool.

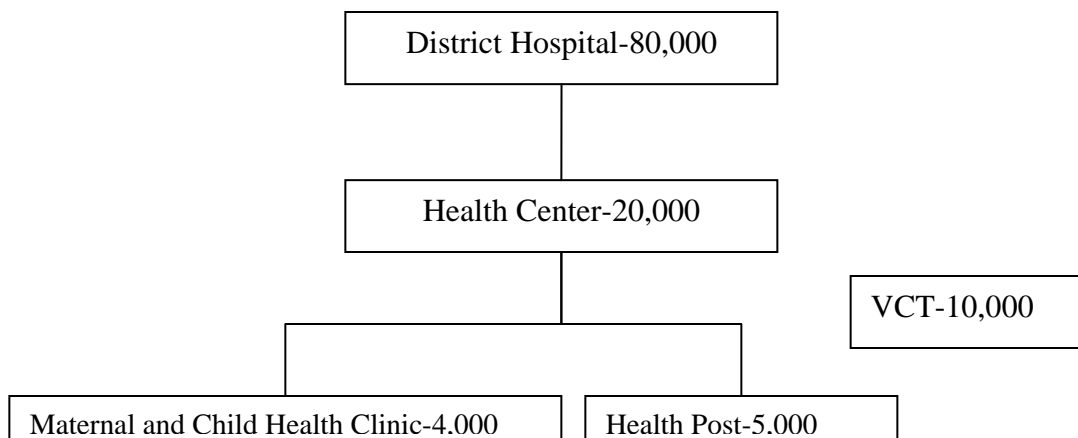
### Exercise 1: Health System Design

The Ministry of Health in the sample country was unsure of how to accurately reflect the structure of the health system in the model. The Ministry has provided the following facility organogram and catchment sizes. Connecting lines indicate that the higher level unit provides all of the health services of the lower level unit.



Task 1. Translate this organogram into the model. The MoH states that the catchment sizes for lower level services provided at higher units are the same as the catchment sizes for the equivalent stand-alone unit (e.g., the catchment size for health post services offered at a health center or district hospital is 5,000).

After reviewing your work, a senior planner at the MoH informs you that the structure of the health system is incorrect. Apparently, the other MoH staff member gave you recommendations from the WHO! The senior planner has redrawn the organogram to reflect the actual situation in the country.



Task 2. Translate the revised organogram into the model.

### **Exercise 2: Baseline Coverage and Targets**

The MoH is having trouble using Section 7: Facilities Scale-up on the ‘Health Systems-Facilities & HR’ worksheet. The baseline coverage data do not seem to fit with the actual number of facilities that are known to exist in the country.

Task 3. Input the baseline coverage (as % of the total population) of facility service levels according to the following data provided by the MoH:

Maternal & Child Health Clinic Services: 65%  
 Health Post Services: 60%  
 Health Center Services: 30%  
 District Hospital Services: 70%  
 VCT Center Services: 40%

Task 4. The MoH wishes to increase coverage of all service levels by 5% per year. Reflect this strategy in the appropriate table.

- What are the resulting 2015 coverage targets for each service level?
- If emergency obstetric care occurs primarily at the health center service level, is the desired coverage target sufficient to meet MDG 5?
- What kinds of considerations should inform an appropriate scale-up path for each health service level?

Task 5. The MoH has recently completed a count of all health facilities in the country. Input the count data into the appropriate table.

Maternal & Child Health Clinic: 2,000  
 Health Post: 1,500  
 Health Center: 100  
 District Hospital: 106

VCT Center: 400

- For which facilities does the survey tally differ from the expected number? Which number does the model use as the initial stock for costing purposes?
- What are possible reasons for this difference?
- What is a major reason to explain why the actual number of lower level facilities (e.g., maternal & child health clinics and health posts) exceeds the expected number? (Hint: think about the distinction between a facility and a facility service level)
- What variable would most likely need adjustment to make the data consistent?

### **Exercise 3: Links Between Health System and Disease Programs**

The head of the malaria unit at the MoH has reviewed the service standards for malaria and wishes to make some changes.

Task 6. Currently, treatment of severe/complicated malaria (no blood transfusion) occurs at the Health Post level. This service actually occurs only at health centers and higher. Change the model to reflect this.

- In the facility services table (Section 3 on 'Health Systems-Facilities & HR' worksheet), what does the "1" represent? Can it be placed at every facility level that provides the service? Is it necessary to do so?
- What is the effect of this change on the total catchment size for this service? (See Section 4 on 'Malaria Treatment' worksheet)
- How does the change affect facility service coverage? What is the difference between the two rows labeled service coverage in this table (rows 133 and 134)? Would changing the values in these rows affect cost estimates?

The head of the malaria unit says that insecticide-treated bed nets are not distributed from facilities but rather through an independent mechanism (e.g., national immunization campaigns). Baseline coverage by the end of 2007 is expected to be roughly 6,000,000 (~50% of the population), with a 5% increase expected each year thereafter.

Task 7. How would you de-link ITN distribution from facilities? What 2 ways could you represent the MoH ITN program in the model? Which would likely be the preferred way? Why?

## **ANNEX 1**



**ANNEX 2**

**ANNEX 3**

**ANNEX 4**