Using Existing Systematic Reviews in Complex Systematic Reviews

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Systematic reviewers increasingly must decide whether and how to incorporate existing systematic reviews into complex systematic reviews that are commissioned to support clinical guideline development or for other health policy uses. To date, however, this issue has been largely unexamined. Reviewers seeking to incorporate existing reviews into new reviews face a set of important questions: Can this practice adhere to systematic review principles? Will it save time? When should it be avoided? Will it produce valid results and be acceptable to users? Drawing from their collective experience, the authors outline a series of steps that can help reviewers reach reasoned decisions about the incorporation of existing systematic reviews and enumerate potential hazards to consider in doing so. They highlight issues surrounding the main steps reviewers must undertake, including locating existing reviews; assessing their relevance to the new review; assessing the quality of relevant reviews; determining how to incorporate high-quality, relevant existing systematic reviews; and clearly reporting the methods used and the results from this process. Further specification of methods, including the development of reporting standards for this approach, is needed.

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A thorough review of available evidence is an essential building block for clinical and health policy decisions (1–3). The typical first task for those creating clinical guidelines, quality-of-care criteria, or coverage or health policy decisions is to conduct a systematic review. Those who perform systematic reviews—as well as those who commission them—face a growing issue: what to do with preexisting reviews of the evidence. Given the explosive growth in the number of systematic reviews and meta-analyses—an estimated 2500 new publications in 2006 (4)—many topics have already been reviewed. This represents the potential for substantial efficiencies in a time- and resource-intensive process (5) but also raises a host of questions.

Some systematic reviews have 1 or a few straightforward questions, but increasingly systematic reviews evaluate a number of linked clinical questions, multiple interventions or diagnostic tests, different or distinct population groups, and/or many outcomes. These complex reviews are often required to adequately support clinical practice guideline development or health policy decision making. Accordingly, this paper focuses on the incorporation of existing systematic reviews into newly commissioned complex reviews, where the potential and need for efficiency is greatest and the obstacles to such incorporation are larger and more numerous. We do not discuss focused, single-question reviews where avoiding duplication is the primary concern or "meta" reviews (overviews of reviews or umbrella reviews) (6, 7).

To date, this issue—whether and how to include existing reviews in new work—has been largely unexamined. We found no specific guidance and little discussion in a recent search of MEDLINE or in a review of methods manuals and other Web-based resources for evidence-based guideline developers (5–13). And yet, an informal survey of 8 systematic reviewers within the Cochrane Collaboration, the National Institute for Health and Clinical Effectiveness, the New Zealand Health Technology Assessment, the Centers for Disease Control and Prevention, and the UK Center for Reviews and Dissemination confirmed that reviewers worldwide are grappling with many of the same questions as they attempt to incorporate existing systematic reviews into their newly commissioned work.

The most important questions reviewers face are these: How can incorporating existing reviews into new work adhere to the principles of comprehensive, transparent, and unbiased methods required for systematic reviews? If we make the effort to incorporate existing reviews, will it save us time and resources? Are there instances where an independent, critical assessment of the evidence warrants conducting a complex review "from scratch," even if there are existing reviews? And, will a complex review that incorporates existing systematic reviews produce valid, reliable results and be both acceptable and useful to decision makers?

The answers to the above questions will not be the same for every new complex review. We believe, however, that a systematic process (**Figure** and **Table 1** [14–17]) can help reviewers reach reasoned decisions about the incorporation of existing systematic reviews on a topic-by-topic basis. We discuss that process and enumerate hazards to consider (**Table 2**).

See also:

Print
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Web-Only
Appendix Tables
Conversion of graphics into slides

Step 1: Locate Existing Systematic Reviews

Although the idea of using existing systematic reviews to gain efficiency is a logical and intuitively appealing concept, our experience suggests that efficiency is not a foregone conclusion. At the very least, however, existing re-

views must be considered a part of the body of evidence in a given topic area, if for no other reason than to serve as a crosscheck on the completeness of the search for primary studies.

