

Is there a need for implementation of more specified reporting guidelines for the search process in systematic reviews and meta-analyses?

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Systematic reviews and meta-analyses

- ❖ The foundation for systematic reviews and meta-analyses:
 - a comprehensive, systematic search, with the aim to exhaust all available studies matching a specific research question and pre-set inclusion criteria (Institute of Medicine, 2011; Deeks et al. 2011)
 - a transparent and detailed method documentation for reproducible search results (Deeks et al. 2011; Koffel & Rethlefsen, 2016; Institute of Medicine, 2011)
- ❖ Connection between the quality of the search and the search documentation and the overall quality and risk of bias of SRs and MAs (Golder, Loke, & Zorzela, 2013; Opheim, 2019; Peters et al., 2015; Salvador-Oliván et al. 2019; Rethlefsen et al. 2015)

Reporting guidelines/standards

- ❖ **1996- The Cochrane Handbook**
- ❖ **2009- PRISMA** (Preferred Reporting Items for Systematic Reviews and Meta- analyses)
- ❖ **2011- IOM** (Institute of Medicines Standards for Systematic Reviews)



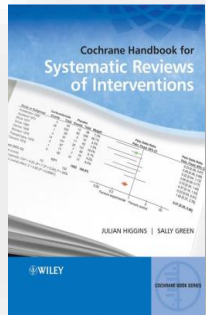
PRISMA

- ❖ Preferred or required reporting guidelines for many high impact medical journals (The Lancet, Annals of Internal Medicine, JAMA, BMJ etc.)
- ❖ General quality improvement of the method and method documentation with PRISMA (Panic,2013)
- ❖ Further endorsement of standardize reporting methods like PRISMA and IOM is recommended (Koffel & Rethlefsen, 2016; Peters et al., 2015; Panic et al., 2013)



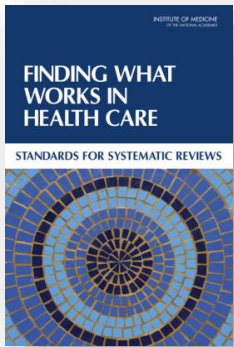
Current research on reporting standards of search strategies in SRs and MAs

- ❖ The search in many SRs and MAs are still of poor quality and includes a very high percentage (up to 93%) of search technical errors (Golder, Loke, & Zorzela, 2013; Grossetta et al. 2019; Koffel & Rethlefsen, 2016; Opheim et al. 2019; Rethlefsen et al. 2015; Salvador-Oliván et al. 2019).
- ❖ Many SRs and MAs lack transparent, re-producible search documentation (up to 92%) which reduces the usefulness of the reviews in evidence-based clinical settings (Golder, Loke, & McIntosh, 2008; Golder, Loke, & Zorzela, 2013; Knehans, Dell & Robinson, 2016; Koffel & Rethlefsen, 2016; Maggio, Tannery & Kanter, 2011; Peters et al. 2015)
- ❖ A poorly conducted and documented systematic search may lead to serious consequences for clinical decision making (Institute of Medicine, 2011)



The Cochrane Handbook

All searches should be reproducible. A full search strategy for each database should be presented in an appendix.



IOM Standards

“Provide a line-by-line description of the search strategy including the date of every search for each database, web browser etc.”
(Standard 3.4., Search documentation)

The PRISMA Checklist



PRISMA 2009 Checklist

METHODS		
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.

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Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	

Practical example: search result variations

	Is the current HbA1c level of 6.5% for diabetes diagnosis too high	Systematic review and meta-analysis on the effect of soy on thyroid function	The association between boarding in the emergency department and in-hospital mortality	Cost-effectiveness of non-surgical weight loss interventions for diabetic obese patients	A systematic review to assess the relationship between sleep duration and mood in adolescents
PubMed result	4916	1501	1451	518	781
Result from additional databases included	7880	3424	6242	1157	1381
Total no. of references after de-duplication	9324	1816	4321	1120	1532
% of total no. of references not covered by PubMed	47,3%	17,3 %	66,4%	53,7%	49%

PubMed "Hb A1c"[Title/Abstract] Search

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- [Hb Hubei \(\$\alpha\$ 114\(GH2\)Pro→His, HBA1: c.344C>A\): A Novel Hemoglobin Variant of the \$\alpha\$ 1-Globin Chain.](#)
Xu AP, Li J, Chen WD, Zhou Y, Ji L.
Hemoglobin. 2018 Oct 2:1-3. doi: 10.1080/03630269.2018.1502197. [Epub ahead of print]
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Diabetes Metab Syndr. 2018 Nov;12(6):1051-1055. doi: 10.1016/j.dsx.2018.06.024. Epub 2018 Jun 30.
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 - Impact of Mean Cell Hemoglobin on **Hb A1c**-Defined Glycemia Status. [Clin Chem. 2016]
 - Hb A_{1c}** Determination by Capillary Electrophoresis is an Efficient [Hemoglobin. 2016]

Conclusions and limitations

❖ Conclusion

- small variations or errors in the search strategy can have a large impact on the search result
- documenting only one or a few of the included databases has a negative impact on the reproducibility and transparency of the systematic search and hinders the appraisal and risk of bias analysis of the study
- implementation of more specified reporting guidelines for the search process could increase the overall quality and clinical usefulness of SRs and MAs

❖ Limitations

- more research on the quality impact of SRs and MAs only reporting on “at least one” database compared to reviews with comprehensive reporting of the entire search process and all information sources included is needed.

