

Supporting systematic, scoping and other types of reviews: Workshops and services offered by the Medical Library at the Charité

Corinna Dressler and Meghan R. Forrest

Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin and Humboldt-Universität zu Berlin, Medical Library, Berlin, Germany

Abstract

Medical libraries have become central in evidence synthesis conduct. The Medical Library at the Charité in Berlin, Germany, initiated “Systematic/Scoping Reviews”, an eight-part workshop series designed to provide comprehensive education and guidance on systematic and scoping review methods. Each session covers a specific step of the review process and offers participants who are conducting a review active engagement in the methodological steps using their own review question. This article provides a summary of each workshop session, outlining preparation requirements, workshop content, and challenges faced by both participants and the teaching team. The workshop series has been well received by participants and has proven to be a valuable complement to the portfolio of health information literacy trainings offered by the Medical Library.

Key words: *systematic reviews; scoping reviews; evidence-based medicine; curriculum; information literacy.*

Introduction

In the field of evidence-based practice, systematic reviews are consistently regarded as the highest level of evidence (1). If conducted rigorously, they are extraordinarily valuable to stakeholders who make clinical and policy decisions, and are highly esteemed due to their comprehensiveness and methodological rigor (1, 2). While systematic reviews are integral in evidence-based medicine, evidence synthesis is not limited to this review type.

The field of evidence synthesis is growing exponentially and rapidly developing. The COVID-19 pandemic served as a catalyst for a steep rise in the publication of rapid reviews (3). In response, there have been efforts to develop standardization of both the definition and methods of rapid reviews (4). Other review types have also been undergoing methodological refinement including scoping reviews (5) and pre-clinical systematic reviews (6). In 2022, Amog and colleagues had identified over 40 different evidence synthesis methods, each of which serves a distinct purpose and has different variations of involved steps (7). Proficiency in each of these methods is built with experience and complex to de-

velop without implicit training. This notion is further accelerated by the availability of more and more automation tools which have potential to facilitate the process. However, these tools are in their infancy, with questions remaining in regards to their future capabilities, underlying mechanisms, and commercialization. The most prominent bodies that provide methodological guidance for evidence synthesis are Cochrane (1), the Campbell Collaboration (2), and JBI (formerly known as the Joanna Briggs Institute) (8). All recommend that researchers elicit the early collaboration of an information specialist or medical librarian when planning a review.

The role of libraries and information specialists

Academic libraries are important resources for those conducting evidence synthesis within research settings (9). Libraries have the infrastructure in place to maintain high volumes of current information and on-site experts with specialized training that is not limited only to skills in knowledge management. These individuals

Address for correspondence: Corinna Dressler, Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin and Humboldt-Universität zu Berlin, Medical Library, Augustenburger Platz 1, 13353 Berlin, Germany.
E-mail: corinna.dressler@charite.de. ORCID 0000-0001-7075-2062

– often referred to as “information specialists” – harbor valuable expertise including knowledge of tools, databases, and best practices, all of which are required to conduct high-quality synthesis studies (10). Information specialists have a deep understanding of databases and tools that can facilitate a comprehensive review (11). Moreover, their experience with reviews equips them with knowledge to assist subject experts effectively with research question refinement and bias mitigation during the review process. Information specialists themselves can take on many roles in the systematic/scoping review from reference manager to principal investigator (10).

Due to the instrumental role of information specialists in the review process, university libraries can quickly become very saturated with requests for support (12). Therefore, the goal should be to equip learners with the necessary knowledge and tools to be able to perform a review themselves.

Services at the Medical Library at Charité - Universitätsmedizin Berlin

To satisfy this high demand for information specialist support at Charité – Universitätsmedizin Berlin in Germany, its Medical Library offers a variety of health information literacy services tailored to students, researchers, and clinicians. These workshops and training sessions are offered for open-source and licensed databases and tools including PubMed, CINAHL, and EndNote. The Medical Library concurrently introduced the workshop “Systematic searches and the first steps of a systematic review” and consultation sessions to students and faculty to advise on searching and review methodology in 2022, see *Box 1*. These offerings are typically available monthly or bi-monthly during the semester in either English or German. However, there remained a persisting need for an even more intensive option for systematic/scoping review education and guidance.

