

It's alive! Feasibility and benefits of living cost-effectiveness modeling following a living SLR

MSR58

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Background

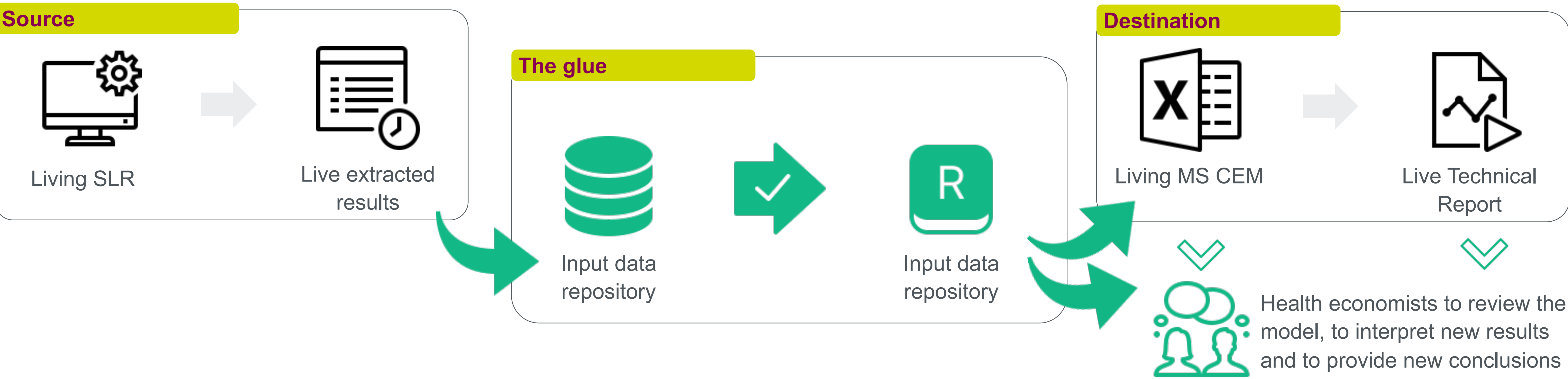
Living Systematic Literature Reviews (SLRs) are continuously updated SLRs, incorporating relevant new evidence as it becomes available [1]. Multiple benefits include continuous monitoring and immediate availability of evidence, and near real-time decision-making. One of this downstream decision-making

tools is a Cost-Effectiveness Model (CEM), pulling input data from the SLR, among other sources, and showing an intervention's effectiveness in terms of costs and quality of life, for patients and payers. This study aims to 1) assess the value of a downstream "Living CEM" for model inputs, 2) present technical implementation details and 3) draw conclusions from this example and establish ground for future research.

Methods

The source: SLRs. Three SLRs on Clinical, Economic and Quality of Life burden of Multiple Sclerosis (MS) were conducted using a proprietary software, integrating all SLR steps, from the definition of the research question to the search and data extraction. Each search was run on monthly basis. Rules were defined to extract new evidence and summarize it for use in the CEM. Examples of new evidence extracted include frequency and duration of relapse events (with or without hospital care), monitoring, administration, adverse events costs and cost of relapse treatment.

The destination: CEM. A simplified CEM was developed in MS-Excel for a hypothetical new relapse-remitting MS drug, based on NICE technology appraisal guidance TA699, TA706, and TA767. Evidence from the SLRs was populated in the model with fixed variable names. New evidence could trigger a re-run of the model as well as the generation of a Technical Report (TR). In this TR, inputs were automatically updated as well as results and result tables; interpretation of results and conclusions were not updated automatically but assessed by a team member.



The glue: standardized automated scripts. Live extracted data from the living SLR were stored in a repository (currently composed of .csv files for ease of implementation). Previously agreed rules were applied (e.g., type of study fit for reporting, store as-is, store average of all values). References to new data were also included in the repository.

Whenever new evidence emerged in the repository, two R scripts (R 4.1.1) would be run by the cron job scheduler on the server. The first R script is verifying the integrity of the data extracted (within range, close to previous value, units, references) and logging any warning or error (non-blocking or blocking

errors). The second R script is transferring the data directly within the Living MS CEM, at the appropriate variable, triggering a re-run of the model and the generation of a new draft TR (that is, technically, done by a third script, beyond the scope of this project).

Finally, health economists were informed of a new version (by email sent by the job scheduler), and they reviewed the model, interpreted new results (e.g., confirmatory vs challenging or contradictory) and provided new conclusions.

Results

- The process resulted in near-instantaneous transfer of input data from the Living SLRs to the Living CEM, with no data loss nor corruption and, ultimately, in reports of better, standardized quality.
- Additional steps could be added and automated, in theory. For instance, provided numerous assumptions, a Living Network Meta-Analysis (NMA) could generate additional, indirect comparison efficacy data and results could be used in the Living CEM.
- Some assumptions need to remain validated while updating the Living CEM:
 - Assumptions described by Cochrane for a Living SLR should remain [1]
- The initial research question should not become outdated nor changed over time
- The context of new Living SLR extracted data should remain constant with new publications. For instance, costs should not change due to changes in administration or legislation.
- Some limitations exist, like the need for proper, continuous human-driven oversight for quality control; technical difficulties at the interface between software and the potential variable results with time.

Conclusions

- > This study demonstrates the feasibility of Living Cost-Effectiveness Model following a Living SLR.
- > A Living CEM has numerous advantages:
 - > the automated process improves efficiencies;
 - > the model always contains the latest data;
 - > countries launching the intervention always benefit from an updated model and
 - > HTA agencies can rely on the latest evidence
- > Further studies will be carried to uncover suitability to the discrete submission process of HTA agencies and improvements using AI to further automate and strengthen the process.

Watch me!



REFERENCE

[1] Cochrane 2016; Guidance for the production and publication of Cochrane living systematic reviews: Cochrane Reviews in living mode.