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Introducing the *Journal of the Medical Library Association's* manuscript resubmission deadlines: creating accountability structures for our authors

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The *Journal of the Medical Library Association (JMLA)* has made the decision to change our "revise-at-will" policy to instead adopt firmer deadlines for manuscript resubmissions. Beginning with this issue, manuscripts returned to authors with a "revise and resubmit" decision must be resubmitted within two months of the editorial decision. Likewise, manuscripts returned to authors with a "revisions required" decision must be resubmitted within one month of the editorial decision. This editorial discusses *JMLA's* experience using a "revise-at-will" policy and outlines some anticipated benefits of the new resubmission deadlines.

One of the most frequent questions we receive from prospective *Journal of the Medical Library Association (JMLA)* authors is "how long will it take my manuscript to be published?" While we can provide rough estimates, our usual response is the deeply unsatisfying "it depends."

Wendi Kaspar's 2016 editorial in *College & Research Libraries* presents a detailed account of the stages of each stage of manuscript review and preparation that is broadly representative of *JMLA's* workflows [1]. While Kaspar provides average estimated days for each stage of the workflow that are roughly similar to *JMLA's*, these approximations offered do not adequately convey the sizable standard deviations within these means. In our experience with manuscripts at *JMLA*, the time elapsed from submission to publication can vary from "several weeks" to "multiple years." In other words, our time-to-publication data are not normalized, so reporting an average will not be a helpful guide for what prospective authors can expect.

As with other journals, the causes of delays in manuscript publication timelines at *JMLA* are multifactorial, unpredictable, and can occur at any stage of the manuscript lifecycle. *JMLA* has not been immune from the structural challenges in identifying peer reviewers that has been discussed at length by others within scholarly publishing [2-4]. Timing can be capricious too—a manuscript that is deemed ready for publication may be accepted right before or right after a full issue is sent to production, which results in a manuscript heading to production within a couple of months of acceptance or being delayed for another three months. Nor are we, the editorial team, blameless. As an MLA membership-supported, diamond open access journal, *JMLA's* editorial team is entirely volunteer. Many times, other professional

or personal demands on the editors' time pull our attention elsewhere, delaying manuscripts at different stages throughout the process that otherwise might move forward more quickly.

However, in our experience, one of the most influential variables in time-to-publish can be the authors. *JMLA* has operated under a "revise-at-will" workflow, where authors are given as much time as they would like to submit a revised manuscript at each stage of publication. How authors respond to this autonomy differs considerably, with some authors revising manuscripts within a couple of business days, while others never submit a revised manuscript at all.

The editorial team at *JMLA* has made the decision to change our "revise-at-will" policy in favor of firmer deadlines. Beginning with this issue, manuscripts returned to authors with a "revise and resubmit" decision must submit their revised submission within two months of the editorial decision. Likewise, manuscripts returned to authors with a "revisions required" decision must be resubmitted within one month of the editorial decision. Mutually agreeable accommodations to reasonably extend these deadlines on a case-by-case basis can be done if the author(s) and editor(s) are engaged in communication throughout the process.

We did not institute this policy change lightly. We recognize that the majority of *JMLA's* core audience of authors and readers are information science practitioners, for whom publishing is not a primary responsibility of their position [5]. We also understand the longstanding, structural barriers that librarians encounter when trying to engage in publishing and scholarship [6,7]. Given our awareness of those barriers, it might seem frustrating to institute a deadline policy that appears to ratchet up the

pressure to publish even more acutely. However, we feel confident this decision will improve the publishing experience for everyone in *JMLA's* community of editors, reviewers, and authors and give better predictability to the time-to-publication question that is often asked.

These new deadlines will prevent the significant disruptions the “revise-at-will” policy creates in *JMLA's* production process. A more predictable timeline will allow our entirely volunteer editorial team to better schedule time to handle the manuscripts. Currently, we struggle to balance our work at *JMLA* against our other responsibilities because we cannot know with any confidence when (if ever) manuscripts will be returned and need our attention. With clearer deadlines, the editorial team will also be able to create *JMLA* issues that are better balanced in terms of extent and topics covered. Our colleagues within the MLA staff who serve as our copy and production editors will also be able to plan their workflows, avoiding the intensive crunch periods they currently experience at publication time.

Removing these lengthy delays will also create more reasonable expectations of our peer reviewers, whose uncompensated contributions to the journal are essential to its continued success [8]. Under our current “revise-at-will” model, we often must ask reviewers to take a second look at a “revise and resubmit” manuscript they last read more than six months ago. When dealing with such significant lag times between original submission and resubmission, it is unreasonable to expect reviewers to recall even the broad points of the manuscript, much less the specific and enumerated comments they shared with the authors originally. A shorter two-month timeline will enable our reviewers to provide more thoughtful commentary to authors who decide to undertake a full revision of their original submission.

Finally, while the latitude afforded by the “revise-at-will” policy appeared more accommodating for our authors, we suspect this policy was not in our authors’ best interests. Research on academic writing suggests that creating structures and accountability (e.g., writing schedules, writing accountability groups, and externally set deadlines) can help writers overcome procrastination and enhance their productivity [9–11].

We anticipate this additional structure and guidance will help more prospective authors achieve their goal of seeing their work published in our journal while improving our ability to estimate timelines and keep production on schedule. As with our recently introduced policy on the use of generative AI [12], this policy will evolve according to the needs of our community.

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Thank you to the *Journal of the Medical Library Association* reviewers in 2023

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We sincerely thank the peer reviewers in 2023 who helped evaluate and improve the quality of work published in the *Journal of the Medical Library Association (JMLA)*.

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Health sciences faculty publication patterns and related information-seeking behavior

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Objectives: This study aims to explore how health science faculty publication patterns at a large public research university have changed over time and examine how productivity relates to their information-seeking behavior and perception of the academic library.

Methods: Two datasets were utilized: one consisted of publication records of health sciences faculty spanning a 15-year period, while the other was from a faculty survey exploring faculty's perception of and satisfaction with library resources and services related to their research.

Results: Health sciences faculty publication patterns have changed over time, characterized by greater productivity, collaboration, and use of literature in their publications. Faculty's literature use correlates with productivity, as evidenced by both datasets. The survey revealed that faculty with more publications tend to rely more on online journals and Interlibrary Loan (ILL). Similarly, the publication data indicated that less productive faculty tended to use fewer references in their publications.

Discussion: The publication data and survey results offer valuable insights into the health sciences faculty's information-seeking behavior and productivity. Online access to information has been effective in facilitating use of information, as indicated by the greater incorporation of references in publications.

Conclusion: The study highlights the changing publication patterns and productivity of health sciences faculty, as well as the role academic libraries play in supporting their research and publishing activities. Although multiple variables influence faculty access to and use of information, faculty attitudes towards the library and use of the library are related to faculty research and productivity.

Keywords: Faculty; Research Practices; Academic Libraries; Faculty publications

INTRODUCTION

The academic health sciences library and the information-seeking behaviors of its users have changed significantly as new online resources and formats have become available. Over two decades of research has shown how online resource usage has overtaken print resources in use and preference [1-4]. Many researchers have also shifted from using Abstracting and Indexing (A&I) databases such as MEDLINE as the main resource for locating literature toward using Google and Google Scholar, at least as the initial starting point [5-8]. Health Sciences faculty have reported how the growth of online information has changed how they searched for and accessed articles, allowing them to expand interests, read more peripheral articles, read articles more in-depth, read a greater number of articles, expand the disciplinary range of journals used, and improve their ability to stay current [7].

The impact of online information is evident within citation patterns in the published literature. During the transition period from print to online journals, references from journal articles that were only available in print had dropped in certain disciplines (nursing and dentistry), while the use of journal articles available in an online format increased [9]. A 2008 study also observed that as more journals and databases became available online, the number of references included in journal articles written by medical college faculty also increased [10]. While online journals and databases are now ubiquitous, health sciences faculty continue to rely on library resources for student lecture preparation and conducting research and highly valued online journals, databases, electronic books, inter-library loan and library personnel in support of their research [11]. Studies have also demonstrated a relationship between the reading of scholarly articles and faculty engagement in research and productivity [2]. While previous studies demonstrate faculty's reliance on academic libraries and how their use of library shaped on

their research productivity, it becomes imperative to take investigations a step further and explore if the perceived value and use of library resources and/or the use of scholarly articles in publications correlates with faculty productivity.

This paper reports on the findings of a survey distributed to health sciences faculty to determine how their use of and perceptions of academic library resources and services relates to their research. In addition, using health sciences faculty journal article publication data, it also explores how publication patterns have changed over time and the relationship between health sciences faculty productivity and their use of literature in journal articles.

METHODS

Data from two different data collection projects are presented in this paper. This includes a retrospective collection of publication data from journal articles authored by UIC health sciences faculty over a 15-year period and the results of survey of health science faculty use and perceptions of the University Library's services and resources.

Research Setting

The University of Illinois Chicago is a large urban Research 1 university with one multidisciplinary library and one health sciences library found on its Chicago campus. Regional health sciences campuses are in Peoria and Rockford, and each include a UIC health sciences library providing access to the same online resources and services. Applied Health Sciences, Dentistry, Medicine, Nursing, Pharmacy, and Public Health are among the health sciences disciplines. While the University also considers Social Work a health sciences college, because this college is serviced by the multidisciplinary library, it was not included in this study.

The UIC library (all libraries) had approximately 15,948 active print collections in 1995. In 1998, the library subscribed to 15 online biomedical journals; by 2000, the library subscribed to more than 3,000 online journals. By 2008, the library had 25,000 online journals and by 2019, there were 28,000 online journals available through the University Library, increasing the availability of journal literature through the library's subscriptions. Database availability increased over time including free search tools (PubMed, Google Scholar), as did open access journals over time. The library had a subscription to Web of Science and Ovid MEDLINE prior to 2000, and in 2004, also added Scopus. While these variables are not controlled for in this study, their availability likely influenced faculty behavior.

DATA COLLECTION

Publication Data

To explore how publication patterns of faculty have changed over time and to explore the relationship between literature use and productivity, searches were conducted in 2020 in Scopus to capture bibliographic records for each faculty publication published between 2005 and 2019, including the number of references used in each publication. Each research team member was provided with a list of UIC faculty members who had been at UIC for at least 5 years, assigned to them for data collection. The team member utilized the "authors" search option in Scopus and typed in the faculty member's last name and initial name to retrieve the publication data from Scopus. Publication data was limited to the document type "article", which filtered out non-journal publications (books and book chapters) and other publication types such as review articles, conference papers, letters, and editorials. The team member exported the list of publications including the citation information (authors, title, journal name, volume, issue, pages, DOI) and "funding details" into a spreadsheet after selecting all publications that met the requirements for the author). The team member then clicked on each article to find out how many references each publication's author(s) had used. More details about the data collection can be found in an Association of Research Libraries report summarizing the findings [12].

In addition to downloading the bibliographic records of each faculty members publications, the following information was captured: literature use (measured by number of references in the publications), grant funding (measured by whether the article was funded), and co-authorship size (measured by number of co-authors). A separate document summarized per faculty member, faculty productivity (measured by number of publications per faculty member), the average number of references included in each publication, and the average number co-authors. This document also included faculty demographics (e.g., status, college, and years at the institution), which were obtained from UIC's Office of Institutional Research (OIR).

Survey Data

The University Library distributed a faculty survey in Spring 2022 using Qualtrics. There were 12 questions in the faculty survey, both open-ended and multiple choice. The survey focused on the use and importance of library resources and services as they relate to faculty teaching and research. The OIR was contacted to obtain UIC faculty demographic information and email addresses. In addition, faculty publication data (the number of articles, conference proceedings, books, and book chapters published in the last five years) for each faculty member was obtained from the University's faculty research

management system. Participant demographic and publication data was uploaded into a panel in Qualtrics prior to survey distribution. Following UIC's Institutional Review Board (IRB) approval, the survey was sent to around 4,500 university faculty and postdoctoral employees at UIC between February 21 and March 25, 2022. As faculty respondents completed the survey, their de-identified demographic and publication data were added to their anonymous survey responses. More information on the development of the survey and a copy of the survey can be found in Scoulas & De Groot (2023) [13].

RESULTS

Publication Patterns

By exploring health sciences faculty that had been at UIC for at least 15 years, we were able to observe the publication patterns of the same faculty over a 15-year period. We calculated the average publications per faculty, the average number of references used in publications, and the average number of co-authors included in publications in 5-year intervals over a 15-year period by college.

In general, the number of publications per author, the number of references per publication and the number of co-authors per publication increased over time (Table 1). The perceptible exceptions to this general trend included the number of references decreasing in publications in nursing from 2010/2014 to 2015/2019 and a decrease in publications for pharmacy faculty, also from 2010/2014 to 2015/2019. Nursing had the most productive faculty as measured by publication output. Nursing, followed by pharmacy, used the most references in their publications. Medicine on average had the most co-authors.

The use of references included in the 2010 to 2019 publications was examined in correlation with the productivity of health sciences faculty, measured by the number of publications to explore the relationship between the use of literature and productivity. The results indicate that there were no statistically significant correlations between them ($r [343] = 0.09, p = .11$). Despite this, it is important to know that the ratio of average references used appeared to be less for the least productivity faculty (avg. 37.2 references/ article) compared to the more productivity (avg. 41.7 references/ article).

As the publication patterns reported above were limited to journal publications, the broader spectrum of the publication output types were explored using the faculty publication data obtained from the faculty survey. Like the publication data presented above, the data was limited to tenure system health sciences faculty. While this data

includes a greater number of faculty than the Scopus publication data and the timeline (2017 to 2022) is not an exact match to the data presented in Table 1 (2015 to 2019 data), it provides insight into faculty productivity beyond journal articles. The number of publications (books, book chapters, conference proceedings, and journal articles), was averaged by college. Table 2 shows that overall, faculty from Pharmacy published the most ($M = 40$), followed by those from Applied Health Sciences ($M = 39$), whereas faculty from Dentistry published the least ($M = 19$). Journal articles were the most common publication type for all health sciences colleges with faculty from Pharmacy and Applied Health Sciences publishing the most per faculty member, followed by nursing. Conference Proceedings are a more common publication output for Pharmacy faculty.

Survey Responses

A total of 557 university faculty members out of 4,507 responded to the survey (12.4% response rate). Of those, 267 health science faculty out of 2,689 (9.9%) responded to the survey. Forty percent of health sciences faculty respondents were assistant professors, followed by professors (23.6%), associate professors (21.4%), and instructors and lecturers (15%). More than half of the faculty were from Medicine (54%), followed by Pharmacy (13%), Applied Health Sciences (10.5%), Nursing (9.4%), Public Health (7.1%) and Dentistry (5.6%). On average, health sciences faculty had worked at the institution for about 11 years.

Faculty members rated the importance of seven listed library services and resources on a scale of 1 (not at all) to 9 (extremely), which were then grouped into three categories: 1-3 for not important, 4-6 for somewhat important, and 7-9 for very important (Figure 1). The results indicate that most faculty members rated online journals and databases as the most important resources, followed by interlibrary loan (ILL). When looking at the resources by college level, almost all faculty perceived the journal as very important regardless of the discipline. However, perceptions of faculty members regarding databases and ILL differed slightly by college level. Faculty members from nursing and public health rated databases as the most important, whereas those from medicine rated them as the least important. For ILL, faculty members from applied health sciences perceived it as the most important, while those from medicine rated it as the least important.

