FlexD: Xpert Scale-Up
A user-friendly, open source transmission model of TB

http://flexdx2.modeltb.org
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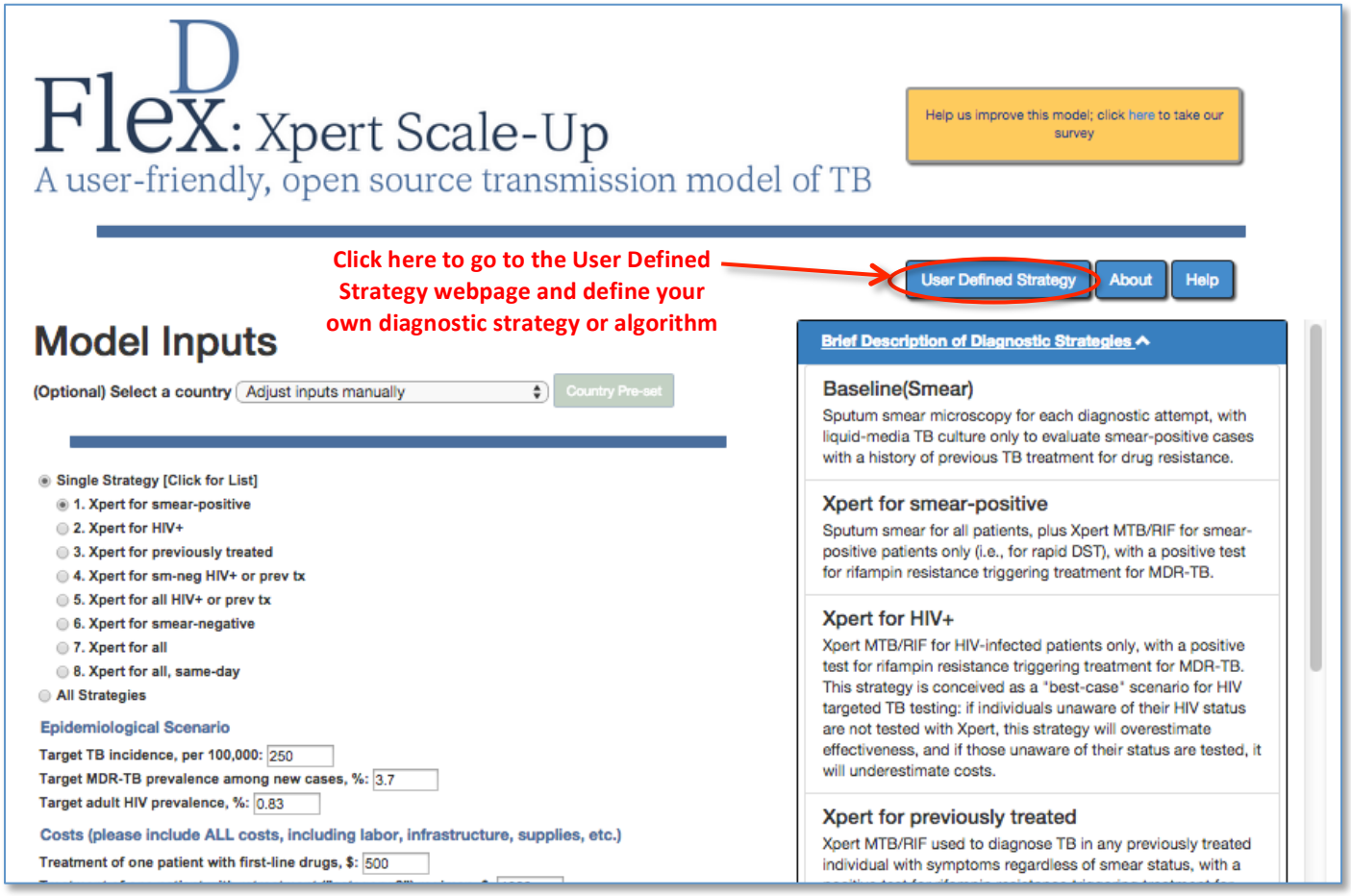
Quick Start Guide

Running the model with User Defined Strategy

The Flexible Diagnostics (FlexDx) TB Model is a flexible, simple, transmission modeling tool that allows users without modeling expertise to generate evidence to aid decision-making for implementation of tuberculosis (TB) diagnostics under local conditions. Using a simple web-based interface, FlexDx incorporates local estimates of TB incidence, MDR-TB, HIV, and costs into a combined decision analysis-transmission modeling framework to generate five-year projections of epidemiological impact and cost-effectiveness of nine diagnostic strategies in reducing TB transmission and mortality.

