

# **Lessons Learned: Creating a Systematic Review Service Model that Expands the Librarian's Role**

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## **Abstract**

As a federal biomedical research library our clientele is comprised of students, post-baccalaureate/post-doctoral, scientific, and public health investigators engaged in research and publishing. The past ten years we experienced a rapidly growing interest in conducting systematic reviews. Initially the Library provided informal support for systematic reviews, and over the last five years, we developed and implemented a systematic review service model resulting in an expanded role for librarians including co-author opportunities.

A group of five librarians moved beyond solely conducting literature searches to include assisting with question formulation, protocol writing, Covidence software training, retrieving full text, selecting risk of bias tools, and manuscript writing and editing. Our initial consultations are standardized to review the request form, PRISMA guidelines, and the customer's knowledge and experience. Librarians engage in peer-review of search strategies and meet weekly to discuss

reviews, searches, resources including providing support and mentorship. We mentor trainees on systematic reviews as part of their *post-baccalaureate*/post-doctoral training. A series of systematic review classes are taught and evaluated annually to identify new class topics based on customer feedback.

Time management is a constant challenge as the librarians provide multiple services and support. Additionally, an increase of requests, short deadlines, and changes due to the COVID-19 pandemic have stretched and challenged the staff and service. We will share successes and challenges running a virtual systematic review service during a pandemic including lessons learned to help us expand, strengthen, and improve not only this important service but also the librarian's role.

## **Introduction**

As a federal biomedical research library, the National Institutes of Health (NIH) Library is part of the NIH, an agency within the U.S. Department of Health and Human Services (HHS). The National Institutes of Health is the largest biomedical research agency in the world and includes 27 institutes and centers. The NIH Library clientele is comprised of students, post-baccalaureate and post-doctoral fellows, scientific and public health investigators and program and policy analysts engaged in research and publishing. The NIH Library staff is comprised of librarians and Informationists, reference assistants, and additional staff who provide support and specialized services (e.g., bioinformatics, data, translations, document delivery, systems, technology, etc.). Librarians and Informationists provide direct customer support for literature searching, reference, citation management, editing and manuscript support, and systematic reviews. Over the last ten years, we experienced a rapidly growing interest in conducting systematic reviews at the NIH (Cooper and Crum 2013). Our models and methods have evolved over the years to adjust for staffing changes, a global pandemic, and new types of reviews and review methods. Our evolution and development of our current model for providing support for systematic and other types of reviews is discussed below.

## **The Early Days: Attempting to Develop the Systematic Review Service Model**

The NIH Library Systematic Review (SR) service has changed from an ad-hoc, informal service challenged by multiple inconsistent and non-implemented plans and procedures due to significant staff turnover and lack of support to a formal, well-organized service supported by Library leadership. The current service model has significantly expanded the librarian's role in the systematic review process.

A brief chronology, touching on the evolution of the NIH Library systematic review service model is described below.

### *Systematic Review Model Timeline*

In 2009, at the inception of the service, the Library was well-positioned to offer a systematic review service for NIH researchers due to a strong foundation in evidence-based medicine principles among the librarians, a perceived need to increase services for conducting systematic reviews, strong search skills, support for training and professional development, staff interest, and expansive access to information resources.

Between 2009 and 2014, some progress was made towards establishing a feasible systematic review service. Some of the activities undertaken during this time were:

- *Training:* To develop skills in conducting systematic reviews, interested NIH Library Informationists attended a week-long "Systematic Review Workshop: The Nuts and Bolts for Librarians at the Health Sciences Library System at the University of Pittsburgh.
- *Teaching:* The first systematic review course at the NIH Library was developed and taught titled: "Undertaking a Systematic Review: What You Need to Know". The course was offered several times and each time was well attended.
- *Staff:* Approximately 10 systematic reviews were supported.
- *LibGuide:* A LibGuide was created on the Library website.
- *Marketing:* Implemented a phased roll-out of the SR service to NIH staff via announcements on the Library website, listserv emails and in an NIH-wide email.
- *Pricing:* Investigated whether a pricing structure for SR services was needed.

