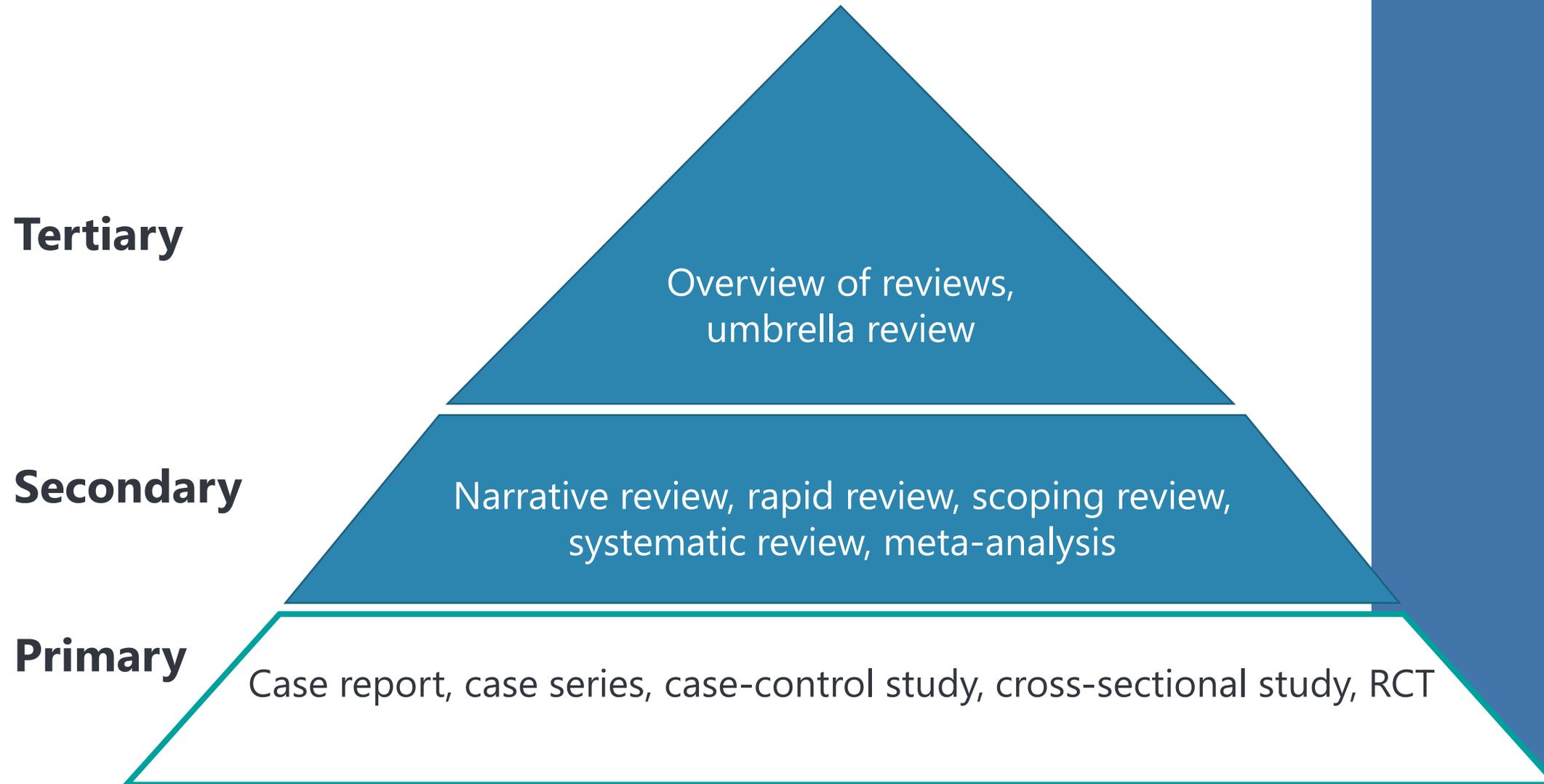


Managing Overlap of Primary Studies Results Across Systematic Reviews

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Clinical Epidemiology

Galaxy of research designs



Tertiary

Overview of reviews,
umbrella review

Secondary

Narrative review, rapid review, scoping review,
systematic review, meta-analysis

Primary

Case report, case series, case-control study, cross-sectional study, RCT

Overviews: umbrella reviews, reviews of reviews, meta-reviews

- Systematic methods to search for and identify multiple SRs on related research questions in the same topic area
- Unit of searching, inclusion and data analysis is the SRs rather than the primary study
- Present outcome as SRs, or re-analyze SRs
- Aim to integrate evidence from multiple SRs within the same field (user friendly) and address a broad spectrum of research questions
- Unclear areas: methodological variations, lack of guideline consensus *dealing with primary study overlap*
- Improper handle >> overstates its sample size and number of events, falsely leading to greater precision in the analysis.