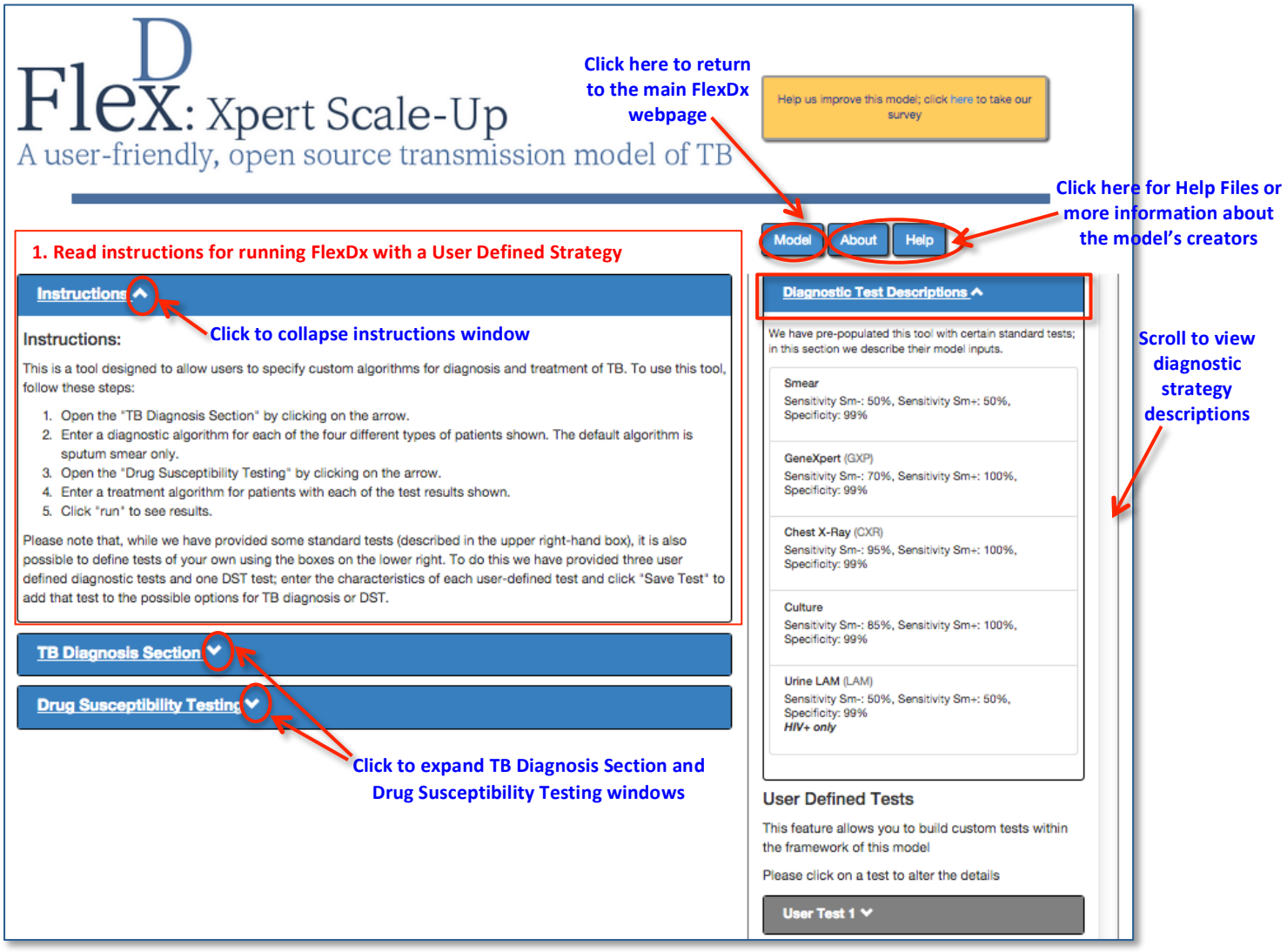
Users can run the FlexDx TB Model by defining their own diagnostic strategy as an algorithm for new and previously treated patients with and without HIV infection. Running the model for a User Defined Strategy will use global pre-loaded values from WHO estimates and other sources for the model parameters. FlexDx will return projected estimates for key epidemiologic indicators based on implementing the User Defined Strategy for diagnostic testing compared to 8 other diagnostic strategies. Users can also run the FlexDx TB Model with pre-set values at the country level, taken from WHO estimates and other sources, that provide some additional functionality (including exploration of uncertainty) than the model with a User Defined Strategy. For users who have values other than the standard country values, we offer a User Input model (with slightly less functionality) in which users can input their own values using the country baseline values as a foundation. See the *Quick Start Guides for Running the model with User Input Values* and *Country Pre-set Values* for more information.