During this time, a systematic review service team was proposed which was open to any NIH Library staff member who had completed University of Pittsburgh systematic review training. A systematic review assistance service model was proposed with services supporting the following six areas:

1. Review of the SR process and gold standard for SR documentation
2. Formulate the SR question
3. Conduct and documentation of the comprehensive literature search
4. Manage and document the literature screened, obtained, read, and analyzed
5. Perform data extraction from the literature included in the SR
6. Draft the methods section of the SR manuscript

Unfortunately, due to staff turnover, a team was not formed, and Library leadership made the decision to allow all Library staff to provide SR support but with services offered informally and based on the librarian's knowledge, interest, and abilities.

During this time, a fee-based service was debated and later adopted for use. There was no charge for the initial consultation, but different tiers of SR service had different pricing. However, the fee-based service never became a standard of practice and was rarely used. Although, some support for SRs was provided by the NIH librarians over this time, it was provided without a formal team, with little to no formal training on methodology, best practices, or searching, poor oversight of searching and overall review methodology, and spotty data

collection.

## **Building Upon the Past: Designing and Implementing the Systematic Review Service Model**

In 2017, a small group of Library staff members revived and created a Systematic Review Service Task Force (SRSTF) to examine the various iterations of the NIH Library systematic review service. The SRSTF recommendations focused on developing a practical service model to re-establish, re-invigorate, and strengthen SR services. A key goal of the SRSTF recommendations and the service model was to involve the librarian or Informationist in the entire review process and expand the librarian role into different areas.

As a first step, the SRSTF conducted an environmental scan of major research and academic libraries to learn about their SR services including levels and types of services provided, how requests were received, distributed, and completed, how requests were tracked and reported internally, challenges, and best practices. Table 1 outlines the various components of this revised model and incorporates many lessons learned from previous SR services and the environmental scan.

Table 1: Proposed NIH Systematic Review Model circa 2017

Systematic Review Model Components	Action
SR Librarian Core Group	Establish a core group of librarians and Informationists dedicated to supporting and implementing the SR service.
Centralized Request Process	Create a centralized request process and procedures for receiving all requests. Requests to be triaged to staff with subject expertise or interest in SRs.
SR Professional Development	Provide SR training and professional development opportunities for NIH Library staff.
SR Training and Class	Develop SR class series instruction for NIH and HHS staff, and NIH Library colleagues.
Marketing SR Services	Design marketing campaign with NIH Communications Team to promote marketing of the SR service to NIH and HHS customers.
Elimination of Customer SR fees	Eliminate extra fees to NIH customers requesting SR assistance.
Evaluation SR Services	Evaluate the NIH Library SR program annually.

In 2017, the SRSTF recommendations for the SR service model were presented and approved by Library leadership thereby establishing it as an official library service. Next, in 2018, a small group of interested librarians and Informationists formed the Systematic Review Service Working Group during which significant progress was made to operationalize and implement the SRSTF recommendations. The SR service was launched officially for NIH staff

on June 1, 2018. The work begun in 2017 and 2018 was the framework used to build the robust systematic review service in existence today at the NIH Library.

The service model implemented in 2018 and expanded upon over the years since has added new and revised existing components from those originally proposed to better reflect changing customer needs, Library staffing and expanded skills and knowledge, and changes in review methodology.

In 2018, the new SR service team began to design, adapt, and implement the various components for the model. One of the early steps taken was to document and post what services would be offered as part of the SR service at the NIH Library.

*NIH Library Systematic Review Service Webpage:* With the formal approval of the SR service, a webpage was created including details about the new service and support provided for our customers to reference to learn more. It also includes links for customers to request a free consultation or assistance, our class training series, and key resources for completing a review.

A key part of the model was designing a process and procedures for receiving and distributing requests from customers to the staff supporting the service.

*Centralized Process for Receiving and Distributing Requests:* A systematic review request distribution process to manage requests received via email, phone, in person, and personal contacts was needed. An [online request form](#) helped to insure a standardized and uncomplicated method for requesting SR assistance online that would then be routed directly to the SR service team.

Initially, the SR service team performed a review of requests to confirm whether the request was truly for a systematic review, scoping review, or meta-analysis, or just a standard literature search or narrative review. After determining what the customer needed, they then contacted SR team members who either have experience and expertise on the research topic, who are assigned to support the specific NIH Institute or Center or have time in their schedules. In 2018 the NIH Library used Desk Tracker to capture requests and the assistance provided. Beginning in 2021, Desk Tracker was replaced by Microsoft Dynamics allowing for further opportunities to streamline, personalize, and refine the reporting of SR services.