Methods coping with overlapping in overview

- Apply decision rules to include only some SRs e.g. the most recent/ the largest/ the highest quality among relevant SRs
- Include all SRs
 - Cochrane suggests to map out which primary studies included in SRs
 - Create citation matrices (Pieper et al. 2014) & calculate corrected covered area (CCA) – if SRs assess different outcomes of primary studies >>> misleading interference about overlap in data.
 - Graphical displays to depict overlap in OoSRs



Matrix and corrected covered area (CCA)

Formula to examine overlap for subsets of outcomes

"1" implies a checkmark, that is the study is included

"0" implies that the study is not included in the review in question

$$CCA = \frac{N - r}{(r \times c) - r}$$

N = total number of included publications

r = number of rows (number of index publications)

c = number of columns (number of reviews)

| Study | Review | | |
|-------------|--------|---|---|
| | 1 | 2 | 3 |
| 1 | 1 | 1 | 0 |
| 2 | 1 | 0 | 0 |
| 3 | 1 | 0 | 0 |
| 4 | 1 | 1 | 0 |
| 5 | 0 | 0 | 1 |
| 6 | 1 | 1 | 0 |
| 7 | 0 | 1 | 1 |
| 8 | 1 | 0 | 0 |
| 9 | 1 | 0 | 0 |
| 10 | 1 | 0 | 0 |
| 11 | 1 | 1 | 0 |
| 12 | 0 | 0 | 1 |
| 13 | 1 | 0 | 0 |
| 14 | 1 | 0 | 0 |
| 15 | 0 | 1 | 1 |
| 16 | 1 | 0 | 0 |
| 17 | 0 | 0 | 1 |
| 18 | 1 | 0 | 0 |
| 19 | 1 | 1 | 0 |
| 20 | 1 | 1 | 0 |
| 21 | 1 | 0 | 0 |
| Studies (k) | 16 | 8 | 5 |

| | Times studies appeared in | | | CCA values | |
|----------------|---------------------------|----------------|-------------------|------------|------------|
| | Number of reviews | Number of rows | Number of reviews | Proportion | Percentage |
| | N | r | c | | |
| Overall | 29 | 21 | 3 | 0.1905 | 19.05% |
| Review 1 vs. 2 | 24 | 18 | 2 | 0.3333 | 33.33% |
| Review 1 vs. 3 | 21 | 21 | 2 | 0.0000 | 0.00% |
| Review 2 vs. 3 | 13 | 11 | 2 | 0.1818 | 18.18% |

$$CCA = \frac{N - r}{(r \times c) - r}$$

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RESEARCH ARTICLE

Managing Overlap of Primary Studies Results Across Systematic Reviews: Practical Considerations for Authors of Overviews of Reviews

> Carole Lunny, Dawid Pieper, Pierre Thabet, Salmaan Kanji

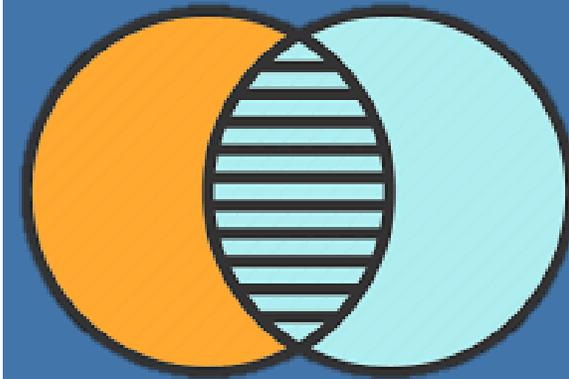
This paper aims to:

- (a) describe types of overlapping data that arise from the same primary studies reported across multiple reviews
- (b) describe methods to identify and explain overlap of primary study data
- (c) present case studies.

-  **Editorial decision: Major revision**
On 22 Mar, 2021
-  **Reviews received**
Received 11 Mar, 2021
-  **Reviewers agreed**
On 02 Mar, 2021
-  **Reviewers invited**
Invitations sent on 02 Feb, 2021
-  **Editor assigned**
On 02 Feb, 2021
-  **Editor invited**
On 18 Jan, 2021
-  **Submission checks complete**
On 18 Jan, 2021
-  **First submitted**
On 12 Jan, 2021

Introduction

- Overviews are increasing in volume in response to the growing number of systematic reviews.
- From **2000 to 2018**, 610 overviews were published, the majority of which (68%) were published in the recent 5 years.
- The overlapping data from the same primary studies reported across multiple systematic reviews may include:
 - overlapping risk of bias assessments
 - overlapping pooled effect estimates across similar outcomes
 - overlapping meta-analysis results (e.g. I^2 heterogeneity statistics)
 - overlapping certainty of the evidence (e.g. Grading of Recommendations, Assessment, Development and Evaluations (GRADE))
- Overstate sample size/number events/false leading to greater precision



