Performing systematic reviews or other types of knowledge synthesis in a doctoral thesis

1) Preamble

On the basis of § 4 Paragraph 1 Sentence 1, Paragraph 7 Sentence 1 and 2 of the Doctoral Regulations, the Doctoral Commission adopted on September 19, 2022 the following "Working Instructions for Conducting Systematic Literature Reviews and Other Types of Knowledge Synthesis in a Doctoral Thesis", which are to be observed when preparing written doctoral theses in accordance with §§ 7, 8 of the Doctoral Regulations.

A high-quality systematic review (with or without a meta-analysis) follows a rigorous and reproducible methodology resulting in a comprehensive summary and appraisal of research in a field. Systematic reviews are regarded as the highest level of clinical evidence and are a vital component of evidence-based medicine. In preclinical research, systematic review can help to inform evidence-based decision making around future animal studies and translation to clinical trial. As with experimental research, systematic reviews are subject to a range of biases and can be of poor quality. However, just as design and reporting standards exist for experimental research, there are standards and tools upon which the quality of a systematic review can be measured

2) Measures to ensure the quality of a systematic review

2.1) Definition and criteria

The commonly accepted definition of a systematic review should be met: “The key characteristics of a systematic review are: (a) a clearly stated set of objectives with an explicit, reproducible methodology; (b) a systematic search that attempts to identify all studies that would meet the eligibility criteria; (c) an assessment of the validity of the findings of the included studies, for example through the assessment of risk of bias; and (d) systematic presentation, and synthesis, of the characteristics and findings of the included studies.” (1)

2.2) Pre-registration / protocol publication: promotes transparency and helps to reduce potential for bias. A protocol should be published and / or registered *a priori* and guide the conduct of a systematic review. PROSPERO (2) is an international registry that accepts registration of clinical and preclinical systematic reviews. An increasing number of journals accept systematic review protocols as publications and repositories such as OSF provide frozen, time-stamped registrations.

2.3) Reporting guidelines: e.g. the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines are endorsed by several editorial organization and several hundred journals that publish systematic reviews. They have recently been updated (3) and recommend reporting items for every aspect of a systematic review. Extension guidelines are available for different types of reviews and an extension for preclinical systematic reviews is under development. For Scoping reviews PRISMA-ScR checklist is available (4).

2.4) AMSTAR 2: is a critical appraisal tool for systematic reviews that results in an overall rating of confidence in the results of the review from “Critically low” to “High”. The AMSTAR 2 checklist can be used to assess completed systematic reviews (7).

3) Typs of systematic reviews

3.1) Cochrane reviews: are prepared and maintained using best practice methodologies and are internationally recognised as the highest standard in evidence-based healthcare. A Cochrane review must be pre-registered and follow the MECIR guidelines for conduct and reporting (7).

3.2) Scoping reviews: are conducted to initially generate an orientation on the state of the research literature, to establish preliminary working definitions, or to conceptually delineate topic areas. They are carried out when the literature on the topic has not yet been comprehensively assessed or is complex or heterogeneous, so that a systematic review (in the narrower sense) is not yet indicated, but its necessity and scope must first be determined (8).

3.3) Knowledge synthesis of studies with qualitative methods: In addition to the very common systematic reviews of studies with quantitative research methodology, systematic reviews of studies with qualitative research methodology are also carried out, especially in the social sciences and in the border area of natural and social sciences. Comparable comprehensive review forms in qualitative research are Narrative Synthesis or Meta-Summary. Depending on the research question also Meta-Interpretation or Meta-Ethnography are appropriate methods if theory building is the main focus.

3.4) Choosing the right review type: An overview of different types of reviews and their indications can be found at https://guides.temple.edu/c.php?g=78618&p=3879604. To assist researchers with selecting the appropriate type of review the tool "RightReview" is recommended. It includes review types for quantitative and qualitative knowledge synthesis: https://whatreviewisrightforyou.knowledgetranslation.net/map/form

4) Training offers

QUEST offers an introduction to preclinical systematic review workshop and more in-depth workshops on specific aspects of systematic reviews, in addition to consultation services. The Medical Library supports these with sessions on searching databases and has licensed the Cochrane Interactive eLearning course on Conducting an Intervention Review that is available to all Charité employees and students alike. The Medical Library offers workshops on ‘Systematic literature searching and first steps towards a systematic review’ regularly as well as consulting services upon demand; a more comprehensive clinical systematic review course is currently being piloted.

These training opportunities are free to Charité employees and credited with ECTS points. Completing relevant courses are recommended to strengthen adherence to best practice, if a systematic review is conducted as part of a PhD.

Quality criteria for doctoral theses

To assure the quality and scientific acceptability of doctoral theses that perform knowledge synthesis the following criteria must be fulfilled at a minimum:

- Pre-registration of the review (PROSPERO if applicable, or OSF) before starting the review
- Proof of a specific training in the area of choice I (standard-track) or area of research methodology (advanced-track) of the doctoral education environment (§ 7a of the Ausführungsbestimmungen zur Promotionsordnung)
- Application of recognized tools in the conduct and reporting of the review (e.g. the Cochrane Handbook, JBI Manual for Evidence Synthesis, PRISMA or other applicable tools, see above)
- Selected type of review should score high in the appraising instrument AMSTAR 2 or other applicable instruments

References:

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2. https://www.crd.york.ac.uk/prospero/
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4. Tricco et al. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. Ann Intern Med. 2018,169(7):467-473. doi:10.7326/M18-0850.
5. https://osf.io/preprints/metaarxiv/v7gm2/
6. https://www.cochrane.org/
7. https://community.cochrane.org/mecir-manual
8. Shea et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both BMJ 2017; 358 :j4008 doi:10.1136/bmj.j4008
9. von Elm et al. Methodische Anleitung für Scoping Reviews (JBI-Methodologie). ZEFQ 2019; 143,1-7, https://doi.org/10.1016/j.zefq.2019.05.004

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