In 2019, the above process was adapted to account for staff departures and all requests for assistance were sent to the SR service lead who contacted the customer to verify what support was needed and distribute the request amongst the team members. Additionally, staff were contacted directly by customers for assistance with their reviews.

Our current distribution practice is that one SR service lead receives the requests submitted via Microsoft Dynamics and distributes them to team members based on their interest and availability. Team members can keep or refer requests for assistance that they receive directly from customers. Thus, having a robust data collection and reporting system with

easy data entry for the librarian is important to encourage collecting data and ease of distribution of requests.

Another vital component of the SR service model was instituting a strong, practical, and useful internal support system for the team members. This internal support took several forms and was adapted over the years to new needs, changing interests, and software systems.

*Professional Development and Internal SR Team Support:* Initially, an internal webpage on the NIH Library staff intranet was used to save useful resources, articles, and support materials and other related documentation. The team developed a Microsoft Word template for returning the completed literature search results to the customer and format for using EndNote for the literature searches. Based on examples of SR intake forms from other academic libraries, a checklist was created for customers to complete before their initial consultation. This was to help gather important feedback about their research question and topic, eligibility criteria, and gauge their level of experience. Additionally, the final documentation including literature searches, EndNote library file, and additional materials for completed reviews were also posted to this internal webpage. Also, during this time team members attended Medical Library Association webinars on systematic reviews, searching, and related topics, and other training opportunities on systematic reviews. Professional development was strongly encouraged by the team and used to continually strengthen their skills and knowledge and keep up with changes in this field.

Since 2021, with the addition of new team members, the SR service further expanded its internal support and processes by updating and formalizing the results template to add new fields, created a template for sharing draft search strategies with customers, and updated the customer checklist into a fillable PDF to include additional fields and details. The checklist has proven to be a valuable and time-saving tool for both the librarian and customer. Please contact the authors to request a copy of our checklist.

Also, since the launch of Microsoft Teams at NIH and new staff arriving in 2021, the SR team has used the Teams Chat feature heavily to ask questions or for help, share resources or information links. Additionally, we have weekly meetings to check-in on our required team tasks, on-going projects, and reviews, share interesting articles, trainings, classes, workshops, or webinars, and to share successes, accolades, and frustrations. We have also transitioned all our internal files to Teams which has encouraged the sharing of documents, consistent use of templates, and finding of materials.

A significant component of our SR service model is training.

*Systematic Review Class Series:* Initially, a one-hour in-person overview class was developed but subsequent classes included in-depth instruction based on the steps in the SR process. The overview class was initially a stand-alone class, but as the number of requests for assistance increased and it became apparent to the SR team members that our customers did not know how to conduct a review, a series of online classes was developed providing both introductory and intermediate levels of training on the conduct of a scoping or systematic review. The class series is taught online using WebEx. While the overall number of classes

included in the series has ebbed and flowed over the years, the current series includes nine online classes. See Table 2 for more information about classes and attendees since 2018.

The classes are offered as a series of one-hour webinars available for NIH and HHS staff and are listed on the NIH Library training calendar where interested participants can read the class description and register. The series is offered approximately three times during the year (e.g., February, May, September) instead of spreading the classes out throughout the year. This type of class schedule offers continuity in learning and has increased class attendance. Classes begin with a high-level introduction to the systematic review process with subsequent classes offering an in-depth look at the steps involved in conducting systematic or scoping reviews.

As SR team members have changed, some of the classes have also to reflect new interests and skillsets. A unique feature of this class series is the collaboration with the NIH Clinical Center’s Biostatistics and Clinical Epidemiology Service (BCES). The BCES statistician teaches an Introduction to Meta-Analysis class and provides statistical support for meta-analyses conducted at the NIH. Additionally, SR team members provided customized training to small groups or teams on the methodology upon request.

**Table 2: Systematic Review Class Series**

2018	Name of Course	Attendance
1	Getting Your Systematic Review Written and Published	51
2	Introduction to the Systematic Review Process	90
3	Systematic Reviews: Basics*	29
4	Systematic Review Types of Reviews, Lit Searching Protocols	130
	Total	<b>300</b>
2019	Name of Course	Attendance
1	Introduction to Systematic Reviews	54
2	Introduction to the Systematic Review Process: Part 1	44
3	Introduction to the Systematic Review Process: Part 2*	6
4	Screening Best Practices and Managing Your Data for Systematic Reviews	71
5	Systematic Reviews: Types of Reviews, the Protocol and Literature Searching	81
6	Using EndNote for Systematic Reviews	71
7	Writing and Publishing Your Systematic Review	65
	Total	<b>392</b>
2020	Name of Course	Attendance
1	Bias in Research Studies: Publication Bias	15
2	Developing and Publishing Your Systematic Review Protocol	47