Box 1. Health information literacy offerings of the Medical Library at Charité – Universitätsmedizin Berlin in 2022

- *Introduction to PubMed*: 90-minute workshop where basics such as the PICO framework, MeSH thesaurus, truncation, and other functionalities are taught
- *Citation management with EndNote 21*: 90-minute workshop
- *Systematic literature searches and first steps towards a systematic (scoping) review*: Intensive 180-minute workshop that covers the importance of the research questions and different types of reviews, frameworks other than PICO, synonyms, thesauri, database functionalities, handbooks and guidelines
- *Consultation*: Up to three 60-minute one-on-one sessions with an information specialist can be booked by Charité members to receive personalized feedback on their review project
- Publication services and services concerning Open Access are available
- *Cochrane Interactive Learning: Conducting an Intervention Review* (13): 15 hours, self-paced, on-demand online training module by Cochrane that can be licensed by libraries and that provides an introduction to systematic review methodology
- *Systematic/Scoping Reviews*: In-depth 8 part workshop series (each session lasts approximately 2.5 hours), for details, refer to the text

Systematic/Scoping Reviews – an 8 part workshop series

The Medical Library launched an eight part workshop series in the summer of 2022 to provide comprehensive systematic and scoping review methods education and guidance in a medium-sized group setting. Each session provides an interactive overview on a separate

methodological step of the review process and applied exercises that require participants to engage with their own review question.

The general setup and requirement of the workshop series are outlined in *Box 2*.

Box 2. General setup and requirements of the Systematic/Scoping Review workshop series

Set-up

- Moodle for online management and assignment submission
- Application process reiterating requirements and prerequisites
- If interest exceeds the number of available places, admission is randomized

Prerequisites for admission (applicants must fulfill one of the following):

- Employees of the Charité with a completed university education who are demonstrably working on a systematic review/scoping review during the duration of the workshop series
- Students in a Master's program at the Charité who have registered a review as their thesis
- Medical/dental students at the Charité who have completed the 2nd science module, have a doctoral contract with the Charité, and plan to work on a systematic review/scoping review as their project

Conditions participants agree to:

- On-site participation must be possible, but some sessions will also take place via Microsoft Teams; availability of a camera and active participation in the workshops are desired
- Participants agree to complete pre- and post-workshop preparations promptly
- No final examination
- To earn 1.6 credit points (European Credit Transfer and Accumulation System "ECTS"), participants must attend at least 85% of the scheduled time and submit all required assignments before the deadline (this requirement aligns with the Charité's "Common guidelines for awarding and crediting ECTS credit points in doctoral training at Charité – Universitätsmedizin Berlin")
- The workshop series is free of charge for participants

Part 1 – Introduction to systematic reviews, formulating a researchable question, and the protocol

PREPARATION: Participants are asked to read an article by Munn et al. (14), which provides an overview of 10 types of systematic reviews and serves as a primer. Additionally, participants must provide their research question in advance so the teaching team can familiarize themselves with the topics. Lastly, they need to write a few sentences on a) why they are conducting a review, and b) the intended end user of the review as a basis for discussion during the workshop.

CONTENT: Part 1 begins with a brief review of course logistics, an overview of the course including learning objectives, participation expectations and requirements, and assignment deadlines. We proceed to cover the importance of systematic/scoping reviews, who conducts them, and the context in which they are conducted. The methodological steps of a systematic/scoping review are described with resources to major guidance and handbooks. The last section of

Part 1 is interactive and focuses on researchable questions, non-PICO frameworks, and the importance of protocols.

CHALLENGE: Participants often face obstacles narrowing down their research question. We see that there are difficulties understanding the difference between systematic and scoping reviews (15). Research questions dictate the choice of synthesis method, and we aim to discourage conducting scoping reviews for the purpose of simplifying or speeding up the process.

