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### Methodology for JBI umbrella reviews

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## Methodology for JBI umbrella reviews

### Abstract

Every year the Joanna Briggs Institute publishes a Reviewers' Manual, which is designed to support individuals who are undertaking systematic reviews following JBI methodologies and methods. This chapter represents the latest work and methodological development of the Institute that was not ready for inclusion in the 2014 edition of the Reviewers' Manual that was published in January. As with the Reviewers' Manual we recommend that this chapter be utilised in conjunction with the JBI SUMARI User Guide. Please note that this chapter makes reference to forthcoming analytical modules that do not currently exist in the JBI SUMARI software suite, but should be available in 2015. For advice on how to best apply the current software to accommodate this new methodology please contact the Synthesis Science Unit of the Institute at [jbisynthesis@adelaide.edu.au](mailto:jbisynthesis@adelaide.edu.au).

### Disciplines

Medicine and Health Sciences | Social and Behavioral Sciences

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## **Methodology for JBI Umbrella Reviews**

*Edoardo Aromataris, Ritin Fernandez, Christina Godfrey, Cheryl Holly, Hanan Khalil, Patraporn Tungpunkom*

### **Umbrella Reviews and Evidence based Practice**

The volume of literature pertinent to healthcare is growing at an increasing rate with thousands of studies published annually. Systematic reviews in healthcare have evolved in large part out of recognition that this overwhelming amount of evidence in the form of published studies makes it difficult for decision makers to access research evidence to inform their decision making. Systematic reviews involve a rigorous scientific approach to an existing body of research evidence in attempt to identify original research, critically appraise eligible studies and summarize and synthesize the results of the research ultimately informing a topic by locating the results of high quality research in a single manuscript.

A number of country-specific organizations, including AHRQ in the USA, NICE in the UK, and international organizations such as the Cochrane Collaboration and Joanna Briggs Institute (JBI) have dedicated themselves to the production of systematic reviews to inform healthcare policy and practice. In doing so, these organizations have contributed to the growing number of systematic reviews that have been published in recent years. Consequently, the number of systematic reviews published is, as with the bulk of scientific literature, also increasing at a phenomenal rate and now risks compounding the problem already faced by healthcare decision makers in sorting through much evidence to inform their questions. Bastian et al in

2010 recently estimated 11 systematic reviews were published every day! Still, decision making can be challenging for healthcare practitioners and policy makers, even with systematic reviews readily available. Many of the issues a systematic reviewer will be familiar with when grappling with original research in terms of eligibility or scope and quality are also considerations for the user/consumer of systematic reviews when deciding if a review should be used to inform their own particular question.

The purpose of this chapter is to provide guidance on a method of review that can address these issues. Called an Umbrella Review, this method of review is an overview of existing systematic reviews.

### **Why an Umbrella Review?**

Considering the large numbers of systematic reviews and research syntheses available to inform many topics in healthcare, systematic reviews of existing reviews are now being undertaken to compare and contrast published reviews and to provide an overall examination of a body of information that is available for a given topic (Hartling et al., 2012). Conduct of an Umbrella Review offers the possibility to address a broad scope of issues related to a topic of interest and is ideal to present a wide picture of the evidence related to a particular question. The wide picture obtainable from the conduct of an Umbrella Review is also ideal to highlight where the evidence base for a question is consistent or if contradictory or discrepant findings exist and to explore and detail the reasons why. Investigation of the evidence with an Umbrella Review allows assessment and consideration of whether reviewers addressing similar review questions independently observe similar results and arrive at generally similar

conclusions. Reviews of systematic reviews are referred to by several different names in the scientific literature including umbrella reviews, overviews of reviews, reviews of reviews, a summary of systematic reviews and also a synthesis of reviews, however in essence they all have the same defining feature in common: a systematic review is the main and often sole “study type” that is considered for inclusion. For JBI syntheses of existing systematic reviews the term “Umbrella Review” will be used. JBI Umbrella Reviews are designed to incorporate all types of syntheses of research evidence, including systematic reviews in their various forms (effectiveness, meta-aggregative, integrative etc) and meta-analyses.

Beyond the impetus for Umbrella Reviews driven by the sheer volume of systematic reviews being published, the need for “fast” evidence in reduced timeframes has also reinforced the attractiveness of undertaking such a review. Decision makers are increasingly required to make evidence informed policy decisions and often require evidence in short timeframes – as a result, “rapid reviews” are also appearing in the research literature. Rapid reviews are essentially a streamlined approach to evidence synthesis in healthcare that attempt to accommodate an evidence informed decision as quickly as possible (Khangura et al., 2012). Whilst the conduct of a rapid review may impinge on, or result in some undesirable modification of some of the processes required of a well-conducted systematic review, this may be alleviated to some extent with consideration of existing systematic reviews if any are available on the topic of interest. Using existing systematic reviews also reinforces the necessity for some measure of efficiency in scientific undertakings today. In short, if current, multiple, good quality, existing systematic reviews exist about a given topic or question, any reviewer should reconsider the need to conduct yet another review addressing the

same issue. Rather, these may be the basis to conduct an Umbrella Review and summarize or synthesize the findings of the systematic reviews already available.

### **Not just effectiveness – JBI Umbrella Reviews**

Similar to the Cochrane Collaboration, the JBI have historically focused on reviews that inform the effectiveness of an intervention or therapy, however the consideration of “best available” evidence in JBI reviews of effectiveness has not constrained itself solely to randomized controlled trials and other experimental studies that occupy the uppermost levels of the evidence hierarchy (ref).

JBI Umbrella Reviews are intended to compile evidence from multiple research syntheses. Any review author will recognize the advantage a good understanding of study design and research methodologies, whether quantitative or qualitative in nature, provides to the systematic reviewer. Similarly, it is recommended any reviewer intending or attempting to undertake a JBI Umbrella Review should have a good understanding of systematic reviews and the diversity and methodological nuances among the various types of reviews (and different organizations and authors that conduct them) before conducting an Umbrella Review themselves.

The reasons for conducting a JBI Umbrella Review are manifold. The principle reason is to summarize evidence from more than one synthesis of existing research evidence at a variety of different levels (ref Chap 2 Cochrane Handbook). These may include analyses of evidence of different interventions for the same problem or condition or evidence from more than one research synthesis investigating the same intervention and condition, but where the different systematic reviews address and report on different outcomes. Similarly, a researcher or reviewer may wish to

summarize more than one research synthesis for different conditions, problems or populations (ref Chap 2 Cochrane Handbook). The principle focus of a JBI Umbrella Review is to provide a summary of existing reaserch syntheses related to a given topic or question, not to re-synthesize, for example with meta-analysis or meta-synthesis, the results of existing reviews or syntheses.

A reviewer familiar with JBI methodology for the conduct of systematic review will appreciate that many questions that are asked in health care practice do not lend themselves directly to experimentation or gathering of numerical data to establish the answer regarding what the effectiveness or outcomes of a particular intervention may be, but rather are more questions of *how* and *why* regarding interventions do or do not work, and how recipients of the intervention may experience them. As a result, many JBI syntheses are of original qualitative research and apply a meta-aggregative approach to synthesis of qualitative data (see Chapter xx). Similarly, JBI Umbrella Reviews may find they inevitably ask questions that direct the reviewer predominantly to existing qualitative reviews. As with the combinations of PICO elements to organize the conduct an Umbrella Review mentioned above, the common denominator or feature across such multiple qualitative syntheses may be the population or subpopulation of interest, coupled with the context of the review question.