Example of overlapping data in primary studies

- Only one systematic review using methodological criteria to select that review.
 1. choose Review 1 with the greatest number of trials (outdate, leave 4 recent trials)
 2. choose Review 2 with the highest quality
 3. choose Review 3 the most recent review (6 trials would be omitted)
- Alternatively, included all the reviews, then involves quantifying the overlap and considering its influence when summarizing the results across the reviews (narratively or statistically).

| RCTs | Mitchell 1993 | Henry 1994 | Smallwood 2001 | Holmes 2002 | Gray 2002 | Bowes 2002 | Ballard 2002 | Akhondzadeh 2003 | Lin 2007 | Burns 2011 | Cameron 2011 | OConnor 2013 | Fu 2013 |
|-----------------|---------------|------------|----------------|-------------|-----------|------------|--------------|------------------|----------|------------|--------------|--------------|-----------|
| Review 1 (2008) | Dark Blue | Dark Blue | Yellow | Yellow | Yellow | Dark Blue | Yellow | | Yellow | | | | |
| Review 2 (2012) | | | Yellow | Yellow | Yellow | | Yellow | Dark Blue | Yellow | Yellow | | | |
| Review 3 (2014) | | | Yellow | | | | Yellow | | Yellow | Yellow | Dark Blue | Dark Blue | Dark Blue |

Methods

- The authors conducted a search in PubMed using the following algorithm: (method*[TI] OR metaepidemiol*) and the search filter for overviews
- Search dates were from **January 2016 to March 2020**

Inclusion criteria:

- a. Articles describing methods for overviews of SRs of interventions
- b. Articles examining methods used in a cross-section or cohort of overviews
- c. Guidance (e.g. handbooks and guidelines) for undertaking overviews
- d. Commentaries or editorials that discuss methods for overviews

Exclusion criteria:

- a. Articles published in languages other than English
- b. Articles describing methods for NMA
- c. Protocols or registered reports
- d. Articles exclusively about methods for overviews of other review types (i.e. not of interventions)

Results

- 6 articles describing methods of overviews
- 2 guidance documents
- 1 empirical study

