Rapid Diagnostic Tests and Artemisinin Combination Therapies:
Script to Accompany the MDAST Training Video

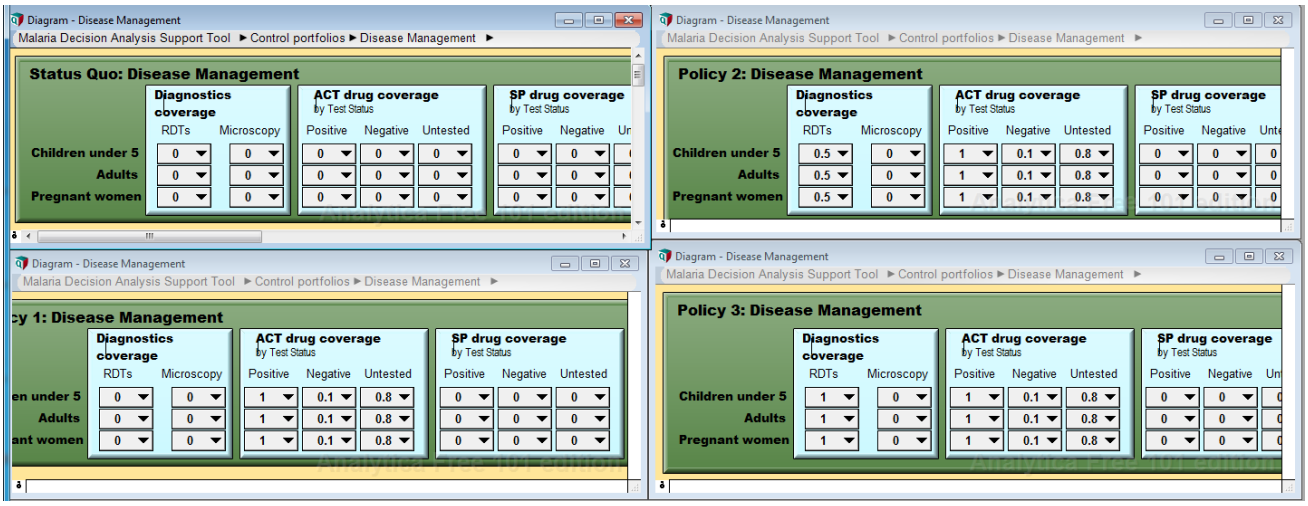
June 2015

This script is intended to accompany the MDAST training video demonstrating an example on Rapid Diagnostic Tests and Artemisinin Combination Therapies, viewable at http://sites.duke.edu/mdast/videos/ . This script is provided so that users can follow along with the video and as an overview of the video's content.

The following video will demonstrate an example on MDAST that considers the intervention of using artemisinin-based combination therapies or ACTs and rapid diagnostic tests or RDTs. RDTs can enhance the impact of a given ACT stockpile by limiting the use of the drugs to confirmed malaria cases, but RDTs are expensive. This example analyzes these tradeoffs. Please use the MDASTv1.3beta_TZ_blank_01072015 model file to follow along with this demonstration. The model we are using is the newer version. There is a slightly updated model online. If you are using the older model, your results may vary. The model has been pre-specified with parameters for rural Tanzania.

The first step is to specify the parameters which will determine the impact of the intervention. The impact of RDT policies in MDAST depends on the incidence of diseases that produce symptoms similar to malaria (in particular, fever) and which would be presumptively diagnosed as malaria in the absence of an RDT. The impact of these interventions depends on how many cases are masquerading as malaria when they are in fact caused by some other disease. The user provides this information, by specifying a value for the parameter "Yearly incidence of non-malaria fever." On the opening page under the Parameters box on the left click on the first option "Malaria burden" and then the second option "Intervention Impact Parameters" to set the values.