Faculty members were asked to rate how often they used seven resources and services provided by the library (Figure 2). The study found that journals and databases were the most frequently used resources, followed by eBooks. Their frequency of use varied by college level, which is consistent with the faculty members' perceptions

Table 1 Publication patterns of tenure system health sciences faculty by college over 15 years.

	2005-2009	2010-2014	2015-2019	Avg all Years
	M (SD)	M(SD)	M(SD)	M
Applied Health Sciences (n=11)				
Publications per Faculty	14.64 (4.91)	18.46 (8.76)	19.73 (11.87)	17.61
References per Publication	39.75 (5.50)	39.56 (5.88)	44.49 (10.93)	41.27
Co-Authors per Publication	4.49 (1.12)	5.49 (1.26)	6.50 (3.61)	5.49
Dentistry (n=15)				
Publications per Faculty	7.87 (6.17)	11.27 (8.34)	10.13 (10.40)	9.76
References per Publication	36.13 (11.19)	37.69 (9.46)	45.13 (11.87)	39.65
Co-Authors per Publication	4.93 (1.39)	6.00 (1.24)	6.63 (2.00)	5.85
Medicine (n=136)				
Publications per Faculty	11.40 (8.33)	12.87 (9.49)	14.70 (14.27)	12.99
References per Publication	35.25 (14.49)	37.73 (14.46)	43.72 (16.96)	38.90
Co-Authors per Publication	7.25 (8.69)	7.32 (3.96)	10.74 (12.88)	8.44
Nursing (n=6)				
Publications per Faculty	9.83 (5.15)	18.17 (8.61)	24.83 (11.96)	17.61
References per Publication	47.07 (8.15)	51.83 (7.71)	47.09 (8.15)	48.66
Co-Authors per Publication	5.25 (1.87)	6.12 (1.52)	6.45 (0.76)	5.94
Pharmacy (n=18)				
Publications per Faculty	14.17 (11.02)	19.33 (12.80)	18.10 (12.64)	17.20
References per Publication	36.55 (7.36)	42.81 (9.17)	47.70 (11.49)	42.35
Co-Authors per Publication	5.54 (1.40)	7.03 (1.99)	18.56 (46.19)	6.75
Public Health (n=24)				
Publications per Faculty	10.42 (7.43)	11.79 (9.09)	13.25 (9.10)	11.81
References per Publication	35.19 (10.74)	37.25 (13.28)	38.05 (10.37)	36.83
Co-Authors per Publication	5.08 (2.04)	5.78 (2.02)	6.05 (2.25)	5.64

Table 2 Average health sciences tenure system faculty publication output type over 5-year period by college (2017 to 2021).

	N	Books	Book Chapter	Conference Proceedings	Journal article	Total all Publication
Applied Health Sciences	42	0.12	1.86	3.88	33.10	38.95
Dentistry	50	0.16	1.34	1.04	16.48	19.02
Medicine	605	0.07	1.78	3.20	19.08	23.53
Nursing	34	0.00	0.68	3.44	25.71	29.82
Pharmacy	46	0.13	1.70	7.26	30.37	39.46
Public Health	48	0.08	0.52	2.71	18.63	21.94

Table 3 Correlations between faculty’s perceptions on the importance of and use of the library resources and services and their level of research productivity.

	Print books	eBooks	Journals	Databases	Special Collections	Inter-library Loan	Librarian Assistance	Literature Search Support
Perception of the importance of the library resources and faculty research productivity								
	(n=193)	(n=202)	(n=211)	(n=209)	(n=187)	(n=203)	(n=197)	(n=204)
Publications (2021)	0.092	0.117	0.091	-0.044	-0.005	0.089	0.025	-0.036
Publications (2017-2021)	0.098	-0.121	0.079	-0.083	-0.061	0.024	-0.015	-0.066
Use of library resources and services and faculty research productivity								
	(n=194)	(n=199)	(n=204)	(n=204)	(n=195)	(n=201)	(n=199)	(n=202)
Publications (2021)	0.026	-0.127	.145*	-0.025	0.010	.149*	0.049	0.057
Publications (2017-2021)	-0.040	-0.139	.141*	-0.056	-0.023	.165*	0.003	0.004

p < .05 level. Research productivity includes books, book chapters, conference proceedings, and journal articles.

Figure 1 Importance of library resources to research by college.

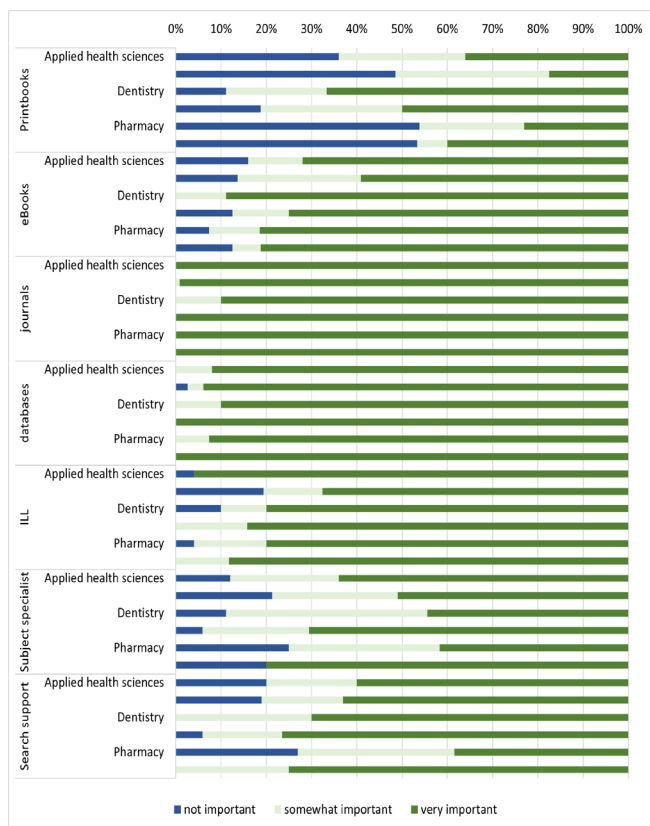
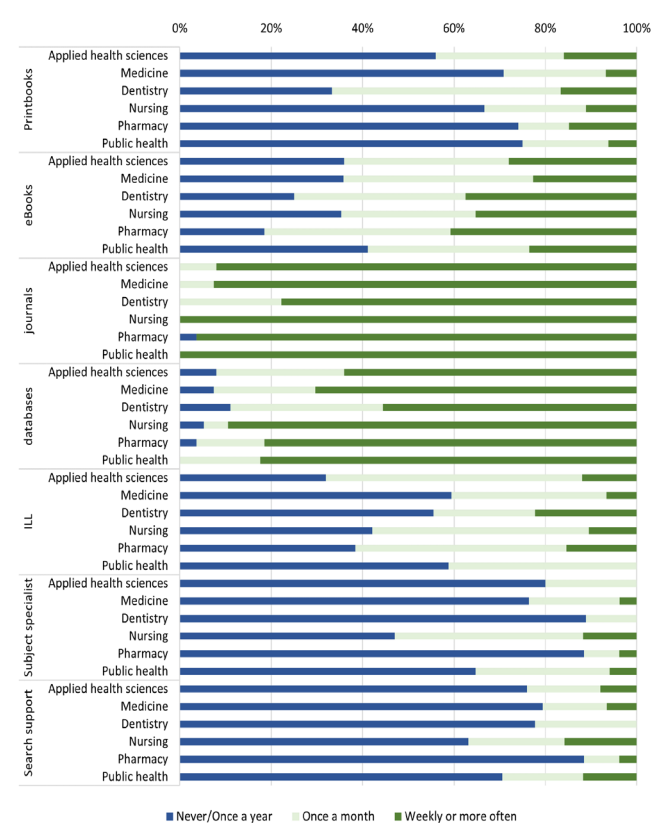


Figure 2 Frequency of library resource use for research purposes by college.



of the importance of those resources. Faculty members from nursing and public health were found to use journals and databases the most frequently, while those from pharmacy used journal the least, and those from dentistry used database the least. For eBooks, faculty from pharmacy used it the most, followed by those from dentistry. For ILL, despite the faculty members' perceptions of its importance, their actual use of this resource differed. Faculty members from applied health science were recorded as the most frequent users (68% for monthly or more), whereas those from medicine were the least frequent users (41% for monthly or more).

Faculty Productivity and Importance and Use of Library Resources and Services

The faculty members were asked to assign a rating, ranging from 1 to 9, to reflect their views on the significance of library resources, with 9 representing an extremely important rating, and 1 indicating a not at all important rating. The study then explored whether there was a relationship between the faculty members' views on the value of library resources for research and their level of research productivity, which was measured by the number of publications (such as journal articles, conference proceedings, books, and book chapters) between 2017 and 2021. The results of the Pearson correlation analysis revealed no significant correlation between the faculty members' perceptions of library resources and their research productivity.

To investigate whether there was a relationship between faculty members' frequency of library resource use and their research productivity, the study conducted a Spearman rank correlation analysis. The research productivity was measured by the number of publications (including books, book chapters, conference proceedings,

and journals) in 2021 and the 5-year period from 2017 to 2021. The findings suggest that certain library resource uses, specifically online journals ($r_s [204] = .145, p < .05$ for 2021 and $r_s [204] = .141, p < .05$ for the 5-year period) and interlibrary loan (ILL) ($r_s [201] = .149, p < .05$ for 2021 and $r_s [201] = .165, p < .05$ for the 5-year period), were correlated with research productivity. This implies that higher usage of online journals and ILL was linked to a greater number of publications in 2021 and during the 5-year period from 2017 to 2021.

DISCUSSION

Health sciences faculty publication patterns have changed over time, marked by an increase in productivity, collaboration, and literature used in publications. Undoubtedly, the increase and availability of online journals, open access journals, and online databases has facilitated the access to and use of online journals, thus increasing the literature used in publications over time.

Other factors not explored in this analysis may also have had an impact. For example, grant funded publications and publications with more co-authors also tend to include more references than non-grant funded publication [12]. Faculty productivity also varies by college, although different levels of productivity were observed between the two datasets exploring productivity. The data set looking at faculty over time (15-year period) would have focused largely on mature researchers whereas the largest faculty group participating in the survey was assistant professors, which may have influenced the productivity observed. However, the broader publication data demonstrated that health sciences faculty also have their scholarship published in conference proceedings, books, and book chapters, although these publication output types are limited and vary by college.

While differences existed in how the health sciences colleges perceived the importance of various library resources, all colleges reported that online journals and databases were very important to their research. They were often used by faculty in most colleges at least monthly. ILL was also considered an important resource by faculty in most colleges, although use of the service varied by college. In general, the importance of library resources was similarly reflected in their use. While faculty in most colleges rated services provided by library professionals (subject specialist and search support) as somewhat or very important, they were general less likely to use these services, suggesting that librarians' expertise is valued, but faculty are generally independent searchers. Faculty may like to know that they can call upon help when needed. Although the scales and some of the resources asked about were different from the current study, Inman et al (2019), also found that faculty considered journals and internet resources as important for conducting research and library databases such as PubMed and interlibrary loan were very important in meeting faculty information needs [11]. In a similar vein, faculty in both studies did not rank books as important as other information resources, although eBooks were rated in both cases as more important than print books. High use of ILL by applied health sciences faculty suggests that the library's journal collection may not be meeting their needs, while faculty in medicine may be finding that most of their needs are met with the library's collection given their low ILL use.

Both data sets suggest that faculty's use of the literature appears to have a relationship with productivity. Survey results demonstrated a relationship between productivity and use of online journals and ILL, where those with more publications reported greater use of online journals and ILL. Although there were no statistically significant correlations between the use of literature and faculty's research productivity, the descriptive statistics from the publication data indicate that those faculty who were less productive also used less references in their publications.

Faculty who were productive and prolific used more references, although the prolific authors tended to use less references than the productive authors. More exploration is needed to understand why highly productive faculty use less literature in their publications. Similarly, further exploration is needed, as it relates to the decreased literature use in publications between 2015 and 2019 for faculty from nursing.

LIMITATIONS

In both data sets, there are some limitations. The survey data only represents faculty that agreed to participate in the survey. Therefore, observed results may not necessarily reflect the characteristics and behaviors of the broader body of health sciences faculty at the institution in the study. For the publication data set that focused on health sciences faculty at the institution for 15 years, these faculty would have also matured in their research over time, which may have some impact on the relative increase in publications over time. In addition, because faculty needed to be at UIC for at least, it limited the number of faculty that could be included, which impacts the generalizability of the data in some colleges. For example, the college of Nursing had a small sample of only 6 researchers.

CONCLUSIONS

The results from the publication and survey provide some insights into health sciences faculty information-seeking behavior and productivity. Libraries' efforts to provide seamless access to information have been successful, as illustrated by the increased use of references in publications. While many factors such as increased online and freely available resources also likely play a role in this, the library remains a critical and valued resource for faculty research. The results also show that library resources such as online journals and databases are still very important to faculty research. Use of the literature appears related to productivity, where productive faculty are more likely to use online journals.

While resources such as print and electronic books are less important than journals and databases for conducting research, they are still utilized by all disciplines. In addition, faculty value the expertise provided by library professionals even if they were not widely utilized. In times of limited budgets and the perception that information is freely available to all, documenting and demonstrating the valuable role library resources play in supporting faculty research is critical.

The results of this study also confirm that publication patterns change over time, demonstrating an increase in publications overall and an increase in co-authorship on those publications. Productivity, literature use, and co-authorship varied by college. Academic libraries can play

a crucial role in supporting their university's research planning and endeavors by exploring and demonstrating changing scholarly publication patterns and engagement. Furthermore, they can assist in understanding their faculty's publication patterns, providing valuable insights that can be used to shape future research initiatives and enhance the overall quality of scholarship.

DATA AVAILABILITY STATEMENT

Data associated with this article are available in the authors' institutional repository: ARL study data: <https://doi.org/10.25417/uic.24891984.v1>; 2022 Faculty survey and data: <https://doi.org/10.25417/uic.23549247>.

AUTHOR CONTRIBUTIONS

Sandra De Groote: conceptualization; data curation, formal analysis; investigation, methodology; project administration, visualization; writing - original draft. Jung Mi Scoulas: conceptualization; data curation, formal analysis; investigation, methodology; project administration, visualization; writing - review & editing.

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Attitudes on data reuse among internal medicine residents

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See end of article for authors' affiliations.

Background: NYU Langone Health offers a collaborative research block for PGY3 Primary Care residents that employs a secondary data analysis methodology. As discussions of data reuse and secondary data analysis have grown in the data library literature, we sought to understand what attitudes internal medicine residents at a large urban academic medical center had around secondary data analysis. This case report describes a novel survey on resident attitudes around data sharing.

Methods: We surveyed internal medicine residents in three tracks: Primary Care (PC), Categorical, and Clinician-Investigator (CI) tracks as part of a larger pilot study on implementation of a research block. All three tracks are in our institution's internal medicine program. In discussions with residency directors and the chief resident, the term "secondary data analysis" was chosen over "data reuse" due to this being more familiar to clinicians, but examples were given to define the concept.

Results: We surveyed a population of 162 residents, and 67 residents responded, representing a 41.36% response rate. Strong majorities of residents exhibited positive views of secondary data analysis. Moreover, in our sample, those with exposure to secondary data analysis research opined that secondary data analysis takes less time and is less difficult to conduct compared to the other residents without curricular exposure to secondary analysis.

Discussion: The survey reflects that residents believe secondary data analysis is worthwhile and this highlights opportunities for data librarians. As current residents matriculate into professional roles as clinicians, educators, and researchers, libraries have an opportunity to bolster support for data curation and education.

