

**Syphilis Interventions Toward Elimination (SITE) model
– User guide to the R-code user interface**

*Version 09 July 2020* 

**Overview**

The Syphilis SITE model is provided as a pair of programmes called:

* ***SITE\_5.0.1.ZIP***
* ***RunSITE.R***

And two spreadsheets:

* ***Syphilis SITE model\_User interface INPUT\_22June2020.xlsx***
* ***Syphilis SITE model\_User interface OUTPUT\_22June2020.xlsx***

All four can be found at (as of 02 July 2020):

* For WHO/PAHO/WPRO:

<https://www.dropbox.com/sh/18x547xv3off2tk/AAC9Q4otNc2v19AI4nUxI-M_a?dl=0>

* For PNG workshop participants: https://www.dropbox.com/sh/x7z6343nhfy8mb9/AADWSuzWv8x5UrLYb3LEAv0sa?dl=0

To start, please download all four into a dedicated new folder. Do not unzip SITE\_5.0.1.ZIP.

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| ***SITE 5.0.1***: The dynamic transmission model, written in R code. The SITE model programme continues to be refined. The latest version, as of 29 June 2020, is 5.0.1. As the software is updated, its version number will change. ***RunSITE.R***: A short program in R, that calls and runs SITE and tells it where to find the input file, and what to call and where to save the output file.***Syphilis SITE model\_User interface INPUT\_29June2020.xlsx:*** An Excel spreadsheet containing the input data for a particular country projection.***Syphilis SITE model\_User interface OUTPUT\_29June2020.xlsx:*** A user interface developed in Excel to help with analyzing, summarizing and plotting the syphilis-related indicators for a particular country projection. |

The model was programmed in C++ as an add-on package of R, version 4.0.1 [1]. User-defined parameter input values are specified in an Excel file, as are model outputs.

Users can run the model through a User Interface in either R or RStudio. RStudio as it is easier for non-programmers to use than R, but still requires R to be installed first. These instructions, as they are designed for non-programmers, includes a description of how to install both R and R Studio.

The technical modelling methods and assumptions are described in detail in [2].

**1. Install R**

Go to: <https://cran.r-project.org>

This will give the option to download for Windows or (Mac) OS X (High Sierra or Above i.e. 10.13 or above).
At present SITE is only compiled for Windows. Please download the latest version: R 4.0.1 for Windows.

**2. Install RStudio**

Go to: <https://rstudio.com/products/rstudio/download/>

Select: RStudio Desktop (open source license) Free

**3. Install R’s background packages**

The SITE model requires several publicly available R packages, that enable generic functions like drawing graphs. To download these in RStudio from the top menu select **Tools** and then select **Install Packages.**

This brings up the screen:



The box Install from should be set to: Repository (CRAN)

Type in the space under packages the following 5 package names, with a space in between each one:

* fastmatch
* abind
* mvtnorm
* mgcv
* openxlsx

The box for Install dependencies should be checked.

Press **Install** (best to install into the default library e.g.*, C:/Users/…/R/win-library/4.0 [Default])*

Another option for loading these packages is to go into the console window and type:

install.packages(c("fastmatch","abind","mvtnorm"," mgcv","openxlsx"), dependencies=TRUE)

**4. Install the SITE model package**

In RStudio, in the top menu go to **Tools** and then select **Install Packages**

The box ‘Install’ from should be set to: From Package archive fileand then select **SITE\_5.0.1.ZIP** and then Open, followed by Install.

Check the Console box (left hand panel) – the latest line should say “*package ‘SITE’ successfully unpacked and MD5 sums checked”* if the model has been successfully loaded.

**5. Open and adjust RunSITE**

In the top menu, go to **File** and then select **Open File**. SelectRunSITE.Rand then select **Open.** This loads the RunSITE, a programme that tells the model what input file to use, under what name to save the output file and then runs the model.

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| **Tip:** Lines in the RunSITE.R with a hashtag (#) before them are comments and are not executed. |

In order to use the RunSITE there are two things that need to be done:

1. **Set Working Directory**

Go into the top menu and select **Session**, then **Set Working Directory,** and then **Choose Directory.** Select the directory where SITE\_5.0.1.ZIP, RunSITE.R and the input file are saved.

To avoid having to do this each time again that RunSITE is used, you might add the following command as the first line within the RunSITE.R file (the yellow part you need to adjust to your specific actual folder structure and folder names):

*setwd("C:/directory path file)*

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| **Tip:** In RStudio, in the Console window typing the instruction *getwd ()* followed by enter displays the current working directory, so you can check that it is set correctly.  |

1. **Name the input file**

Within RunSITE set the name of the input file to specify the file you want to use.
To do so, go to line 8 (or 9) of the code. This line tells the program which input file to use:

mydata <- getSyphDataFromDb(“*Name of input file.xlsx*”)

and change *Name\_of\_input\_file* to the name of the file you want to use.