Part 2 – Databases and systematic search strategies

PREPARATION: Participants are required to refresh their knowledge on basic literature search tools and strategies such as thesauri, PICO, field codes/meta-data, and truncation. We specify sections of the "PubMed User Guide" and ask participants to complete three multiple-choice questions. These questions are practical applications based on common misunderstanding about the search process.

CONTENT: In Part 2, databases pertinent to human health are explored. Steps for developing systematic searches are outlined from frameworks to keyword and search term identification. Since participants have a presumed foundation in PubMed searching, advanced functionalities of MEDLINE® Ovid, Embase Ovid, and CINAHL (EbscoHost) are highlighted. The difference between sensitive and precise searches is discussed. We introduce tools like PubReMiner (16) for search refinement. The workshop is interspersed with exercises where participants apply each step to their own research question.

CHALLENGE: The time it takes to learn how to use the databases and construct a systematic search is often underestimated. This session is often seen as quite “packed”. This had led us to increase the preparation (see above).

Part 3 – Advanced search methods, citation management, and screening

PREPARATION: Participants have two weeks to develop a first draft of their systematic search strategy in one database.

CONTENT: Part 3 begins with a lesson on citation searching, grey literature repositories, pre-print registries, and internet searches before moving to a brief review of the EndNote citation management software. We introduce the open-source tool Systematic Review Accelerator (17) and provide step-by-step instructions. Participants then have time to practice using the tool with their own search.

CHALLENGE: Participants have varying levels of expertise with software. We are increasingly receiving inquiries about more advanced tools, including those using automation. It is necessary for the teaching team to balance the desire of some participants to want to learn about these tools while acknowledging that some may be daunted by them. Our experience tells us that most participants do not need advanced tools when conducting their first review.

Part 4 – Peer review of participant protocols and of the search strategies; PRESS Checklist introduction

PREPARATION: Participants are required to submit a draft of their protocol about four weeks after Part 1. The teaching team provides participants with templates that are abbreviated versions of the Template for

Scoping Reviews by JBI (5) and PRISMA-P (18) to ensure that participants have a clear understanding of the required elements of a protocol. We also ask participants to provide a first draft of their search string in MEDLINE® Ovid. We request participants to submit their protocol and search string drafts one week prior to the session so that the teaching team can prepare.

CONTENT: The basics of peer-reviewing are introduced, as well as an abbreviated version of the PRESS checklist (19). Participants discuss their protocols in small groups and give each other feedback. The teaching team concurrently provides feedback to each individual.

CHALLENGE: We match participants by topic, review type, or prior knowledge so that they can work in small groups. This way, they can give each other suggestions and gain more knowledge about other topics or approaches at the same time. Every participant receives individual feedback from the teaching team; however, the diversity of review questions presents a challenge for the teaching team.

Part 5 – Methodological study quality and risk of bias

PREPARATION: All participants are asked to read the same published study. For this session, the teaching team selects a randomized controlled trial (RCT).

CONTENT: Part 5 begins with a discussion on validity in the context of a study, the difference between quality and bias, and an introduction to different critical appraisal tools. The workshop then focuses on methods to reduce bias in RCTs and, step-by-step, has participants apply the RoB 2 tool (revised tool for risk of bias in randomized trials tool) (20).

CHALLENGE: We use an RCT as the “gold standard” to discuss bias. This makes the in-class application of a critical appraisal tool effective as well as interactive. Those who plan to appraise RCTs benefit – perhaps also those who work in patient care – and derivations to other analytical study designs can be made (21). However, standards and therefore tools can vary widely (22). In some research domains, no such tools have been developed yet (23). In these situations, we suggest that course participants develop their own critical appraisal checklist that is partly derived from validated critical appraisal tools and guided by methodological standards in their field.

Part 6 – Data extraction and meta-analysis

PREPARATION: None required.

CONTENT: Part 6 starts with a game-like exercise “To extract or not to extract, that is the question!” After discussing potential data items to extract in the context of different review types, different formats and tools are introduced. The second half of Part 6 focuses on effect measures and the basic assumptions of a meta-analysis that are taught conceptually.

CHALLENGE: We suggest different tools for managing data and discuss what kind of data needs to be extracted overall. There are no one-size-fits-all approaches, but we do recommend piloting the extraction form.