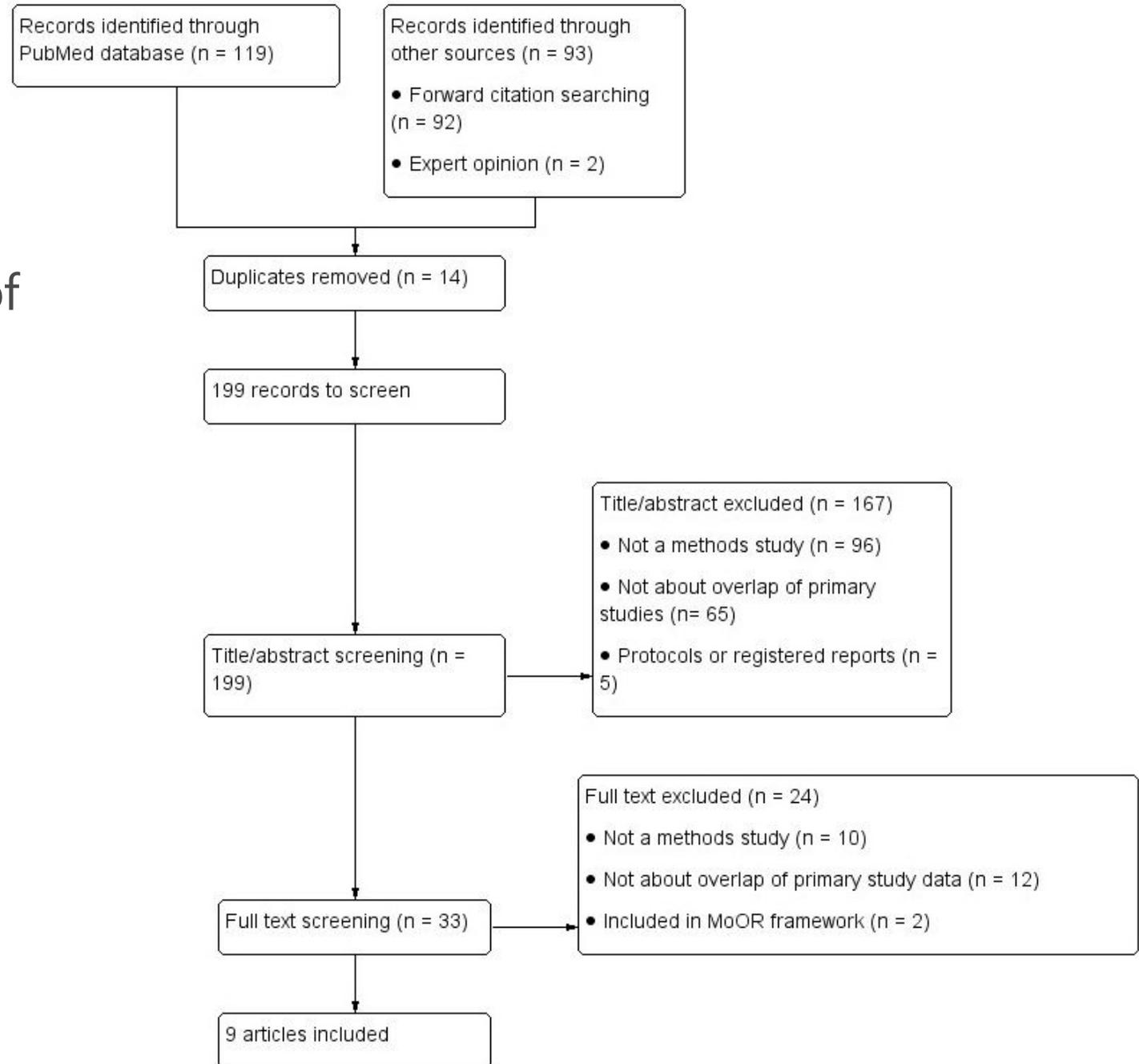


Table 1
 Characteristics of methods studies on overlapping primary study data across reviews

| Author Year | Title | Type of study | Method | Objective |
|----------------------------|--|---|--|---|
| Descriptive studies | | | | |
| Ballard 2017 | Risk of bias in overviews of reviews: a scoping review of methodological guidance and four-item checklist | Article describing methods for overviews of systematic reviews of interventions | Scoping review of guidance and methods | Synthesise guidance on overview practice |
| Bougioukas 2020 | Methods for depicting overlap in overviews of systematic reviews: An introduction to static tabular and graphical displays | Article describing methods for overviews of systematic reviews of interventions | Selective review of papers presenting graphs | Present graphs for visually presenting overlap |
| Hennessey 2019 | Best Practice Guidelines and Essential Methodological Steps to Conduct Rigorous and Systematic Meta-Reviews | Article describing methods for overviews of systematic reviews of interventions | Literature review of methods | Described six steps to address challenges in overviews |
| Hennessey 2020 | Examining overlap of included studies in meta-reviews: Guidance for using the corrected covered area index | Article describing methods for overviews of systematic reviews of interventions | Elaboration of an established methods | Described five steps when examining overlap, illustrated through an example |
| Pollock A. 2017 | Selecting and implementing overview methods: implications from five exemplar overviews | Article examining methods used in a cross-section or cohort of overviews | Elaboration of an established methods | Describes methodological challenges of five overviews |
| Pollock M. 2019 | Chapter V: Overviews of reviews. In Cochrane Handbook for Systematic Reviews of Interventions v 6.0 | Guidance for undertaking overviews | Guidance document | Guidance on how and when to assess overlap in primary studies |

| Author Year | Title | Type of study | Method | Objective |
|--------------------------|---|--|---------------------------------------|---|
| Pollock M. 2019 | A decision tool to help researchers make decisions about including systematic reviews in overviews of reviews of healthcare interventions | Guidance for undertaking overviews | New tool | Systematically conducted seven overviews five times each, making five different decisions about which systematic reviews to include |
| Pérez-Bracchiglione 2019 | Graphical representation of overlap degree of primary studies in systematic reviews in overviews [abstract OS29.1] | Articles describing methods for overviews of systematic reviews of interventions | Elaboration of an established method | Outlines an overlap assessment tool based on the corrected covered area (CCA [12]) |
| Empirical study | | | | |
| Pollock M. 2019 | The impact of different inclusion decisions on the comprehensiveness and complexity of overviews of reviews of healthcare interventions | Empirical study | Empirical study of established method | Assessed the impact of five inclusion decisions on the outcome data lost and changed |

