

# README: RSV modelling project McMarcel

The objective of this modelling project is to evaluate the impact and cost-effectiveness of potential maternal and neonatal RSV immunisation strategies in 72 Gavi countries. The acronym stands for **M**ulti-**C**ountry **M**odel **A**pplication for **R**SV **C**ost-**E**ffectiveness **p**oLicy (McMarcel).

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## Where to start?

We organised our R-project upon **RSV\_main.R**, which is the workbench to coordinate the model input, the number of runs, random seeds, . . . and all output. Please make sure that your **Working Directory** is specified as the location of this R file, since all links in the code are relative to the location of this script. We included **RSV\_main.pdf** with syntax highlighting to get started.

## Where are my results stored?

During the execution of the model (by using the RSV\_main script), an **output** directory will be created. Each run will create a separate sub-directory to store all results.

## How to specify interventions and countries?

The main script uses a csv file in the “config” directory, of which each row leads to one cost-benefit analysis for a specific country, intervention, coverage, etc. Simulation results are grouped per “config\_tag” to create figures and tables.

## Main directory

Directory or file name	Content
config	Directory with model configurations by country, year, coverage, duration of protection, efficacy and intervention (maternal or mAb)
functions	Directory with R help functions
input	Directory with input data to run the analysis for 72 Gavi countries
README.pdf	Readme file with the project introduction and reference
RSV_main.R	Main script to run the cost-effectiveness analysis
RSV_main.pdf	Main script with syntax highlighting to get started
LICENCE.txt	GNU GENERAL PUBLIC LICENSE Version 3

All code is tested with R Version 3.5.3 on MacOS 10.15.2 and R Version 3.5.1 on CentOS Linux 7.

## Input files

File name	Content
cfr_lmhc_ts_n5000.csv	RSV case fatality rate estimations for hospitalised RSV cases, based on data from studies in LMIC countries, represented by 5000x tin-plate splines.
country_details_gavi72.csv	Country data such as, ISO3 code, WHO income region, target population (newborns) and stillbirth rate
cost_inpatient.csv	Estimated RSV inpatient cost based on Zhang et al and WHO unit costs, represented by 5000 samples from a meta-analysis.
cost_outpatient.csv	Estimated RSV outpatient cost based on Zhang et al, WHO unit costs and health care seeking behavior, represented by 5000 samples from a meta-analysis.
hosp_prob_ts_n5000.csv	RSV hospital probability estimations for RSV cases, based on data from Nokes et al, represented by 5000 tin-plate splines (Default)
hosp_prob_ts_n5000_pooled.csv	RSV hospital probability estimations for RSV cases, based on data from Nokes et al and Homaira et al, represented by 5000 tin-plate splines (Sensitivity Analysis)
incidence_lmhc_ts_n5000.csv	RSV incidence estimations, based on data from LMIC countries, represented by 5000 tin-plate splines
natural_earth_data	Directory with free vector and raster map data from <a href="http://www.naturalearthdata.com">www.naturalearthdata.com</a>
RSV_burden_Shi_2017.csv	Country-specific RSV related burden of disease, derived from the systematic review by Shi et al (2017)

More details are provided in the main text and additional file of the reference above.

## Dependencies

R package	Reason
countrycode	To convert country names into iso3 codes
doParallel	To run foreach loops in parallel
dplyr	To aggregate simulation results
ggplot2	To make fancy plots
mgecv	To use the gam function in the EVPI code
rgdal	To plot results on Geospatial scales
scales	To use transparent colors
wpp2017	To obtain population data from from the United Nations World Population Prospects 2017

## Team

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