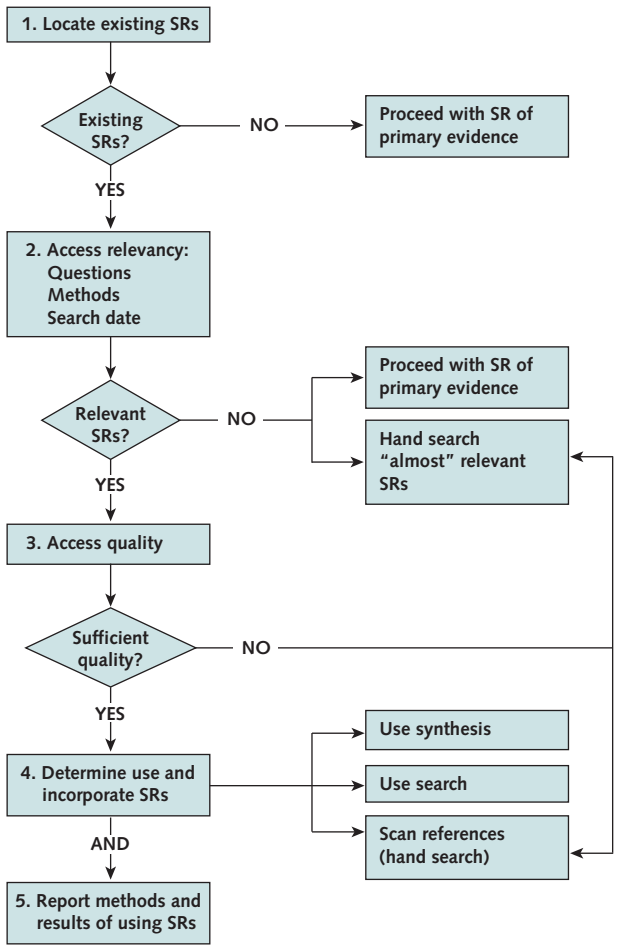
Given this, we generally conduct searches for existing meta-analyses and systematic reviews as an early step in the review process, and we have learned to do this as efficiently as possible. An ideal literature search for existing systematic reviews identifies only the most relevant, recent, and high-quality reviews. To minimize time and resources, we suggest a restricted search strategy focused on databases we have found to be higher-yield, including the Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, Health Technology Assessment, the Evidence-Based Practice Center program, and MEDLINE's Top 120 Index Medicus Journals. Depending on the topic, others may also be included (18, 19). In a recent case, this restricted search required us to evaluate about half as many systematic review citations (104 compared with 205 from the comprehensive search), but we still located the 2 high-quality existing systematic reviews that we ultimately incorporated into our new review.

Step 2: Assess the Relevance of Existing Systematic Reviews

Evaluating whether an existing review is actually relevant to a new systematic review is critically important but can be time-consuming. An initial step is to examine the dates for the literature searches in existing reviews. The time frame of included studies is a major factor for determining relevance and can sometimes serve as a quick screening tool. Systematic reviews can become out of date within about 3 to 5 years, and sometimes sooner (20–22). Review topics with a larger volume of ongoing research or in a rapidly evolving field may become obsolete more quickly; for example, HIV treatment guidelines are updated yearly (23). Although older systematic reviews may be less relevant for current decisions, particularly when a major new trial or contradictory research has been published, they can still provide a primary means for locating relevant primary research if they are of sufficient quality (1, 24, 25).

Determining whether a given review is actually relevant when it appears relevant from reading the title and abstract often requires a detailed assessment of how well the populations, settings, interventions or exposures, comparators, outcomes, and included study designs match up with the intended scope and research questions of the guideline or policy-level review. Even after existing systematic reviews appear to meet most criteria related to scope, differences in review methods (such as inclusion/exclusion criteria) or in data abstraction or reporting (such as not addressing relevant subgroups) can limit an existing review's utility. Developing spreadsheets or other data tools to track these variables can be critical in speeding analysis

Figure. **Methodological steps when using existing systematic reviews (*SRs*).**



of relevance. (**Appendix Tables 1** and **2**, available at www.annals.org, show sample approaches.)