References

- Arora, T., Short, M., Booth, S., Östlundh, L. (2017). A systematic review to assess the relationship between sleep duration and mood in adolescents [Protocol] *PROSPERO*, CRD42017068617
- Boudi, Z., Lauque, D., Alsabri, M., Östlundh, L., Rial, C., Levy, C., ... Bellou, A. (2019). The association between boarding in the emergency department and in-hospital mortality: a systematic review [Protocol]. *PROSPERO*, CRD42019119489
- Butler, A., Atkins, S., Östlundh, L. (2018), Is the current HbA1c level of 6.5% for diabetes diagnosis too high? [Protocol]. *PROSPERO*, CRD42018099410
- Deeks, J. J., Higgins, J. P. T., Altman, D. G., & Green, S. (2011). Cochrane handbook for systematic reviews of interventions version 5.1. 0 (updated March 2011). *The Cochrane Collaboration*.
- Golder, S., Loke, Y., & McIntosh, H. M. (2008). Poor reporting and inadequate searches were apparent in systematic reviews of adverse effects. *Journal of Clinical Epidemiology*, 61(5), 440-448. doi:10.1016/j.jclinepi.2007.06.005
- Golder, S., Loke, Y. K., & Zorzela, L. (2013). Some improvements are apparent in identifying adverse effects in systematic reviews from 1994 to 2011. *Journal of Clinical Epidemiology*, 66(3), 253-260. doi:10.1016/j.jclinepi.2012.09.013
- Grossetta Nardini, H. K., Batten, J., Funaro, M., Garcia-Milian, R., Nyhan, K., Spak, J. M., ... Glover, J. (2019, April 10). Librarians as methodological peer reviewers for systematic reviews: results of a survey. <https://doi.org/10.31219/osf.io/n7w49>
- Institute of Medicine (U.S.). Committee on Standards for Systematic Reviews of Comparative Effectiveness Research. (2011). *Finding what works in health care : Standards for systematic reviews* (J. Eden, L. Levit, A. Berg, & S. Morton, Eds.). Washington, D.C.: National Academies Press. (2011). Retrieved September 15, 2019, from ProQuest Ebook Central.

References

- Knehans, A., Dell, E., & Robinson, C. (2016). Starting a fee-based systematic review service. *Medical Reference Services Quarterly*, 35(3), 266-273. doi:10.1080/02763869.2016.1189779
- Koffel, J. B., & Rethlefsen, M. L. (2016). Reproducibility of search strategies is poor in systematic reviews published in high-impact pediatrics, cardiology and surgery journals: A cross-sectional study. *PloS One*, 11(9), e0163309. doi:10.1371/journal.pone.0163309
- Liberati, A., Altman, D., Tetzlaff, J., Mulrow, C., Gøtzsche, P., Ioannidis, J., . . . Moher, D. (2009). The prisma statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: Explanation and elaboration. *Plos Medicine*, 6(7), doi:10.1371/journal.pmed.1000100
- Maggio, L. A., Tannery, N. H., & Kanter, S. L. (2011). Reproducibility of literature search reporting in medical education reviews. *Academic Medicine : Journal of the Association of American Medical Colleges*, 86(8), 1049-1054. doi:10.1097/ACM.0b013e31822221e
- McGowan, J., Sampson, M., Salzwedel, D. M., Cogo, E., Foerster, V., & Lefebvre, C. (2016). PRESS peer review of electronic search strategies: 2015 guideline statement. *Journal of clinical epidemiology*, 75, 40-46.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., PRISMA Group, & for the PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Bmj*, 339(7716), 332-336. doi:10.1136/bmj.b2535
- Otun, J., Sahebkar, A., Östlundh, L., Atkin, S.L. & Sathyapalan, T. (2019). Systematic Review and Meta-analysis on the Effect of Soy on Thyroid Function. *Scientific Reports*, 8;9(1), 3964. DOI: 10.1038/s41598-019-40647-x

References

Khan, M., Paulo, M., Rifai, R., Östlundh, L., Baniyas, M., Boudi, Z. & Chabra, M. (2019). Cost-effectiveness of non-surgical weight loss interventions for diabetic obese patients [Protocol]. *PROSPERO*, CRD42019138955.

Opheim, E., Andersen, P. N., Jakobsen, M., Aasen, B., & Kvaal, K. (2019). Poor quality in systematic reviews on PTSD and EMDR—an examination of search methodology and reporting. *Frontiers in psychology*, 10.

Panic, N., Leoncini, E., de Belvis, G., Ricciardi, W., & Boccia, S. (2013). Evaluation of the endorsement of the preferred reporting items for systematic reviews and meta-analysis (PRISMA) statement on the quality of published systematic review and meta-analyses. *PloS One*, 8(12), e83138. doi:10.1371/journal.pone.0083138

Peters, J. P. M., Hooft, L., Grohman, W., & Stegeman, I. (2015). Reporting quality of systematic reviews and meta-analyses of otorhinolaryngologic articles based on the PRISMA statement. *Plos One*, 10(8), e0136540. doi:10.1371/journal.pone.0136540

Rethlefsen, M. L., Farrell, A. M., Osterhaus Trzasko, L. C., & Brigham, T. J. (2015). Librarian co-authors correlated with higher quality reported search strategies in general internal medicine systematic reviews. *Journal of Clinical Epidemiology*, 68(6), 617-626. doi:10.1016/j.jclinepi.2014.11.025

Salvador-Oliván, J. A., Marco-Cuenca, G., & Arquero-Avilés, R. (2019). Errors in search strategies used in systematic reviews and their effects on information retrieval. *Journal of the Medical Library Association: JMLA*, 107(2), 210