University of Southern California Norris Medical Library

Abstract

University of Southern California's (USC's) Norris Medical Library is seeking IMLS support under the Community Anchors category for a Sparks project to develop, present, and evaluate a 4-day workshop that will train up to 15 Southern California biomedical researchers and clinicians to conduct thorough and efficient systematic reviews in order to improve patient health outcomes. After testing the workshop curriculum and evaluating the learning outcomes for our initial group of 15 participants, we will refine the curriculum for our workshop and finalize plans for a regional Western U.S. or national systematic review retreat that will share library-based expertise in systematic review with biomedical researchers and clinicians on a larger scale. Our project team includes Co-PIs Robert Johnson and Lynn Kysh, Clinical and Research Librarians at USC Norris Medical Library; Dr. Victoria Cortessis, Associate Professor of Clinical Preventative Medice at Keck School of Medicine or USC; Rikke Ogawa, Team Leader for Research, Instruction, and Collection Services at UCLA's Louise M. Darling Biomedical Library; and Melissa Rethlefsen, Deputy Director of the Spencer S. Eccles Health Sciences Library at the University of Utah. We respectfully request $21,640 in support.

Problem Addressed: Properly conducted systematic reviews play an important part in clinical decision making. A large volume of scientific literature produced is being called systematic review, yet much of this literature does not resemble any of the existing standards. Librarians with their knowledge of systematic review methodology and expertise in seeking and retrieving medical literature are well positioned to partner with research communities in order to create rigorous and clinically useful systematic reviews.

Plan: We will conduct a 4-day interactive workshop for biomedical researchers to teach the methodology of conducting systematic reviews. Day 1 – Systematic Review Overview & Protocol Development; Day 2 – Research Question & Search Strategy; Day 3 – Managing Citations & Screening Independently; Day 4 – Data & Meta-Analysis. After initial input from participants and instructors, we will survey participants at 3-, 6-, and 9-month intervals for input on the workshop's deliverables and to address knowledge gaps. We will continue literature surveillance for 2 years to monitor attendees' publications. As the 15 participants publish systematic reviews, our team will assess the clinical questions, methodologies, and search strategies and compare them with best practices. Our initial and ongoing evaluation activities will inform a) revised workshop curricula and b) plans for a larger-scale, regional or national systematic review workshop. Beginning in July, the project team will begin developing a revised curriculum and a plan for expanding the workshop. We will share our results through publications, presentations, and other avenues—engaging, for example, members of the Medical Library Association and Association of American Medical Colleges

Impact: The immediate impact will be on attendees and their teams who will receive training and building blocks for their systematic reviews. The librarian community will benefit from the information disseminated by the project team. Finally, clinicians and their patients will ultimately be beneficiaries of more conscientiously created scientific literature.

University of Southern California Norris Medical Library

Narrative

1. Statement of National Need

Systematic reviews yield high-quality evidence that counters the recent, exponential growth of medical literature, minimizes bias, supports evidence-based practice, and impacts patient outcomes.[1-3] Systematic reviews change clinical behavior by summarizing the glut of available evidence into clearly defined statements of fact. Rather than relying solely on expert opinions, systematic reviews rely on a replicable process that gathers, appraises, and analyzes as much information as possible. The strengths of systematic reviews lie in their non-biased protocols and their thorough, exhaustive literature searches. Although standards have been established by the Cochrane Collaboration, Institutes of Medicine, PRISMA, and the Joanna Briggs Institute, the methodology continues to be misunderstood. The push toward evidence-based practice in educational, clinical, and regulatory environments has invited a rush to create systematic reviews with little regard to quality.[4] This flawed information makes its way from biomedical researchers under pressure to produce to academic journals publishing systematic reviews of dubious quality to clinicians, whose patient care decisions are informed by results from systematic reviews.

These stressors mean the strengths making systematic reviews valuable to clinicians and their patients are being lost. Librarians are uniquely situated to provide authoritative instruction in systematic review methodology due to their positions in academic communities, expertise in database searching, and commitment to the accurate dissemination of information.