3	Developing the Research Question and Conducting the Literature Search	59
4	Getting Your Systematic Review Written Published	11
5	Gray Literature: Searching Beyond the Databases	39
6	Introduction to the Systematic Review Process	177
7	Meta-Analysis: Quantifying a Systematic Review**	53
8	Screening Best Practices Managing Your Data for Systematic Reviews	36
9	Types of Literature Reviews: Selecting the Most Appropriate Review for Your Research	100
10	Using EndNote for Systematic Reviews	34
11	Writing and Publishing Your Systematic Review	29
	Total	<b>600</b>
<b>2021</b>	<b>Systematic Review Class Series</b>	<b>Attendance</b>
1	Developing and Publishing Your Systematic Review Protocol	72
2	Developing the Research Question and Conducting the Literature Search	69
3	Exploring the Cochrane Library: Systematic Reviews, Clinical Trials, and More	65
4	Getting Your Systematic Review Written & Published	53
5	Gray Literature: Searching Beyond the Databases	55
6	Introduction to Scoping Reviews	129
7	Introduction to the Systematic Review Process	108
8	Screening Best Practices and Managing Your Data for Systematic Reviews	42
9	Selecting the Most Appropriate Type of Literature Review for Your Research	14
10	Types of Literature Reviews: Selecting the Most Appropriate Review for Your Research	46
11	Using Covidence for Conducting Systematic Reviews	41
12	Using EndNote for Systematic Reviews	27
	Total	<b>721</b>
<b>2022</b>	<b>Systematic Review Class Series***</b>	<b>Attendance</b>
1	Developing and Publishing Your Systematic Review Protocol	31
2	Developing the Research Question and Conducting the Literature Search	47
3	Gray Literature: Searching Beyond the Databases	18

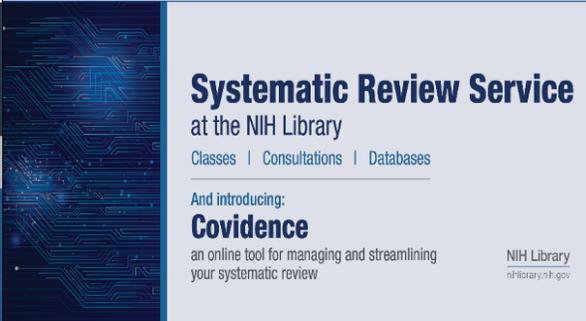
4	Introduction to Scoping Reviews	67
5	Introduction to the Systematic Review Process	54
6	Meta-Analysis: Quantifying a Systematic Review	61
7	Selecting the Most Appropriate Type of Literature Review for Your Research	20
8	Using Covidence for Conducting Your Systematic Review	37
9	Writing and Publishing Your Systematic Review	31
	Total	<b>366</b>
<p>*In-Person Class  **Both in-person and virtual  ***January–May 2022</p>		

An important feature of any service is making your customers aware of it and encouraging its use. Marketing of the NIH Library’s systematic review service has always been a major component of the service model.

*Marketing:* In 2018, the SR team worked with the NIH Library’s Communications team to develop a marketing campaign to promote to NIH and HHS staff the SR services, classes, and resources. When the NIH Library’s new website was launched in Drupal, the SR service was one of the services profiled on the homepage, and was listed on the Library’s services webpage with other traditional library services including bioinformatics, bibliometrics, data services, editing, literature searching, document delivery, etc. The SR service is also included in Library outreach materials and presentations made by our liaisons to the various NIH ICs and HHS customers.

As part of promoting our classes, a comprehensive campaign was developed including a graphic to advertise the upcoming classes, the overall service including encouraging customers to request a consultation, and available databases and software. The marketing campaign was distributed to the NIH Library’s customer email distribution listserv, included on the NIH-wide calendar of events, and on our digital display in the main corridor outside the entrance of the library. As our customer base includes NIH and HHS employees and contractors, email is still the best and easiest communication method, and social media is not regularly used due to our closed customer base. See Figure 2 for two examples of our marketing campaigns and how they have evolved in both visual presentation and content advertised.