Keywords: Graduate Medical Education; data reuse; secondary data analysis; surveys; residents; data services; data curation; GME

BACKGROUND

Secondary data analysis or data reuse is an area of interest to librarians working in data services. Organizations such as the Data Discovery Collaboration (DDC), the Data Curation Network (DCN) and the Research Data Access and Preservation Association (RDAP) work with information professionals to help spread education and infrastructure around data sharing [1–3]. Additionally, the growth of free or no cost-repositories has reduced barriers for storing data for secondary use [4–7]. Research has indicated strong levels of interest in data sharing among scientists across many different disciplines [8–14]. Our study aimed to build upon past work in this area with a novel focus specifically on medical residents' attitudes on secondary data analysis.

NYU Langone Health's Department of General Internal Medicine and Clinical Innovations provides a research block to all Postgraduate Year 3 (PGY3) Primary Care (PC) residents called the Research Practicum. The Research Practicum employs a secondary data analysis

methodology, using either nationally-available data identified using our institutional data catalog or locally collected data from researchers at our institution who have allowed instructors to use their data for educational purposes [15]. This focus on secondary data analysis makes the Research Practicum unique in the medical education literature; as such, these residents provide a unique perspective of being General Medical Education (GME) trainees who also have exposure to data reuse [16–43].

Providing research training is important to GME programs for several reasons. The Accreditation Council of Graduate Medical Education (ACGME) explicitly requires that medical residents engage in scholarly activity, though the specifics are broadly written so as to give programs a great deal of leeway as to how that requirement is met [46]. That said, providing meaningful exposure to research is associated with positive outcomes for physicians. For example, Mills et al., Dengel et al., Fancher et al., Macknin et al., and Robertson et al. correlate participation in residency research programs

with post-residency publishing and increased likelihood of grant awardees, though it is possible this correlation reflects a selection bias (i.e. that those who are drawn to research as residents continue to be drawn to research after residency) [16,25-26,34,36]. Nevertheless, providing opportunities to explore research at a minimum allows those with an interest in research to explore their passion, while also giving hands on exposure to residents who may be unsure about their desire for a research career.

While many residency programs have well-documented research programs [16-43], there is considerably less examination of how often residents gain experience engaging with secondary data analysis in formal settings. This is despite availability of sources of data for secondary analysis [4-7]. As a note on usage, this paper uses the term secondary data analysis to mean a research methodology using research information collected by others to obtain new insights [44]. In the library and information science literature this concept is often described as “data reuse.” In discussions with residency directors and a chief resident, “secondary data analysis” was strongly preferred as being more familiar than “data reuse.” In keeping with their usage, this paper uses “secondary data analysis,” but we view the two terms as interchangeable.

This research grew out of a larger project aiming to understand if a research practicum style block would work in other residency tracks, specifically Categorical Medicine and a Clinician-Investigator (CI) Track, where currently a secondary data analysis research block is not included. While all three tracks are in our internal medicine (IM) department, Categorical focuses more on inpatient care, PC focuses more on ambulatory care, and CI has greater emphasis on research. This research provides an opportunity to understand the views of IM residents at an urban academic medical center on secondary data analysis.

This research was approved by our institution’s IRB, s22-00050.

CASE PRESENTATION

Survey Design and Administration

This case report employed a survey methodology of residents in the Department of Internal Medicine and Clinical Innovations (DGIMCI) at NYU Langone Health in the PC, Categorical and CI tracks. All PGY3s in our PC track are exposed to secondary data analysis, in contrast to the other tracks, and for the current analysis we were primarily interested in overall attitudes about secondary data analysis and focused on overall attitudes as one population of DGIMCI residents.

Our secondary data analysis questions were based on questions relating to data reuse from Curty et al’s

“Attitudes and Norms Affecting Scientists’ Data Reuse” and Tenopir et al.’s “Changes in Data Sharing and Data Reuse Practices and Perceptions Among Scientists Worldwide,” as part of a larger pilot study on implementing a research block in residency tracks [8,11]. Surveys were built by modifying existing questionnaires in discussion with residency leaders. For example, we simplified some of the questions based on conversations with residency stakeholders, as we concluded that the original wording may be too abstract in the context of medical residency.

Anonymous surveys were built in our institution’s instance of REDCap and can be viewed on this project’s OSF page [45]. We distributed the surveys by QR codes on flyers that were distributed in person at residents’ meetings. Residents were reimbursed with a \$10 gift card, which was done to incentivize their time without being large enough to be coercive. Questionnaires were designed to be completed in five to ten minutes to avoid survey fatigue. While this sacrificed validity and the ability to make direct comparisons to other research, the pragmatic consideration of making a shorter survey that residents were more likely to fill out to completion was given priority.

In our survey, secondary data analysis was defined as:

“conducting new analyses to answer a research question that are separate from the stated research goal of the researchers who collected the data. Examples may include, but are not limited to: Using data from a large study such as the NIH Health Information National Trends Survey, <https://hints.cancer.gov/>, to answer a new research question; Requesting data from a researcher to conduct analyses separate from their original research question; Downloading data from an online repository to analyze; Applying for access to data from a public agency or research institution to conduct analysis on data they store.”

Using this description, residents were asked to answer on a four-point Likert scale if they believed secondary data analysis is worthwhile and if residents should be trained to do it. For these original questions, we opted for a four point because a four-point scale does not allow respondents to choose a neutral option and forces an overall choice on the part of the study participant [48]. Based on Tenopir et al. [11] residents were then asked to rate on a five-point Likert scale, with a sixth “Unsure” option, if they felt secondary data analysis: saves time, is efficient, is easier than collecting their own data, is hard to explain in a methods section, improves results, helps answer research questions, is harder than conducting research with their own data, and takes longer than conducting research with their own data.

We hypothesized that in general IM residents would be interested in using secondary data analysis methods and specifically that they would believe that it helps save time, is more efficient than collecting original data (as

defined by conducting a new study rather than analyzing existing data collected by someone else), is easier than collecting original data, that it would be easy to explain in methods, help improve their own research results and answer research questions, and be easier and faster than conducting research with their own data.

Data was analyzed using R version 4.0.3 and RStudio Version 1.3.1093. The image for Figure 1 was made using analysis in R and graphed in Excel version 16.76. Surveys were administered in Spring 2022. Results were also shared with residency directors to help contextualize the data and to confirm that results resonated with their understandings of the residency tracks. We employed the Tidyverse package to help clean and analyze data [47].

Survey Results

The total population of residents was 162, with 114 coming from the Categorical Track, 18 from Clinician-Investigator Track and 30 from Primary Care. 67 residents completed the survey, marking a completion rate of 41.36%. Of these 12 (18%) were PGY1, 31 (46%) PGY2 and 24 (35%) were PGY3. By track, the completion rate was: Categorical 30.7%, PC 83.3% and CI 38.9% relative to each of their total track sizes. See Table 1 for the Demographics breakdown.

A majority of respondents (88.7%) felt secondary data analysis is worthwhile, with residents in the CI track rating it slightly more highly (median rating of worthwhileness CI: 4, PC: 3, Categorical: 3, $p = .03$ in a Kruskal Wallis test, where a 4 indicated "strongly yes" and a 3 a "Yes" on a Likert scale). Additionally, 49 (79.0%) out of 62 stated that residents should be trained in secondary data analysis, and this was consistent across tracks as demonstrated by a non-significant Kruskal-Wallis test highlighting no difference between groups ($p = 0.36$). Results were consistent across tracks with the exception that Categorical residents were slightly less likely to find secondary data analysis efficient (Kruskal-Wallis test $p = 0.02$, median score 4 vs 5 for other groups), time saving (Kruskal-Wallis test $p = 0.01$, median score 4 vs 5 for other groups) or to be useful for answering their own research questions (Kruskal-Wallis test $p = 0.01$, median score 3 vs 4 for other groups).

Most residents surveyed (80%) indicated that they believe secondary data analysis saves time, is efficient and is easier than collecting original data, as determined by agreeing somewhat or strongly with statements on secondary data analysis vs not. Notably, residents were divided on the question of if secondary data analysis was more difficult to explain in methods sections and if it could help them answer their research questions. A majority of residents surveyed did not believe secondary data analysis helps them to improve their own research results. See Figure 1 for a breakdown of percentage answers to each question regarding secondary data

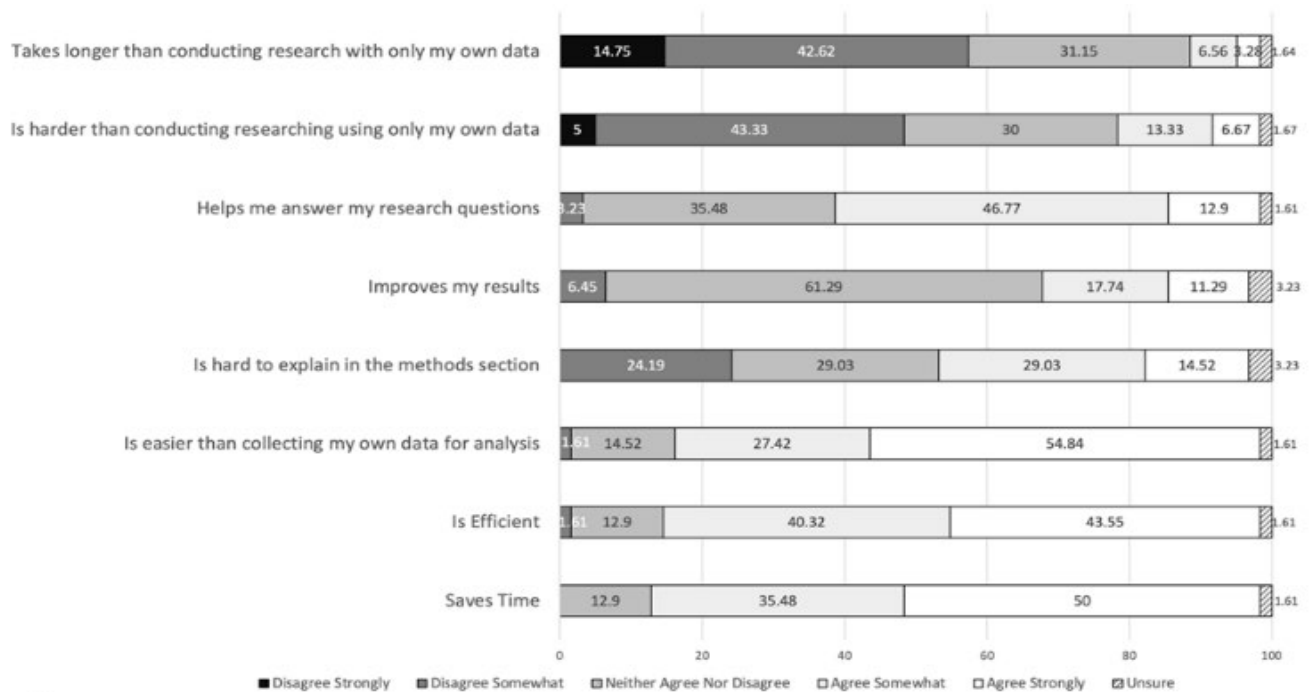
analysis with all tracks pooled. Residents agree with statements that secondary data analysis is efficient and saves time, but were split on how helpful it is at answering their own research questions of the ease of describing secondary data analysis in a methods section.

Table 1 Demographics of study participants by year, gender, race and ethnicity.

	Number of responses (percentage)
Total number of responses	67
PGY1	12 (18%)
PGY2	31 (46%)
PGY3	24 (35%)
Gender	
Female	24 (44%)
Male	30 (66%)
Race	
White	31 (58.5%)
Black/African American	3 (5.7%)
Asian or Asian American	16 (30.2%)
Other	1 (1.9%)
Ethnicity - Hispanic/Latino	5 (9.3%)

DISCUSSION

The results of this survey highlight opportunities and challenges for librarians working in data services and educators in GME. Notably, strong majorities of residents felt that secondary data analysis is worthwhile and an efficient, time saving method of research. Additionally, residents expressed interest in being trained in this methodology. A majority of residents (59.67%) felt secondary data analysis helps them answer their research questions, highlighting its utility as a methodology for residents. Nevertheless, nearly 61.9% of residents neither agreed nor disagreed that secondary data analysis would help improve their own research results, highlighting a need for access to and education on the use of relevant data sources that can meet the diverse needs and research interests of clinicians. While organizations like the DDC, DCN, and RDAP are doing essential work in this field,

Figure 1 Percentages of residents who feel that each statement relates to secondary data analysis.

further progress may depend on data librarians leveraging their resources and understanding to facilitate data discovery and research infrastructure at their institutions [1–3]. For example, a potential area for future librarian skill development may be to learn to provide assistance in identifying usable data specific to researchers' needs.

Residents were less clear in their views on how easy it is to explain secondary data analysis methods in a paper, which highlights an opportunity for educators working in data reuse and secondary data analysis. 45% of residents opined it would be hard to explain their work in methods sections. By comparison, 75% of respondents in the work done by Tenopir et al. shared concerns about misrepresentations due to complexity of data [11]. In other words, residents and research scientists alike are both very concerned about communication and comprehension of their work. The concern about complexity and communication highlights an opportunity for those employed in GME research and data education, namely to help explain the processes of secondary data analysis, and how to compose a methods section employing this methodology, as well as explaining issues around data citation.

Finally, it stands to reason as residents move into roles as clinicians, educators and researchers, the interests and views they hold today may shape clinical research in the future. If residents value secondary data analysis, then it is incumbent on libraries and research institutions to invest in data curation and data infrastructure, as well as

for GME programs to consider incorporating these skills into their training. Investment in data infrastructure can include investing in data catalogs and expertise in data discovery, but will also need to be paired with training in analysis and how to work with data once obtained to avoid biased results. For example, in our experience having librarians with data curation expertise has allowed us to identify data sources that can meet residents' interest and be incorporated into projects that are meaningful to learners, but an ongoing challenge remains having scalable ability to instruct residents in its use beyond a relatively small group. Specifically, at NYU Langone Health the Research Practicum relies on the use of our institutional Data Catalog, which is maintained by the library, highlighting the benefit of investing data infrastructure. Should a similar curriculum be of broader interest in the future it stands to reason that other institutions may also have an interest in developing data infrastructure.

Fortunately, because of work being done by data curation institutions, individual librarians may not be 'on their own' in developing services that can leverage local datasets, and instead they can work with national organizations to gain guidance on how to curate and aid in data discovery locally. For example, the Data Curation Network creates educational programs and working groups to provide individual curators with training and a community of practice as well as connecting institutions for collaboration [3]. Similarly, the Data Discovery

Collaboration has allowed 11 institutions to collaborate and exchange information around data cataloging, metadata and outreach strategies in data curation [1]. We hope that as secondary data analysis becomes more common, so too will training opportunities for librarians and GME educators in how to work with the data being curated for reuse.

LIMITATIONS

This study featured residents from a single program in one academic medical center, and results at other locations and with different subjects may be different. Additionally, our survey instrument is not validated. As such, results cannot be generalized.

In our results PC is relatively over-indexed, and we speculate this may be due to active librarian teaching roles in the track leading to more willingness on the part of residents to spend time filling out surveys for someone they have a relationship with. This highlights an additional possible area of bias: that those participating may be self-selecting to be those who are highly engaged or have an interpersonal desire to assist in the research, limiting how representative they may be.