Common strategy is to limit the number of included reviews

| Step in the conduct of an overview | Methods | Methods studies | Case studies |
|------------------------------------|---|--|--|
| Eligibility criteria step | Include all reviews (manage overlap at other stages) | Pollock [19, 30] | Murphy [23] Patnode [33] |
| | Select one (or more) reviews using pre-specified eligibility criteria | Ballard [28]; Hennessy [16, 29]; Pollock [17]; Pollock [18, 19, 30] | Bidonde [22] Patnode [33] Prousalı [25] Thabet [27] |
| | Select one review from multiple addressing the same question using pre-specified decision rules (e.g. combine one or more eligibility criteria in an algorithm) | Hennessy [16, 29]; Pollock [17]; Pollock [18, 19] | Ryan [26] |
| | Exclude reviews that do not contain any unique primary studies, when there are multiple reviews | Hennessey [29]; Pollock [17]; Pollock [19] | Ryan [26] (a cut-off of 50% unique primary studies was used) |
| Data extraction step | Extract all reviews (manage overlap at other stages) | Pollock [18] | Bidonde [22] Patnode [33] Prousalı [25] Thabet [27] |
| | Extract data from only one (or more) reviews using pre-specified eligibility criteria | Pollock [18, 30] | Murphy [23] Patnode [33] |
| Assessment of risk of bias step | Select one (or more) high quality reviews, or exclude low quality reviews, using pre-specified criteria | Hennessy [16]; Pollock [18, 19] | Murphy [23] Patnode [33] Prousalı [25] Ryan [26] |

Methods for Overviews of Reviews (MOoR) framework:
8 studies were mapped into 9 methods to manage overlap across 4 steps in conducting an overview

| Step in the conduct of an overview | Methods | Methods studies | Case studies |
|---|---|---|---|
| Synthesis and presentation and summary of findings step | Quantifying the amount of overlap (e.g. CCA [12]) | Ballard [28]; Hennessy [16, 29]; Pollock [17]; Pollock [18, 19, 30] | Bidonde [22] Murphy [23] Patnode [33] Prousali [25] Ryan [26] ¹ Thabet [27] |
| | <p>Visually present overlap (e.g. matrix, figures)</p> <p>Not directly address the overlapping problem, but provide data on its extent</p> | Hennessy [16, 29]; Pollock [18, 19, 30]; Bougioukas [32] | Bidonde [22] Murphy [23] Patnode [33] Prousali [25] Thabet |
| | Select one review (e.g. high quality and comprehensive review using decision rules) | Hennessey [29] | Patnode [33] Ryan [26] |
| | Use a statistical method (e.g. conduct sensitivity analyses, inflate the variance of the pooled meta-analysis estimate) | Hennessey [29] | Patnode [33] |

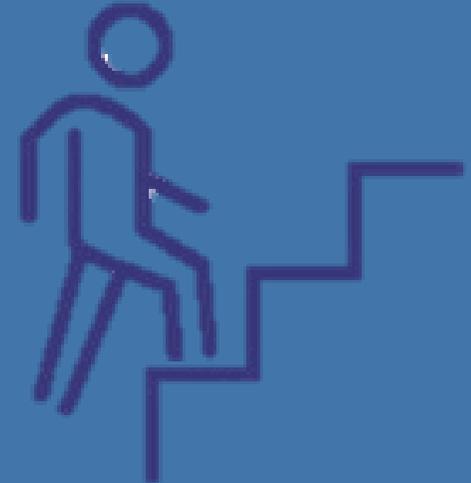
Additional steps to manage overlapping information at the synthesis stage

- **Two non-statistical methods:**

1. Select the result of one (or a subset of) systematic reviews with or without meta-analysis using a decision rule or a published algorithm.
2. Identify systematic reviews with or without meta-analysis with 25% or more of their research in common and eliminate the one with the fewer studies.

- **Two statistical methods:**

1. Conduct sensitivity analyses (e.g. second-order meta-analysis (MA) including all MAs irrespective of overlap compared with second-order MA including only MAs where there is no overlap in primary studies)
2. Indicate the variance of the MA estimate (Tang LL et al 2013); that is, an inflation factor of J can be multiplied with the second order MA variance to correct for the underestimated variance estimator.



Exercise for Adults with Fibromyalgia: An Umbrella Systematic Review with Synthesis of Best Evidence

Bidonde J, Busch AJ, Bath B, Milosavljevic S. Exercise for adults with fibromyalgia: an umbrella systematic review with synthesis of best evidence. *Curr Rheumatol Rev.* 2014;10(1):45-79

- The authors evaluate physical activity interventions focusing on 4 outcomes (pain, multidimensional & physical function, and AE).
- They chose to deal with overlap at the synthesis, presentation and summary of findings step using quantification of the amount of overlap and presenting the results.

29 (48%) RCTs overlapping among 9 reviews
31 (52%) RCTs were unique

Table 5. Number of RCTs overlapped among reviews.