Current research has established that properly conducted systematic reviews can direct medical care and thereby positively impact health outcomes.[1] Recent literature indicates systematic reviews including librarians as co-authors "are correlated with significantly higher quality reported search strategies."[5,6] Recent evidence also describes systematic reviews with unsound methodologies that fail to provide a complete synthesis of literature as poor, inefficient uses of research resources.[3] Current evidence points toward a clear need for librarians to train researchers in the intricacies of how to conduct appropriate and effective searches.[4,5,7]

We are seeking IMLS support for a Sparks project under the Community Anchors category. Our pilot workshop, evaluation activities, and planning efforts to develop a regional or national systematic review workshop will build a core community of biomedical researchers, clinicians, and librarians to assist and advise others on proper methodologies. Our project supports two of three IMLS agency-level goals: “IMLS places the learner at the center and supports engaging experiences in libraries and museums that prepare people to be full participants in their local communities and our global society” and “IMLS promotes museums and libraries as strong community anchors that enhance civic engagement, cultural opportunities, and economic vitality.” As we expand the systematic review workshop to reach more researchers and clinicians in future phases of our project—and other libraries replicate or adapt our workshop curricula—we will positively impact patient health outcomes across the United States while helping U.S. libraries and librarians share expertise that can make substantial contributions to the health and wellbeing of their local communities.

2. Project Design

The goals of the retreat will be to instruct researchers on established methodologies that ensure the transparency, replicability, and minimization of bias in systematic reviews thereby transforming individuals’ current research practices. The outcomes will be published systematic reviews in the peer-reviewed medical literature and the application of their findings in the clinical setting. The development of the retreat is working

under the assumption that dedicated time to learning systematic review methodology through hands-on activities prior to starting a planned systematic review project will result in improved systematic reviews and ultimately patient outcomes. The fundamental risk of the retreat is that participants will not apply lessons learned to their systematic review projects. We intend to account for this risk by facilitating hands-on activities based on participants' individual research questions for their, providing take home materials (both in print and electronic formats), and follow up with participants over nine months to inquire about their progress and address questions or concerns they may have.

One-shot workshops have successfully garnered interest among researchers at conferences and on-campus educational sessions conducted by our team of medical librarians, but have fallen short in providing hands-on learning opportunities and transforming researchers' behavior with tangible takeaways (see supporting documents 1 and 2 for examples of a conference workshop and attendee evaluations). In order to practice core principles of andragogy of providing learners' with experiences and allowing them to make mistakes rather than simply memorize facts[8] we propose a four-day long retreat. Each day will be dedicated to a step in systematic review methodology: Day 1 – Systematic Review Overview & Protocol Development; Day 2 – Research Question & Search Strategy; Day 3 – Managing Citations & Screening Independently; Day 4 – Data & Meta-Analysis (see table below). Activities will emphasize researchers' participation through reflection exercise, think-pair-shares, and dedicated time to apply learned methods to their research project. For example, after learning what components need to be included in the research protocol retreat participants will then be given time to create a research protocol. Handouts will summarize learning objectives from lectures as well as provide templates for the completion of activities that can be used inside the retreat and in real-life practice. The last hour of the retreat will be dedicated to participant evaluations, feedback, and outlining the next steps that research teams will need to complete in order to successfully publish a high quality systematic review.

Time	Item	Activities	Instructors
Day 1 Systematic Review Overview & Protocol Development 8am-4pm	What is a systematic review? How does it fit into Evidence-Based Practice? Systematic Review as a research methodology Formulating a research question (PICO) Elements of a systematic review research protocol Structured time to work on protocol PubMed/Medline Overview Searching systematically (accuracy vs. comprehensiveness)	Lecture Reflection/Debriefing Think-Pair-Share Handouts Group work Instructor feedback Homework: draft PubMed search strategy	Johnson Kysh Ogawa Rethlefsen

Time	Item	Activities	Instructors
Day 2 Searching 8am-4pm	Protocol feedback from instructors PubMed search peer-review How to document search strategy Overview of other relevant databases Searching for grey literature	Lecture Reflection/Debriefing Think-Pair-Share Handouts Group work Instructor feedback Homework: translate PubMed search strategy to one other database	Johnson Kysh Ogawa Rethlefsen
Day 3 Abstract Screening 8am-4pm	EndNote Software instruction Covidence instruction Export citations from PubMed search strategy into EndNote and then into Covidence	Lecture Reflection/Debriefing Think-Pair-Share Handouts Group work Instructor feedback Homework: sort through first 100 citations	Johnson Kysh Ogawa Rethlefsen
Day 4 Appraisal & Meta-Analysis 8am-3pm Reflection & Evaluation 3pm-4pm	Full text appraisal with Covidence Simple Analysis (Excel) Analytic models & Interpretation of Summary Estimates (SAS & Stata) Assessment of Publication Bias Identifying Heterogeneity Course feedback & Identifying Next Steps	Lecture Practice with example data Handouts Group work Instructor feedback	Cortessis Johnson Kysh Ogawa Rethlefsen