Residents also tend to have less research experience and exposure than the broader body of researchers. As such, their expressing that describing secondary data analysis in methods sections may indicate less familiarity and ease with scientific writing overall.

DATA AVAILABILITY STATEMENT

Anonymized data and questionnaires associated with this study are available on OSF: <https://osf.io/n28yj/>.

AUTHOR CONTRIBUTIONS

Fred LaPolla: conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, visualization, writing – original draft, review, and editing. Genevieve Milliken: conceptualization, investigation, writing – review and editing. Colleen Gillespie: conceptualization, funding acquisition, methodology, writing – review and editing.

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Citations in Wikipedia for understanding research reach

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See end of article for authors' affiliations.

Objective: Wikipedia is the most frequently accessed online health information resource and is well positioned as a valuable tool for public health communication and knowledge translation. The authors aimed to explore their institution's health and medical research reach by analyzing its presence in Wikipedia articles.

Methods: In October 2022, a comprehensive database search was constructed in PubMed to retrieve clinical evidence syntheses published by at least one author affiliated with McMaster University from 2017 to 2022, inclusive. Altmetric Explorer was queried using PubMed Identifiers and article titles to access metadata and Wikipedia citation data. 3,582 health evidence syntheses from at least one McMaster University affiliated author were analyzed.

Results: Six percent (n=219) of health evidence syntheses from the authors' institution were cited 568 times in 524 unique Wikipedia articles across 28 different language editions. 45% of citations appeared in English Wikipedia, suggesting a broad global reach for the institutions' research outputs. When adjusted for open access publications, 8% of McMaster University's health evidence syntheses appear in Wikipedia.

Conclusion: Altmetric Explorer is a valuable tool for exploring the reach of an institution's research outputs. Isolating Altmetric data to focus on Wikipedia citations has value for any institution wishing to gain more insight into the global, community-level reach of its contributions to the latest health and medical evidence.

Keywords: Citations; Wikipedia; research reach



See end of article for supplemental content.

INTRODUCTION

Background and Literature Review

McMaster University promotes itself as creating a brighter world through excellence in research across disciplines. The institution takes pride in its commitment "to taking a collaborative approach to improving people's lives, contributing to global knowledge and advancing the health and well-being of the world around us" [1]. McMaster's Health Sciences Library (HSL) supports this mission by facilitating health research excellence, assisting in the exploration and discovery of health information, embracing meaningful community engagement, and providing access to high-quality health information resources in print and online [2]. HSL's research impact services play an integral role in assessing progress towards these "Brighter World" aspirations. Using a combination of traditional metrics (e.g., academic citations; collaboration data) and alternative metrics (e.g., media mentions; Wikipedia citations), the service provides

quantitative data and analyses illuminating McMaster's contribution to global health knowledge.

Traditional metrics, like academic citations, can tell us about a publication's influence within the scientific community, but are inadequate for describing its reach outside the academic world [3]. Altmetrics fill this gap by focusing attention on sources that are freely available and widely used by the general public, such as Twitter, news media, and Wikipedia. As such, altmetrics can identify papers that generate interest outside of the academy and point to the potential reach of scholarly research on society at large [4,5]. In addition, papers start receiving attention from altmetric sources as soon as they are published and thus permit more timely assessments of research reach compared to traditional citation-based metrics that can take years to accrue [6]. The Altmetric Explorer database aggregates mentions of academic papers across a wide variety of online information sources and assigns an Altmetric Attention Score (AAS) that represents the level of attention that a particular publication has received [7]. Altmetric also tracks whether a research publication is

published using an Open Access publication model (hybrid, green, or gold) or, if it is published in a subscription-based format, requiring readers to pay for access to the content [7].

While the heterogeneous nature of the AAS limits its ability to consistently predict real-world impact [8], it is regularly used as a tool for understanding how information about research travels [9–11]. Consequently, the authors intentionally applied the term reach, instead of impact, for this study, because the goal is to leverage Altmeter Explorer's Wikipedia citation data to gain insight into how far into the community McMaster's health evidence syntheses might reach. The authors propose that citations in Wikipedia articles to McMaster affiliated health-evidence syntheses, could be a potential marker of reach. Altmeter Explorer's data, tracking Wikipedia citations, is an opportunity to learn more about whether McMaster's research outputs are available for consumption in publicly accessible online spaces, like Wikipedia.

The weight with which each mention contributes to a publication's AAS is algorithmically determined based on the mention's reach, which considers the mention's source and author [12]. For example, a tweet authored by a researcher unaffiliated with the publication being shared is weighted more heavily than the same tweet from the article's publisher. Similarly, a citation to the same publication in a Wikipedia article (which has significantly more reach) is weighted more heavily than either of these tweets [13].

Wikipedia is the most frequently accessed health information resource on the Internet [14–17]. In 2013, evidence from a survey indicated that individuals can spend up to 52 hours per year consuming health information on Wikipedia [14]. It is used with greater frequency than the consumer health information web sites libraries might prefer to recommend to their patrons, such as MedlinePlus [16]. While it continues to be stigmatized for its collaborative editing processes [18], the public is accessing Wikipedia's health and medical content to the scale of more than two billion views per year [19]. Most recently, Wikipedia received media attention as a major contributor to the prevention of misinformation during the COVID-19 pandemic [20,21] with the Wikimedia Foundation partnering with the WHO in this regard [22]. Furthermore, Wikipedia was identified by The Lancet as a key player in the amplification of science due to its broad reach [23].

Since its launch in 2001, perceptions of Wikipedia have evolved [24]. Although it is not universally accepted [25], academics, health professionals, and librarians have acknowledged its influence and popularity for the communication of science [26–29] and public health education [23,30–32], despite a limited understanding of how or why readers engage with it [33,34]. Scholarship

has explored the benefits associated with including the citation rate on Wikipedia in assessments of the reach of published works [35] and contributing to Wikipedia has continued to gain popularity in medical education [36–40]. Wikipedia also has demonstrated value for the mapping of scientific knowledge [41] while also supporting the open access movement through its preference for summarizing and citing open knowledge sources [42,43]. However, no previous studies of Wikipedia citations as an indicator of the reach of an institution's research outputs were found.

Using Altmeter Explorer to track citations of an institution's publications in Wikipedia, this study aims to gain insight into the reach of a sample of health evidence syntheses published by at least one McMaster University-affiliated author. Using McMaster University as a case example, this study also explores what we can learn about the reach of a research organization through the Wikipedia citations that Altmeter Explorer tracks. Beyond the growing popularity and ubiquity of Wikipedia articles, the authors focused exclusively on citations in Wikipedia because the editorial process requires an element of knowledge translation, has transparent and open process of peer-review, and provides space for community debate to ensure neutrality, accuracy, and verifiability of any contributions made to a Wikipedia article [44].

Research Questions

To better understand the presence of McMaster University's health and medical research in Wikipedia, the following questions were proposed:

RQ1. What proportion of health evidence syntheses from McMaster University affiliated authors, published between 2017 and 2022, have been cited in Wikipedia?

RQ2. When ranked by AAS, of McMaster University's top 10% highest scoring health evidence syntheses, what proportion are cited in Wikipedia?

RQ3. How many citations to McMaster University's published evidence synthesis outputs from 2017 to 2022 appear in Wikipedia? How many Wikipedia articles do these citations appear in?

RQ4. Is there a relationship between open access publication and a research output's citation in Wikipedia?

METHODS

In October 2022, a comprehensive database search was constructed in PubMed to retrieve a purposive sample of health evidence syntheses published by at least one author affiliated with McMaster University from 2017 to 2022,

inclusive (see Appendix for full search strategy). The decision to search only PubMed was twofold. Firstly, because the authors were interested in using a sample of health evidence syntheses, a large clinical database allowed the authors to comprehensively search for evidence synthesis publications within a discipline-focused resource. Second, PubMed can be publicly accessed and so the author's search strategy to retrieve evidence syntheses can be more easily replicated. Evidence syntheses were selected as the research output to measure because of Wikipedia's guidelines for reliable sources in health and medical articles, which indicate a preference for high-quality secondary sources, including popular methodologies for evidence syntheses such as systematic reviews and meta-analyses [42]. Known within the editing community as WP:MEDRS, these guidelines prioritize high-quality secondary studies (e.g. systematic reviews) published in top-tier medical journals, as determined by Western medical practices [42]. Therefore, not all health and medical research output from the university, for example primary studies, meet the reliability guidelines to be cited in Wikipedia.

The search yielded 4,381 results. 699 results were excluded. Articles were excluded if they were not health related, were an evidence synthesis protocol, original primary research such as a lab experiment or patient study, a white paper, a letter to the editor or editorial, published errata, or if the article focused on evidence synthesis as a topic. Next, Altmetric Explorer was queried using PubMed Identifiers and article titles. Because Altmetric Explorer can be searched using either DOIs or PubMed IDs, the authors searched Altmetric Explorer using the PMIDs retrieved from the PubMed search. The query yielded 97% (n= 3,582) of the articles retrieved from the PubMed search. The authors contacted Altmetric learn why 3% of publications from PubMed were not tracked by Altmetric Explorer but received no response.

The authors exported two data sets to Microsoft Excel from Altmetric Explorer. The first data set, Research Outputs, comprehensively listed every publication that met the search criteria and included a column for the number of times each article had been cited in Wikipedia. The second data set, Wikipedia Mentions, collated the Wikipedia articles that cite at least one of the McMaster University affiliated evidence syntheses, as of October 31, 2022. Both data sheets were used to answer the research questions presented above and gain insight into the reach of the institution's research. Some additional context is required for how the authors approached gathering results for RQ2 and RQ4.

To answer RQ1 the authors employed the COUNTIF command in the Research Outputs dataset spreadsheet to count how many articles had at least one citation in a Wikipedia article. For RQ2, ranking by AAS offered insight into whether the proportion of articles cited in Wikipedia could be affected when the article has received

a high AAS. The count of Wikipedia citations would not necessarily impact the AAS in a way that would inherently bias the ranking of articles. This is because "the scoring for Wikipedia articles is static... if a research output is mention[ed] in on Wikipedia post, the score for that paper will increase by 3. However, if a research output is mentioned in more than one Wikipedia post, the score will remain 3" [13]. Therefore, it cannot be assumed that the health evidence syntheses with the highest attention scores are cited in Wikipedia. It can also not necessarily be assumed that being cited in Wikipedia would bias the ranking of research outputs by AAS. That is to say, if all articles only get a score of 3 for being cited in Wikipedia, being cited in Wikipedia would not necessarily bring an article to the top 10% of high-scoring articles.

For RQ4, the authors used a simple random sample (n=347) of all 3,582 of research outputs retrieved to perform a chi-square test for independence in SPSS. The number of results required for a sample that would ensure a 95% confidence interval (n=347) was calculated using a free online Simple Random Sample Calculator [45]. Using RAND() in the data sheet for all 3,582 results, the result set was randomly re-sorted and the top 347 in the list were pulled to make the simple random sample.

RESULTS

RQ1. What proportion of health evidence syntheses from McMaster University affiliated authors, published between 2017 and 2022, have been cited in Wikipedia?

Of the 3,582 health evidence syntheses published between 2017 and 2022 tracked in Altmetric Explorer 6.1% (n=219) were cited in Wikipedia articles at the time of analysis.

RQ2. When ranked by AAS, of McMaster University's top 10% highest scoring health evidence syntheses, what proportion are cited in Wikipedia?

Of the top 10% (n=358) of McMaster University's evidence syntheses, ranked by AAS, 29.3% (n=105) were cited in Wikipedia. These 105 articles represented 48% of the 219 outputs cited in Wikipedia and 62.5% (n = 355) of cumulative citations.

RQ3. How many citations to McMaster University's published evidence synthesis outputs from 2017 to 2022 appear in Wikipedia? How many Wikipedia articles do these citations appear in?

At the time of analysis there were 568 cumulative citations to McMaster's health evidence syntheses within Wikipedia across 524 unique articles in 29 different language editions (see Table 1). 44.9% (n=255) of the citations were in English Wikipedia.

Table 1 Distribution of citations by language fork.

	Wikipedia Language Edition (Wiki prefix)	Citations (n=)	Articles (n=)
1	Arabic (ar)	34	29
2	Bangla (bn)	6	3
3	Catalan (ca)	10	10
4	Czech (cs)	8	5
5	German (de)	22	21
6	Greek (el)	21	14
7	English (en)	255	238
8	Spanish (es)	28	27
9	Fārsi (fa)	8	8
10	Finnish (fi)	11	11
11	French (fr)	24	23
12	Hebrew (he)	7	7
13	Hungarian (hu)	8	4
14	Bahasa Indonesian (id)	5	5
15	Italian (it)	15	14
16	Japanese (ja)	15	14
17	Korean (ko)	10	10
18	Dutch (nl)	4	4
19	Polish (pl)	3	3
20	Portuguese (pt)	11	11
21	Romanian (ro)	2	2
22	Russian (ru)	18	18
23	Serbian (sr)	5	5
24	Swedish (sv)	2	2
25	Thai (th)	1	1
26	Turkish (tr)	9	9
27	Ukrainian (uk)	3	3
28	Vietnamese (vi)	12	12
29	Zhōngwén (zh)	11	11
		568	524

RQ4. Is there a relationship between open access publication and a research output's citation in Wikipedia?

Of the 219 health evidence syntheses cited in Wikipedia, 79% (n = 173) were published using an open access model, according to open access classification data within Altmetric Explorer. When the proportion of articles cited in Wikipedia (6.1%) was limited to open access publications, the proportion of articles cited in Wikipedia increased to 8.1%. As outlined in the methods, a random sample (n=347) of all 3,582 health evidence syntheses included in the study was selected and a statistically significant ($P < 0.05$) relationship between open access evidence syntheses and their presence in Wikipedia was found. ($X^2(1, N=347) = 4.045, p = 0.044$). Therefore, the open access health evidence syntheses included in this study were more likely to be cited in Wikipedia than non-open Access syntheses.

DISCUSSION

The authors sought to gain initial insights into the reach of McMaster University's health and medicine research publications and the value of using Altmetric Explorer to track Wikipedia citations. This study demonstrates that Altmetric Explorer has some utility for tracking attention gained outside of the academic sphere, specifically to understand the inclusion of McMaster's research in frequently accessed public health information resources. This exploratory study also provides a methodology for future exploration of citations in Wikipedia not necessarily limited to health evidence syntheses at a single institution. Since health and medical librarians regularly participate in the production of evidence syntheses and are also a key resource for researchers wishing to understand their research impact, the findings shared here stand to offer health and medical librarians a methodological approach to gathering an additional dimension in understanding how broadly published health evidence syntheses could be shared.

Our findings show that 6% of health evidence syntheses from McMaster-affiliated authors appear in 524 Wikipedia articles across 29 languages. This provides a useful baseline for understanding one institution's citation activity in Wikipedia.[46] Wikipedia mentions can provide insights not available through traditional citation-metrics, such as the global reach of a work, as represented by McMaster's presence in 29 different language editions of Wikipedia.

The research found that despite 6% of McMaster's health evidence syntheses appearing in Wikipedia, the papers with the highest AAS made up nearly half of the 219 evidence syntheses cited in Wikipedia. These publications accounted for more than half of all Wikipedia citations tracked for this study. In total, nearly 30% of these high scoring publications have been summarized for

consumption by the public. In addition to demonstrating the University's reach, data such as this can be related to institutional goals around knowledge translation. Additional investigation into the relationship between AAS and Wikipedia citations is needed for richer insight into the representation of high scoring evidence syntheses in Wikipedia.