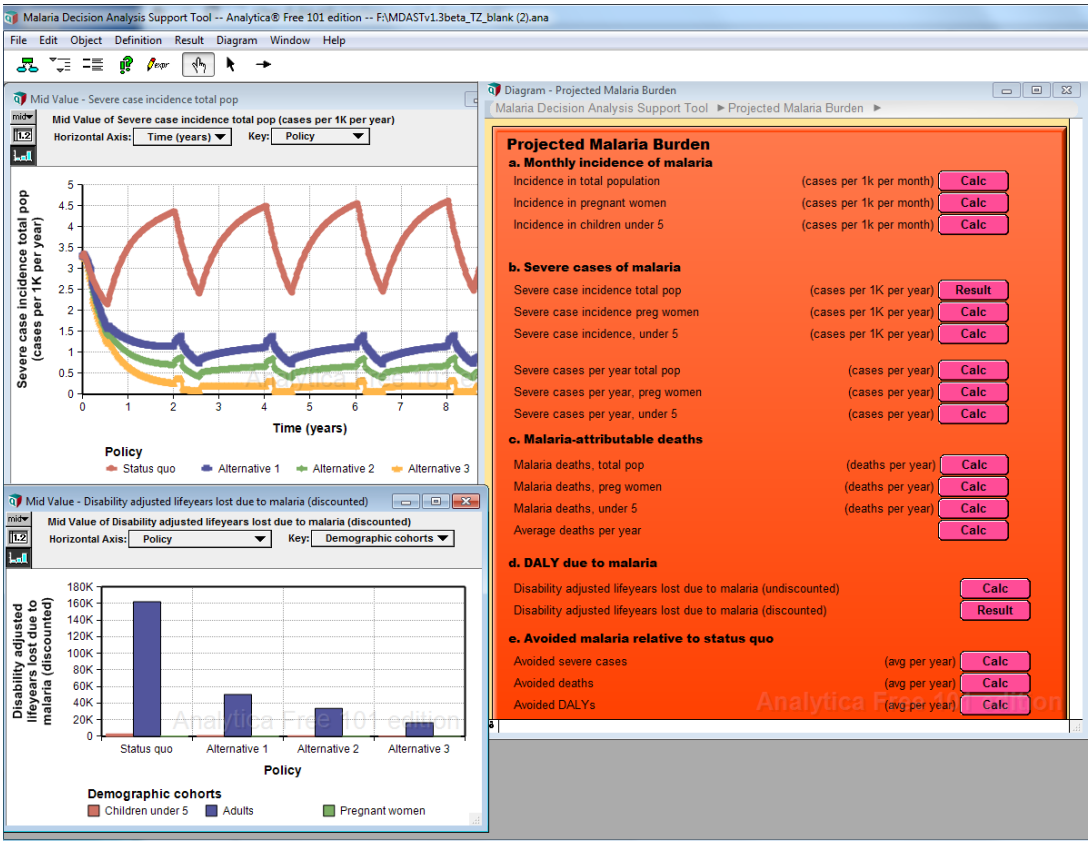
The second step is to set up the interventions. First, we will specify the coverage level of ACT drugs. This is the fraction of people who are sick with malaria who are being treated with ACTs, indexed by a demographic group. ACT is also indexed by the test status of individuals—whether they were tested and what the result of any test was. In this example, we assume that 80% of presumptively diagnosed and test-confirmed malaria cases are treated with ACTs. We also assume that for whatever reason (e.g. Health worker skepticism of RDTs) 10% of symptomatic patients who receive a negative RDT result are still treated. This is reflected under ACT drug coverage. For the Current Interventions or Status Quo policy, we verify that no drugs are used. To do this we click on "Control Portfolios" on the main module. Current interventions is the status quo and we click on "Disease Management". For the Status Quo Policy we verify that no drugs are used. To change the coverage you go to "Policy Alternatives", "Disease Management", and use the drop downs to change the coverage levels. The demographics shown are children under five, pregnant women, and adults. RDTs are under Diagnostics coverage and ACT drug coverage is a separate submodule.



