ISSN 2161-3974

JeSLIB 2021; 10(4): e1220
https://doi.org/10.7191/jeslib.2021.1220

Journal of eScience Librarianship
putting the pieces together: theory and practice

Commentary

Data Management for Systematic Reviews: Guidance is Needed

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Abstract

Data management practices for systematic reviews and other types of knowledge syntheses are variable, with some reviews following open science practices and others with poor reporting practices leading to lack of transparency or reproducibility. Reporting standards have improved the level of detail being shared in published reviews, and also encourage more open sharing of data from various stages of the review process. Similar to project planning or completion of an ethics application, systematic review teams should create a data management plan alongside creation of their study protocol. This commentary provides a brief description of a Data Management Plan Template created specifically for systematic reviews. It also describes the companion LibGuide which was created to provide more detailed examples, and to serve as a living document for updates and new guidance. The creation of the template was funded by the Portage Network.

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Received: June 2, 2021 **Accepted**: October 18, 2021 **Published**: November 9, 2021

Disclosures: The authors report no conflict of interest. The substance of this article is based upon a panel presentation at RDAP Summit 2021. Additional information at end of article.

Data management throughout the life cycle of a systematic review is integral to sound project management, as well as to transparency and reproducibility. Currently, data management and sharing practices for systematic reviews appear to be variable, though the development of reporting frameworks such as the PRISMA (Page et al. 2021) and ROSES (Haddaway et al. 2018) standards have brought some level of standardization. However, adherence to reporting standards varies (Page and Moher 2017) and it remains the case that some reviews include search strategies for the primary database searched; others for all databases. Some reviews may only describe a search in general terms. Full sharing of extracted data beyond tables and figures in the body of the article remains rare. A study of the Systematic Review Data Repository (SRDR) found that only 152 of the 735 projects (21%) in the repository at the time had publicly available data (Saldanha et al. 2019).

It is our belief that data management plans are a key component of an overall project plan. Many of the elements of a DMP represent decisions that will need to be made about the overall project.

Data management is a competency that is well suited to the role that librarians play in systematic reviews (for the sake of brevity, we use "systematic review" as shorthand for all other related forms of knowledge synthesis, such as scoping and realist reviews). The systematic review librarian competency framework developed by Townsend et al. includes a data management competency. Specific aspects of this competency identified by the authors include knowledge and skills in citation software, systematic review software, data extraction tools, and "appropriate data and process archiving, including version tracking and PRISMA data collection" (Townsend et al. 2017).

However, there is little detailed guidance on research data management for systematic reviews and related forms of knowledge synthesis. Chapter 4 of the book *Assembling the Pieces of a Systematic Review: A Guide for Librarians* is dedicated to team dynamics and data management, but other than identifying data management as a role that needs a dedicated team member, and offering guidance on choosing review management software, there is little concrete guidance on data management planning, data sharing, or preservation (MacEachern, Townsend, and Allee 2017).

While many librarians involved in systematic reviews may have knowledge of data management practices, and others have intuitively developed sound practices, we believe that specific guidance for librarians and other members of a systematic review team would be useful. In 2020, the Portage Network, an initiative of the Canadian Association of Research Libraries to support research data management, issued a funding call for interested parties to develop data management planning (DMP) templates for specific disciplines or methodologies. We saw this as an opportunity to provide guidance on data management planning for systematic reviews. We were successful in our application, and have since developed a DMP template (Ganshorn, Premji, and Ronksley 2021) and a complementary LibGuide

(Premji and Ganshorn 2021) with more detailed guidance not only for librarians, but for all members of the systematic review team and all stages of the systematic review process. The template is selectable within the Portage Network's DMP Assistant data management plan tool, and is also available on Zenodo for those who do not use DMP Assistant.

The template itself is organized using the structure of the DMP Assistant, which reflects the stages of the research data lifecycle (data collection; documentation and metadata; active storage and backup; long-term preservation; sharing and reuse). The LibGuide is organized the same way; originally, we had considered organizing the LibGuide according to the stages of a systematic review (searching, screening, data extraction, etc.), but it proved too challenging to map these back to the DMP Assistant structure.

Because many of our clients are either students or researchers embarking on their first systematic review, we assumed that they may be unfamiliar with systematic review data, or data management best practices. Accordingly, we provide extensive examples and tips on the LibGuide. Within each section, we spell out which stages of the systematic review process might use particular file types, for example, or which data can and should be shared (search strategies, data extraction forms, statistical code, thematic coding sheets, etc.) and which data should be preserved in the event that the team wishes to update the review at a later date.

Where possible, we have included this guidance within the template itself; however, we developed the Guide, in part, because we wished to go into greater detail than the space in the template allowed. The content in the template was not replicated in the LibGuide, therefore we emphasize again that the two tools should be used together.

Another reason for offering a supplemental guide to the template is that the guide is much easier to maintain as a living document, as we have direct control over it, whereas the template belongs to Portage Network. It is likely that the templates will also be revised periodically, but we appreciate the ability to add more information and resources to the guide as data management practices for systematic reviews evolve.

Future plans for our work in this area include development of data management planning workshops specific to systematic reviews. We also plan to develop an example DMP using the template with a review team.

We hope that the knowledge synthesis community will find these resources useful. Both the template and LibGuide may be reproduced or adapted under a Creative Commons Attribution 4.0 license. We would be happy to correspond with users who have questions or suggestions regarding the template and accompanying guide.

Acknowledgments

We are grateful for the dedicated funding provided by the Portage Network for the development of the template discussed in this Commentary. We would also like to acknowledge the contributions of Dr. Paul Ronksley, our colleague in the University of Calgary Department of Community Health Sciences, to the systematic review DMP template.

Disclosures

The content of this article is based upon a panel presentation at RDAP Summit 2021 titled "Data Management Planning for Systematic Reviews/Knowledge Syntheses: Development of a DMP Template and LibGuide."

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