With respect to the relationship between open access evidence syntheses and their citation in Wikipedia articles, our finding that the open access evidence syntheses included here are more likely to be cited in Wikipedia than traditionally published (closed) evidence syntheses, is consistent with Wikipedia's well-known preference for verifying its content with citations to open-access materials [42]. This evidence might have utility as libraries continue to strengthen their commitment to promoting open access publishing models. As a potential indicator of mass reach, the relationship between open access publishing models and presence in Wikipedia across multiple languages also has the potential to demonstrate the value of open access publishing.

This study has some limitations. Altmetric tracks Wikipedia citations in real time. Therefore, the evidence syntheses represented in this study are those that were cited in Wikipedia at the time the data was exported. Tracked citations in Wikipedia are not representative of the total number of times a research output has been cited over time. Citations added or deleted after data export are not represented in the results. This does not diminish the results of this exploratory study, but the numbers presented in the results should be considered fluid.

Some McMaster affiliated publications will have overlap with other institutions. While included in estimates of McMaster University's reach, if considered in the context of other institutions' research output, it is important to consider institutional overlap.

Some McMaster researchers have additional affiliations outside of McMaster. Publications in which these authors did not list McMaster as their affiliation were not captured by the PubMed search. This study is also limited to health evidence synthesis and does not represent all knowledge synthesis produced by members of the university.

Given that this was an early exploration of the utility Altmetric Explorer, we only utilized one database (PubMed) to gather a purposive sample of health evidence syntheses from McMaster. Therefore, the collection of evidence syntheses analyzed is not representative of the total output of the University, but rather a snapshot that can be used to inform decision making. Similarly, the authors only analyzed the output from our own University, so the findings can only be considered within the scope of that context. This study does not claim to be generalizable to health evidence syntheses across all institutions, but provides a useful framework for

institutions wishing to gain novel insights into their overall research impact.

This study's findings point to a common theme: high quality health and medical information published by academic researchers is made available beyond the boundaries of academia and medical research through being summarized and cited in Wikipedia across multiple articles and in many languages. Understanding the presence of an organization's research in the publicly accessible sources allows for unique insights into the reach of research within society at large. These initial discoveries add dimension to the authors' understanding of the reach of health evidence syntheses from McMaster University affiliated authors.

Medical research is often borne out of a desire to contribute to a healthier society, yet its findings and innovations are regularly produced for a limited audience. Namely, other researchers at other institutions who have both economic and intellectual access to the material. If citations alone are measured, there is a risk of measuring the activity within a closed system.

With the advent of Altmetric Explorer, Wikipedia mentions are now just as easy to track as academic citations and offer a proxy for understanding societal reach of scholarly work. The public is becoming more proficient at consuming health information from home and understanding the presence of a research organization's output in Wikipedia articles has the potential to add dimension to the story. By isolating Altmetric tracking data to Wikipedia mentions, the authors gained valuable insight into the broad global reach of McMaster's health evidence syntheses and identified opportunities for more thorough exploration of Altmetric data sets and Wikipedia mentions.

DATA AVAILABILITY STATEMENT

Although Altmetric Explorer provides metrics on an article-by-article data, aggregate data pulled from a suite of articles in Altmetrics cannot be made publicly available. This is a feature of the proprietary Altmetric Explorer product. Therefore, the raw data associated with this article cannot be made publicly available because the data retrieved from Altmetric Explorer is owned by Altmetric. The authors' complete PubMed search strategy, used to yield health evidence syntheses from McMaster University-affiliated authors, is supplied in Appendix A.

AUTHOR CONTRIBUTIONS

Denise Smith: conceptualization, data curation; formal analysis, methodology, project administration, visualization, writing -original draft, writing - review & editing; Jack Young: data curation, methodology, writing - original draft, writing - review & editing; Jennifer McKinnell: conceptualization, data curation;

methodology, writing -original draft, writing - review & editing.

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SUPPLEMENTAL FILES

- **Appendix A:** [Search Strategy](#)

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Evolving from public health libraries as a place to focus on public health librarian expertise

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Objective: This article describes the evolution of academic public health library services from standalone academic public health libraries in 2004 to centralized services by 2021.

Methods: Five public health libraries serving public health graduate programs (SPH) at public and private institutions were visited in 2006-07. Visits comprised tours, semi-structured interviews with librarians and local health department staff, and collecting of contemporary print documents. We compiled and compared visit notes across libraries. In 2022, we reviewed online materials announcing library closure or transition for timing and how services were to be subsequently provided.

Results: Libraries and SPH were co-located and most librarians maintained public health expertise though they did not have faculty appointments in their SPHs. Specialized statistical and geographic information systems (GIS) software and data were provided in partnership, often with other system libraries. Only two libraries had strong connections to health departments—one with direct service agreements and another engaged in public health training.

Conclusion: Academic public health libraries' relationships with SPHs and health departments did not ensure their existence as standalone entities. Following a national trend for branch libraries, public health information services were centralized into larger health or science libraries. The scope and specialization of librarian expertise continues to be valued with several institutions having librarians dedicated to public health.

Keywords: Public health; Academic libraries; Library spaces; Branch libraries; Health departments; Public health librarianship



See end of article for supplemental content.

INTRODUCTION

In 1955, Flora Herman, then librarian of the Florida State Board of Health, reported that at the time in the United States, there were "probably eight states" without a public health library, four of which were planning for a library in the following two years [1]. Herman stated, "[m]arked variation is noted among libraries even within the same field. The purpose, clientele served, the physical setup, and, last but not least, the staff of each individual library contributes to this dissimilarity" [1]. Public health libraries (PHLs) include health department or agency libraries as well as academic public health libraries (APHLs) affiliated with schools or programs of public health (SPH).

At the 50th anniversary of Herman's article, in 2005, there were few standalone APHLs in the United States and the number of state health department libraries/resource centers had dwindled, with only 24 having a public-facing online presence [2]. Numerous academic health sciences

libraries received funding from the National Library of Medicine to support and partner with public health agencies (e.g., state or county health departments that lacked their own libraries) [3-7].

The original project sought to understand how APHLs functioned in order to apply this knowledge to the improvement of libraries and information services for local and state departments of public health. The objectives were:

1. to quantitatively and qualitatively assess commonalities and differences among APHLs;
2. to explore the relationships between APHLs and the public health agencies that receive their students, as well as the interplay between these libraries and their counterparts in public health agencies and national organizations; and

3. to disseminate information on public health libraries to both library and public health audiences.

As the project was being conducted and written up, major changes were occurring within the participating APHLs as well as the larger library community [8-10]. Thus, it was important to track and understand how APHLs evolved. Therefore, secondary objectives were:

1. to contrast the perspective gained from visiting the individual APHLs to the current state of spaces and services in those institutions; and
2. to report how one of the APHLs transitioned to a service model not dependent on location.

METHODS

In 2004, working in a municipal health department, the first author (KMA) began a Medical Library Association (MLA) Kronick Travelling Fellowship to better understand APHLs [11]. She proposed this to the bureau director as a group of site visits for informing local practice, a method that was common in agencies. The agency's Institutional Review Board (IRB) was not consulted for this presumed quality improvement (QI) project. In 2022, when the project transitioned from internal QI to external knowledge sharing, we contacted the library directors involved. They each checked this manuscript and agreed to the final version.

Positionality Statement

All three authors practiced public health librarianship. KMA directed a local public health agency library from 2003 to 2005. MLR was a state public health department library staff member and librarian from 2001 to 2005. KMA and MLR belonged to the Public Health/Health Administration (PH/HA) Section of the MLA. KDB is a public health liaison librarian who received the Sewell Stipend [12] to attend the American Public Health Association (APHA) Annual Conference.

Participating Libraries

The five standalone APHLs approached were the Epidemiology and Public Health Library (also called the Ira V. Hiscock Public Health Library) at Yale University (Yale), the Sheldon Margen Public Health Library at the University of California, Berkeley (Berkeley), the Abraham M. Lilienfeld Library at Johns Hopkins University (Hopkins), the School of Public Health Library at the University of Texas Health Science Center (UTHealth) at Houston (Houston), and the Public Health Informatics Services and Access (PHISA) at the University of Michigan (Michigan) [13]. Four were selected as they represented four distinct areas of the country and served longstanding

schools of public health. The fifth library was added as it was geographically convenient.

APHLs existed in a larger environment, including the academic and academic library community with government documents or GIS services as well as the larger public health community. The visits to Berkeley and Michigan included structured interview meetings with local or state public health agencies to assess their view of their information services and training.

DATA COLLECTION

Phase 1: Kronick Visits

The project plan was to gather basic organizational information, statistics on budget, workforce composition, scope of operations, mission and vision, organizational structure, and organizational history, combined with site visits to provide impressions of organizational culture [14]. Additionally, KMA would review documents such as maps of the library, collection development policies, and other procedures that may be of assistance to other PHLs in developing their policies and procedures.

Prior to the visit, the library directors were asked to complete an open-ended questionnaire (Appendix A) about collections, facilities, services, staffing, training offered, relationships with state and local public health agencies, community-based organizations, and state and local libraries, as well as participation in national organizations. The questionnaire drew on MLA Benchmarking questions [15], the issues assessed by Herman's questionnaire [1] and KMA's experience in PHLs. The library directors were asked for permission to analyze and share their data in aggregate.

Between February and April 2006, KMA made one or two-day visits to each of the participating libraries. Itineraries were customized based on discussion with the PHL and the availability of internal and external partners. During those visits, KMA took notes on her observations, gathered printed materials such as brochures and flyers, and completed semi-structured interviews with the library director and other members of the library staff as available, particularly those serving the public health community. In addition to written notes, several of these interviews were also recorded; the audio files were saved but not transcribed.

The first author (KMA) analyzed data from handwritten notes, audio files, brochures, and flyers. She compiled data from the questionnaires and compared data across the other participating libraries looking for similarities and differences. The sections and language from the questions (Appendix A) provided the organizing structure for the initial analysis. She refined the names of categories containing the collocated clusters of responses. As the data compilation and analysis were underway, the status of

these libraries began to evolve with shifts to other service models and closing or merging into other libraries.

Phase 2: Academic Public Health Library Status in 2022

All five physical libraries no longer existed in 2022. We sought records of what happened to each library and its services using a combination of searching Google for the library names, searching their affiliated SPH and/or academic library system websites directly, and using Internet Archive to locate news items regarding each library's merger or transformation. We captured relevant documents about each library for contemporaneous news as well as historical narratives that touched on the libraries. We sought the years associated with each library's opening and closure, as well as the founding date of each affiliated SPH. Michigan's closure of the public health branch library and transition to a team-based support model for public health was included in a broader article about the transformation of their Taubman Medical Library into the Taubman Health Sciences Library [16].

As the public record for other AHPLs was sparse on the

process and motivation for transitioning from the physical location to the current service model, a public health librarian from Yale (KDB) who investigated the presence of peer library services on SPH websites [17] joined the project to extend the story of one of the participating libraries. To provide richer insight, she worked with local colleagues to track down additional details and situate the earlier findings in the context of how public health information services were presented online in 2022 by their SPH partners producing a case report of how Yale shifted in library services from 2004 to the present day.

RESULTS

Findings from the In-Person Visits

Table 1 provides data about the participating libraries and their associated SPH. The substantial variation across libraries is shown by both the numeric data and in the examples in each category of the basic analysis.

Table 1 Participating Academic Public Health Library Data, 2005-2006. Data provided by participating libraries in either 2005 or 2006 depending on time of visit; some amounts estimated or provided from review of annual reports.

University (Status)	Public Health School/ Program Start Year	Library name	Library Start Year	Medical or Academic Health Sciences Center Library on Campus	Staff FTE	Square Footage	2005-06 On-Site Volumes	Journal Subscriptions	Primary Faculty	Graduate Students
California, Berkeley (Public)	1943	Sheldon Margen Public Health Library	1947	No	7.1 (includes contract sites)	8,746	99,291	1,173	64	516
Johns Hopkins (Private)	1916	Lilienfeld Library	1967	Yes	2.0	Not available	31,500	200	485	1,949
Yale (Private)	1915	Ira V. Hiscock Library	1945	Yes	3.0	3,500	25,000 monographs; undetermined number of bound journals	350	58	266
Michigan (Public)	1941	Public Health Library & Informatics	1943	Yes	10.5	2,932	106,556	424	120	840
Texas at Houston (Public)	1967	School of Public Health Library	1970	No	4.5	9,535	56,795	320	146	1,073

Library Identity, Reporting, Budget, and Staffing

Unique collections and staff expertise were reasons for establishing an APHL. This response from Johns Hopkins, quoted with permission, provides more insight:

The Interdepartmental Library was established to meet the specialized information needs of the students of the School of Hygiene and Public Health, needs which it was felt were not being met by other Hopkins Libraries. The new library's collection was interdisciplinary in nature, reflecting the varied backgrounds and interests of the School's students and faculty. Its collection was inherently less clinical in nature than the other libraries on the Medical Campus. For example, there has always been a strong focus on collecting works pertaining to the social and political aspects of health care [18].

While the APHL identity was important, they also benefited from identifying with the larger university library system. All of the libraries except Houston were considered libraries in the larger university system as they related to online resources and journal licensing. At Houston, the university contracted with the Texas Medical Center Library to provide library services and resources. Thus, all APHL constituents had access to a wide range of library resources and services in addition to those provided by the APHL. Three of the libraries operated on a campus with a larger academic health sciences library presence.

This relationship with other campus libraries evolved over time for some APHLs. At Johns Hopkins, it was not until 1996 that the Lilienfeld Library became a branch of the Welch Medical Library. In most cases, the APHL leader formally reported through the university library structure—to the Medical Library, an Assistant University Librarian, or some other title. Only one library reported within the SPH, to the Associate Dean of Research, and that library had informal reporting also to the system library director. At least one library reported having a dotted line to the Dean of SPH to make it easier to respond proactively. When asked about advisory groups or committees, one APHL shared that their library committee no longer existed because the school preferred not to have a formal group.

The budgets reported were typically for collections uniquely purchased by the APHL (\$95K - \$159K) and did not include the salaries of the APHL staff. In at least one case, the budget for the library came from the SPH even where the formal reporting was not to the SPH. In the libraries without additional contract staff, staff size ranged from two to five FTEs of which one to three were librarians; several libraries reported part-time graduate assistants, including one library also supervising the statistical software teaching assistants. In addition to the staff specific to the APHL, there were often librarians or informationists with at least a part-time focus on public health at the medical library. Additionally, many of the

university libraries had librarians focused on GIS/mapping, data and statistics, and government documents who provided services and resources for those areas critical to public health practice.

Librarians had substantial expertise in public health, including public health or related degrees or APHA membership or participation in national, state, or regional public health activities. APHA annual meeting participation, often with support from the Sewell Fund [12], was important to developing public health knowledge and making connections. None of the librarians reported having SPH faculty appointments/status, despite of having substantial teaching roles in the public health curriculum.

Library Presence, Specialized Content and Expertise, and Services

All APHLs had their own websites. At universities where there was not a larger medical library, the APHL website was linked from the SPH website and, in Houston's case, on the top toolbar across the entire organization's site, as it was the lone library for that organization. The website of the library that provided contracted services to health departments was reportedly linked from the Intranet of one health department under a category labeled Workplace Tools.