**Figure 2:** Systematic Review Marketing Examples

2018 Systematic Review Class Announcement	2021 Systematic Review Class Announcement								
<p><b>NOW AVAILABLE AT THE NIH LIBRARY</b> <b>Systematic Review Service</b></p> <p>Classes   Consultations   Search Services   Post-Search Services</p> <p>Register now for <b>Systematic Review Classes</b></p> <table border="1"> <tr> <td data-bbox="191 426 337 506">An Introduction to the Systematic Review Process</td> <td data-bbox="337 426 483 506">Types of Reviews and Literature Searching</td> <td data-bbox="483 426 630 506">Screening Best Practices &amp; Managing Your Data for Systematic Reviews</td> <td data-bbox="630 426 773 506">Getting Your Systematic Review Written &amp; Published</td> </tr> <tr> <td data-bbox="191 506 337 558">June 6   12-1pm Webinar</td> <td data-bbox="337 506 483 558">June 14   1-2pm Webinar</td> <td data-bbox="483 506 630 558">June 19   12-1pm Webinar</td> <td data-bbox="630 506 773 558">June 26   12-1pm Webinar</td> </tr> </table>	An Introduction to the Systematic Review Process	Types of Reviews and Literature Searching	Screening Best Practices & Managing Your Data for Systematic Reviews	Getting Your Systematic Review Written & Published	June 6   12-1pm Webinar	June 14   1-2pm Webinar	June 19   12-1pm Webinar	June 26   12-1pm Webinar	 <p><b>Systematic Review Service</b> at the NIH Library</p> <p>Classes   Consultations   Databases</p> <p>And introducing: <b>Covidence</b> an online tool for managing and streamlining your systematic review</p> <p>NIH Library nihlibrary.nih.gov</p>
An Introduction to the Systematic Review Process	Types of Reviews and Literature Searching	Screening Best Practices & Managing Your Data for Systematic Reviews	Getting Your Systematic Review Written & Published						
June 6   12-1pm Webinar	June 14   1-2pm Webinar	June 19   12-1pm Webinar	June 26   12-1pm Webinar						

Another component of our model was to eliminate fees for SR services.

*Eliminate fees for SR Support:* During previous efforts to launch a SR service, a fee structure was required for any SR services provided to non-Informationist groups beyond 40 hours in total. The services would be charged at the hourly rate for the Informationist’s or Librarian’s time. Although this policy was not enacted in practice, it was a required internal library policy. Currently, no fees are charged, and support is provided to any NIH or HHS customer who is interested in conducting a scoping review, systematic review, meta-analysis or other type of review.

Evaluation of a service is always an important step to take to determine how a service is doing.

*Evaluation of the Systematic Review Service:* Since 2018, we have consistently collected data on the number and type of requests received and completed, type of review, specific work done in support of the review (e.g., consultation, literature searching, reference, protocol support, etc.), and NIH or HHS group using different data collection systems and with changing instructions and guidelines for what data to collect. However, due to the complexity of how data was reported for reviews, changing data collection systems and guidance on what data to collect and when, all data collected for the SR team requires significant cleaning and reconciliation to have a clean data set. As such a comprehensive review of the SR service has not yet been undertaken, although it is planned for 2023 with the help of the NIH Library’s Assessment and Reporting Team. It is hoped that an evaluation would show us trends on types of reviews supported, types of specific activities completed by the SR team members, NIH ICs and HHS groups requesting assistance the most or least, and ways to improve or streamline our data collection process.

Finally, an additional component of our current SR service model is the provision of software and collaboration with other NIH Library services.

*Software and Collaboration with NIH Library Services:* From 2018–2019, the NIH Library licensed DistillerSR (Evidence Partners) screening software for customers to use when conducting systematic reviews. A small number of seats were purchased, and accounts were turned on and off as teams started or completed their reviews. In 2020, the

NIH Library licensed the Covidence (Veritas Health Innovations) screening software for use by all NIH customers undertaking a systematic or scoping review or meta-analysis. This license allowed unlimited numbers of users but with a set threshold of reviews created annually. The SR team provides support for the creation of the review including adding members, setting up of the review, training on using the software, uploading of results for screening at title/abstract and full text review, exporting of results, and troubleshooting its use. We also developed and teach a class on its use as part of our SR class series. The provision of software to our customers has greatly expediated and improved the conduct of reviews by our customers.

