Practical 7. PSA to structural uncertainty

Wednesday, 22 June 2022

Lecture 7   PDF version

Introduction

As mentioned in the lecture, the Bayesian analysis has been performed using two different model specifications. The second one assumes a robust prior for each statin-specific effectiveness (in comparison to placebo), in preventing cardiovascular events. This has been achieved by using a Half-Cauchy distribution, instead of a Normal model.

1. Following the script, load the R datasets contained in the files named respectively `statins_base.Rdata` and `statins_HC.Rdata`. These have suitable `bugs` objects `statins_base` and `statins_HC` in which the results of the two model specifications are stored. Use the R command `print()` on each of them to produce the summary statistics for the nodes that have been monitored.

2. Following the script, use BCEA to perform the economic analysis using the output of the two Bayesian~models.

3. Following the script, re-arrange the objects in your workspace to create suitable `lists`, that can be used to perform the PSA to the structural assumptions.

   - The first one is a `list` containing the two `bugs` objects in which the output of the calls to OpenBUGS are stored.

   - The second one is a `list` containing the simulated values from the posterior distributions for the variables of effectiveness from the two models. These are stored in the `bugs` objects and can be accessed by using the command `name_BUGS_object$sims.list$name_variable`.

   - The third one is a `list` containing the simulated values from the posterior distributions for the costs from the two models. Type the R command `head(costs[[1]])` to visualise the first few values of the first element in the object `costs`. Type the R commands `dim(costs[[1]])` and `dim(effects[[1]])`, which return the `dimensions` (i.e. number of rows and number of columns) of the objects `costs` and `effects`. Make sure you understand these results.

4. Following the script, execute the PSA to the structural assumptions assumed above, using the BCEA function `struct.psa`. Type the R command `names(m3)`, which displays the elements contained in the object `m3`.

5. Visualise the weights associated with each model by typing the R command `m3$w`. Which model is the most supported?
   NB: you can also visualise the DIC associated with each of the models considered by typing the R command `m3$DIC`.

6. Use the element `m3$he` and the BCEA functions (e.g. `plot`, `ceac.plot`, etc.) to visualise the results of the economic analysis on the "average" model (obtained by combining the two different specifications).