## **Section 2.2 Development of an Umbrella Review Protocol**

### **Title and author information**

The title should be informative and give clear indication of the topic of the Umbrella Review. The title of a JBI Umbrella Review should always include the phrase “...:an Umbrella Review” to allow easy identification of the type of document it represents.

A JBI review requires at least two reviewers. The names of all reviewers with their post-nominal qualifications, affiliations for each author including their JBI centre affiliations and email address for the corresponding author should be included.

### **Developing the title and question**

Although the Umbrella Review may aim to examine existing research syntheses for different types of interventions or phenomena of interest with the same condition, or different outcomes for the same intervention or phenomena of interest, the PICO and PICo mnemonic should be used to generate a clear and meaningful title and question for a JBI Umbrella Review. Ideally, the title may incorporate some of the PICO elements, including the Population, the Intervention, the Comparison and Outcome and the PICo elements if considering a question or topic that lends itself to qualitative data, including the Population, the Phenomena of Interest and Context. If a JBI Umbrella Review intends to review both quantitative and qualitative systematic reviews, both intervention and phenomena of interest need to be clearly stipulated in the protocol. The title of the Umbrella Review protocol must be broad enough to reflect the intervention or the phenomena of interest as a whole; however, it should also be as descriptive as possible. If the Umbrella Review is examining an intervention used across different patient conditions or different interventions with the same patient condition, this should be further delineated in the inclusion criteria section. The PICO or PICo mnemonic can provide potential readers with a significant amount of information about the focus, scope and applicability of the Umbrella Review to their needs. The following are examples of Umbrella Review titles:

1. “ *Non pharmacological management for aggressive behaviors in dementia: an Umbrella Review protocol*”



2. *“The experiences of caregivers who are living with and caring for persons with dementia: an Umbrella Review protocol”*

As an illustration of the use of the PICO elements to aid in articulating a title of an Umbrella Review, note that in example number one the population (dementia), the intervention (non pharmacological management), and the outcome (aggressive behaviors) are clearly evident. In this example this may appear as the title of an Umbrella Review that lends itself to the inclusion of systematic reviews of randomized controlled trials to inform the effectiveness of an intervention or therapy, or potentially a broader investigation of research syntheses, that not only explore effectiveness of interventions, but also the experiences of patients that received these therapies and their acceptability. Such an approach to this Umbrella Review will provide a comprehensive picture of the available evidence on the topic. . Similarly, example two provides readers with a clear indication of the population (caregivers of persons dementia), the phenomena of interest (experiences of caregiving), and the context (living with and caring for) as well as the fact that it is Umbrella Review protocol of qualitative evidence.

## **Background**

The background section should be comprehensive and cover all the main elements of the topic under review. It should cover the extant knowledge addressing the question of the Umbrella Review. The reason for undertaking the Umbrella Review should be clearly stated together with the target audience and what the Umbrella Review is intended to inform.

The suggested length for the background section of the review protocol is approximately 1000 words. The background should detail any definitions important to the topic of interest. The information in the background section must also be sufficient to put the inclusion criteria into context, including indication that there are existing systematic reviews or research syntheses available on the topic, hence supporting the rationale to conduct an Umbrella Review. The background section should conclude with a statement that a preliminary search for existing Umbrella Reviews on the topic have been/will be conducted (state the databases searched or search platforms utilized e.g. JBISRI, Cochrane Library, CINAHL, PubMed, EPPI, Epistemonikos and PROSPERO where relevant). If there is an existing Umbrella Review or overview of systematic reviews available on the topic already, justification specifying how the proposed review will differ from those already conducted and identified should be detailed. Vancouver style referencing should be used throughout the protocol with superscript numbers without brackets used for in-text citations. A guide to Vancouver style referencing can be found here:

[openjournals.net/files/Ref/VANCOUVER%20Reference%20guide.pdf](https://openjournals.net/files/Ref/VANCOUVER%20Reference%20guide.pdf)

### **Review question/objective**

The review objective(s) and specific review question(s) must be clearly stated. The objectives of the Umbrella Review should indicate the aims and what the review project is trying to achieve. The objectives may be broad and will guide the development of the specific review question(s). The review question(s) should be consistent with the title and direct the development of the specific inclusion criteria from clearly identifiable PICO. For example, using the first title introduced above, the objectives or aims of this review would be: To examine non-pharmacological

interventions for the management of aggressive behaviors in elderly patients with dementia.

An example of the corresponding questions for this review would be:

1. What are effective non-pharmacological interventions to manage aggressive behavior in elderly patients with dementia?; and
2. What are the experiences of dementia patients and their caregivers with the use of non-pharmacological interventions to manage aggressive behavior?

### **Inclusion criteria**

For the purposes of an Umbrella Review, the term “studies” refers exclusively to syntheses of research evidence including systematic reviews and meta-analyses. The “Inclusion Criteria” of the protocol details the basis on which studies will be considered for inclusion into the Umbrella Review and should be clearly defined. It will provide a guide for both the reader of the protocol to clearly understand what is proposed by the reviewers, as well as, more importantly a clear guide for the reviewers themselves whilst deciding which studies should be selected for inclusion in the Umbrella Review.

#### *Types of participants*

Important characteristics of participants should be detailed, including age and other qualifying criteria that make them appropriate for the objectives of the Umbrella Review and match the review question. In the example question above these characteristics include elderly people with dementia. Umbrella Reviews that aim to encompass multiple population groups should define each group clearly. Justification for the inclusion or exclusion of participants should be explained. In many cases, defining characteristics of the participants for a

review may also include details of the setting of interest such as acute care, primary health care, or the community.

#### *Interventions/Phenomena of interest*

The interventions or phenomena of interest for an Umbrella Review should be defined in detail. and should be congruent with the review objective and Intervention(s) or the phenomena of interest. Umbrella Reviews that aim to address multiple interventions and treatments should define each potential intervention of interest clearly.

#### *Outcomes-*

Outcomes of interest should be predefined in Umbrella Reviews that lend themselves to quantitative evidence. Outcomes should be relevant to the question of the Umbrella Review and also the important outcomes for the participant group of the review. Surrogate outcomes should be explained and presented where there is a clear association with patient relevant outcomes. To provide a balanced overview of the evidence base related to a particular topic and fully inform decision making, an Umbrella Review should attempt to include both beneficial and adverse outcomes amongst those reported.

#### *Context*

Context will vary depending on the objective(s)/question(s) of the review. The context should be clearly defined and may include but is not limited to consideration of cultural factors such as geographic location, specific racial or gender based interests, in some cases, context may also encompass detail

about the specific setting (such as acute care, primary health care, or the community).

### *Types of Studies*

As mentioned at the outset, the unit of analysis for a JBI Umbrella Review is another completed research synthesis, therefore the types of studies included in a JBI Umbrella Review are exclusively syntheses of existing research including systematic reviews (these include reviews using varying internationally accepted methodologies) and meta-analyses. Research syntheses included in a JBI Umbrella Review should represent syntheses of empirical research evidence. There are an enormous range of “review” types and articles that are available in the literature (ref Grant); authors of Umbrella reviews will have to stipulate clearly which review types should be included *a priori* in the protocol. Reviews that incorporate theoretical studies or text and opinion as their primary source of evidence should not be included in a JBI Umbrella Review and should be listed as an explicit exclusion criterion in the protocol.