All libraries used central technical services such as the shared online public access catalog. Though APHL staff participated in university library structures for technical services, at least two wished for more ways to engage with those colleagues. For interlibrary loan (ILL), all but one used central services from the university or medical library. The one with its own presence in DOCLINE, OCLC, and local resource-sharing consortia reported unsuccessfully joining Libraries Very Interested in Sharing (LVIS), the first global OCLC no charge Resource Sharing Group. They learned quickly that LVIS libraries did not have the materials SPH needed, and they were inundated with requests.

SPH Location and Library-SPH Collaborations

All APHLs were located within a building that included other SPH academic services, often having prime visibility on the first floor of the main SPH building. Figure 1 shows the first-floor entrance for the Berkeley Library as an example. Two libraries described touchdown stations in other buildings on the same campus where public health researchers were located. In one case, this meant an additional satellite library directly in SPH and touchdown stations by the SPH digital lab. In another, there were two locations in the health department buildings that housed contracted partners. The locations were not where the libraries had always been or where they were planned to be; plans to move the library to accommodate adding an

Figure 1 First page of the Berkeley Public Health Library Floor Plan. Note: the outline around the entrance location was added for the purpose of this article.

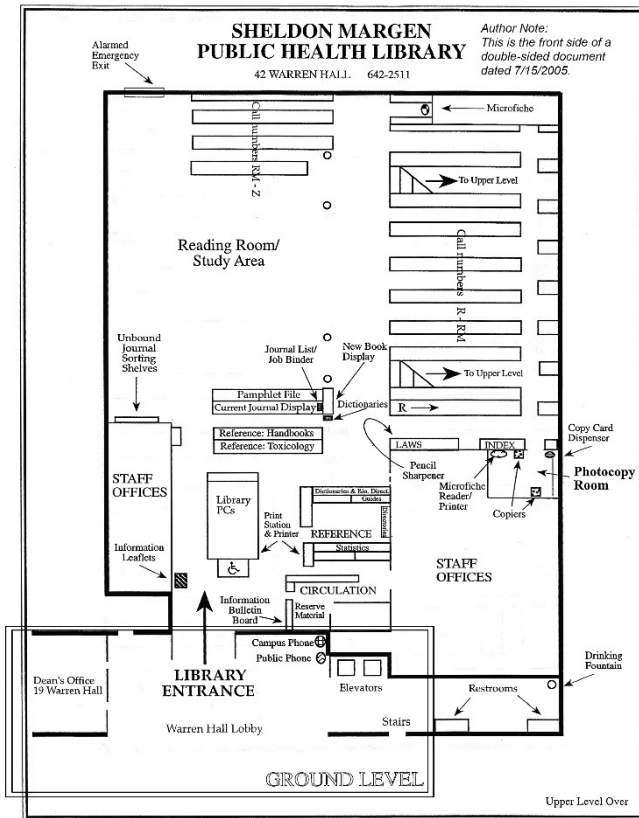


Figure 2 The Librarian's Corner column on "Finding Federal Data Sets" from the Spring 2006 issue of news@tphtc, published by the Texas Public Health Training Center.

The Librarian's Corner

Finding Federal Datasets

Welcome to the Librarian's Corner! This issue's article will focus on determining which federal datasets have the variables you need. Unfortunately, most but not all datasets are readily accessible via the Web. Some have personal identifiers and may require IRB (institutional review board) approval while others are not on data dissemination systems that allow downloading.

The first step is the **Health Services and Sciences Research Resources (HSRR)** database (http://www.nlm.nih.gov/nichsr/hsrr_search/) which was developed by the National Library of Medicine. This database "... is a free searchable catalog of research datasets, instruments and software relevant to health services research, behavioral and social sciences, and public health." It includes datasets from NCHS (National Center for Health Statistics from the CDC) among other federal organizations, and it is being expanded to also include

state datasets. One can use this database to locate datasets that include a specific variable, such as immunizations or blood lead levels. Each hit will include: the title; the title URL; the agency source of the data; the source URL; a description of the dataset; population age and ethnicity; and an abstract. A link to a *PubMed* search has also been enabled.

Another collection of datasets can be found at the **National Archives and Records Administration (NARA)** (<http://www.archives.gov/research/electronic-records/>). These tend to have a more historical bent and include important finds such as the *Epidemiological Studies of Occupational Groups and the Tuskegee Syphilis Study*. While NARA has a searchable database of available datasets, these datasets are not linked in the same manner as the HSRR database, i.e. one cannot access them directly from the Web, but NARA does include some datasets currently not listed at HSRR. Selecting the *Archival Research Catalog* (http://arcweb.archives.gov/arc/basic_search.jsp) enables the search for datasets from the Centers for Disease Control and

Prevention, the National Institutes of Health, general records of the Department of Health and Human Services, the Agency for Healthcare Research and Quality, and the Health Resources and Services Administration.

Lastly is the **Inter-University Consortium for Political and Social Research (ICPSR)** (<http://www.icpsr.org/>). This member-based organization serves as a data warehouse for a number of Federal agencies as well as educational and non-profit organizations. This site requires registration before downloading data and one may not be able to get the dataset wanted as some of the datasets are limited to member institutions.

Of course, there are many more collections of datasets available throughout the Internet. For other links to international, federal, and state resources (including two discussed here), one can access the **UT School of Public Health Library Health Data Library Web site**: http://www.sph.uth.tmc.edu/library/data_access.htm. Questions about data access can be directed to Helena.M.TonVilte@uth.tmc.edu.

Figure 3 Front page of "Quick Guide to Public Health Library Services available to the California Department of Health Services" dated November 29, 2005.

Quick Guide to PUBLIC HEALTH LIBRARY SERVICES
available to the California Department of Health Services

SHELDON MARGEN PUBLIC HEALTH LIBRARY
42 Warren Hall #7360
University of California
Berkeley, CA 94720-7360

Voice: (510) 642-2510
FAX: (510) 642-7623

Debbie Jan
Chief Librarian

<http://www.lib.berkeley.edu/PUBL/DHS/>

undergraduate public health major to the school was mentioned by one library.

Coordination between the APHL and the SPH was common in instruction and the provision of specialized software and data services. In most, librarians were invited by the SPH instructors to teach literature searching and information management skills in the curriculum as well as participate in orientations with a median of 25 sessions annually. In another APHL, new student searching courses were taught by the larger medical library and so rather than teach courses, the APHL provided consultation appointments. One of the libraries also provided faculty development on instruction and digital tools. Two of the libraries co-managed a computer lab in the library with specialized statistical software and in other cases, the statistical lab was nearby in the school building. One library reported that the SPH was working on developing a virtual statistics and software lab. Figure 2 shows an article about data and statistical sources written as part of the regular librarian column in the Texas Public Health Training Center newsletter. The location of

GIS and data services, library services, and instruction depended on the university library structure—map libraries, social sciences libraries, and main libraries were all points of referral.

Faculty publications were another area of library-SPH collaboration, and there were a variety of approaches for engaging with the Dean's office in this area. Where there was a mandatory annual faculty report to the Dean, the university maintained the faculty publications list and the library bought the faculty-published books. Another library reported buying faculty books and doing displays of faculty publications. Others set up searches for the Dean's office and covered new publications in the Faculty "News" section of the SPH site.

Local and State Health Department Relationships

The largest difference among APHLs was the relationship with the local or state department of health. While it is not surprising that two private university APHLs had no official relationships beyond the occasional letter of support for grants or outreach projects, the three public university APHLs each had very different relationships. All the public university libraries were open to external researchers, so health department staff could receive assistance with research questions and use library computers onsite with a guest login. It was not possible to describe these models without identifying the libraries, so we requested permission from the participating libraries for the information shared in this section.

In the case of Berkeley, the California Department of Health Services (DHS) collaborated in developing the SPH and gave its physical collection to form the Public Health Library, which then maintained journal subscriptions for DHS. At the time of the visit in 2005, there had been a contract for direct library services since 1955. Figure 3 shows the title page of the brochure about services available to DHS in 2005. Its eight section headings covered Training, On-Site Use, Mail Delivery, Library Cards, Reference Services and Literature Searching, Current Awareness Services, Document Delivery, and Electronic Journals.

The relationship between Michigan's PHISA and the Department of Public Health included librarian-led training. For example, Michigan librarians taught a full-day course on "Retrieving Online Information" in Traverse City for the Great Lakes Intertribal Council which was co-sponsored by the Michigan Center for Public Health Preparedness and the Michigan Public Health Training Center.

The youngest of the participating libraries, Houston, did not have a relationship with the local or state health departments, primarily due to the prior establishment of other library support for those entities. The Texas State Department of Health has its own library, and the Houston Academy of Medicine-Texas Medical Center

(HAM-TMC) Library provided services to the city and county health departments through the Houston Department of Health and Human Services. However, the Houston librarian did share information about relevant resources with the Texas Public Health Training Center as shown in Figure 2.

Last Words—What APHLs Wished for in 2005

The interviews closed by asking, "What is one thing you wish you had funding for?" While unsurprisingly all of them wished for more librarians and funds, these small libraries were also visionary. The most ambitious wish list had both internal and external components. Internally, these included improving the public workstation space, having a training room within the library, supporting students who do not buy their textbooks, providing more databases, a process for digitizing dissertations, building more interaction/marketing into the course management system, working with faculty on curriculum-integrated instruction and course readings, and being better aligned to research efforts. They also wished for better networking among librarians and vendors that support short-term pay-per-use. Externally, they wanted to do more community outreach, have another librarian for outreach to the regional campuses, and have travel money in their budget.

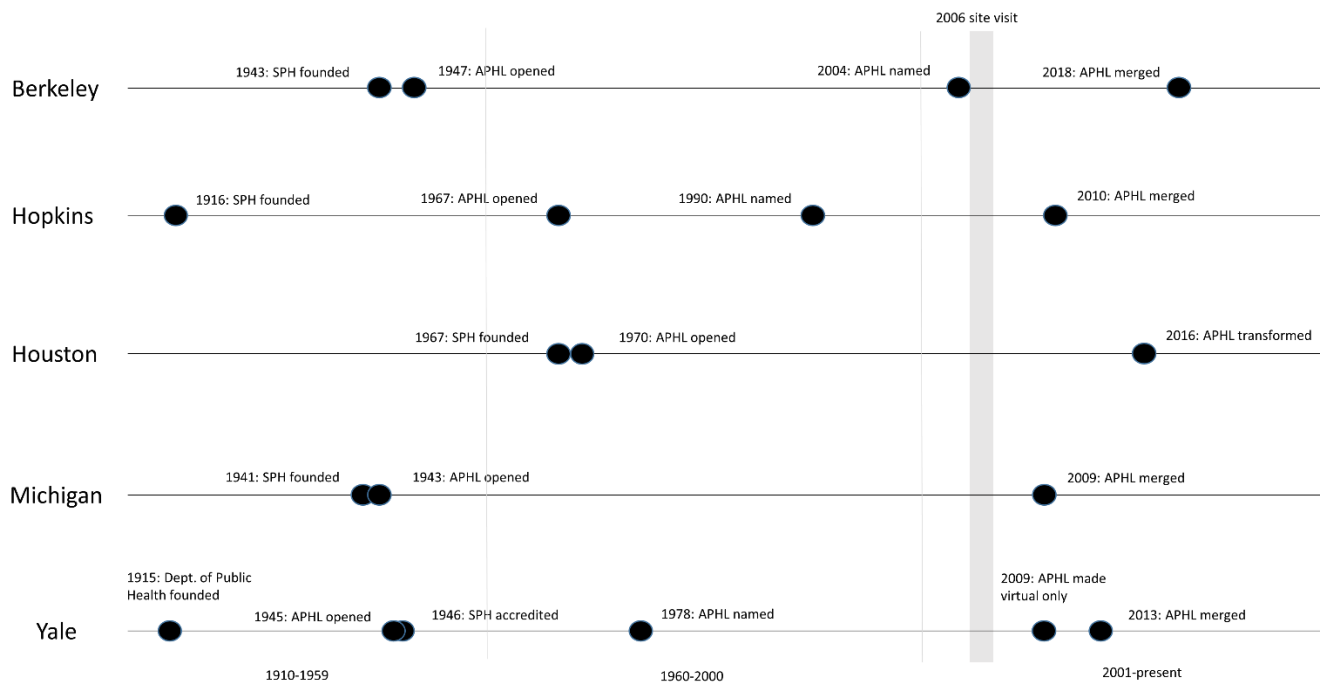
Summary of Similarities and Differences

All libraries were focused primarily on public health as a discipline and offered physical proximity to the SPH, with librarian expertise and professional engagement in public health organizations. All but one of the libraries operated in an academic environment where there was a broader health sciences or medical library on campus providing some collections and services. The provision of specialized statistical and GIS software and source data varied depending on whether the computer lab with the statistical and mapping software was in the library. Differences were primarily with the SPH and local or state health department relationships. Only one had a contract for direct service and staffing. Unofficial areas of agency-librarian cooperation included emergency preparedness and public health informatics training, all of which were stronger in public institutions.

Findings from the Libraries Status in 2022

Figure 4 shows a timeline of the libraries' launch, naming, and cessation based on publicly available announcements. Three libraries were ultimately named for famed public health faculty members at their institutions, all substantially after their foundation. The library with the longest operating history was Berkeley, which launched in 1947 and was renamed for one of UC Berkeley's emeritus faculty, Sheldon Margen, in 2004, shortly before his death. Berkeley merged into the Marian Koshland Bioscience, Natural Resources & Public Health Library in 2018. The

Figure 4 Timeline of sampled APHLs. Four libraries merged between 2009 and 2013. Houston transformed into a learning resource center in 2016 and had no professional librarian as of 2017. Note: The thin vertical lines separate the three time periods in the figure (1910-1959, 1960-2000, and 2001-present). The thick vertical line represents the time frame of the site visits.



earliest named library, the Ira V. Hiscock Library at Yale, was named for a former department chair in 1978 and was extant until 2008. Johns Hopkins' Lilienfeld Library was named in honor of long-time faculty member Abraham M. Lilienfeld in 1990. It closed in 2010 with services transferring to the Welch Medical Library.

Michigan was the earliest APHL created in 1943 with the creation of the SPH and going through evolutions to incorporate informatics before being absorbed into the Taubman Health Sciences Library in 2009 [13, 16]. The youngest library was the UT Health School of Public Health Library (Houston), whose first library director was hired in February 1970 and subsequently established the library. Beginning in 2016, Houston's library transformed into the SPH Library & Graduate Communication Center, retaining the word "library" in the new name, but no longer employing professional librarians. In approximately 2019, Houston's SPH contracted with the Texas Medical Center Library to provide librarian services half-time.

Case Report: Library Support for Yale School of Public Health, 'Then & Now'

In a 2014 study that explored the information needs of public health students, Le concluded that librarians

serving public health students must perform targeted marketing to constituents to leverage relevant library services and build relationships [19]. There is also literature that links library visibility on professional schools or departments' websites to the library's involvement in research projects and library use as a whole [20-23]. This is the case for Yale, where library services for public health have moved from physical embeddedness to embeddedness achieved through mindful marketing, relationship building, and digital presence.

The APHL at Yale closed in 2008 during the financial crash and transitioned to an online-only library [24]. The online-only library closed in 2013, and, from then until 2016, there was no dedicated public health librarian. In 2016, a librarian was hired to support the school. Since being hired, she has co-authored evidence synthesis and meta-research papers, been involved in an SPH committee, and was appointed as a lecturer in an SPH department in 2019.