We advise updating searches to look for new primary studies even when incorporating existing systematic reviews that are relatively recent. However, some exceptions to updating might be reasonable. When a complex new review examines several linked questions within a body of evidence, reviewers might find that findings from previous reviews are so robust and well established (such as the health benefits of tobacco cessation or increased physical activity) that recency for a particular linked question is not an issue (26, 27). In other instances, reviewers might judge it unnecessary to update a large cumulative meta-analysis with very precise and stable estimates (28).

Step 3: Assess the Quality of Existing Systematic Reviews

Systematic reviews should be as free of bias as possible if they are to reliably inform guideline recommendations or

Table 1. **Methodological Considerations When Using Existing Systematic Reviews***

Step	Problems in Using Existing Reviews	Recommendations to Consider
1. Locate existing reviews	Inefficiency of comprehensive searching for existing reviews	Limit searching to higher-yield sources (e.g., CDSR, DARE, HTA, and EPC programs)
2. Assess relevancy of reviews	Subtle differences in inclusion or exclusion criteria of existing reviews and current review criteria	Use a tool to organize a detailed assessment of inclusion and exclusion criteria for important domains: population, setting, intervention or exposure, comparator, outcome, and included study design
	Short shelf-life of existing reviews	Conduct "update" searches for new primary research
3. Assess quality of reviews	Wide variation in quality of existing reviews	Use an established instrument to rate the quality of reviews (such as Oxman–Guyatt [14] or AMSTAR [15])
	Limited reporting in published reviews	Contact review authors for additional details on QUORUM (16) and MOOSE (17) checklists
	Quality assessment tools are subjective and may not be sensitive to methodological deficiencies	Use ≥2 independent reviewers to assess quality; critically appraise reviews for important sources of bias that may not be addressed in quality tools (such as unpublished research, approach to quality rating, method of analysis); and use a higher-quality threshold in accepting secondary research (include only good-quality reviews)
	Data abstraction errors in existing reviews	Revisit and reabstract data from primary research, or evaluate a random sample of primary studies to ensure that data abstraction is accurate and reproducible
4. Determine use and incorporate reviews	Limitations in reporting or concerns about transparency of findings	Revisit primary research in existing review: Reassess the inclusion and exclusion criteria and quality of primary research Reabstract data from primary research
	Multiple relevant and good-quality existing reviews	Choose a single best review on the basis of relevance, quality, and completeness, or evaluate consistency among reviews and include all relevant and good-quality reviews in a summary table
	Consistency across reviews does not necessarily imply robust findings	Be explicit and transparent in reporting the volume and quality of primary research in each review
	Disagreement or discordant findings between existing reviews	Explore subtle differences that may explain discrepancies (such as in questions, methods for study selection, data extraction, data synthesis, or funding source), or conduct a de novo review if discrepancies in findings are not apparent
5. Report methods and results of using reviews	No standards for reporting on the use of existing reviews	Describe methods used to locate and select reviews if different from methods used to locate and select primary research; include a summary table to aid in transparency of volume, type, and quality of primary research, along with assessments of any modifying factors and magnitude of benefits; and document existing reviews that were not used in search results or excluded studies

* AMSTAR = Assessment of Multiple Systematic Reviews; CDSR = Cochrane Database of Systematic Reviews; DARE = Database of Abstracts of Reviews of Effects; EPC = Evidence-based Practice Center; HTA = Health Technology Assessment; MOOSE = Meta-analysis of Observational Studies in Epidemiology; QUORUM = Quality of Reporting of Meta-analyses.

other policy decisions (2). Quality assessment of existing systematic reviews is therefore a critical step and should address both the methods used by the systematic reviewers to minimize bias as well as the transparency and completeness of reporting of review methods, individual study details, and results. In fact, the priority should be to include existing systematic reviews adhering to high methodological standards, rather than to routinely include all existing systematic reviews in order to be comprehensive. Given the several limitations in effectively evaluating systematic review quality (described next), we suggest incorporating only existing reviews that 2 reviewers agree are of high quality. Excluding lower-quality systematic reviews generally should not result in loss of important information because higher-quality reviews should be at least as comprehensive in terms of identifying studies and are less apt to be misleading.

