**ROSES Protocol**

This pro forma applies to systematic review and systematic map protocols.

* + - *Section/sub-section* - The sections or sub-sections listed below correspond to sections in CEE systematic review and map protocols and final reports: please see the relevant text under these subheadings for information within a specific review.
    - *Topic* - the section or sub-section is further broken down for the purposes of clarity.
    - *Description/Further explanation* - Details of what is needed in each section or sub-section are provided, along with practical advice and links to relevant guidance.
    - *Checklist/Meta-data* - Checklist items MUST be completed. Meta-data items correspond to information that should be reported as data or short descriptions that will be used to populate the Summary Record and Flow Diagram. Any meta-data items where stages were not performed (e.g. grey literature searching), this should be stated (e.g. ‘Not performed’).
    - *SR/SM* - items may apply to systematic reviews (SR) and or systematic maps (SM).

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| Section / sub-section | Topic | Description | Further explanation | Checklist/Meta-data | SR/SM |
| Title | Title | The title must indicate that it is either a systematic review or systematic map protocol, and must indicate if it is an update/amendment: e.g. "A systematic map update protocol...". | The title should normally be the same or very similar to the review question. | Meta-data | SR and SM |
| Type of review | Type of review | Select one of the following types of review: systematic review, systematic review update, systematic review amendment, systematic review from a systematic map, systematic map, systematic map update, systematic map amendment | See CEE Guidance on systematic mapping [1], and on amendments and updates [2] | Meta-data | SR and SM |
| Authors contacts | Authors contacts | The full names, institutional addresses, and email addresses for all authors must be provided. |  | Checklist | SR and SM |
| Abstract | Structured summary | Abstract must not exceed 350 words and must include two sections 1) Background, the context and purpose of the review, including the review question; 2) Methods, how the review will be conducted and the outputs that are expected (specifically mention search strategy, inclusion criteria, critical appraisal, data extraction and synthesis). |  | Checklist | SR and SM |
| Background | Background | Describe the rationale for the review in the context of what is already known. Protocol must indicate why this study was necessary and what it aims to contribute to the field. | A theory of change and/or conceptual model can be presented that links the intervention or exposure to the outcome. | Checklist | SR and SM |
| Stakeholder engagement | Stakeholder engagement | The planned/actual role of stakeholders throughout the review process (e.g. in the formulation of the question) must be described and explained (using a broad definition of ‘stakeholder’, including e.g. researchers, funders and other decision-makers; see [3]) |  | Checklist | SR and SM |
| Objective of the review | Objective | Describe the primary question and secondary questions (when applicable). | The primary question is the main question of the review. Secondary questions are usually linked to sources of heterogeneity (effect modifiers). | Checklist | SR and SM |
|  | Definitions of the question components | Break down and summarise question key elements e.g. population, intervention(s)/exposure(s), comparator(s), and outcome(s). | For other question types see [4,5] | Meta-data | SR and SM |
| Methods |  |  |  |  |  |
| Searches | Search strategy | Detail the planned search strategy to be used, including: database names accessed, institutional subscriptions (or date ranges subscribed for each database), search options (e.g. ‘topic words’ or ‘full text’ search facility), efforts to source grey literature, other sources of evidence (e.g. hand searching, calls for evidence/submission of evidence by stakeholders). | Details regarding search strategy testing should be provided. | Checklist | SR and SM |
|  | Search string | Provide Boolean-style full search string and state the platform for which the string is formatted (e.g. Web of Science format) |  | Meta-data | SR and SM |
|  | Languages – bibliographic databases | List languages to be used in bibliographic database searches. |  | Meta-data | SR and SM |
|  | Languages – grey literature | List languages to be used in organizational websites searches and web-based search engines. |  | Meta-data | SR and SM |
|  | Bibliographic databases | Provide the number of bibliographic databases to be searched. |  | Meta-data | SR and SM |
|  | Web – based search engines | Provide the number of web – based search engines to be searched. |  | Meta-data | SR and SM |
|  | Organisational websites | Provide the number of organisational websites to be searched. |  | Meta-data | SR and SM |
|  | Estimating the comprehensiveness of the search | Describe the process by which the comprehensiveness of the search strategy was assessed (i.e. list of benchmark articles). |  | Checklist | SR and SM |
|  | Search update | Describe any plans to update the searches during the conduct of the review. | Optional. A search update is good practice if original searches were performed more than two years prior to review completion. | Checklist | SR and SM |
| Article screening and study inclusion criteria | Screening strategy | Describe the methodology for screening articles/studies for relevance/eligibility. |  | Checklist | SR and SM |
|  | Consistency checking | Describe clearly the process for checking consistency of decisions including the levels at which consistency checking will be undertaken and estimated proportion of articles/studies that will be screened and checked for consistency by two or more reviewers (e.g. Titles (10%), abstracts (10%), full text (10%)). |  | Checklist | SR and SM |
|  | Inclusion criteria | Describe the inclusion criteria used to assess relevance of identified articles/studies. These must be broken down into the question key elements (e.g. relevant subject(s), intervention(s)/exposure(s), comparator(s), outcomes, study design(s)) and any other restrictions (e.g. date ranges or languages). |  | Checklist | SR and SM |
