Objective – Tool purpose

• Network meta-analyses (NMA) are the gold standard method for comparing therapies with each other in the absence of head-to-head trials or to rank treatments based on efficacy and safety.
• Obtaining the data for the NMA is time consuming and NMA implementation is often repetitive.
• In recognition of this, a tool was developed to automate NMAs on up-to-date study data from ClinicalTrials.gov.

Methods

• The tool was built using R and Shiny (shiny.rstudio.com). It works on any web browser.
• Estimates of odds ratios (OR) for drug discontinuations (binary outcome) are calculated through a Bayesian NMA model.
• Bayesian inference is performed with JAGS as an alternative, the user retains the possibility of choosing.
• The tool was built using R and Shiny (shiny.rstudio.com).

Results

Automatic choice random- vs. fixed-effects model

![Figure 3: Algorithm for choice of random- vs. fixed-effects, based on heterogeneity assessment.](image)

• As an alternative, the user retains the possibility to decide between fixed- and random-effects based on their own assessment of the input data.

Automatic corrections for zero-event study arms

• In cases where no event occurred for a given intervention A in any of the studies comparing it to B, the standard NMA model may [5]:
  - Offer poor convergence, or not converge at all in extreme cases
  - Over-estimate the effect (OR)
  - Return wide and skewed confidence intervals

  → To prevent this, corrections (off-sets) are applied automatically and parsimoniously.
  - An off-set, proportional to the sample size in the intervention arm and the relative study sizes [6], is added to each arm of each study.

Tool output: automated report

The tool offers a dynamic display of:

1. Network of evidence, input data inclusion/exclusion, network consistency and heterogeneity.
2. OR tables, forest plots against a reference treatment
3. Bayesian convergence diagnostics.

Conclusion

The tool is able to generate up-to-date NMA reports on data from ClinicalTrials.gov, while providing the user with flexibility to change their choices of interventions and conditions to include, model structure in light of the displayed network, results and diagnostics.