

**Using the Estimation and Projection  
Package (EPP) to Make HIV/AIDS Estimates  
in Countries with Generalized or  
Concentrated Epidemics**

**A Guided Tour**

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## Introduction

### **Preparing HIV/AIDS Estimates**

The Joint United Nations Programme on HIV/AIDS (UNAIDS), Reference Group on Estimates, Models and Projections and World Health Organisation (WHO) prepare HIV/AIDS epidemic estimates every two years for every country in the world. These country estimates are combined to produce regional and global figures that are released on World AIDS Day.

#### **The reporting process**

- The first draft of a country estimate is produced at UNAIDS headquarters in Geneva.
- These estimates are sent to the AIDS control programmes in each country for comments and revisions.
- The country comments are added to revised country estimates that become the basis for the official figures released at the World AIDS Conferences.

The estimates include, by country:

- the number of adults and children living with HIV
- the annual number of new infections
- the current and cumulative number of AIDS deaths.

The estimates are used by many international and national organizations for advocacy and planning, so it is important that they are as accurate as possible.

### **How to Study this Module**

#### **Before you begin**

This participant manual was developed for national AIDS experts and surveillance officers in each country. It explains how:

- UNAIDS prepares initial country estimates.
- You can review and update the initial UNAIDS estimate.

The 2003 round of estimates was prepared using this methodology. The 2005 round will be prepared using the latest version of the program.

## A Guided Tour of the Estimation and Projection Package

If you need additional details on EPP methods and assumptions, they are available in Walker, *et al.* “Improved methods and assumptions for estimation of the HIV/AIDS epidemic and its impact: Recommendations of the UNAIDS Reference Group on Estimates, Modelling and Projections” *AIDS* 2002;16:W1-W14.

### Producing prevalence estimates

The UNAIDS methodology uses HIV surveillance data to produce national HIV prevalence estimates. This methodology is implemented through three computer programs:

- The Workbook Method, an Excel™ spreadsheet developed by WHO and UNAIDS staff. Use Workbook to develop HIV prevalence estimates for *low-level* or *concentrated epidemics*. Workbook is explained in a separate manual.
- EPP, used to develop HIV prevalence estimates for *Generalized epidemics* or *concentrated epidemics with extensive surveillance data*. EPP is explained in this manual.
- Spectrum, which takes data from Workbook or EPP to produce HIV/AIDS estimates of:
  - the number of people living with HIV/AIDS
  - incidence
  - mortality
  - orphanhood

Spectrum is explained in a separate manual.

### Module structure

The module is divided into units. The units are convenient blocks of material for a study session.

### Glossary

All terms are italicized the first time they are used in the manual. Acronyms are spelled out the first time they are used in each unit. Consult the Glossary at the end of this manual if you have questions about terms or acronyms.

## **Additions, Corrections, Suggestions**

Do you have changes to suggest for this manual? Is there other information you would like to see? Please fax or email us. We will collect your comments and consider them in the next update.

Email: [estimates@unaids.org](mailto:estimates@unaids.org)

Fax: +41 22 791 4746 or +41 22 791 4741

## **Using EPP**

National estimates and projections are based on surveillance data.

- EPP includes a UN database that provides data for many countries or
- you can enter surveillance data you've collected.

Based on user input, the EPP program finds the *best fitting curve* that shows the trend in a country's adult HIV prevalence over time.

This manual:

- describes EPP in a guided tour

### **Types of epidemics**

EPP is used to develop estimates for *Generalized epidemics* or *concentrated epidemics* where there is a great deal of data. A different software package, the Workbook Method, is used for *low-level* or *concentrated epidemics*. Characteristics of the different types of epidemics are described next page.

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### Low-level Epidemic (Use The Workbook Method for this)

- Although HIV infection may have existed for many years, it has never spread to significant levels in any sub-population.
- Recorded infection is largely confined to individuals with higher risk behaviour, such as sex workers, drug injectors and men who have sex with men.
- This epidemic state suggests that networks of risk are rather diffuse (with low levels of partner exchange or sharing of drug injecting equipment) or that the virus has been introduced only very recently.
- HIV prevalence has not consistently exceeded 5% in any defined sub-population.

### Concentrated Epidemic (Use The Workbook Method or EPP for this)

- HIV has spread rapidly in a defined sub-population, but is not well-established in the general population.
- This epidemic state suggests active networks of risk within the sub-population.
- HIV prevalence is consistently over 5% in at least one defined sub-population. HIV prevalence is below 1% in pregnant women in urban areas.

### Generalized Epidemic (Use EPP for this)

- HIV is firmly established in the general population.
- Although sub-populations at high risk may continue to contribute disproportionately to the spread of HIV, sexual networking in the general population is sufficient to sustain an epidemic independent of sub-populations at higher risk for infection.
- HIV prevalence consistently over 1% in pregnant women.

## **CD-ROM or Website Download**

The UNAIDS/WHO approach to preparing national HIV estimates involves the use of three computer models:

- The Workbook Method
- The Estimates and Projections Package (EPP)
- Spectrum

All are available on CD-ROM from UNAIDS and other sources. The models can also be downloaded from web sites at UNAIDS ([www.unaids.org](http://www.unaids.org)) and the Futures Group ([www.FuturesGroup.com](http://www.FuturesGroup.com)).

## A Guided Tour of the Estimation and Projection Package

### Requirements

To use EPP, you will need:

- 32MB or more of RAM
- 40 MB of free space on your hard disk
- Windows 95, Windows 98, Windows Me, Windows 2000 or Windows XP

Note also that EPP requires the Java Runtime Environment (JRE) version 1.3.1.

- Download the installation program for the JRE from the following web site: <http://java.sun.com/j2se/1.3/jre/downloadwindows.htm> This will put a file called: j2e-1\_3\_1\_01- win.exe on your computer.
- Double click on j2e-1\_3\_1\_01- win.exe this file to install the Java Runtime Environment.

### CD-ROM installation

Follow the procedure below to install from the CD.

If you have the CD-ROM version of EPP, install the EPP model on your hard disk by selecting **Install EPP** from the menu of the CD-ROM.

### Website download

If you want to download the software and documentation, go to one of these sites:

[http://www.unaids.org/en/resources/epidemiology/epi\\_softwaretools.asp](http://www.unaids.org/en/resources/epidemiology/epi_softwaretools.asp)  
[www.FuturesGroup.com](http://www.FuturesGroup.com)

You will find downloadable EPP software and documentation in several languages. Follow the directions on the site.

### Run EPP

To run EPP:

- Click on the Windows **Start** button at the lower left of your screen
- Select **Programs**.
- Select **EPP**

Or

- Use Windows Explorer to go to the EPP directory
- Double click the file names EPP\_multi.jar

Or

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- Click on the **Start** button
- Select **Run**
- **Browse** to the EPP directory
- Select the EPP\_multi.jar file
- Click **Open**
- Click **OK**

## EPP Guided Tour

### Introduction

This unit walks you through the EPP pages (screens) you will use and describes EPP functionality. At this point, you won't add any real data. This is an overview of EPP. You will have time to look around the program.

If you've used EPP before, you could review this section to see what's new in EPP.

Remember that if you need to know details on a page or functionality, you can look back at this unit.