Using the FlexDx TB Web Interface



Using the User Defined Strategy Web Interface

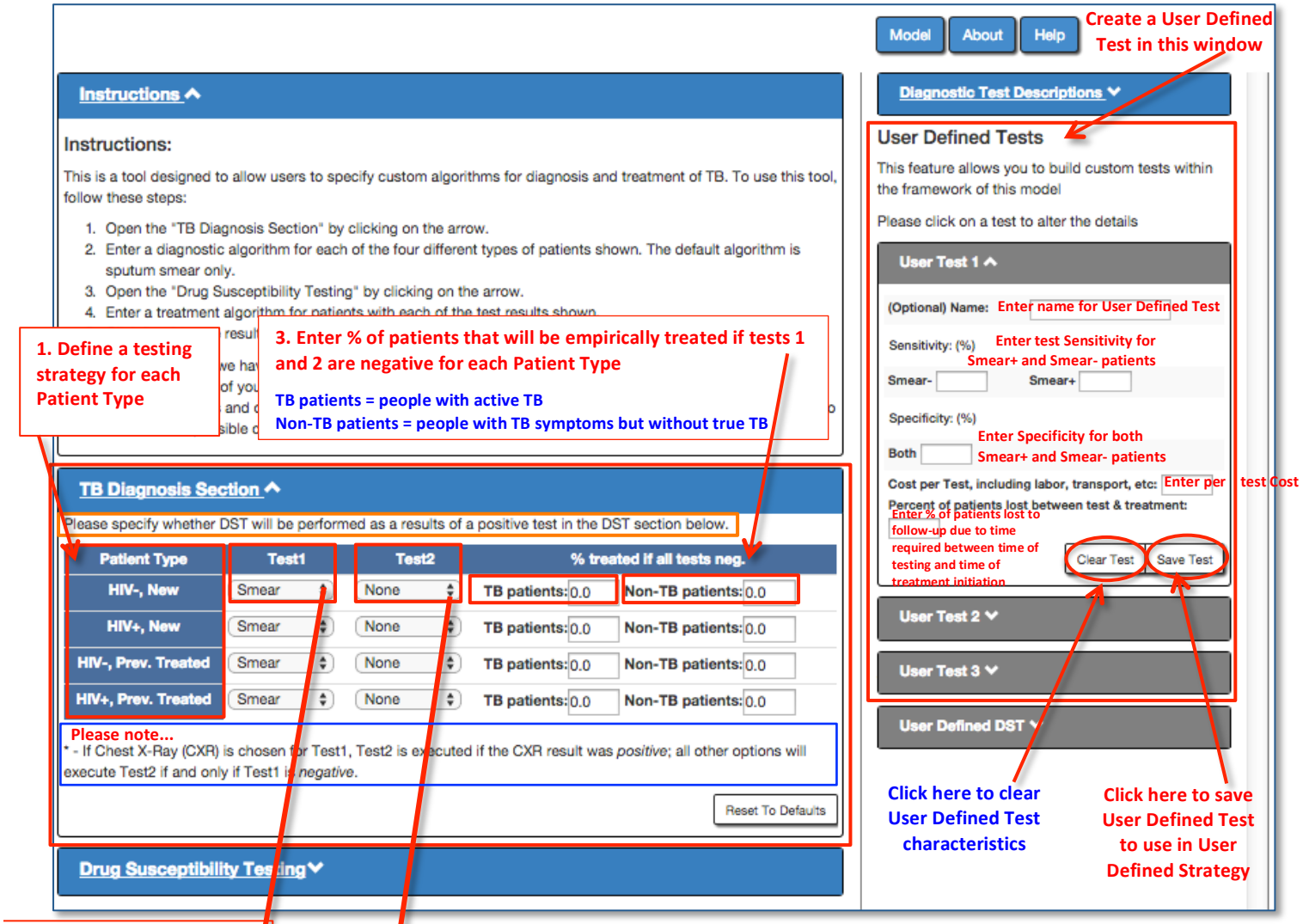
The User Defined Strategy allows users to define their own diagnostic testing strategy algorithm from a separate webpage interface than running the FlexDx TB Model with Country Pre-set Values or User Input Values. The model parameters that are contained on the FlexDx TB Web Interface are pre-populated with global TB estimates from WHO and other sources when running the model for a User Defined Strategy. Thus, users may define their own diagnostic strategy, but the model will return results based upon implementing the User Defined Strategy in the context of the global TB burden.



After reading the instructions for defining your own strategy, users may view the TB Diagnosis Section to view the diagnostic tests available. See next page for more information.

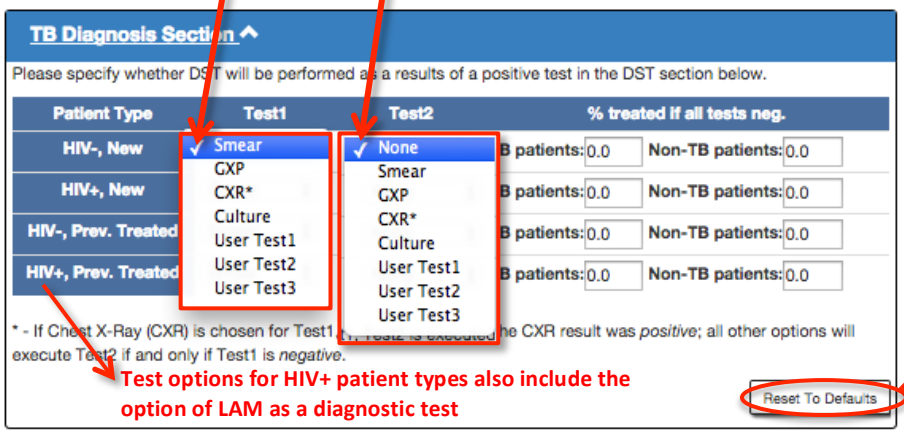
TB Diagnosis Section

For more information on these tests, users may view the Diagnostic Test Descriptions on the right. The User Defined Strategy also has the option to include up to 3 tests defined by the user if a test of interest is not included in the TB Diagnosis Section.



