Evidence map and interactive real-time meta-analyses to present results of a living systematic review (LSR) of COVID-19 vaccines during pregnancy

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Background
The COVID-19 pandemic demanded real-time evidence to inform decision-making. We conducted a LSR to evaluate safety and effectiveness of COVID-19 vaccines administered to pregnant persons. The great amount of evidence, the number of outcomes, and the subgroups of interest allow a large number of meta-analyses. Therefore, it is useful to have an interactive tool that allows tailored meta-analyses by selecting filters according and subgroups for each outcome.

Objectives
To present the evidence map and the tool developed for interactive real-time meta-analyses using the shiny R library and developmental challenges.

Methods
We describe the online evidence map and the main features of the tool developed for interactive real-time meta-analyses using the shiny R library.

Results
The evidence map and the meta-analysis tool are available at https://www.safeinpregnancy.org/living-systematic-review/. The evidence map is automatically generated from a Redcaps database (**Figure 1a**). From the values selected in the menu, dynamic texts are generated with interpretations, graphs, and tables that summarize the information. The greatest difficulties of programming in R are the long list of

filters to perform the meta-analysis (random effect model) and the need for conditional panels and monthly input updating. The filters available for comparing studies include type of outcome; outcome; subgroup; type of vaccine; schema received; pregnancy trimester; dominant variant and effect measure analyzed. Once the values of each filter/variable are chosen (**Figure 1b**), the outputs for the selected outcome are:

- # studies (+ links to studies) reporting adjusted measures and # studies that were included in the meta-analysis.
- Countries of residence of patients
- Forest- plot using the R meta package with the following information:
  - by study: country, # of patients, first author, effect measure (95%CI), weight, quality of the study,
  - by subgroup: combined effect (95%CI) and I^2.
- Text with the summary of filters chosen by the user.
- Summary table with information on all studies in the meta-analysis.

Conclusions

The presented interactive tool is useful for health decision-makers since it allows them to obtain relevant and specific evidence according to their specific needs of information regarding the effects of COVID-19 vaccines during pregnancy.

Figure 1a Evidence Map

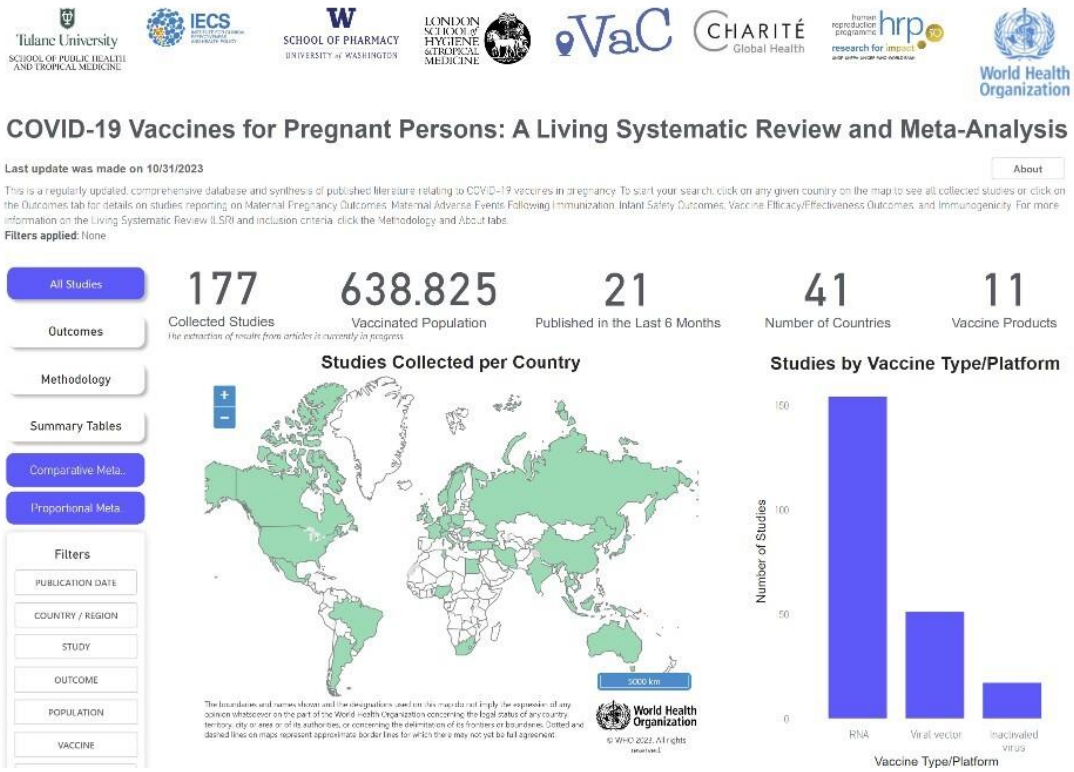

Figure 1b. Interactive meta-analysis interface