

Help file

This is a spatially structured model simulating the spread of infection in a human population. Please, see a YouTube video for a general explanation of how the model works.

Main Menu

“GO” – you can start and stop and resume calculations at will. Time unit is a “day”.

“File ->SavePRMs” - use this menu to save current parameters as “.gmm” file and reload them later using “LoadPRMs”. “Save BMP sequence” - during the model run you can save the results (Map and Graphs) as a sequence of BMP files (24bit) if you wish to convert them into a video file. You can use “Save Map as .bmp” for a single image OR “Save Graph as .bmp” to save the graphs as a picture OR use “Save results as .txt” to load your results into a statistical package (tab-separated).

“File ->Load BMP as Map” is used to load custom 8-bit bmp file as a map into the model. Any pixel with the value above zero is a “land” where individuals can move or commute. If you use population density map, the density is encoded from 1 to 255, and at a “NewRun” the individuals are placed on the map according to pixel values (probability of placement). Two maps are supplied with the model – the shape of England without spatial structure and the map of England with population density as of 2011 census.

“NewRun” – opens the “Settings” dialogue box where you can change the parameters of the “Map” and “Populations” and start the model from Day0. Individuals will be placed on the map according to the conditions, and the model starts calculations. NOTE – you need to click on “Infect” menu to introduce infected individuals into the population.

“Conditions” – most of the Settings can be changed during the current Run except Map and Population sizes, use “NewRun” if you want to change those.

“ShowMap” – The separate Map window will appear next to the main window. Click this menu again to hide the Map.

“SetGraph” – The Graph settings dialogue box will allow you to change the graphs and labels properties.

“Infect” – Click this menu to add newly infected individuals into the population. You can do this at any moment multiple times during the run. The total number of introduced infections will be shown in brackets.

Settings Menu

In “Map” page, you can set the size of the map (in pixels). If you load your own bmp Map, make sure that the dimensions of Map match the .bmp sizes. If you use population density map, the “Use BMP density Map” checkbox should be ON.

In “Population” page, you can set the size of the population (up to 100000). NOTE – if you model the fast spread of infection in a large population, the model will run very slow at the peak of infection when a large number of individuals are in the contagious stage.

“Mobility” – the individuals move randomly at each model step on the map or “land” within the mobility radius (set in pixels, but it is a floating-point number). If the population density map is used, the individuals will stay within the same density areas (pixels) of the map, where they were originally placed.

“Infection distance” – the maximum distance at which the individual can infect another individual.

“Infection probability” – the probability that a susceptible individual within the “Infection distance” is infected.

“Commuters” – a percentage of the population randomly moving long distances “commuting”. In case of density map, the computers move between the areas of the same population density (e.g. from one crowded town to another).

“Duration of infection” – time (in days) from the moment of infection until the individual recovers from the infection.

“Contagious from day” – offset time from the moment of infection until the individual starts to infect other individuals.

“Initial infections” – the number of individuals infected every time you click “Infect” item in the main menu.

MAP menu

“Zoom” – use to change the scale of the map.

“AddGraphs” – set this item to OFF if you want to save the sequence of map images without graphs

“Notes” – few notes and scale on the map.

“SetScale” – if you use the real map bmp, you can set the scale km/pixel to set the correct scale bar values.

If you have questions, please contact us by email gregory@mashanov.uk