|  | Reasons for exclusion | State that you will provide a list of articles excluded at full text with reasons for exclusion. |  | Checklist | SR and SM |
| Critical appraisal | Critical appraisal strategy | Describe here the method you propose for critical appraisal of study validity (including assessment of individual studies and the evidence base as a whole). | Compulsory (SR)/Optional (SM) | Checklist | SR and SM |
|  | Critical appraisal used in synthesis | Describe how the information from critical appraisal will be used in synthesis. | Compulsory (SR)/Optional (SM) | Checklist | SR and SM |
|  | Consistency checking | Describe how repeatability of critical appraisal of study validity will be tested. | Compulsory (SR)/Optional (SM) | Checklist | SR and SM |
| Data extraction | Meta-data extraction and coding strategy | Describe the method for meta-data extraction and coding for studies (potentially providing forms/data sheets (ideally piloted), list if variables to be extracted as meta-data and those that will be coded). |  | Checklist | SR and SM |
|  | Data extraction strategy | Describe the method for extraction of qualitative and/or quantitative study findings (potentially providing forms/data sheets (ideally piloted)) |  | Checklist | SR |
|  | Approaches to missing data | Describe any processes for obtaining and confirming missing or unclear information or data from authors. |  | Checklist | SR |
|  | Consistency checking | Describe how repeatability of the meta-data/data extraction process will be tested. |  | Checklist | SR |
| Potential effect modifiers/reasons for heterogeneity | Potential effect modifiers/reasons for heterogeneity | Provide a list of and justification for the effect modifiers /reasons for heterogeneity that will be considered in the review. Also provide details of how the list was compiled (including consultation of external experts). | The list should not be exhaustive but a short list of those variables thought to be most important and amenable to analysis. | Checklist | SR |
| Data synthesis and presentation | Type of synthesis | State the type of synthesis conducted as part of the systematic map (narrative only) or systematic review (narrative only, narrative and quantitative, narrative and qualitative, narrative, qualitative and quantitative, narrative and mixed-methods) |  | Meta-data | SR and SM |
|  | Narrative synthesis strategy | Describe methods to be used for narratively synthesising the evidence base in the form of descriptive statistics, tables (including SM database) and figures. | Vote-counting (tallying of studies based on the direction or significance of their findings) must be avoided. May include a summary of the outputs of critical appraisal of the evidence base as a whole (if planned to be performed in SM). | Checklist | SR and SM |
|  | Quantitative synthesis strategy | If data are appropriate for quantitative synthesis, describe planned methods for calculating effect sizes, methods for handling complex data, statistical methods for combining data from individual studies, and any planned exploration of heterogeneity (e.g. sensitivity analysis, subgroup analysis and meta-regression). If all studies may not be selected for synthesis explain criteria for selection (e.g. incomplete or missing information). | Compulsory if appropriate for data | Checklist | SR |
|  | Qualitative synthesis strategy | Describe methods to be used for synthesising qualitative data and justify your methodological choice. Describe if and how you plan to analyse subgroups/subsets of data. If all studies may not be selected for synthesis explain criteria for selection (e.g. incomplete or missing information). | Compulsory if appropriate for data | Checklist | SR |
|  | Other synthesis strategies | Describe any other approaches to be used for synthesising data or combining qualitative and quantitative synthesis (e.g. mixed-methods) and justify your methodological choice. | Compulsory if appropriate for data | Checklist | SR |
|  | Assessment of risk of publication bias | Describe planned methods for examining the possible influence of publication bias on the synthesis. | This may be done for quantitative syntheses using diagnostic plots or statistical tests | Checklist | SR |
|  | Knowledge gap and cluster identification strategy | Describe the methods to be used to identify and/or prioritise key knowledge gaps (unrepresented or underrepresented subtopics that warrant further primary research) and knowledge clusters (well-represented subtopics that are amenable to full synthesis via systematic review). |  | Checklist | SR and SM |
|  | Demonstrating procedural independence | Describe the role of systematic reviewers (who have also authored articles to be considered within the review) in decisions regarding inclusion or critical appraisal of their own work. | Reviewers who have authored articles to be considered within the review should be prevented from unduly influencing inclusion decisions, for example by delegating tasks appropriately. | Checklist | SR and SM |

**References**

[1] James, K.L., Randall, N.P. and Haddaway, N.R., 2016. A methodology for systematic mapping in environmental sciences. Environmental Evidence, 5(1), p.7.

[2] Bayliss, H.R., Haddaway, N.R., Eales, J., Frampton, G.K. and James, K.L., 2016. Updating and amending systematic reviews and systematic maps in environmental management. Environmental Evidence, 5(1), p.20.

[3] Haddaway, N.R., Kohl, C., da Silva, N.R., Schiemann, J., Spök, A., Stewart, R., Sweet, J.B. and Wilhelm, R., 2017. A framework for stakeholder engagement during systematic reviews and maps in environmental management. *Environmental Evidence*, *6*(1), p.11.

[4] Collaboration for Environmental Evidence. 2013. Guidelines for Systematic Review and Evidence Synthesis in Environmental Management. Version 4.2. Environmental Evidence: http://environmentalevidence.org/wp-content/uploads/2014/06/Review-guidelinesversion-4.2-finalPRINT.pdf

[5] Leeds Institute of Health Sciences. https://medhealth.leeds.ac.uk/info/639/information\_specialists/1500/search\_concept\_tools. Accessed 12/11/2017.