50 RCTs in 9 Reviews

| | Bidonde (in press) | Busch 2013 | Chan 2012 | Hauser 2010 | Kelley 2010 | Lima 2013 | McVeigh 2008 ^a | Mist 2013 ^b | Ramel 2009 |
|---------------------------|--------------------|------------|-----------|-------------|-------------|-----------|---------------------------|------------------------|------------|
| | n = 16 | n = 5 | n=4 | n = 35 | n = 7 | n = 18 | n = 4/10 | n=9/16 | n = 10 |
| Bidonde (in press) | | 0 | 0 | 9 | 3 | 14 | 4 | 0 | 2 |
| Busch 2013 | 0 | | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Chan 2012 | 0 | 0 | | 1 | 0 | 0 | 0 | 3 | 0 |
| Hauser 2010 | 9 | 1 | 1 | | 6 | 8 | 2 | 0 | 7 |
| Kelley 2010 | 3 | 0 | 0 | 6 | | 3 | 1 | 0 | 2 |
| Lima 2013 | 14 | 0 | 0 | 8 | 3 | | 4 | 0 | 2 |
| McVeigh 2008 ^a | 4 | 0 | 0 | 2 | 1 | 4 | | 0 | 2 |
| Mist 2013 ^b | 0 | 0 | 3 | 0 | 0 | 0 | 0 | | 0 |
| Ramel 2009 | 2 | 1 | 0 | 7 | 2 | 2 | 2 | 0 | |

^aMcVeigh included 10 studies but only 4 RCTs with an exercise component were used in this review.

^bMist included 16 studies but only 9 RCTs were included in this review.

Bidonde [35], Busch [36], Chan [37], Hauser [40], Kelley [41], Lima [38], McVeigh [43], Mist [42], and Ramel [39]

An exemplary quote illustrating this:
“The overview by Kelley 2010 included 7 RCTs: 3 overlapped with Bidonde, 6 with Hauser, 3 with Lima, 1 with McVeigh, and 2 with Ramel”.

Appendix C Table 1. List of Included Studies for Behavioral Intervention Reviews: Adults

| Intervention Type 1=Combined 2=Behavioral counseling 3=Print 4=Phone 5=Computer 6=Behavioral adjunct 7=Special populations | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | | |
|---|--------------|-------------|---------------|------------|--------------|----------------|---------------|-----------|--------------|----------------------|---------------|----------------|------------------|-----------------|-------------|------------|--------------|-------------|--------------|---------------|--------------|-----------|----------------|----------------|--------------|----------------|-----------------|--|
| Reviews | Stead, 2012* | Rice, 2013* | Stead, 2013a* | Carr, 2012 | Bodner, 2009 | Mottillo, 2009 | Hettema, 2010 | Lai, 2010 | Cahill, 2010 | Hartmann-Boyce, 2014 | Stead, 2013c* | Tzelepis, 2011 | Whittaker, 2012* | Civiljak, 2013* | Brown, 2013 | Chen, 2012 | Hutton, 2011 | Myung, 2009 | Shahab, 2009 | Stead, 2013b* | Ebbert, 2011 | Liu, 2013 | Nierkens, 2013 | Johnston, 2013 | Carson, 2012 | Villanti, 2010 | Zbikowski, 2012 | |
| Included Studies | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wangberg 2011 | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | |
| Weissfield & Holloway 1991 | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | |
| Webb 2008 | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | |
| Webb 2009 | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | |
| Webb 2013 | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | |
| Wetter 2007 | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | |
| Wewers 2000 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wewers 2009 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| White 1998 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| White 2007 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Whittaker 2011 | | | | | | | | | | | | | 1 | | | | | | | | | | | | 1 | | | |
| Wiggers 2006 | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | |
| Willemsen 2006 | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | |
| Williams 1988 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Williams 2002 | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Williams 2006 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Williams 2010 | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | |
| Wilson 1982 | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wilson 1988 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wilson 1990 | | | 1 | | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| Wilson 2008 | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | |
| Windsor 1993 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Windsor 2000 | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | |
| Wing 2010 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wolfenden 2005 | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | |
| Wong 2008 | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | |
| Wood 2008 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Woodruff 2002 | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | |
| Woodruff 2007 | | | | | | | 1 | | | | | | | 1 | | | | | | | | | | | | | | |

Patnode CD, Henderson JT, Thompson JH, et al. Behavioral Counseling and Pharmacotherapy Interventions for Tobacco Cessation in Adults, Including Pregnant Women: A Review of Reviews for the U.S. Preventive Services Task Force [Internet]. Rockville (MD): Agency for Healthcare Research and Quality (US); 2015 Sep. (Evidence Syntheses, No. 134.) Available from: <https://www.ncbi.nlm.nih.gov/books/NBK321744/>

Clinical-effectiveness of self-management interventions in chronic obstructive pulmonary disease

- Overlap of 165 unique primary studies was visually presented in tables.
- Overlap was calculated as the proportion of primary studies from one systematic review found in another, however this was not explicitly stated in the methods.
- The authors do not report the reference review for calculation of percentage overlap. Without knowledge of the reference review, percentage overlap is not reproducible.