### EPP Description

#### Launch EPP

First, launch EPP:

- Click on the Windows **Start** button at the lower left of your screen
- Select **Programs**.
- Select **EPP**

Or

- Use Windows Explorer to go to the EPP directory
- Double click the file names EPP\_multi.jar

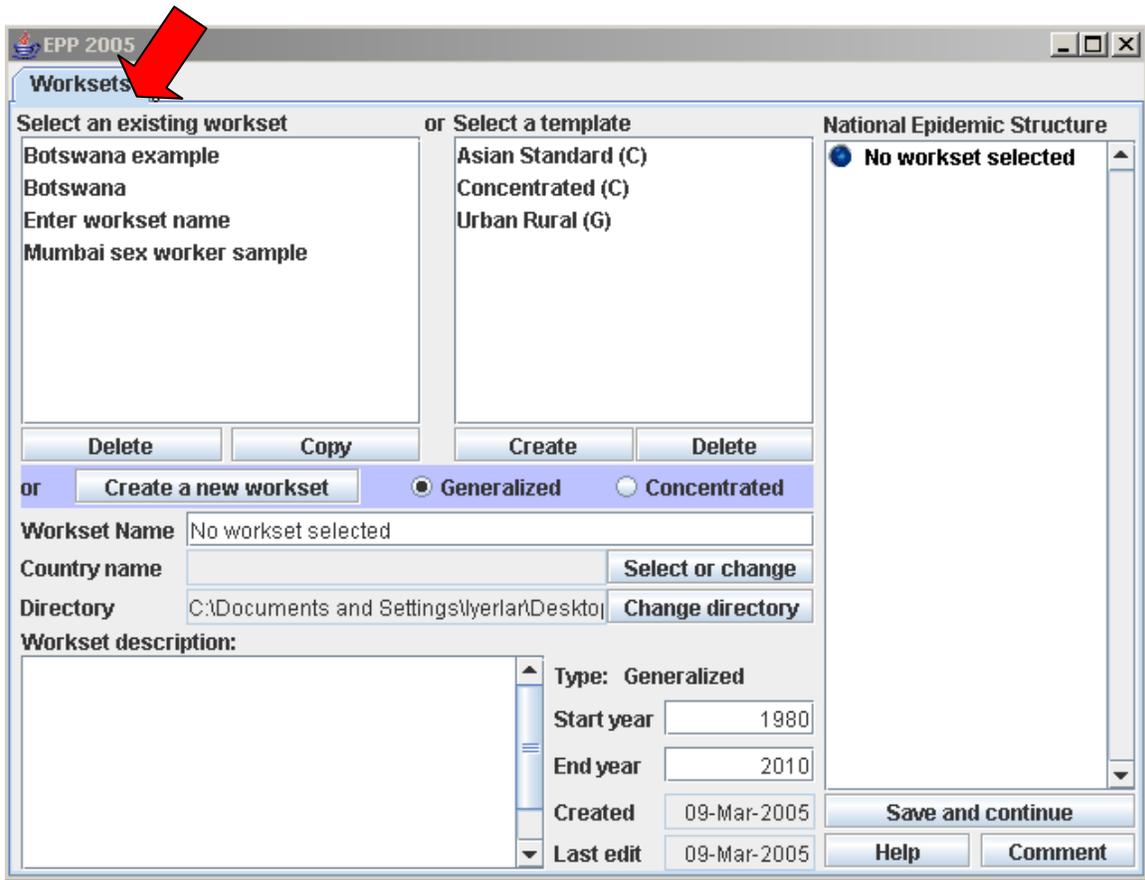
Or

- Click on the **Start** button
- Select **Run**
- **Browse** to the EPP directory
- Select the EPP\_multi.jar file
- Click **Open**
- Click **OK**

When you first open EPP, you will only see the Workset tab, shown in Figure 1-1. This is your starting point where you select an existing workset or start a new one.

When you fill in that sheet by selecting a workset to use, then click **Save and continue**, more tabs will appear.

Figure 1-1. First Page of EPP



### EPP interface

EPP uses a tabbed interface. When you click a tab, its sheet appears. You create a projection by working through the tabs in order, from left to right. As you finish your work on one tab (page), you will **Save and continue**. This advances you to the next tab.

- All the pages have a **Help** button. When you click it, you'll see information about that page.
- All the pages have a **Comment** button. When you click it, a word processing program opens. Use **Comment** to keep a record of decisions you are making as you work through the tabs. That way, if someone else uses your estimate later, they will know what you did.

Figure 1-2 shows all the tabs. In this view, someone filled out the Workset tab to get us started.

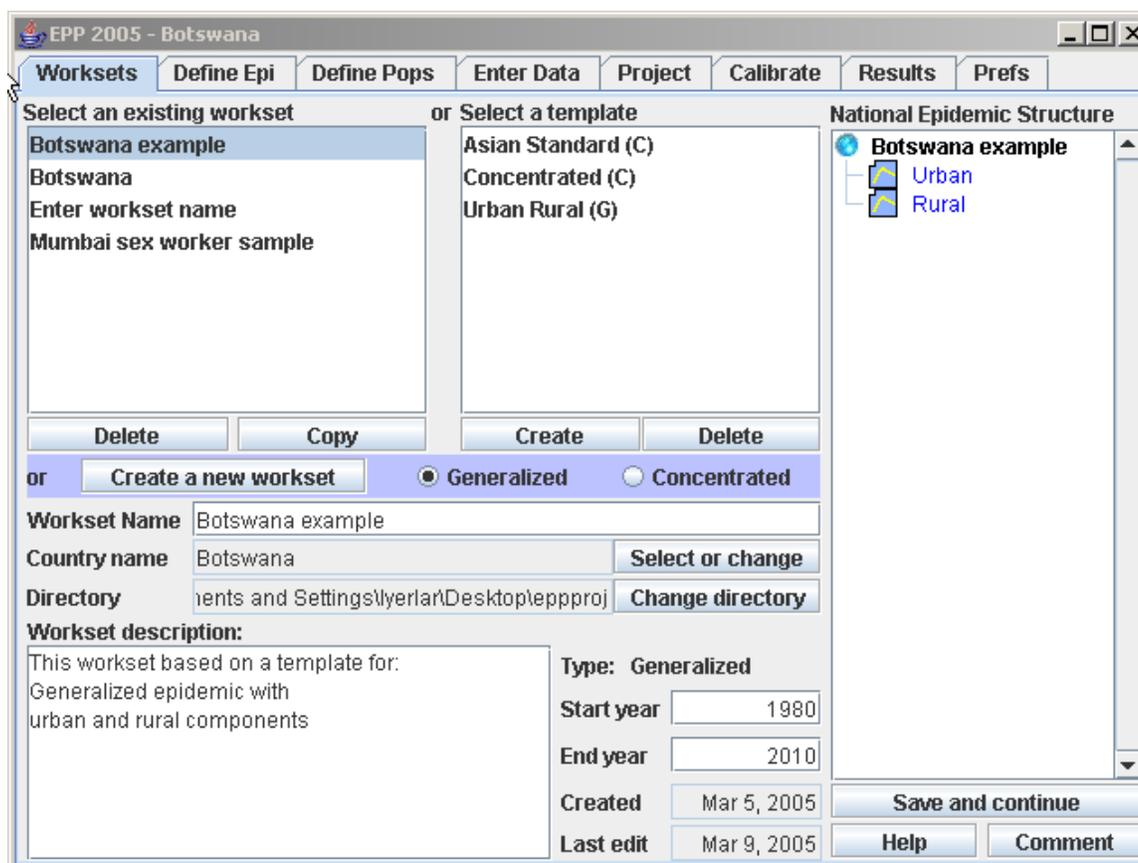
- Workset
- Define epi

## A Guided Tour of the Estimation and Projection Package

- Define pops
- Enter data
- Project
- Calibrate
- Results
- Prefs

Each tab is described in detail in the pages that follow in this unit.

Figure 1-2. Create a Projection by Working through the Tabs in Order



## Load a Workset

There are four ways to load a workset:

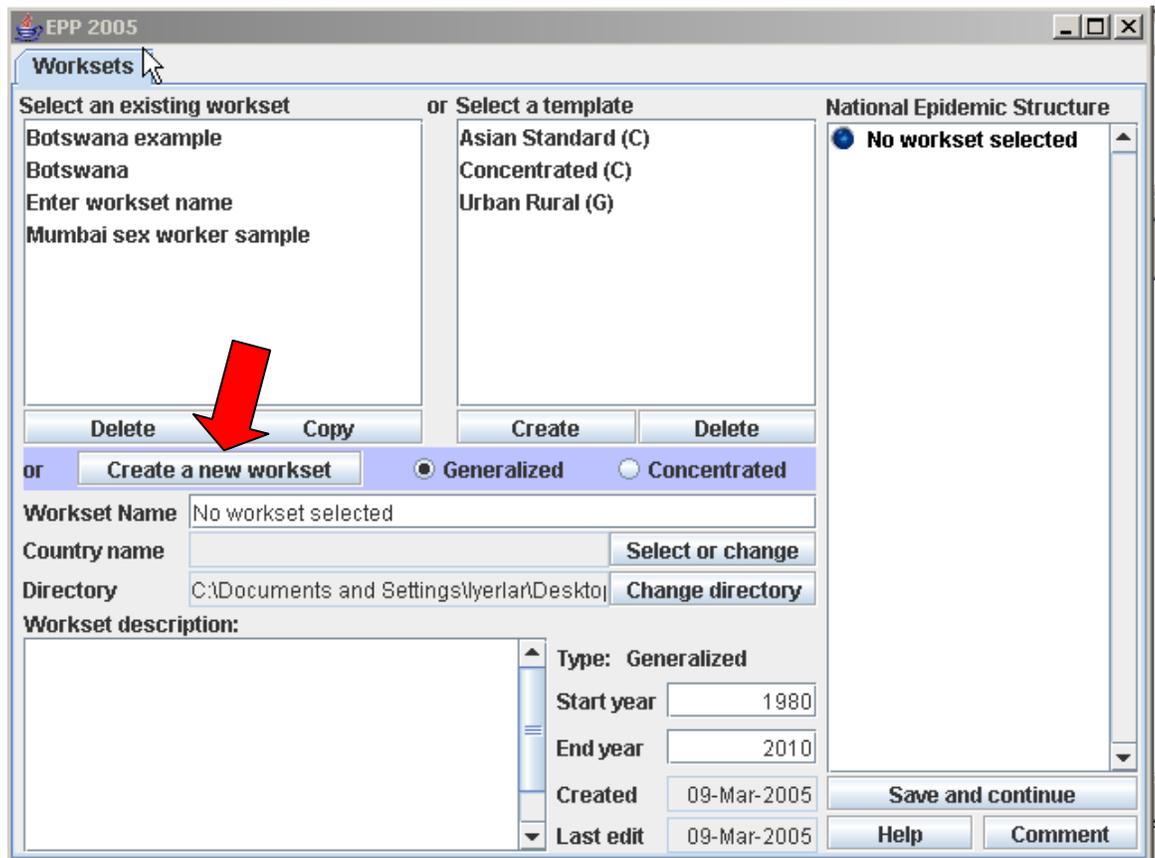
- create a new workset
- select an existing workset
- select an existing template
- create a new template, for advanced users

We will discuss each of these below.

### Create a new workset

If you are starting a new workset or are a new user, you will need to create a workset. In Figure 1-3 below, each button you will use is labeled with a number. Below the figure, you will see a key that explains what each button means.

Figure 1-3. Create a New Workset



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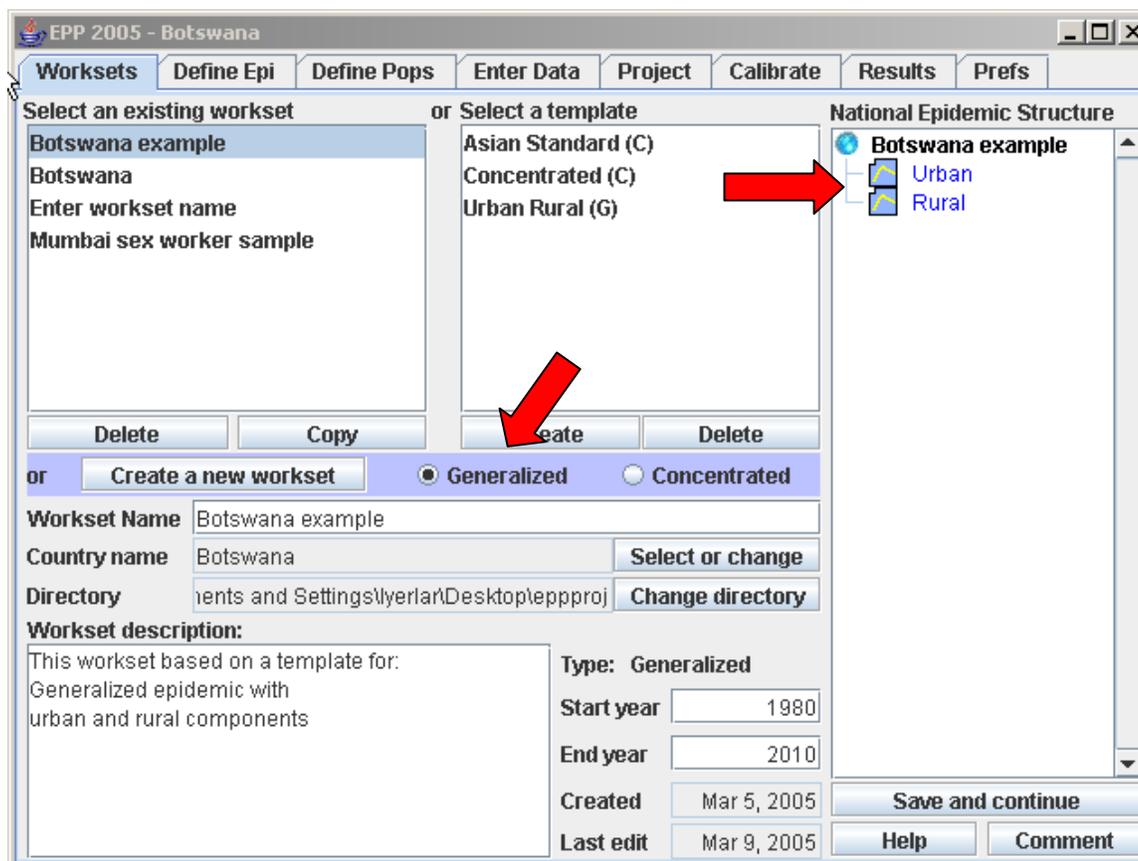
Table 1-1. Key to Figure 1-3 Numbers

Number	Your Action or What It Does:
1	<b>Workset name</b> – Use any legitimate Windows filename. When you name a workset, your files will be stored as <Workset name>.epr in the epproj directory.
2	<b>Country Name</b> - Chosen from the United Nations list of existing countries when the projection is first created.
3	<b>Directory</b> - Location where the workset is stored on your computer.
4	<b>Description</b> - For this projection, created when you create or edit the projection. Description can be of any length. If it is too large to fit in the space provided, scrollbars will appear.
5	<b>Projections start year</b> and <b>Projections end year</b> - The years when the projection begins and ends. This is <u>not the same</u> as the start date of the epidemic. For example, you may decide to start your projection in 1980, because it is a census year, but the HIV epidemic may not have started until 1985.
6	<b>Created</b> - Date when the projection was first created.
7	<b>Last edit</b> - Date when the projection file was last changed. This can include editing projection information, adding or changing data, running a new fit, or changing any of the model results.

**Create a New Workset, continued**

When you create a new workset as shown in Figure 1-4, you choose Generalized or Concentrated. Selecting one of these two choices is important for pages you will use later in the program. **You will not be able to come back to this page to reset.**

Figure 1-4. Select Generalized or Concentrated



**Select an existing workset**

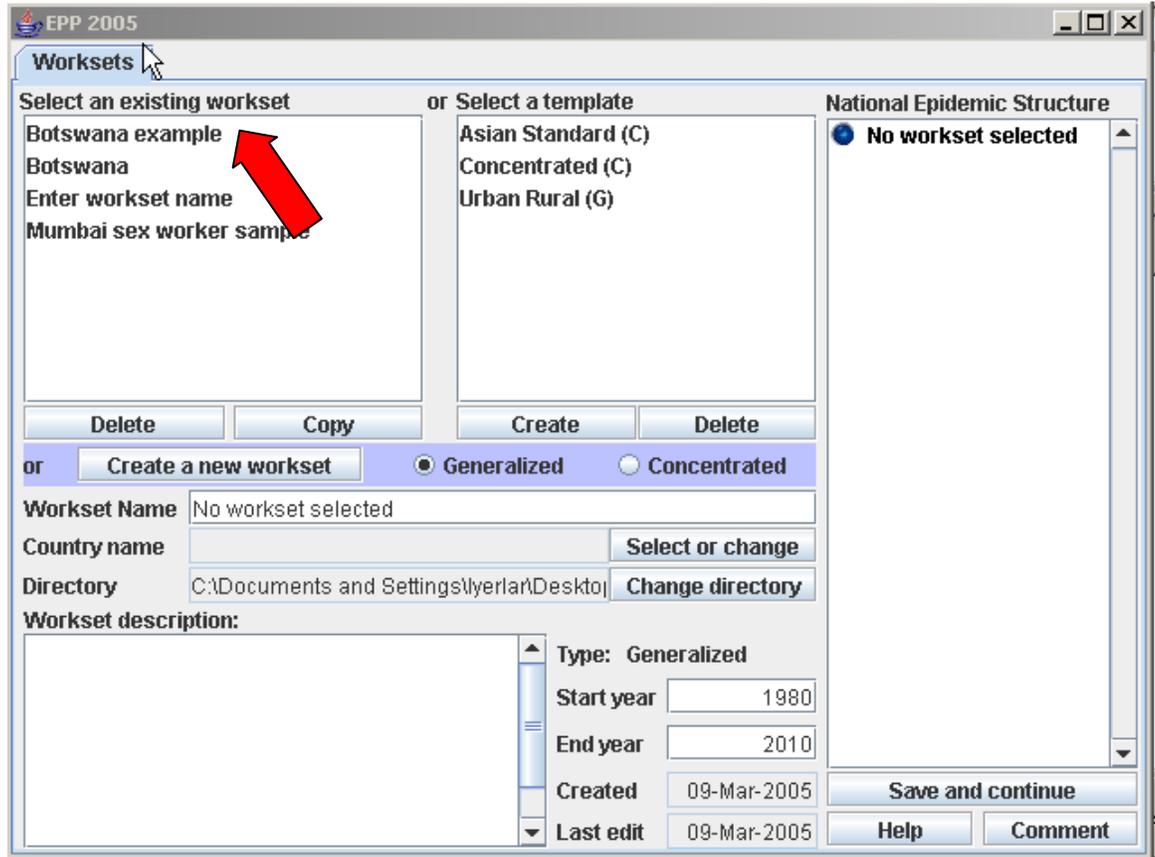
To make additions or changes, **Select an existing workset** from the list in the upper left corner of the page, shown in Figure 1-5.