### **Search strategy**

The search for an Umbrella Review should aim to identify all research syntheses relevant to the review question. The protocol should provide a detailed strategy for locating research syntheses including the key terms to be used and the resources to be searched. Predefined search filters for reviews for various databases already exist and they are worthwhile investigating whilst developing the search strategy for the review. An example is the “systematic[sb]” search filter for PubMed, details of which

can be viewed here: [http://www.nlm.nih.gov/bsd/pubmed\\_subsets/sysreviews\\_strategy.html](http://www.nlm.nih.gov/bsd/pubmed_subsets/sysreviews_strategy.html).

Many databases may not have a predefined search filter for review articles, in these cases it is always worth searching with key terms such as “systematic” or “meta-analysis” in the title or abstract fields. Most authors will use these terms in the title of their publications to clearly identify what the publication is; authors of JBI systematic reviews will be familiar with the recommendation to identify the document as a systematic review in the review title to maximize the likelihood that it will be retrieved and read. The search terms used should be broad enough to capture all relevant reviews. A three phase search process should be used. First, initial keywords are identified followed by analysis of the text words contained in the title and abstract, and of the index terms to describe relevant reviews. The additional terms, i.e., meta-analysis or systematic review need to be included in the key terms for searching. Second, database-specific search filters for each bibliographic citation database stipulated in the protocol are constructed, and finally the reference list of all included reviews should also be searched.

The search for systematic reviews rarely needs to extend prior to 1990 as there were very few systematic reviews published prior to that time (ref Smith et al). Essentially searching for the research syntheses conducted within the last five to ten years will yield original/primary research conducted 30+ years prior that has been included in the located reviews and research syntheses. As well as biomedical citation databases such as Medline, PubMed, EMBASE, and CINAHL, other sources to search include the major repositories of systematic reviews such as the JBI Database of Systematic Reviews and Implementation Reports, the Cochrane Database of Systematic Reviews, DARE and the PROSPERO register. The federated search engine Epistemonikos (<http://www.epistemonikos.org/>) that specifically targets research syntheses is also

worthwhile using, particularly for initial searches. The databases searched for an Umbrella Review will depend on the review questions and objectives, for example, PEDro is a database indexing reviews relevant to physiotherapy, OTseeker, indexing reviews relevant to Occupational Therapy while BEME and the EPPI Centre Evidence Library are repositories of reviews relevant to education. Due to limitations of available resources, most JBI Umbrella Reviews will inevitably focus on including studies published in the English language. Where a review team has capacity, the search should ideally attempt to identify research syntheses published in any language and may expand the search to include databases that index languages other than English.

A comprehensive search for a JBI Umbrella Review should also encompass a search for grey literature or reports that are not commercially published. As decision makers are increasingly required to base their decisions on the available evidence, more and more research syntheses are being commissioned by practitioners and health care policy makers in governments globally; as a result many reports available via government or organisational websites are syntheses of research evidence and may be eligible for inclusion in a JBI Umbrella Review. A JBI Umbrella Review should attempt to search at least 2-3 relevant sources for “grey” reports.

### **Assessment of methodological quality**

Ideally, only high quality systematic reviews should be included in an Umbrella Review. Research syntheses that are eligible for inclusion in a JBI Umbrella Review must be assessed for methodological quality. There are a variety of checklists and tools available to assess research syntheses and systematic reviews. Most checklists use a series of criteria that can be scored as being met or not met or unclear and in

some instances as not applicable. The decision as to whether or not to include a study can be made based on meeting a pre-determined proportion of all criteria, or on certain criteria being met. It is also possible to weight certain criteria differently. Decisions about a scoring system or any cut-off for exclusion should be made in advance and agreed upon by all reviewers before critical appraisal commences. The protocol, therefore, should detail how selected research syntheses will be assessed for quality, e.g.. use of a predetermined cut off score .

It is the JBI policy that all systematic reviews need to be critically appraised using the standard JBI critical appraisal instrument for Systematic reviews and Research Syntheses that is available in **Appendix xx**. For a JBI Umbrella Review the assessment criteria are built into the analytical module URARI. The tool is designed to be used with two independent reviewers conducting the critical appraisal of each research synthesis selected. Reviewers are blinded to each other's assessment and assessments can only be compared once initial appraisal of an article is completed by both reviewers. Where there is a lack of consensus, discussion between reviewers should occur. In some instances it may be appropriate to seek assistance from a third reviewer. The JBI critical appraisal tool for research syntheses must be appended to the protocol.

### **Data collection**

Data collection is the procedure for extracting relevant details and data from the included systematic reviews and meta-analyses for the Umbrella Review. To avoid risk of bias, the standardized JBI data extraction tools (see Appendix **xx**) should be used to extract the data from the included reviews. Reviewers should ideally have discussed and piloted its use prior to launching into extraction of data for the



Umbrella Review to maximize consistency and the likelihood that the relevant results are being identified and detailed sufficiently for the purposes of reporting in the Umbrella Review. Without some discussion and piloting, reviewers may interpret fields in the tool or their relevance to the Umbrella Review questions slightly differently; differences unearthed at the completion of extraction for the review will invariably create more, unnecessary work for the review team. Any additions or modifications to the data extraction tool that are demanded by the nature of review question should be reviewed through by all reviewers and discussed in detail before extracting the data independently. Any additions or modifications should be identified and submitted with the review protocol and approved for publication in the *JBIR Database of Systematic Reviews and Implementation Reports* prior to use by any reviewer.

The JBI data extraction tool for Systematic Reviews and Research Syntheses is built into the URARI analytical module and is available in [Appendix xx](#). Guided by the data extraction tool, information regarding the citation details, the objectives of the included review, the participants, the setting and context, the number of databases sourced and searched, the date range of database searching, the date range of included studies that inform each outcome of interest, the number/types of studies/country of origin of primary research studies in the included research synthesis, the instrument used to appraise the primary studies in the research synthesis and the rating of their quality, the outcomes reported by the included reviews that are relevant to the Umbrella Review question, and the type of review and the method of synthesis/analysis employed to synthesize the evidence as well as any comments or notes the Umbrella review authors may have regarding any included study. Importantly, specific details of the factor or issue of interest to the Umbrella Review;

for example the range of interventions, phenomena of interest, population details or outcome differences should be extracted in detail with the key findings/results.

Extraction for a JBI Umbrella Review should be conducted independently by two reviewers to further minimize the risk of error. The protocol must therefore describe how data will be extracted and include the JBI data extraction instruments for systematic reviews in appendices of the protocol. It is unlikely that authors of a JBI Umbrella review will need to contact the authors of an included research synthesis as is often the norm when undertaking a JBI Systematic Review (see other chapters of this Manual).

### **Data Summary**

As the aim of the JBI Umbrella review is to present a summary of existing research syntheses relevant to a particular topic or question and not any further “synthesis” of the results of these publications. To this end, the results of all included studies should be presented to the reader to allow ready and easily interpretable overview of the findings.

In the Umbrella Review protocol the means by which the results of the reviews will be presented should be described in as much as detail as possible. Tabular presentation of findings is recommended where overall effect estimates extracted from systematic reviews or other similar numerical data are presented. Where quantitative data is presented, the number of studies that inform the outcome and number of participants (from included studies) the heterogeneity of the results of included reviews should be reported upon also (ref Smith et al). Where the results of qualitative systematic reviews are included in the Umbrella Review, the final or overall synthesized findings from included reviews should be presented, ideally also

in tabular format, with enough relevant contextual information alongside each synthesized finding to ensure each is interpretable to the reader of the Umbrella Review. **Clear indication of overlap of original research studies in each of the included research syntheses must also be presented in the JBI Umbrella Review.**

Principles from Grading of Recommendations Assessment, Development, and Evaluation (GRADE)

Should be used for an overall assessment of the quality of evidence for each intervention or phenomena of interest. The GRADE concept is based on an assessment of the following criteria: quality of primary studies, design of primary studies, consistency, and directness.