2. Select Diagnostic test options for Test 1 and Test 2, or create a user defined test

Click Test drop down box to select test
Test 1 = Diagnostic Test
Test 2 = Confirmatory or DST Option that will be performed as a result of a positive result for Test 1



Test options for HIV+ patient types also include the option of LAM as a diagnostic test

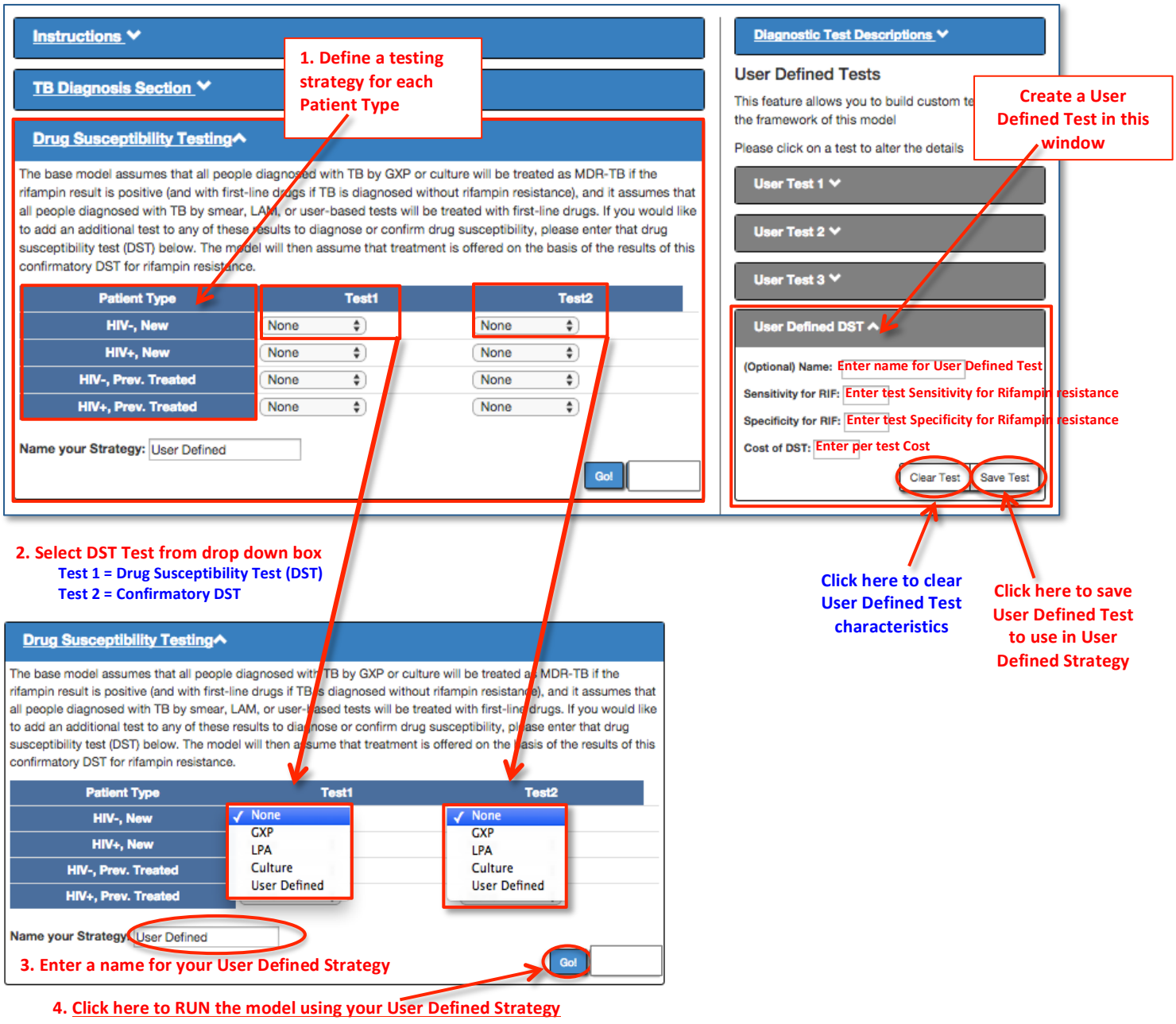
Click to clear selections and return to default settings