Table 4. Study crossover between the included systematic reviews.^a

| Review (year) | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P |
|---------------------------------|---|----|----|---|---|----|----|---|---|----|---|----|----|---|----|----|
| A Bentsen et al. ¹⁶ | 4 | | | | | | | | | | | | | | | |
| B Effing et al. ¹² | 2 | 13 | | | | | | | | | | | | | | |
| C Tan et al. ¹² | 2 | 4 | 12 | | | | | | | | | | | | | |
| D Turnock et al. ¹⁴ | 0 | 1 | 1 | 3 | | | | | | | | | | | | |
| E Wong et al. ²⁷ | 1 | 4 | 2 | 0 | 9 | | | | | | | | | | | |
| F Cruz et al. ²³ | 0 | 0 | 0 | 0 | 0 | 10 | | | | | | | | | | |
| G Dickens et al. ¹⁷ | 1 | 5 | 4 | 1 | 4 | 1 | 32 | | | | | | | | | |
| H Harrison et al. ¹⁸ | 0 | 0 | 2 | 0 | 1 | 0 | 4 | 7 | | | | | | | | |
| I Kamei et al. ²⁴ | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 7 | | | | | | | |
| J Kruis et al. ¹⁹ | 1 | 4 | 2 | 0 | 4 | 1 | 1 | 1 | 0 | 26 | | | | | | |
| K Lundell et al. ²⁵ | 1 | 1 | 2 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 9 | | | | | |
| L Zwerink et al. ²⁰ | 3 | 6 | 5 | 0 | 2 | 1 | 7 | 1 | 0 | 6 | 2 | 29 | | | | |
| M McLean et al. ²⁶ | 1 | 1 | 2 | 0 | 1 | 0 | 3 | 3 | 2 | 1 | 3 | 3 | 10 | | | |
| N Walters et al. ¹⁵ | 0 | 2 | 1 | 3 | 0 | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 0 | 5 | | |
| O Jordan et al. ²¹ | 0 | 0 | 2 | 0 | 2 | 0 | 4 | 5 | 0 | 1 | 1 | 1 | 2 | 0 | 10 | |
| P McCarthy et al. ²² | 0 | 3 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 12 | 0 | 2 | 0 | 0 | 1 | 65 |

The table has no legend to guide its interpretation. Given the multiple methods for managing overlap, authors of overview should explicitly and entirely state methods used in calculation and assessment of overlap.

Murphy LA, Harrington P, Taylor SJ, Teljeur C, Smith SM, Pinnock H, Ryan M. Clinical-effectiveness of self-management interventions in chronic obstructive pulmonary disease: An overview of reviews. *Chron Respir Dis*. 2017 Aug;14(3):276-288.

In the case of substantial overlap (> 70%), the higher quality review (using R-AMSTAR) was selected if it was published the same year or more recently than the comparison reviews.

The authors excluded Bensten & Harrison (low quality, high overlap, low no. of primary study). Loss of information but gain in utility, efficiency, less resource.

^aPRISMS study is based on a search from 1993 to January 2013. This search was updated to April 2015.

Efficacy and safety of interventions to control myopia progression in children: an overview of systematic reviews and meta-analyses.

Prousalis E, Haidich AB, Fontalis A, Ziakas N, Brazitikos P, Mataftsi A. Efficacy and safety of interventions to control myopia progression in children: an overview of systematic reviews and meta-analyses. BMC Ophthalmol. 2019 May 9;19(1):106.