Over the last few years, the NIH Library has also provided a site license to the EndNote (Clarivate Analytics) citation management tool for all NIH and HHS customers to download and use. This software is also used extensively for the conduct of reviews, particularly when writing, inserting, and formatting the references.

In addition to the provision of software, the SR service team collaborates with other NIH Library services to support our customer's needs. We have collaborated closely with the statistical support component of the Library's data services to provide statistical support for meta-analyses and systematic reviews and teach as part of our class series. The Library's biostatistician provides assistance to SR teams, answering question or information to share with a customer. Document delivery is another service that is relied upon heavily when conducting a review of any type as usually a significant number of articles need to be requested for full text review. We collaborate with our Document Delivery Service team to develop a process for requesting assistance with review teams that need a large number of articles requested (e.g., >100). This has reduced the burden on the customer and SR team member to individually request each article, streamlined and clarified the request process, information and format the citations needs to be shared with document delivery, and expectations on both sides.

The above components represent the framework for our SR service model, but what we specifically do in support of a request for assistance is also crucial and novel work.

After a request is received, the customer receives the checklist described above and additional background materials on the methodologies to use for conducting a scoping or systematic review. During the initial consultation, the librarian ascertains the level of experience and knowledge of the team and/or team lead on the required methodology and shares the PRISMA 2020 guidelines and expectation to follow these. This often dictates the topics covered during the rest of the consultation as more time may be needed discussing methodology versus discussing their research topic and questions. Oftentimes, the librarian is the most experienced person in conducting the review and most familiar with the required methodology to use. This results many times in the librarian serving as a key member of the review team or a formal or informal co-team lead, and therefore engaged for the entire process of the review from start to finish (i.e., writing the protocol through journal submission).

At the NIH, many of our customers conducting reviews are fellows who have little experience or familiar with reviews. In these situations, the Library's SR team member often

serves as a mentor to the fellow and guides them throughout the entire process from start to finish. This often involves many meetings and consultations to discuss questions or problems, plan out next steps, and help facilitate team meetings.

Depending on the needs of the team, the librarian is often helping to clarify, refine, and write the research question(s) for the review. Many times, the questions are not clearly formulated, too vague or broad, or inappropriate for the type of review they want to conduct. We often share question framework documents, provide suggestions for clarifying and rewriting the question, looking for other similar reviews, or providing general feedback.

The writing of the protocol is a strongly and highly recommended best practice that the SR team promotes to all its customers. While the majority are willing, and write the protocol, there are some teams that refuse or do so incompletely. However, we provide the appropriate guidance documents including [Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols \(PRISMA-P\)](#) and recommend using the [PRISMA Scoping Review extension](#) as an outline for the scoping review (Page et al. 2021; Shamseer et al. 2015; Tricco et al. 2018). We are currently developing templates for customers to fill-in and that are customized to each type of review we most commonly support. The SR team also promotes depositing the completed protocol into [PROSPERO](#) for systematic reviews, [Open Science Framework](#) for scoping reviews, or publishing the protocol in a journal.

Once the protocol is written, we strongly encourage the team to conduct a pilot of the screening steps (both title abstract and full text), data extraction or collection, and the risk of bias assessment with all team members participating in each step. During the pilot, we are often heavily engaged in teaching the team how to use Covidence guiding them through each step. The pilot usually requires an initial search in PubMed to select a random sample of records to upload into Covidence and use as the sample set. The team is encouraged to meet after each step in the pilot to discuss problems, questions, and changes to the eligibility criteria for that step. We have discovered that by encouraging and nudging our customers to complete the pilot, they complete the overall review much quicker, more rigorously, and feel more confident in their end product.

As expected, we complete the literature searching step of the review including searching grey literature as appropriate and requested. We develop and test the search strategies, share with the customer for feedback and input, and revise and finalize. After running the searches in the specified databases, we use EndNote (Clarivate Analytics) to identify duplicates and the unique records to upload into Covidence. As part of our service, we will upload the unique records into the review in Covidence for title and abstract screening; we may also setup the review by adding the inclusion and exclusion criteria, reasons for exclusion, and keywords for highlighting.

In 2022, we instituted a pilot program for internal peer review of the search strategies by the SR team. This is voluntary, and staff post their draft search for PubMed or Embase, research question and eligibility criteria for the review, and any specific questions they have to our SR team channel on Microsoft Teams along with a due date. To date, the pilot has gone well with some valuable and helpful suggestions and edits made. We plan to continue the pilot through the end of 2022 and determine how to institute formally for 2023.