### **Section 2.3 The Umbrella Review and Summary of findings of research syntheses**

This section provides further guidance on the components that should comprise the final report of a JBI Umbrella Review and the information that each component should contain. It illustrates how each component of the review is managed in the JBI URARI analytical module and the outputs that can be expected in JBI CReMs. This section also provides a brief outline of how the Umbrella Review should be formatted and the stylistic conventions that should be used to ensure the review meets the criteria for publication in the *JBI Database of Systematic Reviews and Implementation Reports*. For further information please refer to the Author Guidelines of the journal. (<http://www.joannabriggslibrary.org/jbilibrary/index.php/jbisrir/about/submissions#authorGuidelines>). Specifically, guidance is provided on the following components: outline of the report, inclusion criteria (i.e., PICO), search strategy, critical appraisal, data

extraction, data synthesis, results, and conclusions. All JBI Umbrella Reviews should be based on a peer reviewed, Umbrella Review protocol that has been accepted for publication in the JBI Database of Systematic Reviews and Implementation Reports. Deviations from a published review protocol are rare and must be clearly detailed and justified in the methods section of the report where they occur. The section also presents a series of questions designed to prompt the reviewer to check that certain key information or requirements have been adequately addressed.

### **2.3.1 Title of the Umbrella Review**

The title should be clear, explicit and reflect the core elements of the review. Titles should not be phrased as questions or conclusions and there should be congruency between the title, review objectives/questions and inclusion criteria. The title should include the phrase: “An Umbrella Review“. Conventional wisdom allows that the title should not be more than 12-14 words for ease of understanding. See the informative examples above in Section xx.

### **2.3.2 Review Authors**

Each reviewer should have post-nominal qualifications listed. Affiliations for each author need to be stated, including the JBI affiliation of each reviewer. If a reviewer is conducting the JBI Umbrella Review as part of an award for a degree, candidature should be noted amongst post-nominals. A valid email address must be provided as contact details for the corresponding author.

### **2.3.3 Executive summary**

This section is a structured abstract of the main features of the Umbrella Review. It must be no longer than 500 words and should contain no abbreviations or references. The executive summary must accurately reflect and summarize the review for the reader, in particular the results of the review. The executive summary should include the following required headings:

### **Background**

This section briefly describes the issue under review.

### **Objectives**

The review objectives should be stated in full, as described in the protocol section.

### **Inclusion criteria**

#### *Types of participants*

Describe the important details.

#### *Interventions/Phenomena of interest (exclude if not applicable)*

Describe the important details of those relevant to the Umbrella review.

#### *Types of studies*

Briefly indicate the types of studies - if all research syntheses or just systematic reviews for example.

#### *Types of outcomes (if applicable)*

Indicate the outcomes relevant to the review question.

### **Search strategy**

Details of the approach to searching as well as the sources searched should be detailed.

### **Methodological quality**

The methods/tools used to assess methodological quality of the included research syntheses should be described in brief.

## **Data collection**

The methods/tools used to extract data from the included research syntheses should be described in brief.

## **Data Summary**

Details of tabular presentation of study characteristics and presentation of quantitative and qualitative findings (if applicable) should be described in brief.

## **Results**

This should be the principle focus of the Executive Summary. Important details of the results, including the number of research syntheses located and included, the results of critical appraisal and the most importantly, the key findings should be clearly detailed.

## **Conclusions**

Brief overall conclusions based on the Umbrella Review findings should be articulated, including, ideally a clear answer to the question(s)/objective(s) of the Umbrella Review.

### *Implications for practice*

Succinctly detail the key implications for practice or policy.

### *Implications for research*

Succinctly detail the key implications for research and further need for systematic reviews in the field.

## **Main body of the report**

### **2.3.4 Background**

The background section should be comprehensive and cover all the main elements of the topic under review, and may include information about pathophysiology,

diagnosis, prognosis, prevalence or incidence or other detail important to the review and why the topic or question of interest lends itself to an Umbrella Review, for example addressing arrange of interventions relevant to a particular diagnosis. The primary objective of the Umbrella Review should be evident in the background as the background situates the justification and importance of the question(s) posed. While many of these details will already have been addressed in “Background” section of the protocol, many reviewers will find that the background provided with the protocol needs modification or extension following the conduct of the review proper. The background section should conclude with a statement that a preliminary search for previous Umbrella Reviews on the topic was conducted (state the sources searched e.g. *JBIR Database of Systematic Reviews and Implementation Reports*, The Cochrane Library, Campbell Collection etc). Vancouver style referencing should be used throughout the review with superscript numbers without brackets used for in-text citations.

### **2.3.5 Objectives**

The primary objective of the review should be stated. It can be followed by specific objectives or aims that relate to differing comparisons contained in the Umbrella Review, such as, participant groups, interventions or outcome measures or a more in depth understanding of a particular phenomenon of interest. See example above in **Section xx**.

### **2.3.6 Inclusion criteria**

This section of the review details the basis on which systematic reviews and/or meta-analyses were considered for inclusion in the Umbrella Review and should be as

transparent and unambiguous as possible. The inclusion criteria for an Umbrella Review will depend on the question(s) asked. As a guiding principle, they should follow the norm for any JBI systematic review, where a question of effectiveness of an intervention(s) or therapy, for example, will stipulate a PICO (Population, Intervention, Comparator, Outcome), or an Umbrella Review that addresses a question that would lend itself to inclusion of qualitative systematic reviews would include a PICo (Population, Phenomena of interest and Context). Umbrella reviews that address multiple questions and evidence types may stipulate both PICO and PICo elements.

#### *Types of participants*

The types of participants should be related to the review objectives. The reasons for the inclusion or exclusion of participants detailed in this section should be explained to the reader of the Umbrella Review in the background section of the report.

#### *Interventions/Phenomena of interest*

There should be congruence between the review objective and the outcomes of interventions under review and/or the phenomena of interest. Interventions may be focused, for example, to only pharmacological management or broad including both pharmacology and other interventions (e.g, diet, exercise, surgery). Relationships should be clearly detailed in the background section. It is beneficial to use definitions where appropriate for the purposes of clarity.

#### *Context/Setting*

In an Umbrella Review, the context or setting will vary depending on the objective of the review. Context may include but is not limited to consideration of cultural factors such as geographic location, specific racial or



gender based interests. The setting details important features of the study location, such as acute care, primary health care, or the community.

#### *Outcomes*

Outcomes for Umbrella Reviews should be described and defined and relevant to the question posed by the review. If outcomes are measured in a particular way, this should be included in the description (e.g, measurement of quality of life using the SF-36 questionnaire).

#### *Types of studies*

While it is clear that an Umbrella Review will include only existing research syntheses and systematic reviews, there should be a match in this section between the methodology of the systematic review to be considered for inclusion in the Umbrella Review and its primary objective. For example, an Umbrella Review that aims to assess the effectiveness of a range of interventions for aggressive behaviors in elderly dementia patients may limit itself to including systematic reviews that assessed effectiveness by including only randomized controlled trials and other experimental study designs.