Meta-analyses can get complicated fast, which requires support by a statistician. Many questions we receive are outside of the scope of this course. The Institute of Biometry and Clinical Epidemiology at the Charité provides free statistical consulting sessions to Master’s or PhD students for their thesis projects, to which course participants are referred.

Part 7 – Other knowledge synthesis methods

PREPARATION: None required.

CONTENT: In the first half of Part 7, we discuss non-statistical synthesis methods of quantitative data in systematic reviews including narrative synthesis, narrative summary, and graphical approaches. We also discuss data collation for scoping reviews while providing several best-practice examples. The second half of Part 7 comprises of a 45-min lecture on the GRADE (Grading of Recommendations, Assessment, Development and Evaluation) method, which is a now established system to rate the certainty of evidence (24).

CHALLENGE: Synthesis without meta-analysis is relevant for the majority of participants conducting a systematic/scoping review. It is challenging to create such summaries that truly provide holistic syntheses rather than simply listing results from independent studies. Introducing GRADE is rather advanced and only relevant to few participants. In the future, we plan to give participants the option of either the GRADE lecture or an extended working session on non-statistical synthesis.

Part 8 – Critical appraisal of a systematic review

PREPARATION: All participants read the same published study.

CONTENT: In Part 8, the AMSTAR-2 appraisal tool is applied to a published review. Each question of the tool is introduced while using it as a basis to recap each step in the systematic/scoping review process.

CHALLENGE: The participants of the course series work in very diverse fields. It is not possible to accommodate each research field, though we aim to select a paper that is interesting to many participants.

Overall challenges

After having offered the entire workshop series twice, we have identified several overarching challenges. Some participants are not yet routinely immersed in “scientific working” and thus overwhelmed with basic steps and tools. Being unaware of the complexity of the methods, participants often underestimate the amount of time a systematic or scoping review takes. In terms of project management, we advise participants to make a time plan calculating backwards from the submission date and not to forget vacation and turn-around time when feedback is required. During one-on-one consultations, we often clearly articulate the next steps in the process tailored to the learners’ knowledge and query. Performing a review also means having the experience and ability to understand different primary research studies. Projects often have several supervisors, some serving as “topic experts” and the others serving as “methods experts”. Topic experts provide necessary input to students. At times, we have experienced tensions between the topic supervisor and specialists in review methods with regards to the appropriate type of review, the number of databases to be included, or the outcomes to be extracted. We provide reassurance when learners outline a decision and reasons for the decision. We encourage transparency and provide resources to support decisions.

Master’s and doctoral students have the additional challenge of a very limited or no budget, which can often be prohibitive for recruiting a team of appropriate size to conduct a methodologically sound review.

Discussion

More reviews are being performed each year (25) and educational programs are challenged to remain current with the educational need in this research domain. The method is nuanced and the field is rapidly evolving with automation tools being more accepted (26).

Following the systematic/scoping review process step-by-step, our workshop series incorporates valuable insights gleaned from two years of teaching and advising students, researchers, and clinicians at the Charité. That said, the teaching team requirements for such an extensive workshop series include experience with database searching, expertise in evidence synthesis methodology, and experience in conducting a full systematic and/or scoping review.

A key challenge lies in providing expert guidance and pertinent workshop material tailored to diverse disciplines. While there are now over 40 distinct knowledge synthesis methods (7), systematic reviews remain relatively novel in certain fields such as medical informatics and laboratory research. Keeping abreast of methodological developments and introducing new tools necessitates workshop organizers to stay up-to-date. We plan to offer the eight-part workshop series twice in 2024 for members of the Charité with increased capacity to cater for the interest that we have observed. The positive reception and constructive feedback from participants are warmly acknowledged.

The Medical Library at Charité – Universitätsmedizin Berlin has further developed its services and workshop portfolio to meet an increasing demand. Knowledge about and resources for systematic/scoping review methods and tools can be curated and cultivated in a library over time to become a hub of knowledge – a constant contrary to research groups changing due to resource allocation and members rotating in and out.