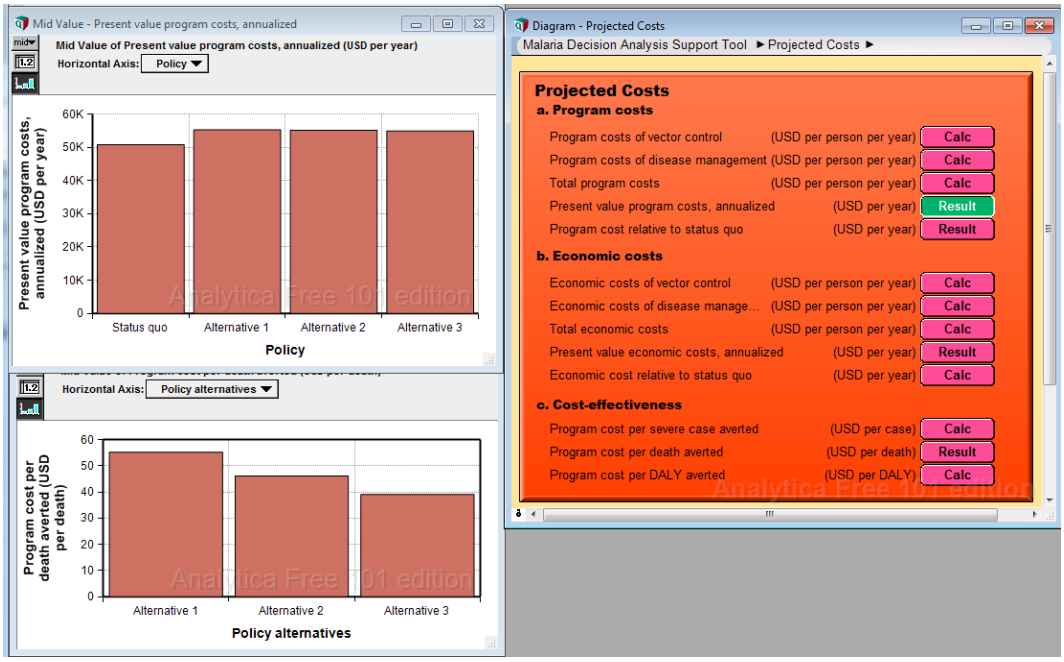
In this example the only differences between the policy alternatives is the level of RDT coverage. These levels specify what fraction of individuals with malaria symptoms are treated. Policy 1 corresponds to a policy of not using any RDTS and hence prescribing ACTs entirely based on presumptive diagnosis. Click on the "Disease Management" icon or the second option under alternative 1. Edit the RDT dropdown menu by clicking on the black arrow and select all 0's for the different demographics for policy 1. In policy 2, we are assuming 50% of symptomatic individuals are tested with RDTs. Edit the RDT drop down menu for Policy 2 and select all 0.5's for each demographic. Policy 3 assumes that 100% of symptomatic cases are tested with RDTs. Edit the RDT drop down menu for Policy three with 1.0 selected for each demographic. Then close out of the boxes.

After this is complete, we will turn to the results module. We will first examine the predicted disease burden under the policy alternatives. Go to the "Projected Malaria Burden" or first option under "Results" on the main module on the right hand side. Click on the first "Calc" under part b to the right of severe case incidence total population per 1,000 people per year. After you have selected "Calc" it will change to "Result." A line graph will appear, plotting the status quo and each alternative policy. Make sure Time in years is on the Horizontal axis and the key is policy. Under part d on the same page, click on the second "Calc" labeled disability adjusted lifeyears lost due to malaria (discounted). When looking at the DALYs we see that the 3 ACT policies dramatically decrease the time people spend sick with malaria, relative to the status quo. A bar graph appears showing the three demographic cohorts and three policy alternatives and the DALYs. Make sure the horizontal axis represents policy and the key represents demographic cohorts. A line graph also appears showing the policy alternatives and the status quo.

*If you are using a different model, your results will vary. The original model uses 90% instead of 80% for presumptively diagnosed and test-confirmed malaria cases that are treated with ACTs. The original model shows that drugs were used for the original 30% of presumptive cases treated with SP. The second model does not follow this assumption and should have 0% for SP.



We are also interested in the cost. Under the “Projected Costs” submodule on the main page beneath “Results” and “Projected Malaria Burden”, there is a function under part c that shows cost effectiveness. We are particularly interested in the second item under the last tab or the “Program Cost per death averted”. To the right of this, next to USD per death there is a “Calc” tab. We are also interested in “Present value program costs, annualized”. This is under Part a. Once the “Calc” tabs are selected two graphs should appear. These graphs show how RDT use changes the cost effectiveness of an ACT-based malaria-control program.



For more information such as Parameter Inputs please see the Manual on our Website. If you have any questions or need further assistance please email, support-mdast@duke.edu.