Towards open collaboration in biomedical and health research: A protocol for a scoping review of open collaboration

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Study information

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Description

Scientific research now almost always requires working with other people. With the increasing emphasis on and demand for science to be more open, how we collaborate together is a key component to making science more open from the start of any project. But how do we collaborate in an open and transparent way? What are the best practices and tools we can use? What is an ideal collaborative workflow and how close or far are we from this ideal in reality? This project aims to address some of these questions.

From our work in the health research field, we have experienced many different ways of collaborating, but rarely in the form of open collaboration. With the growing complexity and specialization in scien-

tific practices and methods, together with globalisation of health and environmental issues, there is a great need for a paradigm shift in research collaboration to be able to tackle these challenges.

We define open collaboration using the definition as found in (1):

> "*an online environment that (a) supports the collective production of an artifact (b) through a technologically mediated collaboration platform (c) that presents a low barrier to entry and exit and (d) supports the emergence of persistent but malleable social structures.*" This scoping review will focus on current practices of open collaboration and open science in relation to collaboration in the field of biomedical and health research.

Hypotheses

This is a scoping review and does not have explicit hypotheses. Our overarching aim of this scoping review is to identify current practices of open collaboration in biomedical and health research.

The specific aims of this scoping review are to:

- Provide an overview of current practices of or opinions about research collaboration that follow basic open principles (e.g., transparency, accessibility)
- Summarize existing online tools and resources available to improve open collaboration in research

Design plan

Study type

Scoping review on literature relating to open collaboration.

Blinding

No blinding is involved in this study, since this is a scoping review of existing literature.

Study design

This is a scoping review, so we are following the framework described in (2) as well as the guidelines outlined in the PRISMA-ScR statement (3).

Sampling Plan

Existing data

Registration prior to creation of data. As of the date of submission of this research plan for preregistration, the data have not yet been collected, created, or realized.

Data collection procedures

We developed the initial search strategy in consultation with a research librarian. We will collect the data via systematic searches of databases, as well as some hand searches.

Document selection

- **Document types**:
  - Open access journal articles published in peer-reviewed and non-peer-reviewed journals.
  - Websites, blogs, and other online resources.
  - Books
- **Information sources and search terms**: We will use these information sources and databases:
  - Formal publication repositories: SCOPUS, Web of Science, MEDLINE (via PubMed), and EMBASE
  - Preprint repositories: medRxiv, bioRxiv, and arXiv
  - Other dissemination repositories: Zenodo and figshare
  - Reference lists from extracted articles
- **Search terms**: Each repository has some small differences in how to use their search terms, but in general, the search term we will use looks like:

  > (open[title]) AND (science OR research) AND (collaborating OR collaboration OR collaborate OR team OR cooperate OR cooperation OR cooperating) AND (technology OR technologies OR tool OR framework OR guideline OR principles OR practices OR systems OR resources)

- **Inclusion criteria**: This includes any document where open collaboration practices are not the primary focus. We will be guided by the definition of open collaboration from Forte and Lampe (2013) mentioned above in determining whether the records are relevant.
  - Any published document with reporting on current open collaboration practices.

    - Any published document with advice, guidance, tools, and/or recommendations for improving open collaboration.
    - Article language in English.
- **Exclusion criteria**:
    - Documents that do not report on specific open collaboration practices.
    - Documents published >5 years in the past (defined as before 2017-01-01) to capture current/most recent practices.

Software and tools used

We will use R to search and retrieve results from the databases using the following packages:

- easyPubMed package for searching and retrieving from MEDLINE via PubMed.
- wosr package for searching and retrieving from Web of Science.
- rscopus package for searching and retrieving from Scopus and EMBASE.
- medrxivr and aRxiv packages for searching and retrieving from preprint repositories.
- zen4R and rfigshare for searching and retrieving from Zenodo and figshare.

Sample size

We aim to identify at least 1000 articles in the initial database search.

Sample size rationale

The sample size is based on our available time and resources to work on this project.

Stopping rule

In terms of database searches, we aim to limit the search until the end date (maximum 2022-11-31). Searches will be concluded when we reach conceptual saturation (i.e., when it is determined that we are not identifying any new concepts/resources). Depending on the quantity of records retrieved, even after further filtering, we may randomly select a sample that each person can go through and manually review them. In the interests of feasibility, a maximum for 4 books will be selected and evaluated. Books will be selected based on consensus in the research group.

Variables

Measured variables

The primary "variables" of interest will be the article title, abstract, topic list, and full length article including content relating to open collaboration. In addition to these variables, we will also obtain article metadata, such as publication date, URL/DOI, and author list.

Analysis Plan

Statistical models

Since this is a scoping review, the purpose is to explore a research topic and we will not be conducting any statistical modeling.

All data obtained from all searches in online databases will be exported into text files or CVS files for further processing including removal of duplicates.

At least two of us will extract data using a standardized and tested template. Data regarding the data source (e.g., author, title, publication year), open collaboration practices, and any other relevant information, will be extracted. Extracted data will be summarized with the descriptive analytical method described by Arksey and O'Malley (2005). The descriptive analytical method is aimed at identifying and summarizing different open collaboration practices.

Results will be presented in a descriptive way and general topics that we extract from the sources will be subjectively grouped into common themes. We will not do any formal analyses aside from descriptively listing the perspectives or practices for doing open collaborative research.

Other

Anticipated duration

Phase	Start	End
Overall	2022-01-01	2023-12-31
Research design and data collection	2022-01-01	2022-11-31
Screening resources	2022-12-01	2023-06-01
Analyses and manuscript writing	2023-06-01	2023-12-31

Bibliography

1. Forte A, Lampe C. Defining, Understanding, and Supporting Open Collaboration: Lessons From the Literature. American Behavioral Scientist. 2013Jan;57(5):535–47.

2. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. International Journal of Social Research Methodology. 2005Feb;8(1):19–32.

3. Tricco A C, Lillie E, Zarin W, O'Brien K K, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. Annals of Internal Medicine. 2018Oct;169(7):467–73.