A number of methods for assessing quality of systematic reviews are available (29). Although no currently available quality rating instrument is clearly superior, it is important to use an instrument that addresses all of the important methodological domains (one that has content validity). These include evaluation of methods used to identify, select, appraise, abstract data, and synthesize studies and those used to assess for publication bias and report conflicts of interest (15). We suggest using either the Oxman and Guyatt instrument (14), which (unlike other quality rating instruments for systematic reviews) has some empirical evidence supporting its utility (30, 31), or the newer Assessment of Multiple Systematic Reviews tool, which incorporates several additional methodological domains (such as whether study selection and data extraction were conducted in duplicate, the assessment of publication bias, and reporting of conflicts of interest) (15).

A problem when applying quality rating instruments for assessing existing systematic reviews is that they are all relatively subjective. Assessments of quality can be misleading because they frequently seem more clear-cut than they really are. It is therefore important for at least 2 independent reviewers to assess quality and to report discrepancies between reviewers, as well as methods for resolving them. However, we recognize that dual review and consensus res-

olution do not fully address the subjective nature or variability of quality assessment. Another pitfall in applying quality rating instruments is that they may be relatively insensitive to real problems, such as inconsistencies in application of inclusion criteria or errors in data abstraction. For example, a systematic review of antidepressants for low back pain specified randomization as an inclusion criterion (32) but included a trial that was not clearly randomized (33). Among the included studies, this trial reported the highest estimate of benefit and may have had an important effect on conclusions. Checking data from systematic reviews against primary studies can reveal important discrepancies (34, 35). Therefore, we recommend that reviewers confirm the reproducibility of application of inclusion criteria and the accuracy of data abstraction in at least a sample of the studies, even when incorporating higher-quality existing systematic reviews (24).

Step 4: Determine How to Incorporate Existing Systematic Reviews

Once existing reviews are deemed to be relevant and of high quality, reviewers must determine the appropriate way to incorporate them into the current review—either to provide already-summarized evidence or to provide part of the comprehensive search strategy to identify primary studies. Existing reviews can be incorporated in their entirety, in the case of high-quality reviews with almost identical research questions, or in part, where only a portion of the review (such as that pertaining to a specific population or specific intervention) is of interest.

Reporting limitations can be an important factor limiting the use of existing systematic reviews. In some reviews, results from individual trials are not presented or are only presented in part. This can make it difficult to determine the accuracy or validity of the review's results and is a violation of the principle of transparency in systematic reviews. Little may be gained from incorporating such a review because it is impossible to update results of meta-analyses in the existing review with results from new studies without obtaining the primary studies and repeating the data abstraction (34, 35).

When limitations in reporting, concerns about data abstraction, or other concerns limit the full incorporation of a good-quality review, the review may still be used as part of the primary search strategy. This is particularly true for high-quality reviews that completely report their comprehensive search strategy, inclusion criteria, and excluded studies, such as Cochrane reviews (18). When an existing review is used to cover comprehensive searching for a given period, all identified studies are retrieved, evaluated against the inclusion/exclusion criteria of the current review, and assessed for quality.

Multiple Existing Systematic Reviews on the Same Topic

Some topics may have more than 1 relatively recent, relevant, apparently high-quality systematic review, allowing multiple reasonable approaches. One approach is to incorporate a single "best" existing review from among the most recent reviews, the one that seems the most relevant and least biased. This approach has the appeal of being relatively straightforward and minimizing potential effects from "double-counting" of primary studies in multiple reviews. In addition to confirming the quality of the study selection and data abstraction in the "best" review, we recommend confirming its comprehensiveness by retrieving additional studies identified by other recent reviews to check that no relevant studies were missed.