When the customer is ready for the full text review step, we often help by retrieving the PDFs to those journals for which the NIH Library subscribes. We use the export feature in Covidence to export the citations back into EndNote and use the find full text feature to retrieve the PDFs. Then following the steps outlined by Covidence to use the Bulk PDF Import to import most of the PDFs into Covidence and append them to the records. Further we share instructions with the customer on how to use our free Document Delivery Service to request those articles for which we do not subscribe and then add them to Covidence. If there are a significant number of articles needed, we collaborate with the Library's Document Delivery Service team to facilitate their retrieval.

Frequently we also provide consultation and assistance in completing the risk of bias assessment for systematic reviews. Oftentimes, the customer team has no familiar with this step and do not know how or where to find the tools to use. We explain how this step should be completed, provide the relevant chapters from the [Cochrane Collaboration's Handbook of Systematic Review Interventions](#) and/or the [JBI Manual for Evidence Synthesis](#) on risk of bias, and links to the various types of checklists and tools available for the study designs they plan to include (e.g., cohort, case-control, randomized controlled trials, etc.) (Higgins JPT et al. 2022; Aromataris E and Munn Z 2020).

For the data extraction step, customer teams are often not sure which tool to use, thus we often provide suggestions of other software that is available at the NIH including Microsoft Forms and Excel, QualtricsXM (Qualtrics), Covidence, REDCap (Vanderbilt University), and others. If they use Covidence for data extraction, we often help them with building the data extraction template and understanding how to collect and perform consensus on the collected data. Additionally, during the writing of the protocol, we often provide suggestions on which data items to collect for their review, including specifying open and closed ended responses, reminding them the data should relate back to their research question, and providing general feedback on selecting appropriate data items for extraction.

Finally, during the writing step of the review, the SR team writes the methods and results sections pertaining to the literature searches, completes the beginning of the PRISMA 2020 flow diagram, and formats the final search strategies for supplemental materials (Page et al. 2021). Frequently, we also provide overall editing and writing support and pay particular attention to the methods and results sections to ensure that they have followed PRISMA appropriately and included the appropriate terminology to describe what they did and what they found. As a result of our collaboration with the customer team from the very beginning and our participation in the writing of the manuscript, we are frequently a co-author on the final journal article.

As a result of the implementation and adaptation of the above components to form our SR service model's framework and the actual services and help we provide to our customers, we believe that we have greatly expanded the librarian's role in systematic reviews at the NIH and hope that we have shown how this can be done at other institutions.

## **Challenges and Opportunities**

## Challenges

The first year of the NIH systematic review service model proved to be a success, but also created challenges with providing enough staff to support the increasing demand. In 2019, it was again recommended for all NIH librarians and Informationist to learn and conduct systematic reviews in order to provide the additional manpower for the growing SR service. Unfortunately, these plans were never implemented, as the library was again experiencing significant staff turnover, there was a lack of interest of remaining staff to add SR supports to their already heavy workload responsibilities, and other library priorities took precedence. Therefore, the SR service continued to be offered and supported by a few SR Working Group members (primarily less than 3). Despite these challenges the service grew in 2019, the number of systematic review requests increased, and new classes were added to the SR class series.

Other challenges experienced over the years include:

- *Time Management:* The complexity and expanded librarian role in the SR process demands time and commitment. The SR team members struggle with juggling support for multiple reviews which are all at different stages in the process, other job duties and responsibilities (e.g., outreach, general reference and literature searching, editing, training/instruction, Informationist embedded group support, professional development, reporting and administrative requirements, etc.) all of which may lead to job burnout, additional stress, and lowered productivity and quality.
- *Continuity and Staffing:* The years since 2018 have seen several retirements, departures and new staff arrivals which has impacted the SR service. Each time new staff arrive, significant time and effort is made to train and mentor the person and orient them to our processes, procedures, and model. While two staff have remained in place since 2017, others have not. Continuity is important to maintain our service overall and ensure quality. However, this has also led to over-burdening the SR team members in that each had to take on more work and reviews, while also addressing ways to improve, change, or implement new components or approaches. Since 2021, we have slowly grown the SR team and hope to add new staff in the future who can devote a significant part of their responsibilities to the SR team.
- *Expanding Our Services:* To remain relevant, useful, and impactful we need to be consistently reviewing our model and services and determining what we need to do differently or new. However, this requires time to do thoughtfully, and overall support from Library leadership.
- *Training Challenges:* Participating in professional development training and activities is difficult to fit into one's already busy and full schedule and can be time prohibitive to attend while balancing other duties.
- *Updating and Contracted Reviews:* The use of outside companies as government contractors to conduct SRs is common at the NIH and HHS and poses challenges for the NIH Library SR team. Over the years, we have been asked to update the searches for reviews conducted by outside contractors who either used search strategies which we did not recommend, did not do the searching correctly or used databases to which we do not have access. Also, some of these contracted reviews could potentially have been conducted internally at the NIH with the support of the NIH Library's SR service thereby