We will survey participants at 3-, 6-, and 9-month intervals for input on the workshop's deliverables and to address knowledge gaps. We will continue literature surveillance for 2 years to monitor attendees' publications. As participants publish systematic reviews, our team will assess the clinical questions, methodologies, and search strategies and compare them with established best practices. The majority of the retreat will be planned, implemented, and managed by our project team: Robert Johnson and Lynn Kysh from USC, Rikke Ogawa from the University of California at Los Angeles (UCLA), and Melissa Rethlefsen from University of Utah (Utah). The exception to this is the retreat content dedicated to the meta-analysis which will be planned, implemented, and managed by Dr. Victoria Cortessis from USC. We consider Dr. Cortessis' participation in our retreat a significant strength not only with her subject expertise, but also in her input and

buy-in as a teaching professional outside of medical librarianship. See supporting document 3 for the team's letters of support and commitment.

The audience for this proposed retreat will be biomedical researchers. We intend to recruit in Southern California as well as at the following regional and national conferences: Western Group on Educational Affairs of the Association of American Medical Colleges (AAMC) and the Pediatric Academic Society (PAS). We hope to include new faculty, junior faculty, post-docs, and other researchers who typically receive less funding, support, and resources than tenured faculty. Our retreat will be designed for participants to provide input through on-site debriefing activities and follow up evaluations. We hope in the future to expand the retreat to researchers outside of medicine that also conduct systematic reviews such as social work and education. We intend to share data from this feedback at regional and national conferences including those hosted by the AAMC and the Medical Library Association. We will also seek out publication opportunities in peer-reviewed medical library or medical education journals. We also intend to use this evaluation data to assess our curriculum and make adjustments for improvement. The goal would be following our funding period to continue to host the retreat through a combination of funding through our separate university affiliations and charging researchers attendance fees. We believe that the likelihood of our success to convince our university stakeholders and future participants to fund this retreat will be significantly strengthened through the dissemination of our evaluation data.

In order to be successful in carrying out our pilot systematic review retreat for researchers we will require financial support to cover the costs of travel for instructors, on-site logistical needs of researchers (meals, parking, etc.) and software that we will be using during instruction. We will also require multiple instructors to bring their unique skills, expertise, and teaching styles in order to create a dynamic, engaging, and comprehensive systematic review methodology curriculum.

We respectfully request $21,640 in IMLS funds to support a 12-month project: $2,902 in salaries (Johnson 2%; Kysh 2%); $963 in benefits (33.2% federal benefits rate); $1,500 compensation for a biostatistician instructor; $9,350 materials and supplies for the workshop (15 copies of EndNote citation management software for participants @$250/ea.; 15 copies of Covidence systematic review software @$240/ea.; meals during workshop sessions, $1,500; $500 for thumb drives, folders, and miscellaneous supplies); $2,460 in travel costs ($1,500 for travel to workshop by instructors based outside Southern California; $960 in parking expenses for 15 participants); and $4,465 in indirect costs at USC's federally negotiated indirect cost rate of 26% for off-campus instruction activities (Dept. Health and Human Services, July 21, 2016).

3. National Impact

Currently, other workshops train librarians to conduct systematic reviews as part of a team, but none offer training to biomedical researchers, and none are offered in the western U.S. One member of our team has attended a librarian-centered systematic review workshop, and our group has integrated some of that workshop's training into the West Coast Systematic Review Retreat for Researchers. However, our workshop differs in several key ways. First, the intended audience is not librarians, but researchers. Second, this workshop includes aspects of the full range of systematic review procedures (including appraisal and meta-analysis provided by a biostatistician and clinician) rather than focusing solely on protocol development and literature searching. Third, attendee activities and output apply to each researcher's specific project and therefore directly facilitate systematic review production. The cumulative result is a strong foundation for researchers to take home and build on, improving the likelihood that they not only complete their projects, but also complete them with appropriate methodological rigor. Attendance will also increase the likelihood of

those researchers contacting their institutional librarians and involving them in future projects. Our workshop will therefore fill important gaps by providing direct training in systematic reviews for biomedical researchers and clinicians in the West and build a community of interest that includes both librarians and researchers emphasizing principles described in the Cochrane Handbook; asking answerable questions, developing and adhering to a protocol, conducting appropriate literature searches, appraising data, and assembling a team that includes librarians.