Drug Susceptibility Testing (DST) Section

In this section, users can specify whether or not a DST will be performed based on results from the TB Diagnosis Section. The base model assumes, if a test from the TB Diagnosis Section has a positive result:

- All people diagnosed with TB by GXP or by culture will be treated as MDR-TB if the rifampin result is positive
- All people diagnosed with TB by GXP or by culture without rifampin resistance will be treated with 1st-line drugs
- All people diagnosed with TB by smear, LAM, or user-based tests will be treated with 1st-line drugs

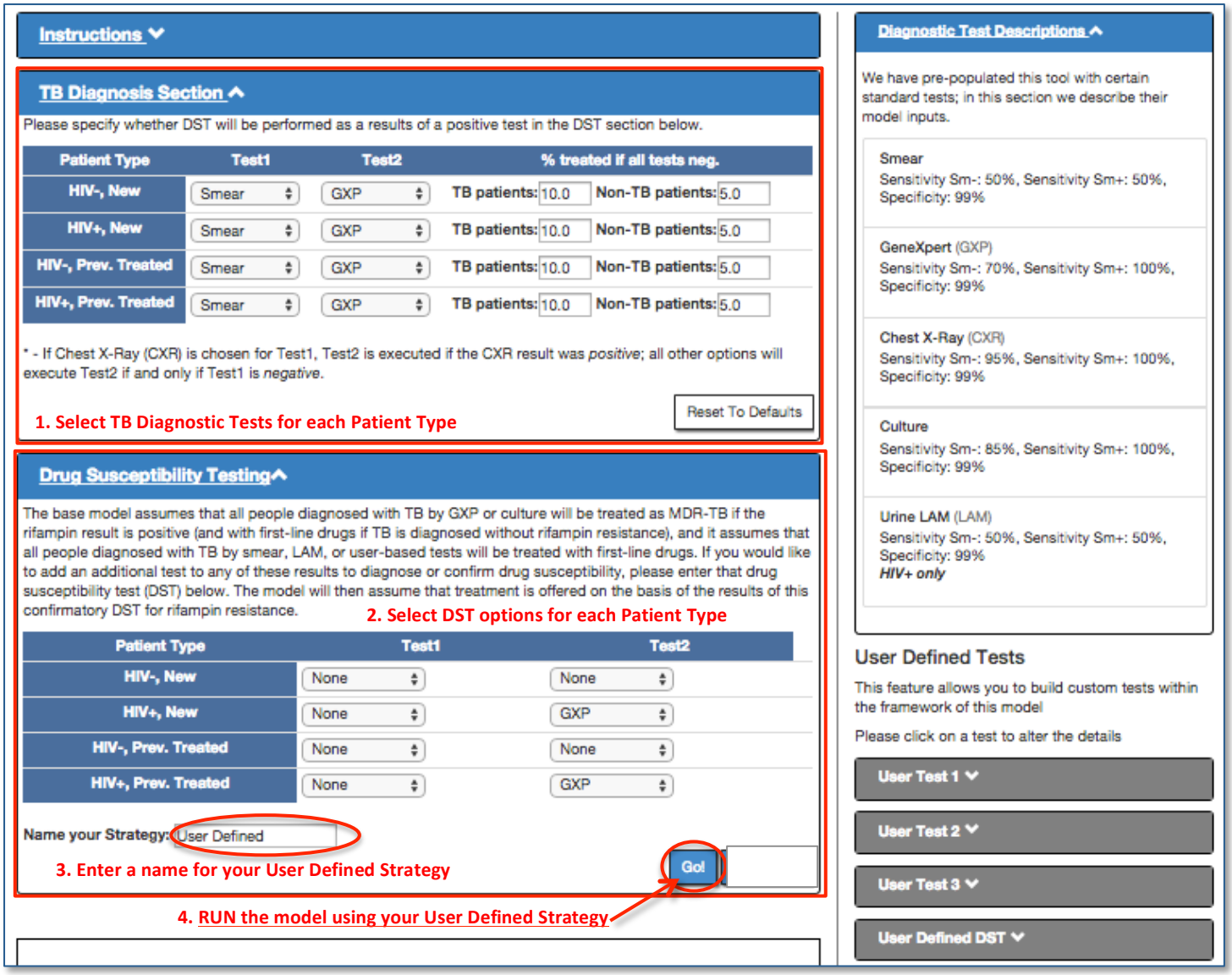
If users would like to add an additional test to any of these results to diagnose or confirm drug susceptibility, you can enter that drug susceptibility test (DST) in this section as Test 1 or Test 2. If users enter a test in the DST section, then the model will assume that treatment is offered based on the results of this confirmatory DST for rifampin resistance. Users also have the option to define an additional DST if a test of interest is not included in the DST Section.



On the next page, we will go through an example of running the FlexDx TB Model with a User Defined Strategy and the accompanying results output.