- Click on the workset you want to use in the **Select an existing workset** list.
- When you select a workset from the list, the relevant information for that projection will appear in the bottom part of the window.

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We have chosen an existing workset for Botswana. If you have entered data in this program before for Botswana, you may return to it by selecting it out of the list.

Figure 1-5. Select an Existing Workset, Botswana



### Select an existing template

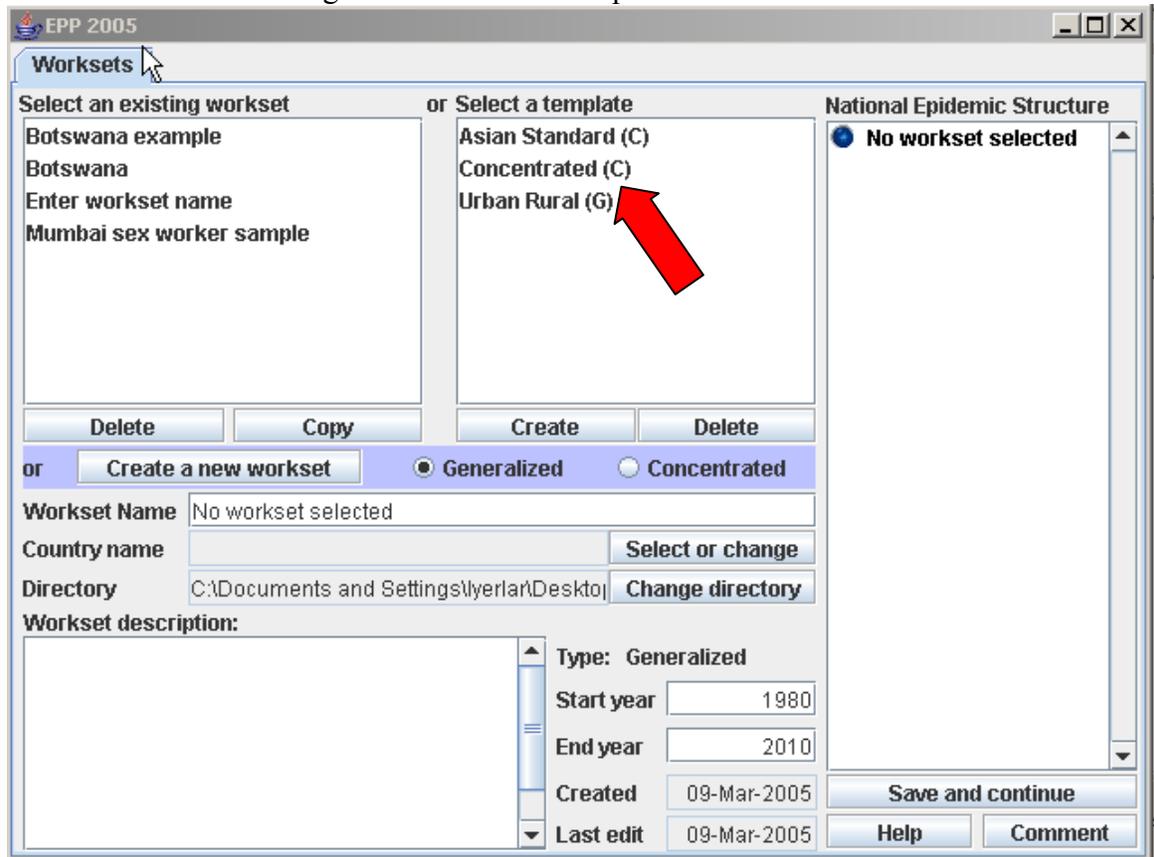
If you want to create a new workset and use sub-populations (you'll see this icon ) , **select an existing template** is the easiest option. You will choose one of the three available templates, shown in Figure 1-6. Do that now to see the choices. Choose an option in the area of the page called **Select a template**.

The templates have sub-epidemic structures already defined. There are two general templates, one for Generalized Epidemics and one for Concentrated:

- **Urban rural** - includes sub-epidemics for urban and rural populations and is most useful for Generalized epidemics, where prevalence in antenatal clinics is above one percent. If you have additional sub-epidemics beyond urban and rural, you can add those on the next tab, **Define Epi**.

- **Concentrated** - If you have a concentrated epidemic, choosing a template is the easiest way to specify sub-epidemics (your higher-risk behaviour groups). The **Concentrated** template includes sub-epidemics for sex workers (SWs), SW clients and injecting drug users (IDUs). If you have additional higher risk behaviour groups to add to **Concentrated**, you can add those on the next tab, **Define Epi**.