To assess the impact of our pilot project and the value of our workshops, we will collect data from instructors and attendees during the retreat in keeping with IMLS guidelines for performance measures for projects that advance the IMLS Agency-level goal for Community: "Strengthen museums and libraries as essential partners in addressing the needs of their communities." Data will include instructor responses regarding the impact of the pilot program on their organizations' ability to provide systematic review services, engage their communities, develop and maintain ongoing relationships with biomedical researchers, and share knowledge and resources as active problem solving contributors. Attendees will be asked their opinions about the programs, services, or resources provided in a library context, and their opinions regarding libraries as active contributors or problem solvers through the pilot program. We will tabulate the total number of responses, non-responses, and responses per answer option and provide them with our final project report. In addition to this on-site data collection, we will survey participants at 3-, 6-, and 9-month intervals for input on the workshop's deliverables and to address knowledge gaps. We will continue literature surveillance for 2 years to monitor attendees' publications. All of these measures will help us evaluate the impact of our proposed project, measure its effects on our attendees, and plan our next steps.

Current literature projects that systematic review will continue evolving rapidly into a more diverse and complex practice, requiring even more dedication to transparency and diligent documentation.[7] Both formal training in systematic review methodology (protocols, grey literature searching, etc.) and librarian involvement in systematic review searches are strongly associated with the use of recommended search methods and improved quality in reviews.[6] This workshop will provide these interventions to spur more methodologically sound systematic reviews and, in turn, improve clinicians' bedside decisions. We will share our results through publications, presentations, and other avenues—engaging, for example, members of the Medical Library Association and Association of American Medical Colleges. When disseminating what our team learns through this process, we hope to become a model for other regions desiring to partner with local researchers and encourage rigorous systematic reviews.

References

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Schedule of Completion

Activity	April 2017	May 2017	June 2017	July 2017	Aug 2017	Sept 2017	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	April 2018
Reserve meeting spaces @ UCLA													
Plan curriculum													
Plan evaluation													
Publicize retreat													
Open registration for retreat													
Walkthrough meeting spaces @ UCLA													
Purchase airfare & accommodations													
Hold retreat													
Follow up surveys & interviews													
Participant Publication Monitoring													Until 10/19
Submit abstracts to meetings													
Apply evaluation data to curriculum development													
Begin drafting manuscript for publication													

DIGITAL PRODUCT FORM

Introduction
The Institute of Museum and Library Services (IMLS) is committed to expanding public access to federally funded digital products (i.e., digital content, resources, assets, software, and datasets). The products you create with IMLS funding require careful stewardship to protect and enhance their value, and they should be freely and readily available for use and re-use by libraries, archives, museums, and the public. However, applying these principles to the development and management of digital products can be challenging. Because technology is dynamic and because we do not want to inhibit innovation, we do not want to prescribe set standards and practices that could become quickly outdated. Instead, we ask that you answer questions that address specific aspects of creating and managing digital products. Like all components of your IMLS application, your answers will be used by IMLS staff and by expert peer reviewers to evaluate your application, and they will be important in determining whether your project will be funded.

Instructions
You must provide answers to the questions in Part I. In addition, you must also complete at least one of the subsequent sections. If you intend to create or collect digital content, resources, or assets, complete Part II. If you intend to develop software, complete Part III. If you intend to create a dataset, complete Part IV.

PART I: Intellectual Property Rights and Permissions

A.1 What will be the intellectual property status of the digital products (content, resources, assets, software, or datasets) you intend to create? Who will hold the copyright(s)? How will you explain property rights and permissions to potential users (for example, by assigning a non-restrictive license such as BSD, GNU, MIT, or Creative Commons to the product)? Explain and justify your licensing selections.

Not applicable.

A.2 What ownership rights will your organization assert over the new digital products and what conditions will you impose on access and use? Explain and justify any terms of access and conditions of use and detail how you will notify potential users about relevant terms or conditions.

Not applicable.

A.3 If you will create any products that may involve privacy concerns, require obtaining permissions or rights, or raise any cultural sensitivities, describe the issues and how you plan to address them.

Not applicable.

Part II: Projects Creating or Collecting Digital Content, Resources, or Assets

A. Creating or Collecting New Digital Content, Resources, or Assets

A.1 Describe the digital content, resources, or assets you will create or collect, the quantities of each type, and format you will use.

Not applicable.

A.2 List the equipment, software, and supplies that you will use to create the content, resources, or assets, or the name of the service provider that will perform the work.

Not applicable.

A.3 List all the digital file formats (e.g., XML, TIFF, MPEG) you plan to use, along with the relevant information about the appropriate quality standards (e.g., resolution, sampling rate, or pixel dimensions).

Not applicable.

B. Workflow and Asset Maintenance/Preservation

B.1 Describe your quality control plan (i.e., how you will monitor and evaluate your workflow and products).

Not applicable.