Example of running the FlexDx TB Model with a User Defined Strategy

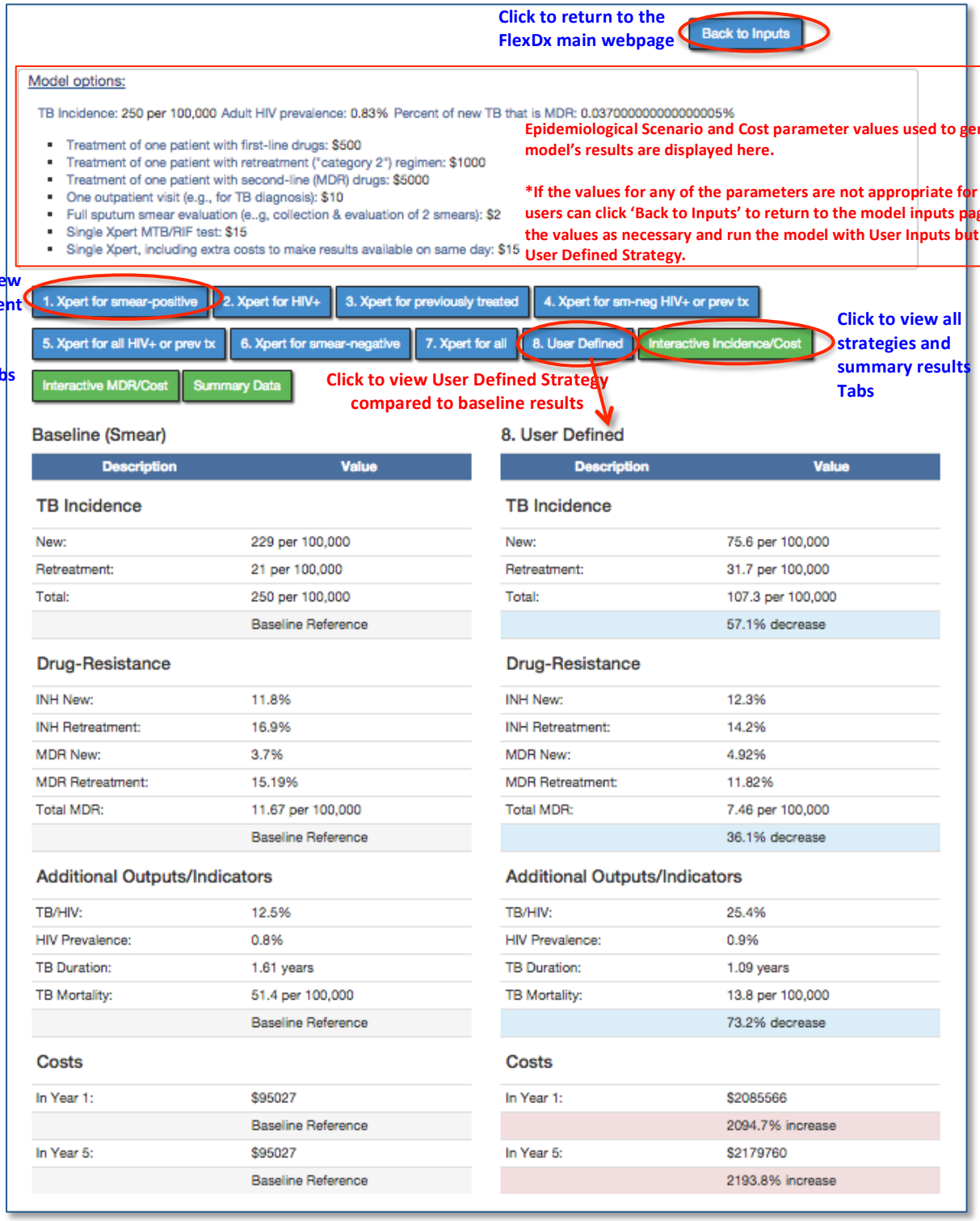
In this example, we defined a strategy where all patient types will first be tested with Smear and second by GXP. Those people without HIV that test negative by Smear and GXP will be considered to be Non-TB Patient who have TB symptoms but not true TB regardless of history of TB. Those people with HIV that test positive by Smear and GXP will be considered to be TB patients with active TB and will have a second GXP performed to confirm their drug-resistance status prior to initiating TB treatment.



On the next page, we will go through the results output from running the FlexDx TB Model with a User Defined Strategy.