### **2.3.7 Search strategy**

This section should document how the reviewers searched for relevant papers to include in the Umbrella Review. The search strategy needs to be comprehensively reported and as a minimum, a detailed search strategy for at least one major bibliographic citation database that was searched should be appended to the review, ideally the search strategies for all of the databases searched should be presented sequentially in the single appendix. Clear documentation of the search strategy(ies) is a key element of the scientific validity of an Umbrella Review. A JBI Umbrella

Review should consider papers published both commercially and in non-commercially in the grey literature. The timeframe chosen for the search should be justified and any language restrictions stated (e.g. only studies published in English were considered for inclusion). The databases that were searched must be listed along with the search dates. Any hand searching of relevant journals should be described as to journal name and years searched. Author contact, if appropriate, should also be included with the results of that contact.

### **2.3.8 Method of the review**

#### **2.3.8.1 Assessment of methodological quality/Critical appraisal**

This section should detail the approach to critical appraisal, not the assessment results, and should be consistent with the details in the published JBI Umbrella Review protocol. Any deviations from the protocol must be reported and explained in this section of the review report. The JBI critical appraisal instrument for Systematic Reviews and Research Syntheses embedded in the JBI URARI software (See [Appendix xx](#)) used must be appended to the review report.

#### **2.3.8.2 Data collection**

Standardized data extraction tools maximise the consistent extraction of accurate data across the included studies and are required for JBI Umbrella Reviews. The review should detail what data the reviewers extracted from the included systematic reviews and the JBI data extraction tool for Systematic Reviews and Research Syntheses embedded in the JBI URARI software must be appended to the review report ([see Appendix xx](#)). Using the JBI extraction tool, at a minimum, details and data relevant to the items listed below should be extracted where the information is available. The

majority of this information will appear in the Table of Included Study Characteristics to be appended to the review report, whilst some of the important details extracted, particularly relevant to the findings of the review (see **xx** below) will appear in the body of the review report:

#### *Author/Year*

The citation details of included studies should be consistently referred to throughout the document. The citation details should include the name of the first author (Vancouver reference) and year of publication.

#### *Objective(s)*

A clear description of the objective of the included research synthesis should be stated.

#### *Participants (characteristics/total number)*

The defining characteristics of the participants in studies included in the research syntheses should be detailed, for example this may include diagnostic criteria, or age or ethnicity. The total number of participants that inform the outcomes relevant to the Umbrella Review question from all studies included studies should be presented also.

#### *Setting/Context*

Details of the setting of interest such as acute care, primary health care, or the community or a particular geographical location should be included. For some Umbrella Reviews, particularly those that draw upon qualitative research syntheses, the context that underpins the review question will be important to clearly reveal to the reader and may include but is not limited to consideration of cultural factors such as geographic location and specific racial or gender based interests.

#### *Interventions/Phenomena of interest*

Clear, succinct details of the interventions or phenomena of interest should be detailed, including the type of intervention, the frequency and/or intensity of the intervention for example. A statement of the phenomena of interest is also required where applicable.

*Number of databases/sources searched*

The number of sources searched should be reported. Though this will have been considered during critical appraisal of the research synthesis, reporting to the reader of the review will allow rapid and easy comparison between differences of included reviews and also consideration of potential for publication bias in the event no formal analysis has been conducted. Where possible the names of databases and sources should be listed (i.e. if <5-10). The search range of each database should also be included.

*Date range of included studies*

The date range spanning from the earliest study that informs the included research synthesis to the latest should be reported. This is important information that allows for consideration of the currency of the evidence base not necessarily reflected in the year of publication of the research synthesis. If this is not readily identifiable in the table of study characteristics provided by the included synthesis, it should be discernable by scanning the date range of publications through the results section of the included review.

*Number of Studies/Type of Studies/Country of origin of included studies*

Summary descriptive details of the included studies in the research synthesis should be reported. This includes the number of studies in the included research synthesis, the types of study designs included in the research synthesis, for example randomized controlled trials, prospective cohort study, phenomenology, ethnography etc., and also

the country of origin of the included studies. The later is important to allow the reader of the review for consideration of external validity and the generalizability of the results presented.

#### *Appraisal instrument and rating*

The instrument or tool used to assess risk of bias, rigor or study quality should be reported along with some summary estimate of the quality of primary studies in the included research synthesis. For example, for systematic reviews that use the Jadad Scale, a mean score for quality may be reported where as for checklist appraisals, reporting of cutt-off score or any ranking of quality should be reported. An example of the latter would be exclusion of studies that score  $<3/10$ , and inclusion of four moderate quality studies (4-6/10) and two high quality studies (7-10/10).

#### *Type of Review/Method of analysis*

The type of research synthesis as stated by the authors of the included review should be detailed. The method of analysis or synthesis used by the included research synthesis should be reported. For example, this may include random effects meta-analysis, fixed effect meta-analysis, meta-aggregative synthesis or meta-ethnography.

#### *Outcome(s)*

Reported here should be the outcomes of interest to the Umbrella Review question reported on by the included research synthesis i.e. the names or labels of the outcomes (for presentation of results, [see below](#)).

#### *Results/findings*

The relevant findings or results presented by the included reserach syntheses must be extracted. For quantitative reviews, this will ideally be an effect estimate or measure from a presented meta-analysis. Measures of heterogeneity should also be extracted where applicable. In the absence of this a statement indicating the key result relevant

to an outcome may be inserted in the required field. For qualitative syntheses, the key synthesized finding should be extracted.

#### *Comments*

There should be provision to extract and present in the table of included study characteristics any relevant details or comments on the included research synthesis by the authors of the Umbrella Review, e.g. this may be important details regarding features of note about an included research synthesis, for example, are the conclusions of the included review consistent with the results presented by the study.

#### **2.3.8.3 Data Summary**

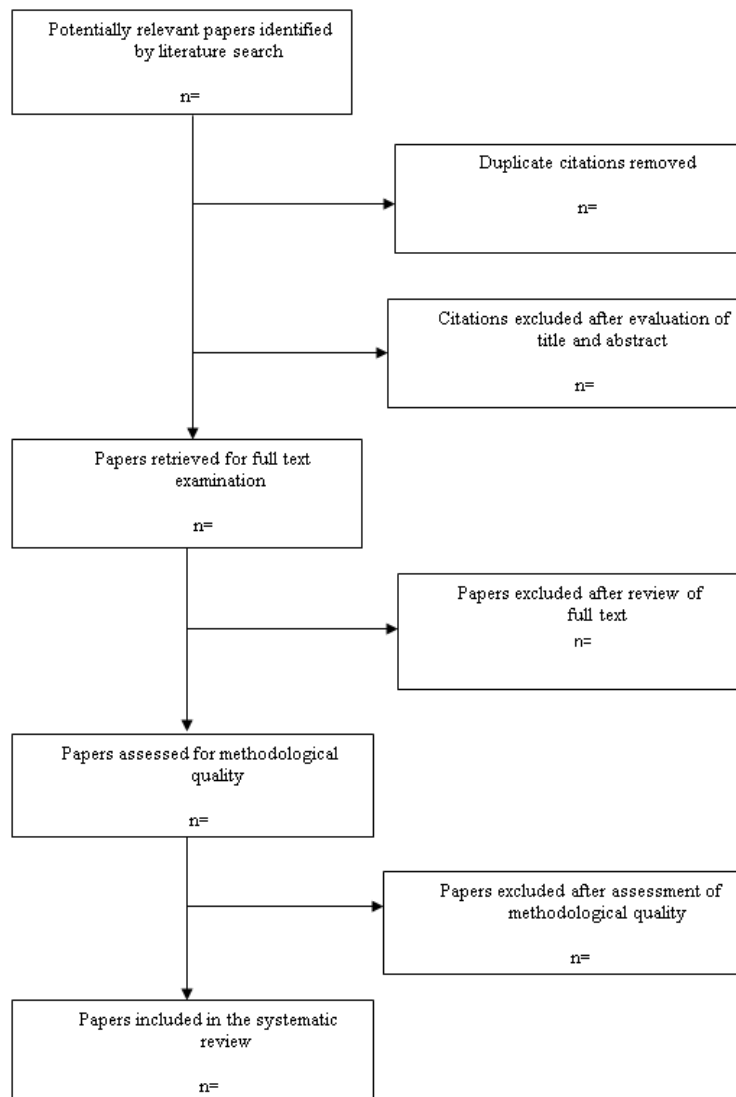
This section should detail the approach to the presentation of findings and results from included research syntheses facilitated by JBI URARI, not the results of this process. The types of data detailed in this section should be consistent with the methods used for data collection and the included study designs.