**6. Run the Model**

Within RunSITE, select all of the lines (around 37 lines) in the top left panel, by typing Control and A at the same time. Then run the selected lines by:

* typing ‘**Control’** AND **‘Enter’** together OR
* in the top menu, under **Code**, in the dropdown menu select ‘**Run selected line(s)**’.

The programme RunSITE calls and runs SITE\_5.0.1 and tells SITE where to find the input XLS file and where to write the output file.

The model gives the output file the same name as the input file, with ***‘\_out’*** added, for example:

Input = *SITE input COUNTRY\_29June2020.xlsx*

Output = *SITE input COUNTRY\_29June2020****\_out****.xlsx*

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| **Tips:*** Running the model takes about 50 seconds on a standard personal computer. While the model runs, lines will appear in the Console panel (bottom-left). If there are any errors these will appear in a different color.
* To clear the lines in the Console panel, click on the grey broom in the top right hand corner of the Console panel.
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**7. Review the output file**

Go to the working directory and check that the output XLS file is produced or, if the model has been re-run using the same input file as an earlier run, that the earlier output file has been over-written (i.e. check the date and time of the new output file).

The output XLS file has several worksheets, including:

1. ProjectionResults: Provides results for 17 syphilis-related indicators by 10 population groups (or combinations of groups) (n=71) for 1970 to 2050 inclusive.
2. MixingMatrices: Provides results about sexual contacts and the structure of sexual ‘mixing’ between the 7 high-risk and lower-risk groups for 1970 and for 2050 that drive the transmission of syphilis. This output is primarily intended for use by technical model developers [2].

**8. Review outputs using the user interface**

A user output interface has been developed in Excel to help with analyzing, summarizing and plotting the syphilis-related indicators. The latest version of this user interface (*Syphilis SITE model\_User interface OUTPUT\_22June2020.xlsx)* can be found at: <https://www.dropbox.com/sh/18x547xv3off2tk/AAC9Q4otNc2v19AI4nUxI-M_a?dl=0>

To use this interface:

* Open *Syphilis SITE model\_User interface OUTPUT\_29June2020.xlsx* in Excel
* Rename the file: *"Name of input file\_OUTPUT+CHART+TABLE.xlsx’’*
* Open the output file from the new simulation in Excel
* Copy the worksheet sheet ‘ProjectionResults’ from the output file from the new simulation
* Paste the new worksheet in the “ProjectionResults” worksheet in *"Name of input file\_OUTPUT+CHART+TABLE.xlsx’’* – thus overwriting the original content of this sheet
* Save your XLS.

The user output interface has five sheets that are visible to the user. There are also some hidden sheets, where key calculations are conducted. Please do not make any changes to these.

1. ProjectionResults: Raw output data from the model
2. Readme: Background information on the model, version, developers etc.
3. Dictionary: Explanation, definition and units of indicators, population groups, and other terminology used in the model output and XLS.
4. Trend graphs: Interface for producing trend line graphs. Users can select:
	* Indicator of interest from the 17 syphilis-related indicators
	* Range of years from 1970-2050
	* Population group(s) displayed
5. Summary + Cost-Effect*:* Table summarizing the population distribution of syphilis and of syphilis intervention service outputs, for a calendar year that the user can select. Users also have the option to specify service delivery unit costs, which are used to calculate total intervention program cost.

**Trouble Shooting**

| **Problem** | **Solution** |
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| Input XLS could not be read correctly | Check to see the structure of the input file had been disturbed (e.g. if any rows, columns or cells from the input XLS have been added or deleted) |
| The output file is not produced, or it was not overwritten at a repeat run | Check that the output file was not open in XLS whilst R-code was running; if the output file was open it will not have been updated. |
| Change to a new version of *RunSITE* & *SITE\_5.0.1.ZIP*: new version does not work | Check the date and time of the programmes in the working directory. They should be the actual date/time. If the old version was open/loaded in RStudio when the programme was being installed, the new version will not have loaded properly. |
| Any problem, question or comment | E-mail Avenir Health at: ekorenromp@avenirhealth.org … ideally enclosing:* a screenshot of the RStudio Console window, at maximum size, showing any error messages
* The RHistory file, stored in your working directory, latest version after closing RStudio
* Your input XLS file
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Comments and questions, please to:
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**References**

1. R Core Team. R: A language and environment for statistical computing Vienna, Austria: R Foundation for Statistical Computing, ; 2018 [cited 2019 4 July]. Available from: <https://www.R-project.org/>.

2. Korenromp EL, Mahiané G, Glaubius R, Stover J. The Syphilis Interventions towards Elimination (SITE) model to inform national strategies and targets for syphilis control – technical methods report. Geneva / Glastonbury: 2020 30 June.