Output for each Single Strategy assessed by the FlexDx TB Model

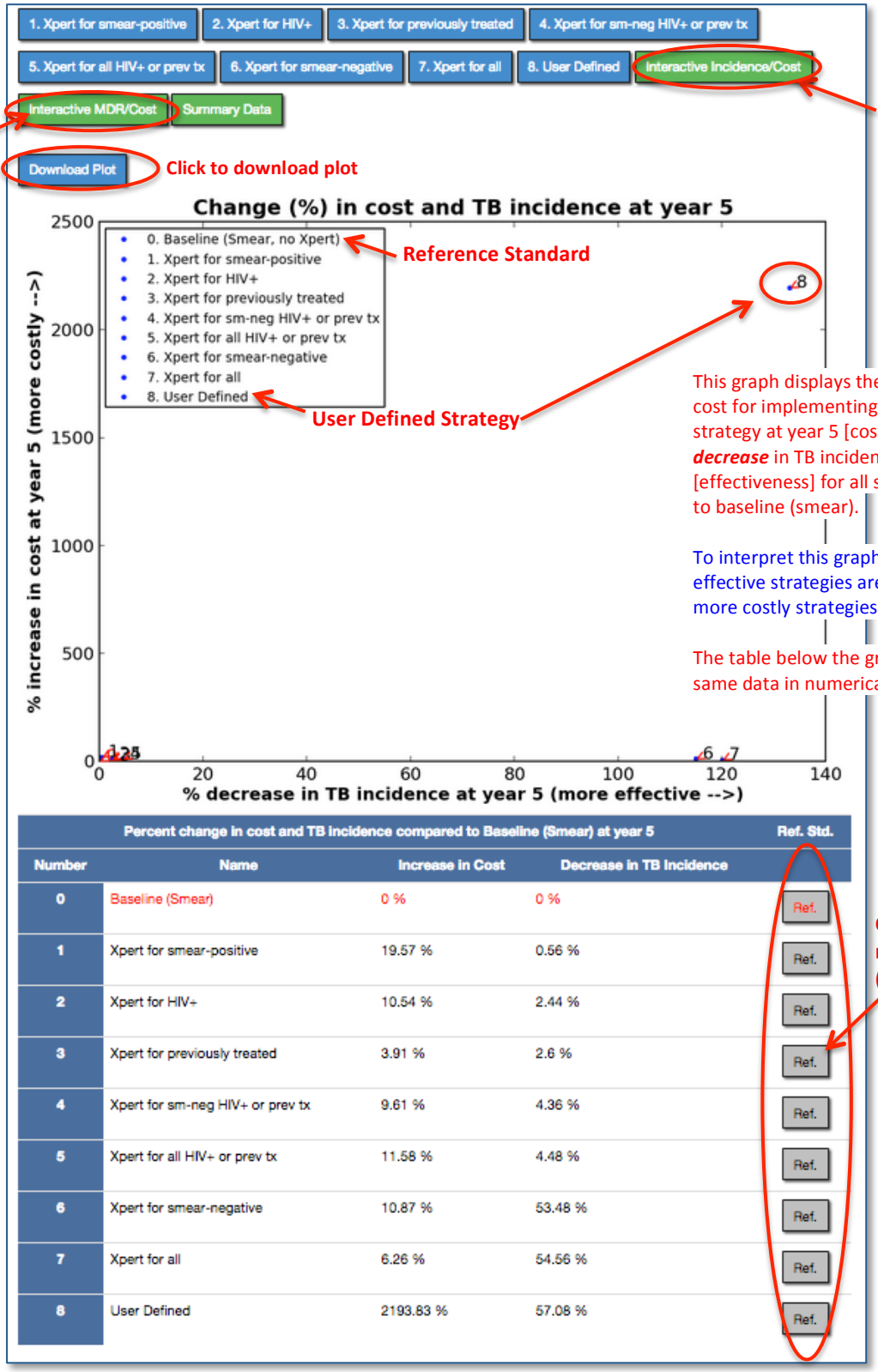
The results using User Input values are displayed below for all strategies. Note that this is the output returned when the model is run for a single strategy as well. The estimates displayed reflect projections that are expected in Year 5 of the strategy's implementation.



See the full FlexDx TB Model User's Manual for a more detailed description of the output.

Interactive Incidence/Cost and MDR/Cost Tabs

The FlexDx TB Model will generate an interactive graph and summary table Tab for TB Incidence and MDR Incidence that allow the user to change the reference standard. The results for overall TB Incidence are shown below, but the corresponding results for MDR Incidence can by seen by clicking the Interactive MDR/Cost Tab.



This graph displays the percent ***increase*** in cost for implementing the diagnostic strategy at year 5 [cost] vs. the percent ***decrease*** in TB incidence at year 5 [effectiveness] for all strategies compared to baseline (smear).