#### **2.3.8 Results**

This introductory section to the results of the Umbrella Review should allow the reader to clearly follow how the included studies were identified and selected for inclusion in the review. There should be a narrative description of the process accompanied by a flowchart (see Figure 1 for example flowchart template). The flow chart should clearly detail the review process (from PRISMA statement), indicating the results from the search for research syntheses, removal of duplicate citations, study selection, , full text retrieval, any additions from 3<sup>rd</sup> search, appraisal, extraction and final summary presentation.

### 2.3.8.1 Description of studies

This section of the results should also include an overall description of the included studies (with reference to the detailed table of included study characteristics in the appendices), with the main aim to provide some context to the results section and sufficient descriptive detail for the reader to support the inclusion of the systematic reviews, their relevance to the question and the evidence base they offer to the question. Specific items/points of interest/outcomes from individual reviews may also be highlighted here. A summary table of included studies should be appended to the report that will be populated from the appropriate extraction fields in the JBI URARI analytical module.



**Figure 1.** Flowchart detailing identification and selection of research syntheses for inclusion in the Umbrella Review

### 2.3.8.2 Methodological quality

This section should focus on methodological quality as determined by the JBI critical appraisal checklist for Systematic Reviews and Research Syntheses (see Appendix xx). There should be a narrative summary of the overall methodological quality of the included studies, which can be supported (optional) by a table showing the overall results of the critical appraisal (see Table 1 for example). Where only few studies are identified, or there are specific items of interest from included studies, these should be addressed in the narrative also, particularly where studies were deficient, or particularly good. i.e. with clear narrative regarding risk of bias/rigour of included studies. Use of N/A should also be justified in the text. Importantly, in a JBI Umbrella Review, it is important to present to the reader with clear indication of the quality of the included original research studies in each of the systematic reviews or research syntheses that are included in the Umbrella Review. This will have an impact on the interpretation and implications for practice and research and must be noted with clarity to the reader of the review in the body of the report. This detail will appear in the appended Table of Included Study Characteristics (see Section xx above)

Table 1. Critical appraisal results for included studies using the JBI-URARI

Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Author(s)	Y	Y	Y	N	Y	U	Y	N	Y	U



ref										

Y - Yes, N - No, U - Unclear

### 2.3.8.3 Findings of the review

The findings of the review and presentation of the results should flow logically from the review objection/question i.e. they must ultimately answer the questions posed.

The findings and key results extracted using JBI-URARI view table from the included research syntheses should constitute part of this section and may include presentation of quantitative and qualitative data.

Both quantitative and qualitative findings presented in the JBI Umbrella Review report should be presented in tabular format with supporting text.

Quantitative tabulation of results presented in this section must include clear presentation of the name of the intervention, the study or citation details that inform the intervention, the number of studies and individual participants that inform the outcome measure, the calculated effect estimate where possible or the main finding of the study related to the intervention and relevant outcome, as well as any details of measures of heterogeneity about the effect estimate(s). An example of the table of findings is below in Table 2 for one outcome, in this example it is for ‘aggressive behaviors’, if other outcomes were included, the final three columns of the table would be repeated for each. Tabular presentation must be accompanied by a clear and detailed description of the interventions addressed.

Table 2: Tabular presentation of quantitative findings for an Umbrella review

Interventions/ phenomena of interest	Author/year	Number of studies/Participants	Results/Findings	Heterogeneity
Staff training programs	Kynoch, et al, 2009	1	No difference in Patient aggression between staff training and control group.	N/A
Physical restraint	Kynoch, et al, 2009	1	Not calculated	
Music therapy	Kynoch, et al, 2009	2	Not calculated	
Multiple interventions	Kynoch, et al, 2009	2	Not calculated	
Bright light	Forbes	5 /343 participants	Agitation at 1 year follow-up -2.00 (-11.71,7.71)	N/A

Qualitative findings should also be tabulated in this section of the umbrella review report. A description of the phenomenon of interest alongside the key synthesized findings extracted from each included qualitative meta- synthesis or systematic review should be presented. Individual findings and illustrations that would be the norm for presentation in a JBI meta-aggregative review would not be presented in a JBI Umbrella Review presenting qualitative data. To facilitate interpretability and clarity of the findings in this section of the review, adequate contextual and descriptive detail should be also be presented. An example of the tabular presentation of qualitative findings in a JBI Umbrella Review is presented in Table 3. In this table the synthesized finding presented must be an accurate, verbatim replication of the finding from the source review; the descriptive information in the final column may constitute the Umbrella Review author's own words to provide the necessary detail for interpretability. Depending on the review, it is likely that an individual table would be presented for each included qualitative synthesis, otherwise, further rows could be added to the example table. This tabular presentation

must be accompanied by further descriptive detail of the phenomena of interest to the review in the text.

Table 3. Tabular presentation of qualitative findings for an Umbrella review

Phenomena of interest/context	Synthesized finding	Details of strategies
Nurse's perspective of therapeutic interventions to manage verbal and behavioural aggression among patients with dementia or brain injury	<p>Entering the patient's world: Nurses are encouraged to become a part of the patient's world and to strive for mutual understanding and action.</p> <p>Patient negativity is downplayed and interactions are shaped in thoughtfully creative ways</p>	<p><b>Normalization:</b> Getting to know the patient behind the aggression and normalizing their experiences. Aggression is seen as part of the condition</p> <p><b>Person-centered care:</b> During care the person's needs, experiences, and feelings remain a focal point instead of procedures</p> <p><b>Nurse-patient mutuality:</b> Nurses are encouraged to mutually work through problems rather than always doing things to and for patients</p> <p><b>Downplaying negativity:</b> Nurses are urged to develop a positive interaction style with potentially aggressive patients and to disregard or overlook negative behavior</p> <p><b>Thoughtful creativity:</b> Nurses are urged to be reflective, use their imaginations, and be flexible when providing care</p>
	<p>Utilitarian care: Nurses are inflexibly committed to rules and routines; focused on duty, responsibility, being in charge, and streamlining care</p>	<p><b>Inflexible routines:</b> When inflexible routines are maintained, patients tend to be seen as troublesome, and their behaviors are viewed as meaningless</p>

#### 2.3.8.4 Summary of Findings

In line with the objectives of a JBI Umbrella Review to present an accurate and informative overview of the findings of research syntheses that inform a broad topic or question, all JBI Umbrella Reviews should conclude the results section of the report with a final and easily interpretable table that presents the overall 'Summary of Findings'.