An alternative is to select all relevant systematic reviews that meet an a priori publication date threshold and are of high quality and evaluate consistency among these reviews. For a recent review, we did this by determining the number, quality, and results from the individual trials included across all systematic reviews and displayed the results in summary tables stratified by therapy (36). In another case, we summarized existing systematic reviews on palliative and end-of-life care to allow a qualitative comparison of consistency across reviews (37).

Consistency between existing reviews may be more reassuring when they contain multiple high-quality primary studies or when different review methods result in similar conclusions. However, the concept of consistency in systematic reviews is more complex than previously appreciated. Although the presence of multiple existing systematic reviews with consistent results would appear to suggest a robust finding, this may not be the case. Highly consistent results could be based on only a small number of trials or flawed trials or be due to consistently applied but inappropriate analyses (such as pooling disparate studies or not adjusting for important confounders). The number and quality of individual trials and appropriateness of analytic methods are more important than the number of consistent systematic reviews.

The situation is more challenging when existing systematic reviews disagree with one another (38, 39). Discordant conclusions can be due to obvious or relatively subtle differences in the questions addressed or methods

Table 2. **Hazards in Using Existing Systematic Reviews**

Much time is spent trying to find and evaluate relevant reviews, which would be better spent on locating and analyzing the primary studies.
Incorporating the results of existing reviews could simply propagate errors.
Reviewers have less experience (and guidance) on how to compare multiple reviews on the same subject, which could introduce random error.
Lack of clear methodological guidance on selecting the most relevant reviews could introduce reviewer bias in cases where findings differ among multiple reviews.
When confronted with discordant reviews, not starting from scratch could be an error. Sometimes discordant reviews are the best indicator that a new review with its own independent critical appraisal is needed.
Incorporating an existing systematic review instead of conducting a de novo review could limit credibility with users.
High-profile topics may benefit from a new review to provide independent confirmation or disconfirmation of previous review findings.

used for study selection, data extraction, or data synthesis (39–41). When high-quality reviews disagree, reviewers may be able to explore discrepancies through analyses conducted as part of the new review. Existing reviews that are contradictory may be the signal that a new independent review is warranted; however, this may be difficult to determine because of inadequate transparency or reporting of systematic review methods or uncertainty about the most appropriate systematic review methods. Even a detailed review of the methods and conclusions generated by existing systematic reviews may be unable to identify sources of discrepancy. Recent studies suggest that even when existing reviews report similar methods and results, conflicts of interest related to the funding source can affect the conclusions (42, 43). If reviewers choose to include discordant systematic reviews in their analysis, we recommend that they include a table or narrative description of how the systematic reviews differ (for example, by search methods, inclusion criteria, methods for assessing quality, analytic methods, or funding source) and an assessment of how those differences might affect results.

Reasons for Not Incorporating Existing Systematic Reviews

In some situations, it may be preferable not to include relevant systematic reviews. First, reviews should be excluded when the number of primary studies is small and any gains in efficiency by using the reviews would be minimal at best. Second, when higher-quality reviews disagree, a new independent review that carefully addresses potential sources of disagreement with careful sensitivity or subgroup analyses may be the most informative strategy. Third, existing systematic reviews may reach concordant conclusions, but this could be because of similar deficiencies in analysis or interpretation. In one example, a colleague excluded preexisting systematic reviews because they did not adequately evaluate potential confounders for the treatment in question (44). In this case, conducting a new review that appropriately addressed the methodological shortcomings of existing reviews was more informative than simply describing existing flaws and how they might affect conclusions. Finally, the use of existing systematic reviews may not be acceptable to some members of the commissioning body. In a recent review commissioned to inform the development of clinical guidelines, we found that some members reviewing the guidelines were reluctant to rely on systematic reviews performed by other entities.