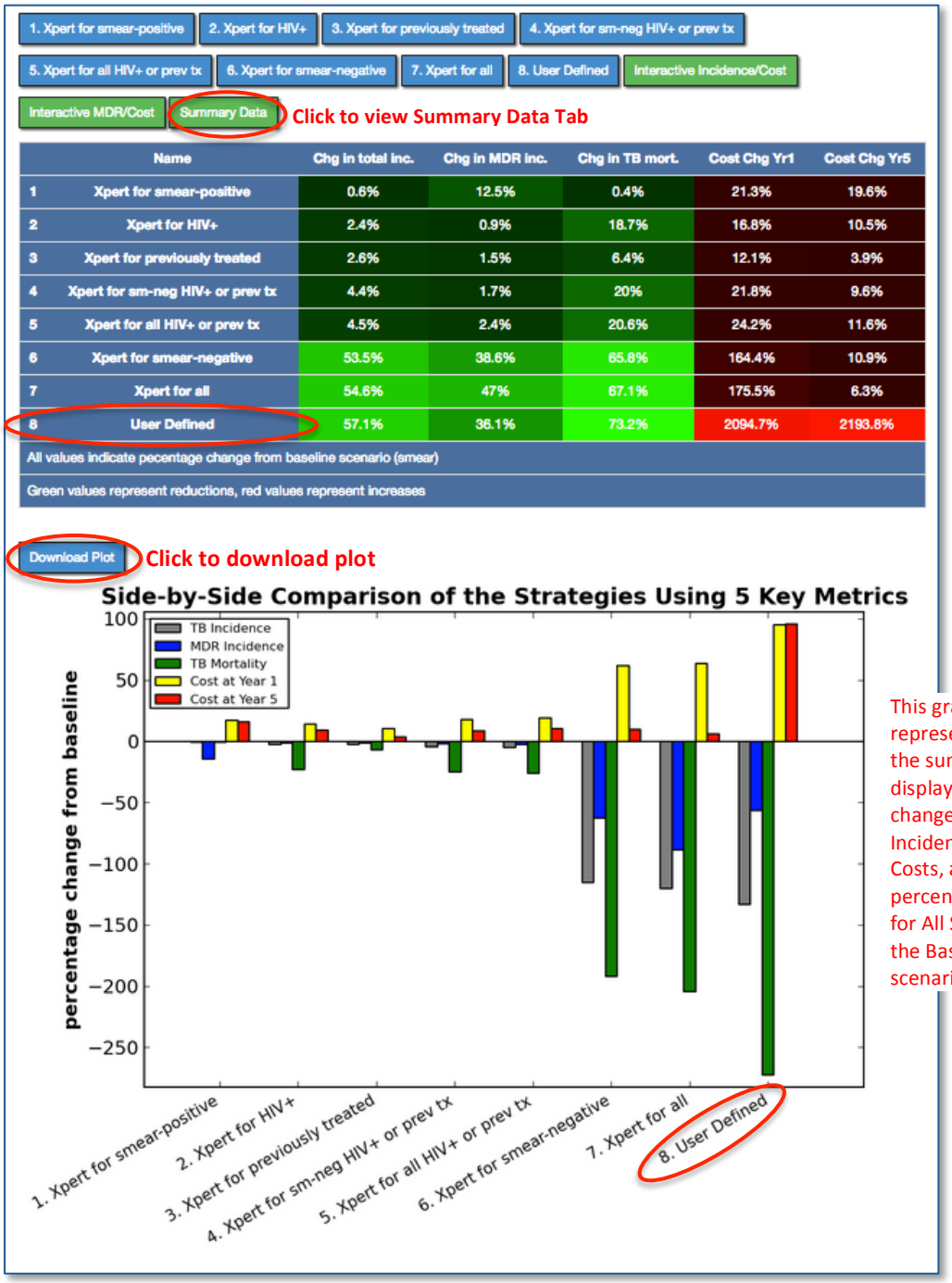
To interpret this graph, note that more effective strategies are to the right, and more costly strategies are toward the top.

The table below the graph reports the same data in numerical form.

Changing the reference standard will cause the number corresponding the selected reference strategy to turn red in the graph. The Cost and Incidence estimates in the table will change to reflect the selected reference standard.

Summary Tab

The Summary Data Tab provides the user with a summary of the FlexDx TB Model results for TB and MDR Incidence, Mortality, Year 1 Cost, and Year 5 Cost projections.



This table displays the projected changes in TB Incidence, MDR Incidence, TB Mortality, Year 1 Costs, and Year 5 Costs as a percent *decrease* (***green***) or *increase* (***red***) for All Strategies compared to the Baseline (smear) diagnostic scenario.

To extract the data in this table, users may take a screen shot of the table or manually extract and copy the data into a program of their choice. The next version of FlexDx will offer the option to download the table.

This graph provides a visual representation of the data in the summary table above, displaying the projected changes in TB Incidence, MDR Incidence, TB Mortality, Year 1 Costs, and Year 5 Costs as a percent *decrease* or *increase* for All Strategies compared to the Baseline (smear) diagnostic scenario.

Limitations of the FlexDx TB Model

As with any modeling analysis, the FlexDx TB Model and the user generated results from the model have important limitations. Thus, while FlexDx can be a very useful tool to provide access to "first-pass" estimates in epidemiological settings (e.g., sub-district level data) that will never be captured by more detailed and closely-calibrated TB transmission models, it does not eliminate the necessity for more detailed models.

For more information or to access the help files for the FlexDx Model, users can click on the 'About' and 'Help' buttons on the model input page. See the full ***FlexDx TB Model User's Manual*** for more details on using the model.