Figure 1-6. Select a Template

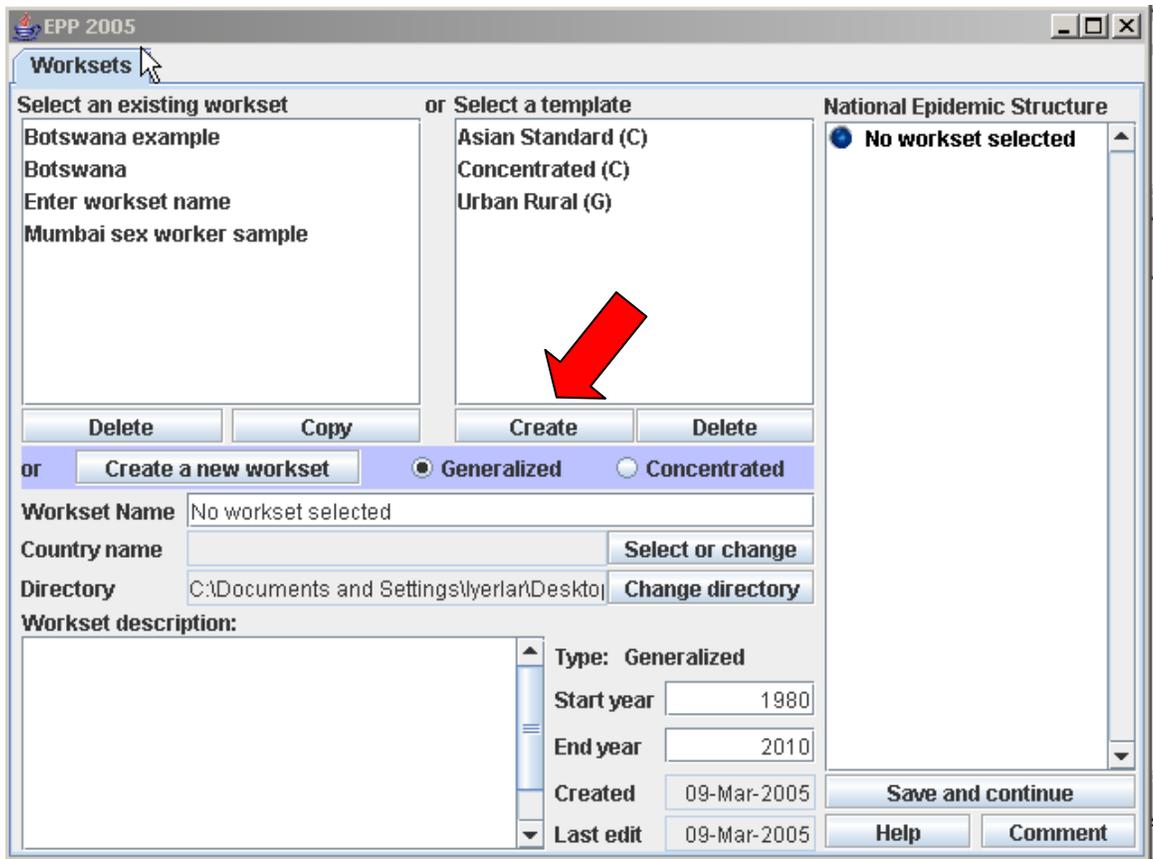


### Create a new template

This is for advanced users. Occasionally you might want to create a new template that you will be able to use over and over. For example, for a Generalised epidemic, you might want to split groups other than Urban/Rural that you would like to repeat in several regions within the same country. Clicking on the **Create** button in the template window shown in Figure 1-7 begins this process.

Figure 1-7. Click **Create**

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## A Guided Tour of the Estimation and Projection Package

Clicking **Create** generates a new pop up window, shown in Figure 1-8. The popup window for creating a new template will prompt you through the steps to create a template. You will be able to use this template as you develop a national estimate.

Figure 1-8. Create a New Template

Creating a new template

On this page you can create a new template for future use. Follow each of the steps defined below, making the appropriate choices or building your template from sub-epidemics and sub-populations. If you decide to choose a country, you will select it after you hit "Save."

1. Enter name & hit enter:
2. Select a template type:  Generalized  Concentrated
3. Do you want to choose a country for this template?  No  Yes
4. Now build your epidemic below, then hit "Save."

Workset (national epidemic)

Geographic sub-epidemic

Sub-population

Urban/Rural      Select sub-population characteristics here:

Urban       Not special pop     MSM

Rural       FSW                   IDU

Both       Client                Low risk

Save

Help      Comment

Delete

---

or   Generalized  Concentrated

Workset Name: Botswana example

Country name: Botswana

Directory: C:\Documents and Settings\yerlan\Desktop\lepproj

Workset description:

This workset based on a template for:  
Generalized epidemic with  
urban and rural components

Type: Generalized

Start year: 1980

End year: 2010

Created: Mar 5, 2005

Last edit: Mar 9, 2005

Once you have chosen a way to load a workset, click the **Save and continue** button.

The display will move to the **Define epidemics** tab.

## Add or Change Epidemic Data

### Define epi tab

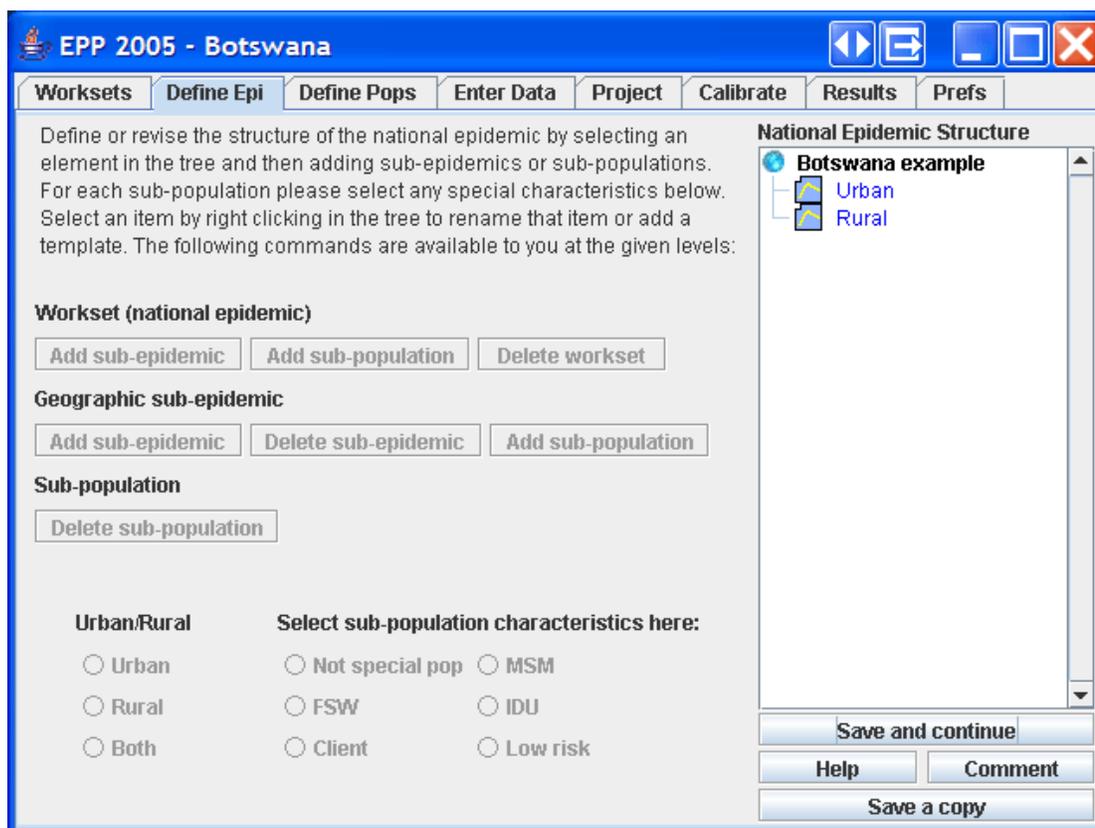
You will see and can change the structure of the epidemic on this page. Figure 1-9 shows what the epidemic structure will look like if you have loaded a workset for a country that has a generalized epidemic.

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Generalized epidemic (workset name)

- Rural
- Urban

Figure 1-9. The Define epi Tab with Generalized Epidemic Chosen

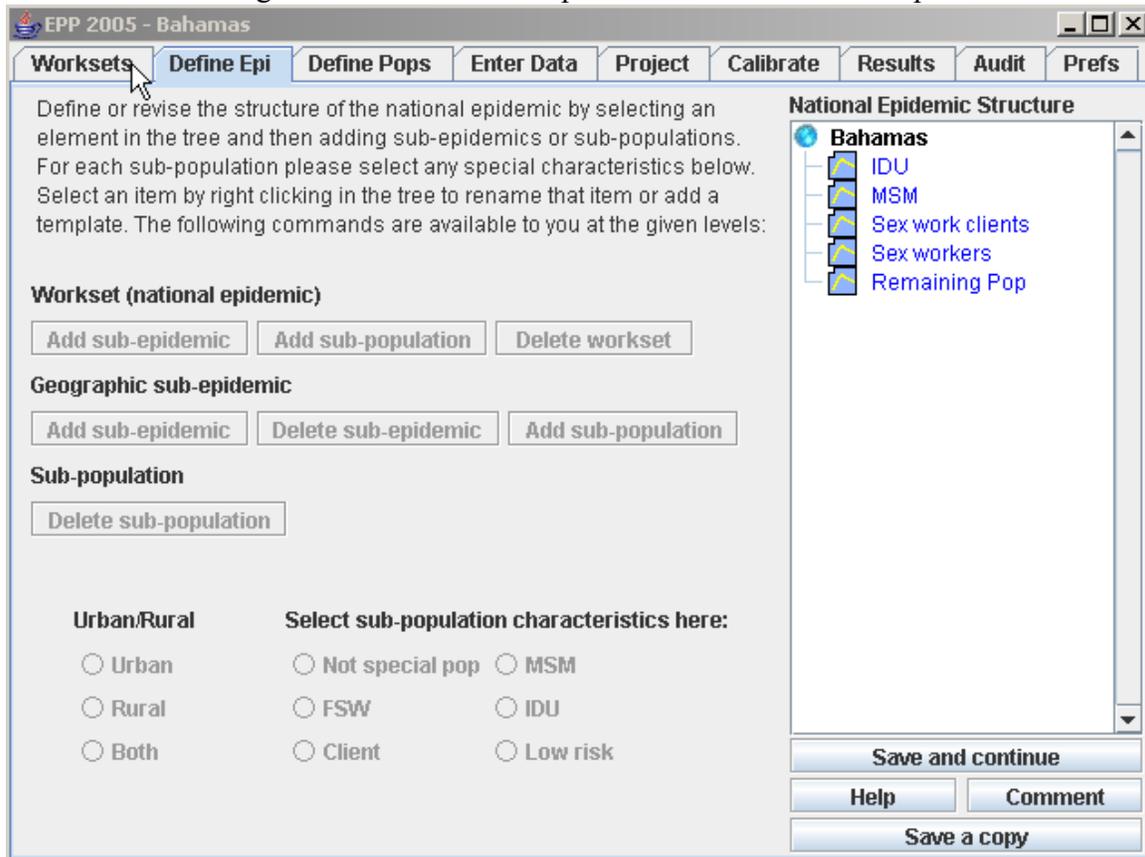


If you selected a concentrated epidemic, the epidemic structure will look like Figure 1-10:

Concentrated epidemic (workset name)

- Sex workers
- IDU
- MSM
- Clients
- Remaining population

Figure 1-10. The Define epi Tab with Concentrated Epidemic Chosen



In both cases above,

- the national epidemic is composed of sub-epidemics.
- the sub- epidemic total numbers must add up to the national total.
- If your sub-epidemic numbers do not add up to the national total, the category **Remaining population** may appear. In the concentrated epidemic, Figure 1-10, not all infections will occur in the sub-populations specified. In this case, **Remaining population** refers to the rest of the adult population not included in any of the specified sub-populations.

If you want to modify the epidemic structure, you would add an epidemic or a projection now.

If you have selected a prepared country file (EPP has an embedded database from UN Population Group that has data on every country) or decided to create a new file from a template, then the epidemic structure should already be correct.

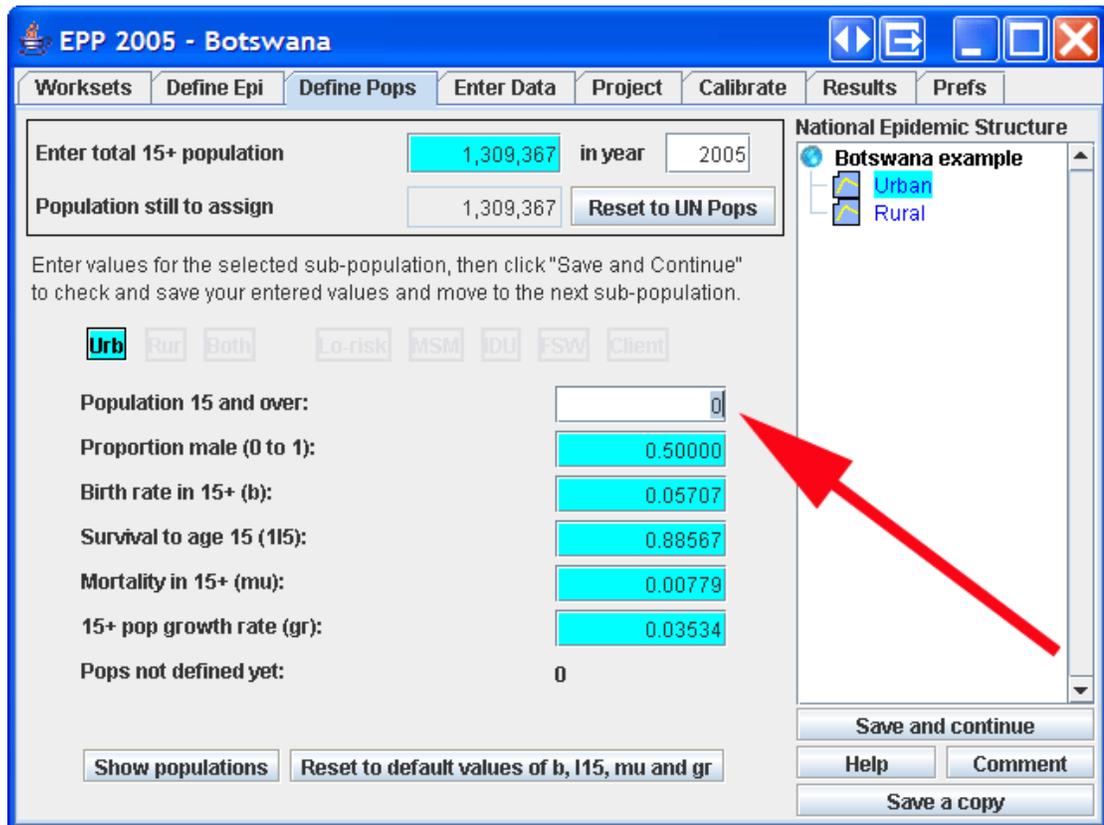
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Click **Save and continue** to go to the next tab.

### **Define populations**

This page, shown in Figure 1-11, allows you to enter or modify information about the characteristics of the population associated with each *sub-epidemic*.

Figure 1-11. Define Pops Page



In the Define Pops page, you provide demographic information about each sub-population. The program will start with the first sub-population  in the epidemic structure.

If you are working with a country data set that came with EPP then you should not have to do anything on this page other than to add sub-population  size data.

Provide population values for each of the sub-populations  you have identified. Note that the page also keeps track of:

- the Population total from UN POP sources
- the population you have accounted for in the ‘population still to assign’ box.

Because on the previous page you have chosen characteristics about the sub-population, values such as the **proportion male** and **mortality** will change based on default values provided by the program. Notice that blue squares will be highlighted Under the population line based on the decisions you made on the Define Epi page.

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Once you enter the information for each sub-population, press Enter or click **Save and continue**. The program will advance to the next sub-population.

### Enter data

The HIV Data Entry Tab, Figure 1-12, is the place to enter your surveillance data for each sub-epidemic. Click the **Save data** button for each sub-epidemic. If you are using a pre-existing workset, the data may already be entered. In that case, you can review the data for completeness. If it is complete, you can advance to the Projection tab.

Figure 1-12. Enter Data Page

The screenshot shows the 'EPP 2005 - Botswana' software interface. The 'Enter Data' tab is active. The 'Data in % (0.0 to 100) for:' field is set to 'Urban'. The data entry table is as follows:

Year	In	1985	1986	1987	1988	1989	1990
MEDIAN PREV							
MEAN PREV							
Site 1 (%)	<input checked="" type="checkbox"/>	-	-	-	-	-	-
(N)		-	-	-	-	-	-

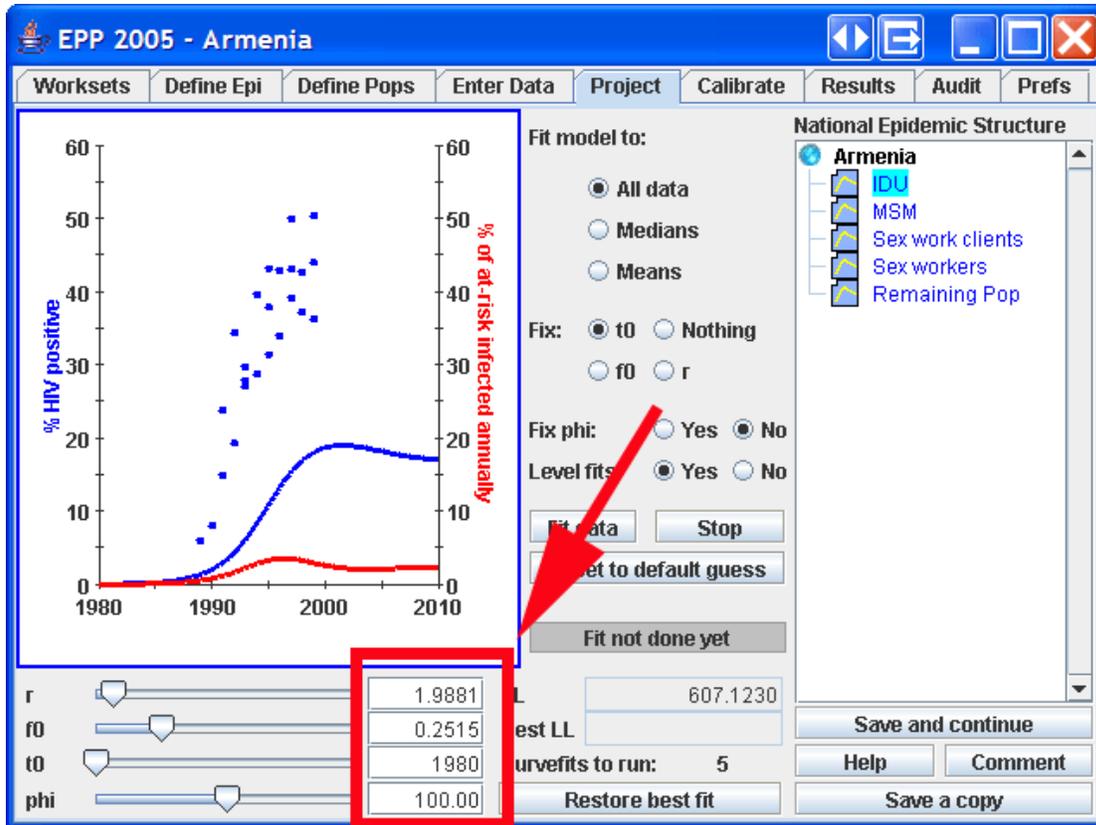
The 'National Epidemic Structure' tree on the right shows 'Botswana example' with sub-populations 'Urban' and 'Rural'. A red arrow points to the 'Urban' sub-population. At the bottom, there are buttons for 'Add sites', 'Delete sites', 'Undelete sites', 'Print', 'Save and continue', 'Help', 'Comment', and 'Save a copy'. The status bar shows 'Sub-populations with no data: 0' and 'Display: % HIV', 'N', and 'Both' (selected).