Step 5: Report the Methods and Results of Using Existing Systematic Reviews

At present, the methods for reporting whether and how to use existing reviews are not as standardized as the methods of reporting a systematic review of primary studies. We believe that guides for reporting on the incorporation of existing systematic reviews are needed. In the interim, reviewers should adhere to principles of reproducibility and transparency when documenting both their methods and the results. This means that reviewers should clearly describe the methods used to locate systematic reviews, determine relevance, assess quality, select reviews for inclusion, and resolve discrepancies if present. Similar to a discussion of primary research, investigators should clearly document the results that are based on included systematic reviews, as well as their limitations. In most cases, a summary table that details all included reviews as well as primary studies is warranted. Although the exact format of each table will vary depending on the topic, we suggest including the important elements put forth by the Grading of Recommendations, Assessment, Development, and Evaluation workgroup (45), such as the number, type, and quality of primary studies and assessments of any modifying factors and magnitude of benefits. Examples of these summary tables are included in our recently published complex reviews (36, 37). Finally, even when reviewers do not incorporate existing systematic reviews into their new reviews, they should consider discussing potential sources of discrepancy (if present) between the new review and any existing reviews.

Summary and Conclusion

Systematic reviewers increasingly must decide whether and how to incorporate existing systematic reviews into complex systematic reviews that are newly commissioned to support clinical guidelines development or other health policy uses. The most important questions facing systematic reviewers as they consider whether and how to include existing reviews into new work are as follows: Can this practice adhere to principles of completeness, transparency, and lack of bias? Will it save time? When should it be avoided? Will it produce valid results and be acceptable to users? We claim no definitive answers to these questions but have several observations for reviewers and commissioning bodies to consider as they confront this practice in their own work.

First, methodological standards for incorporating existing systematic reviews are at a relatively early stage of development. We have outlined several ways to make the process more systematic and transparent and to reduce potential bias. Refinements and further suggestions from others are needed.

Second, it is not clear if incorporating existing reviews actually saves time and effort. Incorporating reviews with few research questions or primary studies may not achieve that goal. Even when many higher-quality reviews can be found and the new review is highly complex, more research is needed to evaluate whether and when efficiency can be gained.

Third, issues of relevance or quality are not the only reasons to consider excluding existing reviews altogether. In addition to cases in which incorporating existing reviews would require increased time and effort, we would consider creating a new review if the existing reviews were contra-

dictory and the reasons for discord not readily apparent, or if the commissioning body was reluctant to accept evidence from a third party.

Finally, although some "clients" of systematic reviews may never accept inclusion of existing reviews, the practice is widespread and is probably increasing. We believe a more rigorous and transparent process for incorporating existing systematic reviews into complex reviews should result in more valid conclusions. Further efforts to demonstrate validity will depend on clearly communicating current methods and on undertaking empirical research to consider how these methods relate to the validity of review results.

In conclusion, many reviewers of complex topics, developers of guidelines, and commissioning bodies face the issues and questions addressed in this article. We strongly recommend a more robust dialogue on this topic, more methodological research to assist with specification of methods, and the development of reporting standards.

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Appendix Table 1. **Example Criteria in Evaluating Relevance of Existing Systematic Reviews***

Criteria to Assess Relevance	Example Criteria from "Falls in Older Adults" Protocol	Sample Abstraction of Existing Systematic Review
Author (year)	–	Gillespie (2005)
Systematic review	–	Yes
Content category by KQ	KQs 1 and 3 (effectiveness of intervention or screening), KQ 2 (risk assessment/prognosis), KQ 4 (harms of intervention or screening)	KQ 3
Review focus	Type of intervention (clinical screening, clinical management, clinical education or behavioral counseling, home hazard modification, exercise or physical therapy) OR Type of risk assessment (details)	Interventions to prevent falls: exercise or physical therapy; home hazard modifications; clinical education or behavioral counseling, clinical management (medication withdrawal or adjustment, nutritional or pharmacological therapies, vision, multifactorial risk factor screening and intervention)
Databases and included dates	Not determined until systematic review evaluation process is completed	Cochrane Bone, Joint and Muscle Trauma Group Specialised Register (to Jan 2003), Cochrane Central Register of Controlled Trials (to Jan 2003), MEDLINE (1966–Feb 2003), EMBASE (1998–2003 wk 19), CINAHL (1982–Apr 2003), National Research Register Current Controlled Trials (Issue 2, 2003), reference list of articles, PsycLIT and Social Sciences Citation Index (to May 1997)
Study design (inclusion criteria)	KQs 1 and 3: SR, RCT, or CCT KQ 2: SR, RCT, or CCT; cohort studies (prospective or retrospective); nested case–control studies	RCT
Target population	Age ≥65 y	Elderly adults, male and female
Setting	Community-dwelling only (exclude institutionalized, other high-risk settings)	Living in the community, residential settings, or institutional care
Outcomes	Number of falls or patients who fell, fall-related fractures and serious injuries, QOL, functional limitations, disability, institutionalization, death	Number of falls or patients who fell, severity of falls
Cost addressed	No	Yes
Trials and participants	–	62 trials (47 trials in participants living in the community, which are reported separately)
Quality	–	Good