In 2021, in response to increased student enrollment in SPH programs, KDB was hired as the Simbonis Librarian for Public Health, a three-year term position for a librarian primarily supporting Yale's SPH. With more library staff to support Yale's SPH, the public health librarians became

more visible to leaders and were able to think more strategically about outreach to engage with constituents in new ways [25]. They have been invited to lecture during non-curricular happenings including student case competitions and research fellowship informational sessions for students, and they have been asked to be advisors for grant proposals written by SPH Department Chairs. Additionally, they are compiling findings from a primary research study exploring SPH faculty members' understanding of open access publishing and received great support from SPH leadership while conducting this study.

Some aspects of 2004 Yale library services for public health are not much different from present day. There is still no formal partnership between the medical library and the New Haven Department of Health or the Connecticut Department of Health, though the medical library is open to the public. The public health librarians are active in professional associations and conferences, including APHA. They do not formally track SPH faculty publications but have helped SPH leaders create searches to identify faculty publications for annual reports. The

Table 2 Portrayal of library services on six peer institution SPH websites as of June 2023

Name of SPH	Is the Library that serves the SPH indicated on the SPH website? If 'yes,' through which menus/navigation?		Are public health librarians mentioned on the SPH website?	Number of clicks it takes to get to the Library website from the SPH website	Name of the library that serves the SPH	Number of public health librarians
UC Berkeley School of Public Health	Yes	Under menu → 'Student Life' → 'Marian Koshland [...] Library'	No	2	Marian Koshland Bioscience, Natural Resources & Public Health Library	1
Johns Hopkins Bloomberg School of Public Health	No	The website doesn't indicate which library serves the SPH; although, all campus libraries are listed in the footer menu of the homepage under 'Offices and Services' → 'Libraries'	No	3	William H. Welch Medical Library	2
University of Michigan School of Public Health	Yes	Under 'community' → 'student experience' → 'campus resources and services' → 'University Libraries'	No	3	Taubman Health Sciences Library	1
UT Health Houston School of Public Health	Yes	In footer menu of homepage under 'Quick Links' → 'Library'	No	2	Texas Medical Center Library	1
Yale School of Public Health	Yes	Under menu → 'Admissions and Financial Aid' → 'Student Life & Academic Support' → 'Libraries at Yale'	Yes	4-5 The link to the library is listed on 'Student Life & Academic Support' page and 'Libraries at Yale' page	Harvey Cushing/John Hay Whitney Medical Library	2

Arrows indicate navigation to named webpages or sections. All clicks were counted, even if it simply expanded a menu.

organizational structure has remained such that public health librarians are a part of the larger Yale University Library promotion/ranking system and report to the Cushing/Whitney Medical Library Director. While KDB's position is currently funded through an endowment, the cost of the other public health librarian is paid for by Yale School of Medicine, of which SPH is a department, at the time of this writing.

Unsurprisingly, the Yale web presence has also evolved. In 2004, the APHL had its own website, which was available directly from the SPH website and the medical library website. While this website no longer exists, the public health librarians launched a 'support for Public Health' webpage on the medical library website in 2022 and phased out existing public health LibGuides, which were used from 2016-2021. They asked the SPH Marketing and public relations team to link to this webpage from the SPH website, to which they agreed.

Liaison librarian visibility on SPH websites

Del Biondo assessed public health liaison librarian visibility on six schools of public health websites and found that only two of the six schools mentioned the medical library that serves the SPHs on its websites [17]. This method was used to evaluate the visibility of library services for SPHs on the websites of the SPHs included in the original Kronick study and the number of clicks to reach the medical library's website was also recorded [23]. This website analysis was conducted in June 2023 and represents the SPH website layouts at that specific point in time. Table 2 summarizes these observations.

Although the physical APHLs have closed since the Kronick visits, four of the five SPHs' websites highlight library services or collections for public health and/or note the medical library which serves public health. This may be to market to prospective students in addition to serving as a resource or reminder to current students, faculty, and staff. The one Hopkins SPH does not describe library services, however, the school links out to the university library system from its website. In the case of Yale, the public health liaison librarians are noted on the SPH website's description of the Library. For the other schools, the library website is hyperlinked so that a web user could find additional information upon visiting the website and exploring (e.g. searching for staff or selecting a LibGuide by subject area). According to the Welch Medical Library web sites (Hopkins), one informationist serves Public Health Administration and one serves Public Health Graduate Students. In the case of Michigan's Taubman Health Sciences Library website, there is a Global Health Coordinator for Library Research not accounted for in Table 2.

DISCUSSION

Limitations

We are not able to share the detailed interview notes and findings or attribute most of them to individual libraries due to the original agreed-upon internal QI-only nature of the interviews. If these investigations were being pursued today, we would have engaged with the IRB and developed a prospective informed consent process for all those interviewed. The health department perspective is also limited as we did not meet with the health departments in Houston, Baltimore, and New Haven, as the librarians indicated that there was not a service model or collaboration.

Special Services Require Expertise

The primary finding at the time of the visits was that APHLs were in a great state of flux. Those located at universities with medical centers were being further integrated into the overall medical library with a primarily virtual collection and less emphasis on physical collections and spaces as the typical branch library model. They were moving from being supported by a small PHL staff to being served by the reference and outreach efforts of the larger academic library, often by integrating the public health librarian into the larger staff. These findings are institution-specific and neither these reports nor the website analysis are intended to suggest that they fully represent the larger picture of PH library services and expertise in the United States.

One united health sciences library as opposed to a standalone public health library has its strengths, judging by Yale's experience. When liaison librarians are close to the larger library's stacks, technologies, reservable spaces, and historical collections, this fostered a greater understanding of the library's diverse collections, so that liaisons can confidently organize programming and tours for their constituents in one centralized place. This also allows librarian colleagues to more readily collaborate, ask each other for assistance, and answer general reference questions or directional questions from other schools and disciplines.

Public Health Knowledge Resources Access in a World without APHLs

The hope was that these visits would lead to increased communication and collaboration among academic and governmental public health libraries, but as budget challenges focused academic libraries on their core constituencies of faculty, staff, and students, the responsibility to be a state or local resource was less of a priority. Collection access was one of the only avenues for health department staff to use the libraries. As APHLs were dismantling their print collections and dealing with back issues, storage, and digitization, it is unclear what

happened to these collections, except for Yale, where 2089 volumes from 58 titles from the APhL were absorbed into the Medical Library collection. This absorption of subject-specific branch libraries is not unique to public health libraries. Our findings parallel a larger trend in the closure or consolidation of branch libraries in academia. In some cases, the spaces remain as study centers with the staffing and collections returned to the main library. In other cases, the physical footprint has been absorbed entirely [8].

Public health journal coverage online has improved, and *American Journal of Public Health (AJPH)* and *Public Health Reports* have digitized backfiles in PubMed Central. However, as we learned from public health bibliometric studies of public health nursing [26], environmental health [27], infectious disease [28], and *AJPH* [29], the older literature is still cited. Many public health departments now participate as members of the Public Health Digital Library [30], which provides a core collection of online resources and partners libraries with an academic health sciences library for ILL services. Very few state or local public health libraries in the United States, such as the Texas Department of Health Library, remain.

During the COVID-19 pandemic, the world witnessed huge demands for public health professionals and evidence-based public health information. Public health professionals must understand how to access and use information, and librarians are critical to their professional development. The closure of physical libraries does not reflect the demand for public health librarian expertise, which remains strong, especially as academic public health programs continue to expand. Continuing to invest in public health librarian expertise is essential for SPH and the libraries that partner with them.

CONCLUSIONS

The nuances in comparing five APhLs, much as Herman had commented in 1955, were complicated enough to shift from quantitative reporting on the focused questions in the interview guide to qualitative description beneath broad categories. The lessons learned from standalone PHLs still inform the practice of this generation of librarians working in these spaces who have successfully transitioned to the current model of centralized library services to public health. However, these librarians are aging out of the profession making it timely to reflect on these experiences and document the history of these libraries in supporting public health learners and workers.

Regardless of physical location, librarian outreach can be successful through strategic communication and relationship-building that deepens over time. We are optimistic about the value that public health librarians and informationists demonstrate. The large number of MLA members engaged in the Public Health/Health Administration Caucus (261 as of December 14, 2023 [31]) suggests that this expertise continues to be developed and

deployed to educate those who will ultimately improve the health of the public.

As was intended for the original project, this article is one attempt to communicate awareness of public health librarian practice and services in a venue that is accessible to public health educators and decision makers who fund public health workforce development, such as agency and university administrators responsible for meeting the learning needs of those in public health educational programs. We hope our work sparks conversations and collaborations among public health leaders and librarians who support public health about what combination of library support models and services ensure successful learning experiences that prepare public health practitioners for their wide-ranging and critical roles in our society.

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DATA AVAILABILITY STATEMENT

Additional data from this quality improvement project is not publicly available because participants were not asked to provide consent to have their information shared for research purposes.

AUTHOR CONTRIBUTIONS

Kristine M. Alpi: conceptualization; formal analysis; funding acquisition; investigation; methodology; project administration; writing – original draft; writing – review & editing. Kayla M. Del Biondo: investigation; writing – original draft; writing – review & editing. Melissa L. Rethlefsen: conceptualization; investigation; project administration; visualization; writing – original draft; writing – review & editing.

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**SUPPLEMENTAL FILES**

- [Appendix A](#)

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Impacts of educational interventions of librarian instruction on health information seeking attitudes and behaviors in an employee wellness program

Colleen Marie Foy

See end of article for authors' affiliations.

Objective: Health literacy and its potential impacts on the wellbeing of patrons remain a highly regarded objective among health science and medical librarians when considering learning outcomes of patron communities. Librarians are positioned to champion literacy instruction activities. This study aimed to examine health information seeking attitudes and behaviors in an academic-based employee wellness program before and after health literacy workshops were developed and facilitated by an academic health sciences librarian.

Methods: The intervention included instruction informed by Don Nutbeam's Health Literacy Framework and the Research Triangle Institute's Health Literacy Conceptual Framework. Sixty-five participants obtained through convenience sampling attended workshops and were invited to respond to pre- and post-session surveys. Using a quantitative quasi-experimental methodology, surveys collected health literacy indicators including preferred sources and handling practices of in-person and online health information.

Results: Findings indicated workshops influenced information seeking behaviors as participants documented a decrease in social media use for health and wellness information (-36%) and medical information (-13%). An increase in the usage of consumer health databases (like Medline Plus) was also indicated post-workshop for health and wellness information (18%) and medical information (31%).

Conclusion: Favorable impacts are evident in this small-scale study; however, more research is needed to confirm the influence of these methods on larger and more diverse populations. Librarians should continue to develop and disseminate theory-informed tools and methods aimed at engaging various communities in constructive health information seeking practices.

Keywords: Health literacy; instruction techniques; employee wellness; health promotion; library partnership; academic library



See end of article for supplemental content.

INTRODUCTION

Information literacy remains the core objective for librarians, particularly for instructional librarians working in academic settings. Learning outcomes related to literacy and its associated behaviors and attitudes are a common thread throughout library instructional sessions. Health literacy (HL) and its potential impacts on patron wellbeing also remain a specific objective for health science librarians when working with student and patient communities. The Centers for Disease Control and Prevention has found that nearly 90% of the United States adult population has limited HL [1] and the United Nations recently declared the COVID pandemic to be an infodemic [2]. The global wellness market exceeds \$5

trillion, of which \$1.9 billion is spent in the US on traditional medicine, weight loss, nutrition, physical activity, and preventative medicine products and services [3], and mobile phone research suggests users receive an average of 74 notifications per day [4]. This context has created a strong need for valid health information [5] and increased literacy to help students, patients, and patrons navigate through this information landscape.

The phrase "health literacy" dates back to the 1970s when it used to describe standards for grade level education [6] and in the publication "Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention" which elicited the Healthy People Initiatives [7] in the United States, its definition has evolved to now

include both personal and organizational responsibilities in the pursuit of public health [8]. With US adults spending over half their waking hours in the workplace [9] and the World Health Organization recognizing employee wellness programs as a best buy platform for non-communicable disease prevention and control [10], corporate wellness programs have great potential for the proliferation of health literacy concept awareness and skill development. Workplace wellness programs can include health risk assessments, educational sessions, exercise and weight loss motivated activities, nutrition counseling, health fairs, and disease targeting [11–16]. The promising synergies of combining the reach of existing workplace wellness programming with a health science librarian's unique skills as health information professional, subject specialist, fact checker, and facilitator of health literacy skill development [17–19] are worth exploring.

This study's intervention is based upon Don Nutbeam's 2000 Health Literacy Model and the Research Triangle Institutes (RTI) Health Literacy Conceptual Framework of 2012. The Health Literacy Model explores HL as a function of wellbeing and everyday life and establishes a hierarchical lens on related concepts. Each level - functional, interactive, and critical - promotes independence and empowerment of health information consumers [5]. The RTI's Health Literacy Conceptual Framework bridges the gap between form and function of HL and acknowledges the complexity and range of individual HL skill attainment. It theorizes that demographic characteristics, prior knowledge and experiences, accessibility of resources, physical and intellectual capabilities, as well as external factors such as mass media, which now includes the internet and social media, influence the development, refinement, and utilization of health literacy skills to varying degrees [20].

Numerous examples of library educational partnerships are evident in the literature on HL education programming and support in public, academic, and special library settings. While playing "neutral party" and "connector" roles as multidisciplinary partners and information disseminators, librarians are model players when engaging in and developing partnerships both internally and externally to advance literacy among patron groups [21]. Barr-Walker et al. [22], Shipman et al. [21], and Swanberg et al. [23] published overviews of specific and successful instances of library involvement in HL support programs. From developing workshops with objectives to decrease computer anxiety in older adults and refugee populations when making health decisions, to workshops and tool kits designed for local community groups in support of valid health information seeking behaviors, to building tutorials that expand HL and evidence-based medicine concepts for health science students, librarians are empowering patients as consumers and students as future educators and providers. To highlight collaborative examples targeting young adults, but with highly adaptable and transferable curriculums

and objectives for diverse populations, health science and medical libraries in Texas [24] and Maryland [25] developed or supported HL modules to strengthen those skills in high school students. Both programs met students in their settings and facilitated interactive real-life examples which trained students to locate and evaluate online health information and used gaming to reinforce concepts. Both programs also increased confidence levels for a diverse population of young adults to use and validate online health information [24,25].

Although the benefits of workplace wellness programming are highly debated in the literature relative to returns on investment, workforce health risks and productivity, and employee moral [11,13,15,26], specific instances of programs that apply HL-focused constructs may yield isolated, but measurable, outcomes. Literacy-focused interventions have been shown to influence diet choice and quality outcomes in workforce populations following educational workshops and messaging strategically scheduled and placed in workplace environments [12,14]. To address overall HL aptitude among employee organizations, a 2016 Virginia Tech study determined that existing HL levels among employees from various backgrounds and professional settings may influence the likelihood of participation and success at each phase of programming. Although employees with limited HL were less likely to enroll in programs offered and achieve prescribed weight loss objectives [16]. In each study case, results convey the need for strategies that enhance HL levels in workplace settings to improve participation in health-driven incentive programs and their potential participation-related health outcomes.

In a 2020 bibliometric analysis, Wilson et al. posited that the lack of published HL related work by librarians may not directly correlate to the successful execution of those efforts within their communities [27]. It is hoped that increased publication of work in this field may facilitate the dissemination of successful approaches and applications of HL instruction. Therefore, with improved HL linked with favorable health outcomes, and the lack of HL concepts and instructional strategies evident in the employee wellness literature, this study aimed to answer the following research questions:

- What is the impact of theory informed librarian-facilitated instruction on understanding and attitudes toward HL in an employee wellness program through intentional instructional design and behavioral assessment?
- What is the impact of experiential learning approaches on health information evaluation behaviors?
- What is the impact of exposure to valid health information sources on the likelihood of user engagement?