## Adjust the Curve

### Project tab

The project tab/page allows you to fit an epidemic curve to the surveillance data for each sub-epidemic, shown in Figure 1-13 below.

Figure 1-13. Project Page

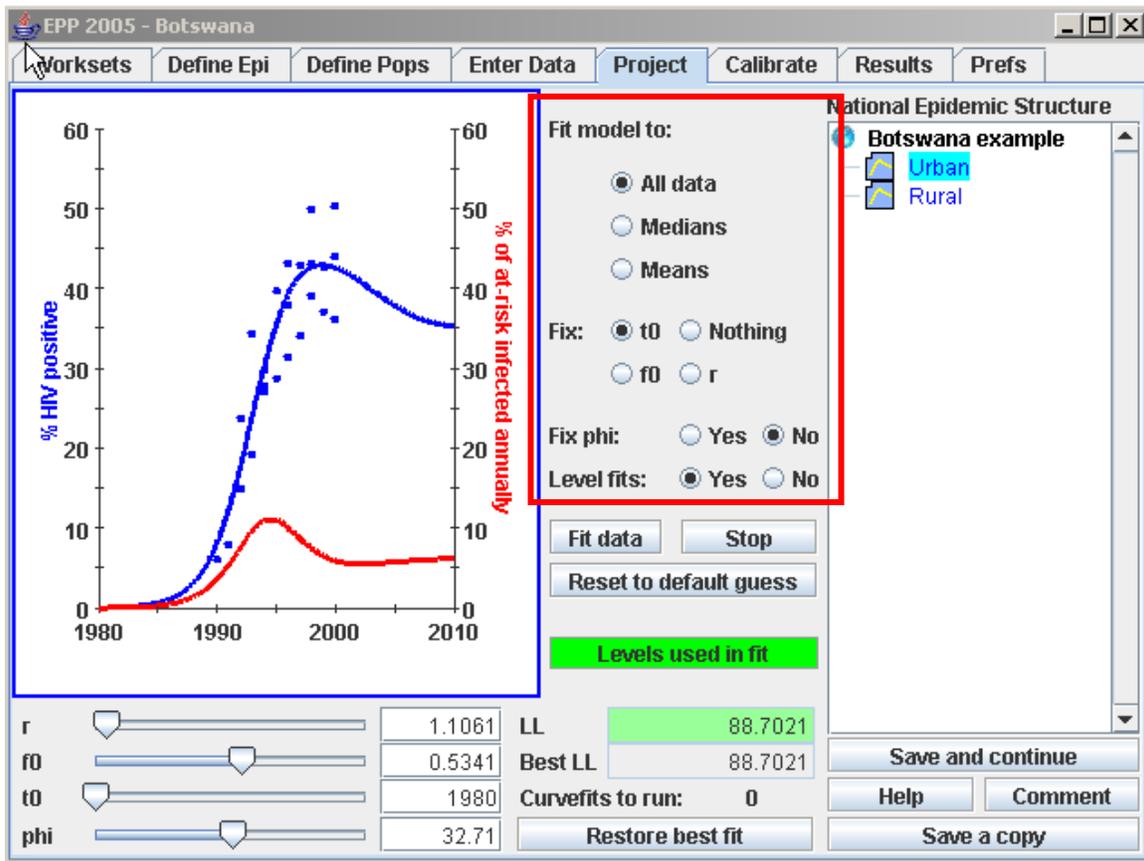


You should see the surveillance data points for the urban epidemic appear in the graph at the bottom of the page as blue dots.

The radio buttons on the page set several options, shown in Figure 1-14. The buttons following **Fit Model To** allow you to select for each year:

- all the surveillance data or
- just the median or mean values.

Figure 1-14. Project Page with Radio Buttons Identified



### Modify the curve to fit the data

Still on the Project page, if you think the generated curve does not show the true epidemic in your country, you can modify the curve by changing the values of some of the model parameters, **t0**, **f0**, **r**, or **phi**. A procedure for how to modify the curve is shown in the Units 2 and 3.

Once you have fit the rural epidemic curve, click **Save and continue** to save the results. You will automatically move to the Calibrate tab.

## Consider Additional Data

### Calibrate

The Calibrate page is shown in Figure 1-15. Before you continue your analysis, you may want to add additional information from other HIV

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prevalence surveys to produce estimates that better represent your national situation. You may have:

- a national survey
- a regional survey
- some other source of information that may alter the fit of the curve to your data.

If you have no additional data, click ‘No calibration needed’, then **Save and continue**. You will then move to the **Results** tab.

Figure 1-15. The Calibrate Page

EPP 2005 - Botswana

Worksets Define Epi Define Pops Enter Data Project **Calibrate** Results Prefs

Before presenting results, we wish to calibrate your projections for any general population HIV prevalence surveys that may have been done, for example a national DHS or other large-scale survey. This will allow the results presented to reflect your national situation. Please select one of the following options :

Adjust HIV in all sub-populations so national prevalence is:

Urban:  % HIV+ in year

Rural:  % HIV+ in year

Scale HIV in all sub-populations by:  Urban  Rural

Adjust HIV prevalence in each sub-population individually

Urban  
Rural

No adjustment for this sub-population

Scale HIV by factor of

Adjust to  % HIV+ in year

Set scaling for sub-population

No calibration needed, proceed without adjustments

Help Comment Save and continue

### Three ways to add data

You can add data in three ways:

- apply global scaling
- use a scaling ratio
- adjust individual curves

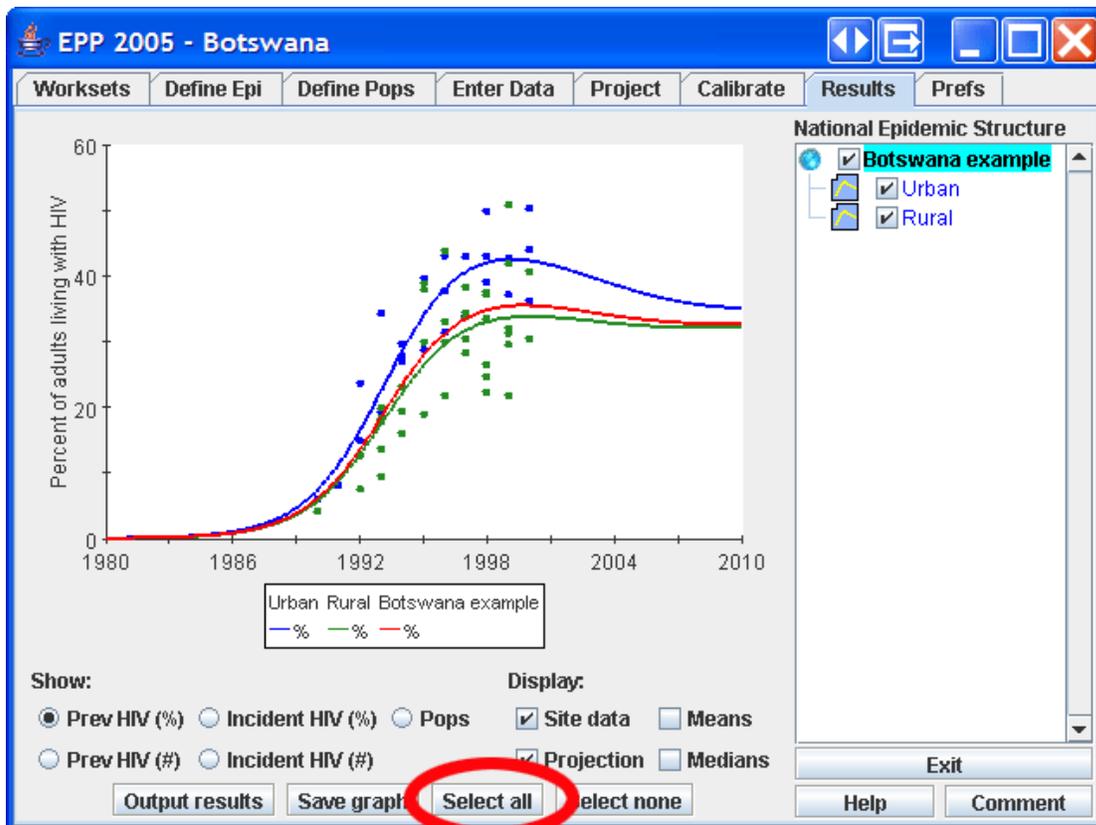
Each way is discussed in the procedures in Units 2 and 3. When you finish calibration, click **Save and continue** to move to the next page.

## Results

On the **Results** page, shown in Figure 1-16, you will see epidemic curves for the sub-populations you have set up in the earlier pages. A combined curve is shown for the entire country.

- To select the curves you want to see, you would check the boxes next to the epidemics in the box in the upper right of the display, shown in Figure 1-12.
- You can see the results in table form by clicking the button **Numerical results**.

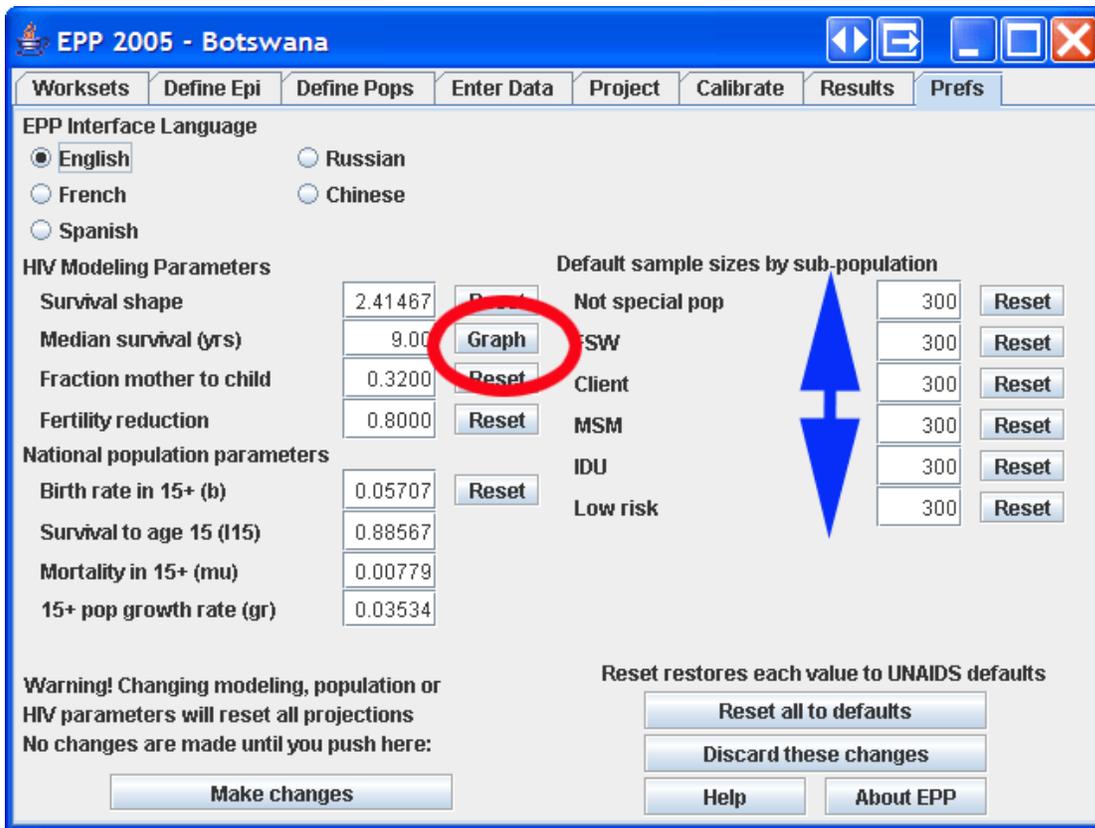
Figure 1-16. See Your Results



Some users will want to set preferences for using EPP 2005. In that case, there is an additional tab identified as PREFS. It is intended for more advanced users. You see an example in Figure 1-17.

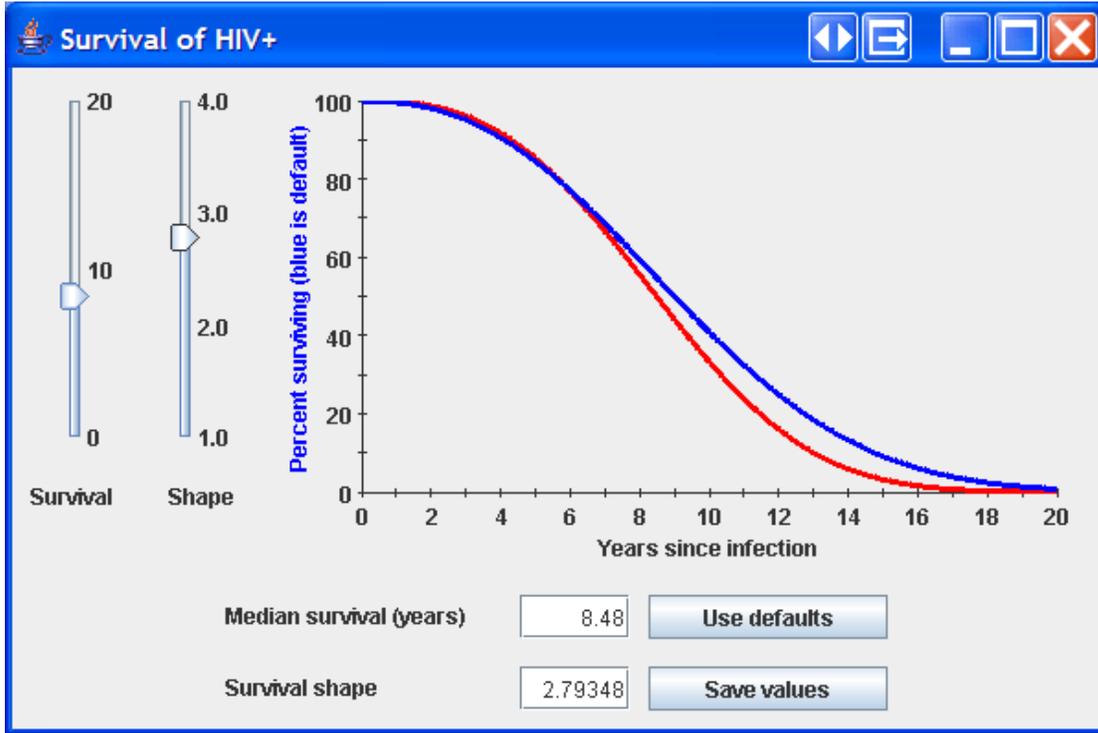
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Figure 1-17. Set or alter your preferences



The GRAPHS option circled in Figure 1-17 will provide a pop up window showing a graph of progression of HIV to death (see Figure 1-18). You may alter the values of ALPHA and BETA of the Weibull curve describing survival over time

Figure 1-18 Graph option on PREFS tab



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An additional page exists when using EPP 2005 for concentrated epidemics. It is provided here for purposes of information. It is known as the AUDIT page and checks input values.

Figure 1-19 The AUDIT tab