* Table used in evaluating existing reviews on interventions to prevent falls in older adults. CCT = controlled clinical trial; KQ = key question; QOL = quality of life; RCT = randomized, controlled trial; SR = systematic review.

Appendix Table 2. **Illustrative Excerpt from Sorting Table of Existing Systematic Reviews***

Comparison	Outcome Addressed	Reviews, *n*	Review (Year)	Studies, *n*	Study (Year)	Participants, *n*
CCPT vs. PEP	Lung Function	4	Thomas (1995)	6	Tonnesen (1984)	24
					Tyrell (1986)	19
					Hofmeyr (1986)	36
					Oberwaldner (1986)	22
					Van Asperen (1987)	10
					Steen (1991)	48
			Hess (2001)	7	Tonnesen (1984)	24
					Steen (1991)	48
					Hofmeyr (1986)	36
					Oberwaldner (1986)	22
					Van Asperen (1987)	10
					Tyrrell (1986)	19
					McIlwaine(1997)	36
			Main (2005)	6	Tyrrell (1986)	19
					Van Asperen (1987)	10
					Darbee (1990)	13
					McIlwaine (1991)	18
					McIlwaine (1997)	36
					Gaskin (1998)	61
			Elkins (2006)	8	Hofmeyr (1986)	18
					Van Asperen (1987)	13
					Darbee (1990)	13
					McIlwaine (1991)	18
					Steen (1991)	28
					McIlwaine (1997)	40
					Gaskin (1998)	66
					Padman (1999)	15
	Quality of Life	2	Main (2005)	1	Gaskin (1998)	61
			Elkins (2006)	1	Gaskin (1998)	61
	Patient Preference	2	Main (2005)	4	Darbee	13
					McIlwaine (1991)	18
					McIlwaine (1997)	36
					Constantini (1998)	12
			Elkins (2006)	4	Darbee (1990)	13
					McIlwaine (1991)	18
					McIlwaine (1997)	36
					Constantini (1998)	12
	Adverse Events	2	Main (2005)	2	McIlwaine (1997)	36
					Constantini (1998)	12
			Elkins (2006)	2	McIlwaine (1997)	40
					Constantini (2001)	26
	Exacerbations	2	Main (2005)	2	McIlwaine (1997)	36
					Constantini (1998)	12
			Elkins (2006)	1	Constantini (2001)	26
	Sputum Secretions	2	Thomas (1995)	6	Tonnesen (1984)	24
					Oberwaldner (1986)	22
					Van Asperen (1987)	10
					McIlwaine (1988)	28
					Steen (1991)	48
					Lannefors (1992)	18
			Hess (2001)	8	Falk (1984)	14
					Tonnesen (1984)	24
					Tyrrell (1986)	16
					Hofmeyr (1986)	18
					Oberwaldner (1986)	20
					Van Asperen (1987)	10
					Steen (1991)	48
					Lannefors (1992)	18
	Oxygen Saturation	2	Elkins (2006)	5	Falk (1984)	14
					Hofmeyr (1986)	18
					Padman (1999)	15
					Battistini (2001)	8
					Constantini (2001)	26
			Hess (2001)	2	Falk (1984)	14
					Hofmeyr (1986)	18

* Table used in evaluating existing reviews on interventions used in cystic fibrosis. CCPT = conventional chest physiotherapy; PEP = positive expiratory pressure mask therapy.