18 SRs & 44 unique RCTs

Table S4. Citation matrix

| Systematic Reviews | | | | | | | | | | | | | | | | | | | | |
|---------------------|-----------------------|------------------------|-------------------------|-----------------------|--------------------------|--------------------------|-----------------------|-------------------------|-----------------------------|-----------------------|------------------------|------------------------|-----------------------|----------------------------|-----------------------|-------------------------|---------------------------|------------------------|-----------------------|------------------------------|
| Primary study | Type of primary study | Cui 2017 ²⁶ | Gong 2017 ¹² | Li 2017 ¹⁴ | Xiong 2017 ¹⁵ | Huang 2016 ²⁵ | Li 2016 ¹³ | Shih 2016 ¹⁹ | Chassine 2015 ²⁹ | Si 2015 ²³ | Sun 2015 ²² | Wen 2015 ²⁴ | Li 2014 ²⁸ | Sherwin 2012 ²⁷ | Li 2011 ²¹ | Song 2011 ²⁰ | Walline 2011 ⁵ | Wei 2011 ¹⁸ | Saw 2002 ⁹ | Total number of reviews (18) |
| Adler 2006 | RCT | - | - | - | - | + | - | - | - | - | - | - | - | - | - | - | + | - | - | 2 |
| Aller 2006 | RCT | - | - | - | - | + | - | - | - | - | - | - | - | - | - | - | + | - | - | 2 |
| Aller 2016 | RCT | - | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| Anstice 2011 | RCT | - | - | + | - | + | - | - | + | - | - | - | - | - | - | - | - | - | - | 2 |
| Bartlett 2003 | RCT | - | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - | - | - | 1 |
| Berntsen 2012 | RCT | - | - | - | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| Chan 2014 | RCT | - | - | - | - | - | + | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| Charm 2013 | RCT | - | - | - | - | + | + | - | - | + | + | + | - | - | - | - | - | - | - | 5 |
| Cheng 2010 | RCT | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - | + | - | - | 2 |
| Cheng 2014 | RCT | - | - | - | - | + | - | - | + | - | - | - | - | - | - | - | - | - | - | 2 |
| Cheng 2016 | RCT | - | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| Chia 2012 | RCT | - | + | - | - | + | - | + | + | - | - | - | - | - | - | - | - | - | - | 4 |
| Chia 2014 | RCT | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - | - | - | - | 1 |
| Cho and Cheung 2012 | RCT | - | - | - | - | + | + | - | - | + | + | + | - | - | - | - | - | - | - | 5 |
| Chua 2006 | RCT | - | + | - | - | + | - | + | + | - | - | - | + | - | - | + | + | - | - | 7 |
| Chung 2002 | RCT | - | - | - | - | + | - | - | + | - | - | - | - | - | - | - | + | - | - | 3 |
| Edwards 2002 | RCT | - | - | - | - | + | - | - | - | - | - | - | - | - | + | - | + | - | - | 3 |
| Fujikado 2014 | RCT | - | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| Fulk 1996 | RCT | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - | + | 2 |

A citation matrix was presented.

Overlap was quantified at the review level (as opposed to the outcome level) using the CCA. High overlap as equal to or more than 10%. If a review contained high overlap, (1) the most recent, (2) contained the highest amount of information, and (3) had the lowest risk of bias were selected.

Overlap was considered moderate (CCA = 6.2%). Since overlap < 10%, all included reviews were retained in the analysis.

Conclusions

- Currently *no standard methodological approach* to deal with overlap in primary studies across reviews.
- Choosing a method might be dependent on *the number of included reviews and their primary studies*.
- In reviews with high yields, the breadth and depth of analysis can be challenging and resource intensive.
- Creating large reports with too much information and data can limit the readability and utility of an overview for decision makers and healthcare providers, and decrease the efficiency in its production.
- As a general rule, creating citation matrices are helpful. However, better reporting of the reference review when calculating overlap, and details about how overlap is calculated is needed.
- Gaps in in evaluation of methods to address overlap were found and *further investigation in this area is needed*.



Matrices provided by Epistemonikos

Melatonin for jet lag

November 24, 2015 *María Jesús Silva*, *Francisco Tortorolo Contreras*, *Florencia Farren*, *Pilar Musalem*

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16 References (11 Primary studies) **Studify** ⓘ 100% Randomized controlled trial (RCT)

Arendt, J 1987
Spitzer RL 1999
Suhner A 1998
Beaumont M 2004
Edwards BJ 2000
Petrie K 1989
Petrie K 1993
Suhner A 2001
Claustrat B 1992
Arendt J 1986
Nickelsen, T 1991
Suhner, A 1999
Skene, DJ 1989
Arendt, J 1988
Suhner, A 1988
Spitzer, RL 1997

4 Systematic reviews



| | Arendt, J 1987 | Spitzer RL 1999 | Suhner A 1998 | Beaumont M 2004 | Edwards BJ 2000 | Petrie K 1989 | Petrie K 1993 | Suhner A 2001 | Claustrat B 1992 | Arendt J 1986 | Nickelsen, T 1991 | Suhner, A 1999 | Skene, DJ 1989 | Arendt, J 1988 | Suhner, A 1988 | Spitzer, RL 1997 |
|--------------------------|----------------|-----------------|---------------|-----------------|-----------------|---------------|---------------|---------------|------------------|---------------|-------------------|----------------|----------------|----------------|----------------|------------------|
| Costello RB 2014 | █ | █ | █ | █ | █ | █ | █ | █ | █ | | | | | | | |
| Herxheimer A 2002 | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Buscemi, N 2004 | | | █ | █ | █ | █ | █ | █ | █ | | | | | | | |
| Buscemi N 2006 | | | █ | █ | █ | █ | █ | █ | █ | | | | | | | |

Epistemonikos is a collaborative, multilingual database of health evidence. It is the largest source of systematic reviews relevant for health-decision making, and a large source of other types of scientific evidence.



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