Acknowledgement

This paper is based on a talk given at AGMB Annual Meeting in Bonn, Germany in 2023, which was then subsequently written up and published in the GMS MBI (27). Since then, the second cohort finished the *Systematic/Scoping Reviews* workshop series. This paper was revised using ChatGPT (version 4.0)(28).

Conflicts of interest: no financial COI

*Submitted on invitation.
Accepted on 6 March 2024.*

REFERENCES

1. Higgins J, Thomas J, Chandler J, Cumpston M, Li T, Page M, Welch V. Cochrane Handbook for Systematic Reviews of Interventions: Cochrane; 2023 [updated 22 August, 2023; cited 2023 27 October]. Available from: www.training.cochrane.org/handbook.
2. Campbell Collaboration. What is a systematic review? 2023 [cited 2023 30 October]. Available from: <https://www.campbellcollaboration.org/what-is-a-systematic-review.html>.
3. Tricco AC, Straus SE, Ghaffar A, Langlois EV. Rapid reviews for health policy and systems decision-making: more important than ever before. *Syst Rev.* 2022;11(1):153. 10.1186/s13643-022-01887-7
4. Garrity C, Gartlehner G, Nussbaumer-Streit B, King VJ, Hamel C, Kamel C, Affengruber L, Stevens A. Cochrane Rapid Reviews Methods Group offers evidence-informed guidance to conduct rapid reviews. *J Clin Epidemiol.* 2021;130:13-22. 10.1016/j.jclinepi.2020.10.007
5. JBI Scoping Review Network. Resources 2024 [cited 2024 12 February]. Available from: <https://jbi.global/scoping-review-network/resources>.
6. Berlin Institute of Health. CAMARADES (Collaborative Approach to Meta-Analysis and Review of Animal Data from Experimental Studies) 2023 [cited 2023 27 October]. Available from: <https://www.bihealth.org/de/translation/innovation-streiber/quest-center/services/service/camarades> AND <https://www.ed.ac.uk/clinical-brain-sciences/research/camarades/about-camarades>
7. Amog K, Pham B, Courvoisier M, Mak M, Booth A, Godfrey C, Hwee J, Straus SE, Tricco AC. The web-based "Right Review" tool asks reviewers simple questions to suggest methods from 41 knowledge synthesis methods. *J Clin Epidemiol.* 2022;147:42-51. 10.1016/j.jclinepi.2022.03.004
8. Aromataris E, Munn Z. JBI Manual for Evidence Synthesis: JBI; 2020 [cited 2023 27 October]. Available from: <https://synthesismanual.jbi.global>.