B.2 Describe your plan for preserving and maintaining digital assets during and after the award period of performance. Your plan may address storage systems, shared repositories, technical documentation, migration planning, and commitment of organizational funding for these purposes. Please note: You may charge the federal award before closeout for the costs of publication or sharing of research results if the costs are not incurred during the period of performance of the federal award (see 2 C.F.R. § 200.461).

Not applicable.

C. Metadata

C.1 Describe how you will produce any and all technical, descriptive, administrative, or preservation metadata. Specify which standards you will use for the metadata structure (e.g., MARC, Dublin Core, Encoded Archival Description, PBCore, PREMIS) and metadata content (e.g., thesauri).

Not applicable.

C.2 Explain your strategy for preserving and maintaining metadata created or collected during and after the award period of performance.

Not applicable.

C.3 Explain what metadata sharing and/or other strategies you will use to facilitate widespread discovery and use of the digital content, resources, or assets created during your project (e.g., an API [Application Programming Interface], contributions to a digital platform, or other ways you might enable batch queries and retrieval of metadata).

Not applicable.

D. Access and Use

D.1 Describe how you will make the digital content, resources, or assets available to the public. Include details such as the delivery strategy (e.g., openly available online, available to specified audiences) and underlying hardware/software platforms and infrastructure (e.g., specific digital repository software or leased services, accessibility via standard web browsers, requirements for special software tools in order to use the content).

Not applicable.

D.2 Provide the name(s) and URL(s) (Uniform Resource Locator) for any examples of previous digital content, resources, or assets your organization has created.

Not applicable.

Part III. Projects Developing Software

A. General Information

A.1 Describe the software you intend to create, including a summary of the major functions it will perform and the intended primary audience(s) it will serve.

Not applicable.

A.2 List other existing software that wholly or partially performs the same functions, and explain how the software you intend to create is different, and justify why those differences are significant and necessary.

Not applicable.

B. Technical Information

B.1 List the programming languages, platforms, software, or other applications you will use to create your software and explain why you chose them.

Not applicable.

B.2 Describe how the software you intend to create will extend or interoperate with relevant existing software.

Not applicable.

B.3 Describe any underlying additional software or system dependencies necessary to run the software you intend to create.

Not applicable.

B.4 Describe the processes you will use for development, documentation, and for maintaining and updating documentation for users of the software.

Not applicable.

B.5 Provide the name(s) and URL(s) for examples of any previous software your organization has created.

Not applicable.

C. Access and Use

C.1 We expect applicants seeking federal funds for software to develop and release these products under open-source licenses to maximize access and promote reuse. What ownership rights will your organization assert over the software you intend to create, and what conditions will you impose on its access and use? Identify and explain the license under which you will release source code for the software you develop (e.g., BSD, GNU, or MIT software licenses). Explain and justify any prohibitive terms or conditions of use or access and detail how you will notify potential users about relevant terms and conditions.

Not applicable.

C.2 Describe how you will make the software and source code available to the public and/or its intended users.

Not applicable.

C.3 Identify where you will deposit the source code for the software you intend to develop:

Name of publicly accessible source code repository: Not applicable.

URL:

Part IV: Projects Creating Datasets

A.1 Identify the type of data you plan to collect or generate, and the purpose or intended use to which you expect it to be put. Describe the method(s) you will use and the approximate dates or intervals at which you will collect or generate it.

Not applicable.

A.2 Does the proposed data collection or research activity require approval by any internal review panel or institutional review board (IRB)? If so, has the proposed research activity been approved? If not, what is your plan for securing approval?

Not applicable.

A.3 Will you collect any personally identifiable information (PII), confidential information (e.g., trade secrets), or proprietary information? If so, detail the specific steps you will take to protect such information while you prepare the data files for public release (e.g., data anonymization, data suppression PII, or synthetic data).

Not applicable.

A.4 If you will collect additional documentation, such as consent agreements, along with the data, describe plans for preserving the documentation and ensuring that its relationship to the collected data is maintained.

Not applicable.

A.5 What methods will you use to collect or generate the data? Provide details about any technical requirements or dependencies that would be necessary for understanding, retrieving, displaying, or processing the dataset(s).

Not applicable.

A.6 What documentation (e.g., data documentation, codebooks) will you capture or create along with the dataset(s)? Where will the documentation be stored and in what format(s)? How will you permanently associate and manage the documentation with the dataset(s) it describes?

Not applicable.

A.7 What is your plan for archiving, managing, and disseminating data after the completion of the award-funded project?

Not applicable.

A.8 Identify where you will deposit the dataset(s):

Not applicable.

A.9 When and how frequently will you review this data management plan? How will the implementation be monitored?

Not applicable.