saving financially; however, the lack of time by NIH staff to devote to properly conducting a SR is often a barrier to them conducting it themselves.

### *Opportunities*

During the COVID pandemic, from 2020–present, the SR service has operated as a completely virtual service. Since 2021, the SR service team is currently a group of four librarians with expertise in systematic reviews (and other types) who continue to promote, maintain, and conduct the service. Despite the pandemic, the request for SR service has grown during these years as many NIH staff including students, post-baccalaureate/post-doctoral and scientific staff transitioned to remote work. A possible impetus for the increased interest in reviews during the pandemic was that conducting literature reviews was specifically mentioned by NIH leadership as a way for students and staff to continue to conduct research projects while working remotely.

Throughout the rest of 2022 and into the future, the following are opportunities for the NIH Library’s systematic review service to expand its reach, impact, and into new areas of support:

- *Expanding Review Support:* The SR Team has expanded the SR service to include support on best practices for conducting meta-analyses, scoping reviews, rapid reviews, umbrella reviews, and other types.
- *Additional Classes:* As we continue to increase our experience in the SR process, we will be able to identify new classes (e.g., tips on data extraction, risk of bias assessment, etc.) to offer, and instructors to meet evolving customer needs and to expand our own knowledge and expertise.
- *Expanding Librarians’ Role:* Beyond performing the database search strategies, the SR services includes assisting with question formulation, protocol development and writing, data extraction, and including recommendations of critical appraisal tools. Our customers appear to need additional support for data extraction and conducting risk of bias, and may be future areas to develop our skills and knowledge to better support our customers.
- *SR Authorship:* Due to increased engagement in the process, SR Librarians have increased as a co-authors to protocols and manuscripts. We need to be sure to request this at the beginning if it appears our role will be significant and ensure that we are reviewing the final manuscript to ensure our work is accurately represented and stated in the methods and results.
- *Covidence Support:* The initial Covidence request allows the SR librarians an opportunity to engage with NIH researchers who are in the early stages of planning their reviews and maintain our involvement in the reviews process by assisting and instructing on using Covidence as teams work to complete a review.
- *SR Support Materials:* SR librarians developed and improved additional support materials to continuously improve the service including a customer checklist, internal consultation forms, standardized documentation templates for results, and protocol templates.
- *Mentorship:* Providing continuous support to SR members, especially more novice librarians, is critical to help promote and learn best practices and shared expertise and experience enhances a deeper understanding of the SR process. We will also investigate how to best incorporate peer review of our search strategies into our team and workflows to ensure we are all constantly learning and ensuring our work is of the highest standard.

## Conclusion

Systematic reviews as well as other types of reviews have increased exponentially in the scientific literature, and it is important for the librarian's role to expand beyond the literature searches (Healy, Regan, and Deberg 2020; McKeown and Ross-White 2019; Roth 2018). The NIH Library attempted to meet this need over the years through various iterations of a service. Once our SR model and service were officially launched, we have seen customer interest expand, number of requests increase, our knowledge, skills, and expertise grow, and our focus evolve with the changing landscape of reviews and customer needs. One of the lessons learned by the NIH Library's SR team is that although formal SR training is important, librarians need mentoring support when putting class lessons into practice. We do this through a mentoring group that meets virtually on a regular basis, to ask questions and share resources. Most importantly we share our experiences which allows for the critical opportunity to learn from each other's expertise and knowledge. Additionally, supporting and encouraging mentorship and improving librarians' skills in conducting the entire SR from start to finish yields a much deeper engagement, that oftentimes leads to authorship opportunities. The NIH Library's systematic review model provides an example of how to design an SR service that meets the current demand of researchers by providing support from the novice to expert level, as well as committed to adapting in response to changing customer needs.

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