For quantitative findings, a final table should be presented that names the intervention, identifies the included research synthesis and provides a simple, visual indication of the results. Visual indication should follow a simple 'stop-light' indicator, where green indicates the intervention is beneficial (effective), amber that there is no difference in the investigated comparison, and red that the results suggest

the intervention is detrimental or less effective than the comparator. Actual details and effect estimates are presented in the findings of the review (see **xx** above). An example for ‘aggressive behavior’ is presented in Table 4. Further outcomes reported on by the Umbrella Review could be added in columns to the right. Where a study does not report on an outcome, the indicator square should be left blank.

Table 4: Summary of Findings from quantitative research syntheses in a JBI Umbrella Review.

Interventions/ phenomena of interest	Author/year	Aggressive behavior
Bright light	Forbes 2009	
Staff training programs	Kynoch, et al, 2009	
Physical restraint	Kynoch, et al, 2009	
Music therapy	Kynoch, et al, 2009	
Multiple interventions	Kynoch, et al, 2009	

Similarly, Umbrella Reviews that include qualitative syntheses should also conclude the results section of the Umbrella Review with a clear summary of the overall findings of the included research syntheses. In the final summary table, the key synthesized findings should be presented for the reader; for other contextual details the main findings can be referred to (see **xx** above). As with summary presentation of qualitative findings, where possible visual indicators as to the nature of the finding should be included. In the example provided in Table 5, those perspectives (see

phenomenon) that are beneficial or facilitatory are highlighted in green, whilst those that are inhibitory are highlighted in red.

Table 5: Summary of Findings from qualitative research syntheses in a JBI Umbrella Review.

Phenomena of interest	Authors	Synthesized finding
Nurse's perspective of optimal therapeutic interventions	Finfgeld-Connett et al.	Entering the patient's world - becoming part of the patient's world characterised by: <ul style="list-style-type: none"> <li>• Normalization</li> <li>• Person-centered care</li> <li>• Nurse-patient mutuality</li> <li>• Downplaying negativity</li> <li>• Thoughtful creativity</li> </ul>
		Utilitarian care – characterized by: <ul style="list-style-type: none"> <li>• Being inflexibly committed to rules and routines</li> <li>• Focused on duty, responsibility, being in charge and streamlining care</li> </ul>

### 2.3.9 Discussion

This section should discuss the results of the review as well as any limitations of the systematic reviews or research syntheses included in the Umbrella Review and of the review itself (i.e. language, access, timeframe, study design, etc.). The results should be discussed in the context of current literature, practice and policy. Umbrella Reviews are subject to many of the limitations of any systematic review including that potentially relevant studies have been omitted and that some systematic error occurred during the selection, appraisal or data extraction processes. Similarly, Umbrella Reviews are ultimately dependent on the reporting of the included research syntheses which may limit reporting of desirable details of interventions for example in the Umbrella Review report. Inherent bias exists in the reporting of an Umbrella Review

as one round of appraisal and extraction, where errors may arise, has already been performed in the conduct of the included systematic review or meta-analysis.

Umbrella Reviews will also always be limited by the coverage of existing systematic reviews or research syntheses, for example, if an existing intervention or phenomena of interest is yet to be addressed in a systematic review, an Umbrella Review will never identify it.

### **2.3.10 Conclusions**

This section should begin with an overall conclusion based on the results. The conclusions drawn should match the review objective/question.

### **2.3.11 Implications for practice**

It should be stated how the findings of the review impact on clinical practice or policy in the area. Where there is sufficient evidence to make specific recommendations for practice, these should be clearly articulated.

### **2.3.12 Implications for research**

This section should include clear, specific recommendations for future research based on gaps in knowledge identified from the results of the review. Umbrella Review authors may find they are able to make comment both on the future conduct of research syntheses and systematic reviews as well as to provide comment on the primary research conducted in the area of interest.

### **2.3.13 Conflicts of interest**

A statement which either declares the absence of any conflicts of interest or which describes a specified or potential conflict of interest should be made by the reviewers in this section.

### **2.3.14 Acknowledgements**

Any acknowledgements should be made in this section e.g. sources of external funding or the contribution of colleagues or institutions. It should also be noted if the Umbrella Review is to count toward the award of a degree.

### **2.3.15 References**

All references should be listed in full using Vancouver referencing style, in the order in which they appear in the review.

### **2.3.16 Appendices**

Appendices should be numbered using Roman numerals in the order in which they have been referred to in the body of the text. There are several required appendices for a JBI review:

#### **Appendix I: Search strategy**

A detailed search strategy for at least one of the major databases searched must be appended.

#### **Appendix II: Critical appraisal instrument**

The critical appraisal instrument used must be appended

#### **Appendix III: Data extraction instrument**

The data extraction instrument used must be appended

#### **Appendix IV: Table of included study characteristics**

A table of included studies is crucial to allow a snapshot of the studies included in the review. Much of this data will be populated from the detailed extraction undertaken in the JBI URARI analytical module.

#### **Appendix V: List of excluded studies**

At a minimum, a list of studies excluded at the critical appraisal stage must be appended and reasons for exclusion should be provided for each study (these reasons should relate to the methodological quality of the study, not study selection). Studies excluded following examination of the full-text may also be listed along with their reason for exclusion at that stage (i.e. a mismatch with the inclusion criteria). This may be as a separate appendix or itemized in some fashion within the one appendix.

Appropriate Appendices (appraisal, extraction tools) as they appear from CReMS should be provided and referred to in the chapter.



## References

Bastian H, Glasziou P, Chalmers I. Seventy-five trials and eleven systematic reviews a day: how will we ever keep up? *PLoS Med* 2010; 7(9):e1000326.

Khangura S, Konnyu K, Cushman R, Grimshaw J, Moher M. Evidence summaries: the evolution of a rapid review approach. *Systematic Reviews* 2012; 1:10.

Hartling L, Chisholm A, Thomson D, Dryden DM. A descriptive analysis of overviews of reviews published between 2000 and 2011. *PLoS One* 2012; 7(11):e49667.

Grant [add](#)

Smith [add](#)

Cochrane [add](#)

## JBI Critical Appraisal Checklist for Systematic Reviews and Research Syntheses

Reviewer \_\_\_\_\_ Date \_\_\_\_\_  
 Author \_\_\_\_\_ Year \_\_\_\_\_ Record Number \_\_\_\_\_

	Yes	No	Unclear	Not applicable
1. Is the review question clearly and explicitly stated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the inclusion criteria appropriate for the review question?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Was the search strategy appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were the sources of studies adequate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Were the criteria for appraising studies appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was critical appraisal conducted by two or more reviewers independently?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were there methods to minimize errors in data extraction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were the methods used to combine studies appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Was the likelihood of publication bias assessed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Were recommendations for policy and/or practice supported by the reported data?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Were the specific directives for new research appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall appraisal:	Include <input type="checkbox"/>	Exclude <input type="checkbox"/>	Seek further info <input type="checkbox"/>	

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## Appendix **xx**

### JBI Critical Appraisal Checklist for Research Syntheses

When conducting an umbrella review using the JBI method, the critical appraisal instrument for Systematic Reviews must be used. This appraisal instrument can be found in the URARI analytical module of the SUMARI software.

The primary and secondary reviewer should discuss each item in the appraisal instrument for each study included in their review. In particular, discussions should focus on what is considered acceptable to the aims of the review in terms of the specific study characteristics. When appraising systematic reviews this discussion may include issues such as what represents an adequate search strategy or appropriate methods of synthesis. The reviewers should be clear on what constitutes acceptable levels of information to allocate a positive appraisal compared with a negative, or response of “unclear”. This discussion should ideally take place before the reviewers independently conduct the appraisal.