9. Knüttel H, Krause E, Semmler-Schmetz M, Reimann I, Metzendorf M-I. Health sciences libraries in Germany: new directions. *Health Info Libr J.* 2020;37(1):83-8. 10.1111/hir.12299
10. Beverley CA, Booth A, Bath PA. The role of the information specialist in the systematic review process: a health information case study. *Health Info Libr J.* 2003;20(2):65-74. 10.1046/j.1471-1842.2003.00411.x
11. Cooper C, Booth A, Varley-Campbell J, Britten N, Garside R. Defining the process to literature searching in systematic reviews: a literature review of guidance and supporting studies. *BMC Med Res Methodol.* 2018;18(1):85. 10.1186/s12874-018-0545-3
12. McKeown S, Mir ZM, Ritonja JA, Soleas E. Systematic review support received and needed by researchers: a survey of libraries supporting Ontario medical schools. *J Can Health Libr Assoc.* 2021;42(3):154-63. 10.29173/jchla29571
13. Cochrane. Cochrane Interactive Learning: Conducting an Intervention Review 2023 [cited 2023 30 October]. Available from: <https://training.cochrane.org/interactivelearning>.
14. Munn Z, Stern C, Aromataris E, Lockwood C, Jordan Z. What kind of systematic review should I conduct? A proposed typology and guidance for systematic reviewers in the medical and health sciences. *BMC Medical Research Methodology.* 2018;18(1):5. 10.1186/s12874-017-0468-4
15. Pollock D, Peters MDJ, Khalil H, McInerney P, Alexander L, Tricco AC, Evans C, de Moraes É B, Godfrey CM, Pieper D, Saran A, Stern C, Munn Z. Recommendations for the extraction, analysis, and presentation of results in scoping reviews. *JBIEvid Synth.* 2023;21(3):520-32. 10.11124/jbies-22-00123
16. Koster J. PubMed PubReMiner [cited 2024 Mar 5]. Available from: <https://hgserver2.amc.nl/cgi-bin/miner/miner2.cgi>.
17. Clark J, Glasziou P, Del Mar C, Bannach-Brown A, Stehlik P, Scott AM. A full systematic review was completed in 2 weeks using automation tools: a case study. *J Clin Epidemiol.* 2020;121:81-90. 10.1016/j.jclinepi.2020.01.008
18. Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart LA. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Syst Rev.* 2015;4(1):1. 10.1186/2046-4053-4-1
19. McGowan J, Sampson M, Salzwedel DM, Cogo E, Foerster V, Lefebvre C. PRESS Peer Review of Electronic Search Strategies: 2015 Guideline Statement. *J Clin Epidemiol.* 2016;75:40-6. 10.1016/j.jclinepi.2016.01.021
20. Sterne JAC, Savović J, Page MJ, Elbers RG, Blencowe NS, Boutron I, Cates CJ, Cheng HY, Corbett MS, Eldridge SM, Emberson JR, Hernán MA, Hopewell S, Hróbjartsson A, Junqueira DR, Jüni P, Kirkham JJ, Lasserson T, Li T, McAleenan A, Reeves BC, Shepperd S, Shrier I, Stewart LA, Tilling K, White IR, Whiting PF, Higgins JPT. RoB 2: a revised tool for assessing risk of bias in randomised trials. *Bmj.* 2019;366:l4898. 10.1136/bmj.l4898
21. University of Oxford. Nuffield Department of Primary Care Health Sciences. Centre for Evidence-Based Medicine. Study Designs. 2024 [cited 2024 12 February]. Available from: <https://www.cebm.ox.ac.uk/resources/ebm-tools/study-designs>.
22. National Health and Medical Research Council (NHMRC). Assessing risk of bias 2023 [cited 2023 30 October]. Available from: <https://www.nhmrc.gov.au/guidelinesforguidelines/develop/assessing-risk-bias>.
23. Ali ASM, Wu D, Bannach-Brown A, Dhamrait D, Berg J, Tolksdorf B, Lichtenstein D, Dressler C, Braeuning A, Kurreck J, Hülsemann M. 3D bio-printing of liver models: A systematic scoping review of methods, bioinks, and reporting quality. *Materials Today Bio.* 2024:100991. 10.1016/j.mtbio.2024.100991
24. Guyatt G, Oxman AD, Akl EA, Kunz R, Vist G, Brozek J, Norris S, Falck-Ytter Y, Glasziou P, DeBeer H, Jaeschke R, Rind D, Meerpohl J, Dahm P, Schünemann HJ. GRADE guidelines: 1. Introduction-GRADE evidence profiles and summary of findings tables. *J Clin Epidemiol.* 2011;64(4):383-94. 10.1016/j.jclinepi.2010.04.026

25. Ioannidis JP. The Mass Production of Redundant, Misleading, and Conflicted Systematic Reviews and Meta-analyses. *Milbank Q.* 2016;94(3):485-514. 10.1111/1468-0009.12210
26. Cierco Jimenez R, Lee T, Rosillo N, Cordova R, Cree IA, Gonzalez A, Indave Ruiz BI. Machine learning computational tools to assist the performance of systematic reviews: A mapping review. *BMC Med Res Methodol.* 2022;22(1):322. 10.1186/s12874-022-01805-4
27. Dressler C. Angebote zu Systematic Reviews durch die Medizinische Bibliothek der Charité – Universitätsmedizin Berlin. *GMS Medizin Bibliothek Information.* 2023;23(2). 10.3205/MBI000579
28. Open AI. ChatGPT Version 4.0 2024 [cited 2024 Mar]. Available from: <https://chat.openai.com/>.