Within umbrella reviews, quantitative or qualitative systematic reviews may be incorporated, as well as meta-analyses of existing research. This section of the handbook presents the criteria for appraising each of these designs as contained in the JBI analytical module URARI. The individual checklists can be located in **Appendix XX/page XX**

There are 11 questions to guide the appraisal of systematic reviews or meta-analyses. Each question should be answered as “yes”, “no”, or “unclear”. Not applicable “NA” is also provided as an option and may be appropriate in rare instances.

#### 1. Is the review question clearly and explicitly stated?

The review question is an essential step in the systematic review process. A well-articulated question defines the scope of the review and aids in the development of the search strategy to locate the relevant evidence. An explicitly stated question, formulated around its PICO (Population, Intervention, Comparator, Outcome) elements aids both the review team in the conduct of the review and the reader in determining if they review has achieved its objectives. Ideally the review question should be articulated in a published protocol; however this will not always be the case with many reviews that are located.

#### 2. Were the inclusion criteria appropriate for the review question?

The inclusion criteria should be identifiable from, and match the review question. The necessary elements of the PICO should be explicit and clearly defined. The inclusion criteria should be detailed and the included reviews should clearly be eligible when matched against the stated inclusion criteria. Appraisers of meta-analyses will find that inclusion criteria may include criteria around the ability to conduct statistical analyses which would not be the norm for a systematic review. The types of included studies should be relevant to the review question, for example, an umbrella review aiming to summarize a range of effective non-pharmacological interventions for aggressive behaviors amongst elderly patients

with dementia will limit itself to including systematic reviews and meta-analyses that synthesize quantitative studies assessing the various interventions; qualitative or economic reviews would not be included.

3. Was the search strategy appropriate?

A systematic review should provide evidence of the search strategy that has been used to locate the evidence. This may be found in the methods section of the review report in some cases, or as an appendix that may be provided as supplementary information to the review publication. A systematic review should present a clear search strategy that addresses each of the identifiable PICO components of the review question. Some reviews may also provide a description of the approach to searching and how the terms that were ultimately used were derived, though due to limits on word counts in journals this may be more the norm in online only publications. There should be evidence of logical and relevant keywords and terms and also evidence that Subject Headings and Indexing terms have been used in the conduct of the search. Limits on the search should also be considered and their potential impact; for example, if a date limit was used, was this appropriate and/or justified? If only English language studies were included, will such a language bias have an impact on the review? The response to these considerations will depend, in part, on the review question.

4. Were the sources of studies adequate?

A systematic review should attempt to identify “all” the available evidence and as such there should be evidence of a comprehensive search strategy. Multiple electronic databases should be searched including major bibliographic citation databases such as MEDLINE and CINAHL. Ideally, other databases that are relevant to the review question should also be searched, for example, a systematic review with a question about a physical therapy intervention should also look to search the PEDro database, whilst a review focussing on an educational intervention should also search the ERIC. Reviews of effectiveness should aim to search trial registries. A comprehensive search is the ideal way to minimize publication bias, as a result, a well conducted systematic review should also attempt to search for grey literature, or “unpublished” studies; this may involve searching websites relevant to the review question, or thesis repositories.

5. Were the criteria for appraising studies appropriate?

The systematic review should present a clear statement that critical appraisal was conducted and provide the details of the items that were used to assess the included studies. This may be presented in the methods of the review, as an appendix of supplementary information, or as a reference to a source that can be located. The tools or instruments used should be appropriate for the review question asked and the type of research conducted. For example, a systematic review of effectiveness should present a tool or instrument that addresses aspects of validity for experimental studies and randomised controlled trials such as randomization and blinding – if the review includes observational research to answer the same question a different tool would be more appropriate. Similarly, a

review assessing diagnostic test accuracy may refer to the recognised QUADAS (ref) tool.

6. Was critical appraisal conducted by two or more reviewers independently?

Critical appraisal or some similar assessment of the quality of the literature included in a systematic review is essential. A key characteristic to minimize bias or systematic error in the conduct of a systematic review is to have the critical appraisal of the included studies completed independently and in duplicate by members of the review team. The systematic review should present a clear statement that critical appraisal was conducted by at least two reviewers working independently from each other and conferring where necessary to reach decision regarding study quality and eligibility on the basis of quality.

7. Were there methods to minimize errors in data extraction?

Efforts made by review authors during data extraction can also minimize bias or systematic errors in the conduct of a systematic review. Strategies to minimize bias may include conducting all data extraction in duplicate and independently, using specific tools or instruments to guide data extraction and some evidence of piloting or training around their use.

8. Were the methods used to combine studies appropriate?

A synthesis of the evidence is a key feature of a systematic review. The synthesis that is presented should be appropriate for the review question and the stated type of systematic review and evidence it refers to. If a meta-analysis has been conducted this needs to be reviewed carefully. Was it appropriate to combine the studies? Have the reviewers assessed heterogeneity statistically and provided some explanation for heterogeneity that may be present? Often, where heterogeneous studies are included in the systematic review, narrative synthesis will be an appropriate method for presenting the results of multiple studies. If a qualitative review, are the methods that have been used to synthesise findings congruent with the stated methodology of the review? Is there adequate descriptive and explanatory information to support the final synthesised findings that have been constructed from the findings sourced from the original research?

9. Was the likelihood of publication bias assessed?

As mentioned, a comprehensive search strategy is the best means by which a review author may alleviate the impact of publication bias on the results of the review. Reviews may also present statistical tests such as Egger's test or funnel plots to also assess the potential presence of publication bias and its potential impact on the results of the review.

10. Were recommendations for policy and/or practice supported by the reported data?

Whilst the first nine (9) questions specifically look to identify potential bias in the conduct of a systematic review, the final questions are more indicators of review quality rather than validity. Ideally a review should present recommendations for policy and practice. Where these recommendations are made there should be a

clear link to the results of the review. Is there evidence that the strength of the findings and the quality of the research been considered in the formulation of review recommendations?

11. Were the specific directives for new research appropriate?

The systematic review process is recognised for its ability to identify where gaps in the research, or knowledge base, around a particular topic exist. Most systematic review authors will provide some indication, often in the discussion section of the report, of where future research direction should lie. Where evidence is scarce or sample sizes that support overall estimates of effect are small and effect estimates are imprecise, repeating similar research to those identified by the review may be called for and appropriate. In other instances, the case for new research questions to investigate the topic may be warranted.

Penny Whiting, Anne WS Rutjes, Johannes B Reitsma, Patrick MM Bossuyt and Jos Kleijnen. The development of QUADAS: a tool for the quality assessment of studies of diagnostic accuracy included in systematic reviews *BMC Medical Research Methodology* 2003, 3:25 doi:10.1186/1471-2288-3-25

## JBI Data Extraction Form for Review for Systematic Reviews and Research Syntheses

<b>Study Details</b>	
Author/year	
objectives	
Participants (characteristics/total number)	
Setting/context	
Description of Interventions/ phenomena of interest	
<b>Search Details</b>	
Sources searched	
Range (years) of incl studies	
Number of studies included /	
Types of studies included	
Country of origin of incl. studies	
<b>Appraisal</b>	
Appraisal instruments used	
Appraisal rating	
<b>Analysis</b>	
Method of analysis	
Outcome assessed	
Results/Findings	
Significance/direction	
Heterogeneity	
Comments	