METHODS

Design and Sample

Taking a quantitative approach to a quasi-experimental methodology (without a control group), instruction and pre-post surveys were designed for participants in predetermined cohorts of a medically directed employee wellness program at Wake Forest University (WFU). The Health and Exercise Science (HES) Department at WFU conducts Healthy Exercise & Lifestyle ProgramS (HELPS) which offer a three-month Therapeutic Lifestyle Change (TLC) program and a six-month Healthy Weight for You (H-WFU) program. HELPS session schedules, participants, formats, and durations were predetermined by administrators prior to library involvement; therefore, the librarian investigator did not dictate nor participate in sampling practices. All full-time WFU faculty and staff employees may participate in HELPS programming as space allows. Although the WFU Office of Institutional Research publishes employment demographic statistics [28], that information was not collected during this research and may or may not be representative of overall workshop participants. Sixty-five individuals attended HL workshops during the Fall 2022 and Spring 2023 semesters: Fall TLC (n=15), Fall H-WFU (n=17), Spring TLC (n=15), Spring H-WFU (n=18). Although the study investigator acts as the HES librarian liaison, project advocacy and proposal for librarian-facilitated HL instruction and assessment occurred before the study's launch. The Institutional Review Board of WFU approved this study in July 2022 under Protocol #IRB00024753.

Intervention

The intervention included a 60-minute workshop to assist participants in making informed decisions regarding finding, evaluating, and using online health information. A total of four workshops were available during the Fall 2022 and Spring 2023 semesters for four separate cohorts of HELPS programs; no participant attended more than one workshop during the research timeframe. All sessions were synchronous, virtual, and occurred in October 2022 and March 2023 except for one in-person session occurring in May 2023 once HELPS administrators were comfortable holding in-person sessions post-COVID.

Workshop content was facilitated by the librarian investigator and incorporated educational tools including discussions introducing HL levels as defined by Nutbeam [5] and their implications and proposed health outcomes and disparities as indicated by Squires et al. [20] in the RTI HL Conceptual Framework. For instance, instructional prompts encouraged participants to consider cultural literacy as a tangential component and acknowledge related challenges when seeking health information. Engagement activities utilizing social media platforms via break out rooms or small group discussions provided experiential learning approaches to unpacking health

information messages in YouTube Short, TikTok, TED Talk, and Mayo Clinic Minute videos. Participants were exposed to lateral reading strategies, also used by expert fact-checkers, to validate video message content and presenters [29]. The lateral reading methodology involves the four "SIFT" moves (S = stop, I = investigate the source, F = find better coverage, T = trace claims to original content) where readers leave the media source and attempt to find supporting information using additional – or lateral – tabs on their device [30]. Additionally, trusted consumer health information sources were demonstrated including [MedlinePlus](#) and [Drugs.com](#) with introductions to [DailyMed](#) and [ClinicalTrials.gov](#). The [Mayo Clinic](#) and [Cleveland Clinic](#) virtual health libraries were shared for awareness but not demonstrated. Lastly, recommendations for the MyPlate and CalorieKing mobile apps were mentioned as future additional or alternative tools to the MyFitnessPal app used by HELPS participants during the program. Rationales for choosing the selected sources were shared with participants during sessions, included in lesson plans, and derived from training, experience, and expertise of the librarian facilitator. Workshop slides, lesson plan and teaching script are available in Appendices A and B.

Assessment and Data Analysis

Participants were invited to take a seven-question digital survey via Qualtrics before and after workshops allowing for the collection of data identifying baseline and completion HL indicators. Although various forms of validated HL measurement tools are documented in the literature, no existing tools attempting to collect attitude and behavior information from study participants were found [31]. As the objectives in this research aimed to survey the attitudes and behaviors following HL-based instruction and activities rather than to test HL levels per-post workshop, the investigator developed a new survey (Appendix C) which aimed to capture information aligning with study objectives and which addressed three themes among questions: (1) types of health information used by participants, (2) sources of health information, and (3) respondents' attitudes and behaviors prior to making health related decisions. Types of information were addressed in two categories and, therefore, separately in the survey: health and wellness (HW) and medical (MED). This delineation was determined when considering global wellness market data which compartmentalizes spending in categories. Traditional medicine and public health spending is separate from personal care & beauty, nutrition, and physical activity groups [32]. Although all categories may include overlapping health related outcomes, the author anticipated respondents may look for information on a prescribed medical test, for example, in a separate location from skin or hair care information. Sources of information and examples are provided in the survey for participants to understand and respond appropriately, i.e., WebMD is

a website and PubMed is a bibliographic database. Lastly, the investigator was interested in the attitudes and behaviors of respondents prior to making health related decisions as HL can determine the efficacy associated with decision making [5,20,33].

The survey consisted of five multiple-choice / multiple-answer and Likert style questions (#1-5) aimed to collect quantitative data regarding information seeking manners as well as likelihoods and frequencies relative to trust, behaviors, and attitudes regarding health information handling. An additional open-ended question (#6) was intended to obtain various health interests and burning questions from respondents to address during or immediately after sessions. Upon data analysis and study completion, responses to this question, as well as a component of a Likert-style question addressing the frequency of engaging in trust behaviors when viewing online health information (#5c), were found interesting but beyond the scope of this research. Responses were collected, coded, and analyzed using a sequential explanatory design and various statistical measurement tools in Qualtrics, Microsoft Excel, and [online calculators](#). Significance values were calculated for data points discussed in the results section using the Chi-squared Test which assesses correlation between variables using p-values and relies on approximation [34]. Values were considered statistically significant when $p < 0.05$.

RESULTS

Response Rates

The 65 workshop participants were invited to take part in pre- and post-surveys totaling 130 invitations and possible responses. Seventy respondents agreed to participate via informed consent and completed the survey resulting in a 53.8% response rate. Sixteen participants started but did not complete the survey and 2 denied informed consent. More participants responded to pre-workshop surveys than post: pre ($n=47, 72.3\%$), post ($n=23, 35.4\%$). Email invitations to participate in the survey were sent a total of four times: one week prior, one day before, immediately after, and one week after all sessions. Invitations came from the HELPS program coordinator with hopes of increasing visibility from a familiar source rather than from the librarian investigator whose name may have been unknown to participants especially in pre-session messaging. Additionally, the librarian investigator or HELPS program coordinator requested post-survey feedback during live workshops.

Finding, Understanding, and Using Health Information

First and foremost, and in congruence with the CDCs definition of HL as “the degree to which individuals have the ability to find, understand, and use information and services to inform health-related decisions” [8], it is worth

noting that 96% ($n=45$) of pre-workshop participants claim to find valid health information online. Ninety-six percent ($n=45$) of participants also claim to understand the information found and 74% ($n=35$) use that information to make health decisions. Post-workshop responses were not significantly different at 83% ($n=19$) for finding, 87% ($n=20$) for understanding, and 65% ($n=15$) for using health information online.

Sources of Health and Medical Information

When asked where they looked for health and wellness information, pre-workshop respondents reported visiting or contacting healthcare providers most frequently ($n=40, 85\%$), followed by mobile apps ($n=34, 72\%$), friends/family colleagues (FFC) ($n=31, 66\%$), websites ($n=30, 64\%$), organizations ($n=29, 62\%$), and social media ($n=27, 57\%$). When asked the same question post-workshop, respondents answered similarly with a few differences: healthcare providers ($n=20, 87\%$), organizations ($n=16, 70\%$), websites ($n=15, 65\%$), and mobile apps ($n=12, 52\%$).

When looking for medical information, pre-workshop respondents were more likely to consult their healthcare providers ($n=43, 91\%$), websites ($n=32, 68\%$), and organizations ($n=30, 64\%$). Post-workshop responses aligned similarly: healthcare providers ($n=20, 87\%$), websites ($n=15, 65\%$), and organizations ($n=15, 65\%$).

Survey participants were guided by recommendations for each of the response options for information seeking questions. For instance, the “Healthcare providers” response included examples of such: physicians, pharmacists, therapists, physical assistants (PA), trainers.

The data indicated notable differences with responses pre- to post-workshop including a decrease in social media (-36% HW, -13% MED) and mobile app use (-20% HW, -8% MED) as well as the increase in database use (18% HW, 31% MED). The Chi-Square Test of Independence was performed to assess the correlation between these health information seeking behaviors and the workshop intervention. Pre- to post-workshop, there was a significant relationship between social media use for HW where $\chi^2(1, N=70) = 7.93, p = .005$ and database use for MED where $\chi^2(1, N=70) = 9.57, p = .002$. All variance and correlation values are noted in Table 1.

Friends, Family, Colleagues, and Word-Of-Mouth Referrals

Other data worth highlighting are likelihood behaviors from respondents regarding referrals about health providers, products, or services. Referral source and behavior information was captured over seven survey response options. Only one instance of significance was found between referrals for HW information from FFC and the workshop intervention where $\chi^2(1, N=70) = 7.85, p = .005$. Pre- to post- data variances are shown in Figure

4; significance values assessed using the Chi-Square Test of Independence are also noted in Table 2.

Figure 1 Health literacy-related information management

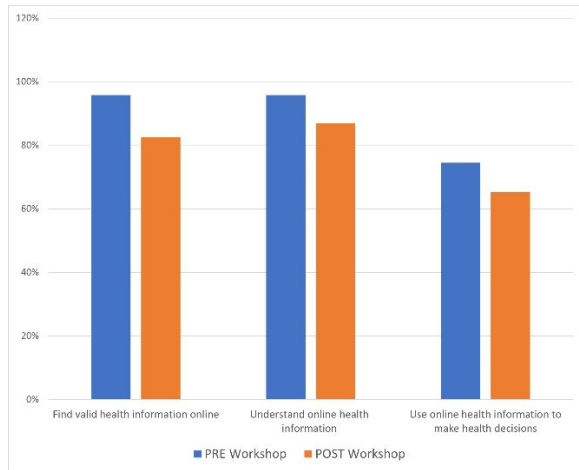


Figure 2 Health and wellness information seeking pre- to post-workshop

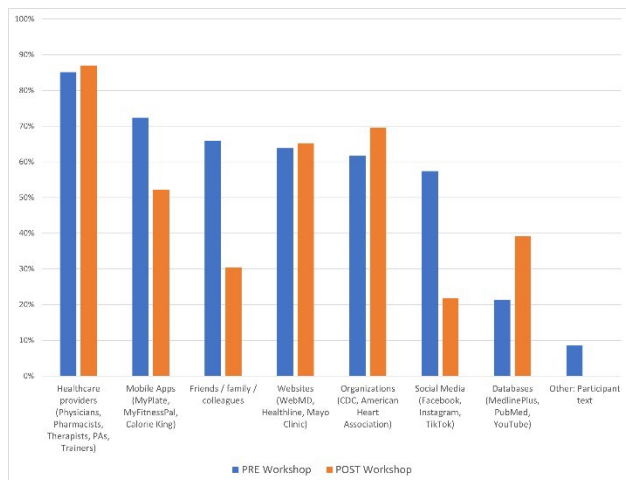


Figure 3 Medical information seeking pre- to post-workshop

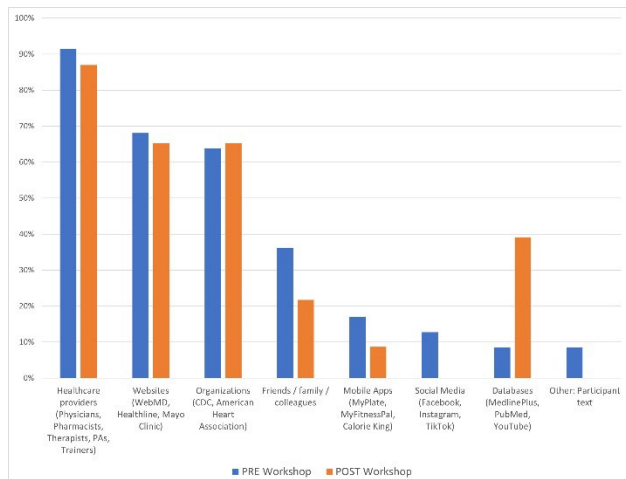


Figure 4 Referrals for health and wellness and medical information pre- to post-workshop

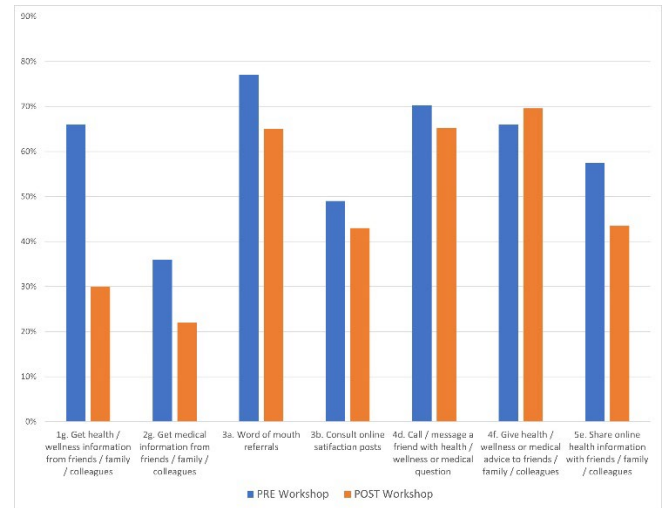


Table 1 Health information seeking behaviors pre- to post-workshop

Source / Use	Health and Wellness			Medical		
	Pre to post Variance	p-values	X ² *	Pre to post Variance	p-values	X ² *
Social Media	-36%	.005	7.93	-13%	.073	3.21
Database	18%	.115	2.79	31%	.350	0.87
Mobile Application	-20%	.095	2.49	-8%	.002	9.57

*for all values N=70

Table 2 Referrals source behaviors pre- to post-workshop

Survey Q#	Referral Source / Behavior	Pre to post Variance	p-values	X ² *
1g	Get health and wellness information from friends / family / colleagues	-36%	.005	7.85
2g	Get medical information from friends / family / colleagues	-14%	.222	1.49
3a	Word of mouth referrals	-12%	.315	1.01
3b	Consult online satisfaction posts	-6%	.667	0.18
4d	Call / message a friend with health / wellness or medical question	-5%	.672	0.18
4f	Give health / wellness or medical advice to friends / family / colleagues	4%	.763	0.09
5e	Share online health information with friends / family / colleagues	-14%	.271	1.21

*for all values N=70

DISCUSSION

Though small-scaled, this study can invoke health science librarians and other health information professionals in pursuit of community and public health education. As instruction practices were developed using the Nutbeam [5] and RTI [20] HL models, various results aligned with some of those key concepts. Although HL was not measured in this research, attitudes and behaviors that can support and enhance HL practices were observed through pre- and post-surveys. Workshops provided a structured approach to health information seeking and response behaviors through the provision of information [33]. External factors were also addressed through practical applications offering participants exposure to lateral

reading practices while combatting misinformation messages and tactics delivered through social media [20].

The employee wellness platform provided iterative instruction opportunities along with the advantage of establishing a long-term partnership between the librarian investigator and the HES department. Both entities benefitted, and continue to benefit, from the synergistic effect of a multidisciplinary partnership [21]. The HELPS program was able to expand and enhance its curriculum while the librarian provided health literacy instruction to faculty and staff who may not have been previously exposed to library services. Not only have health literacy workshops become a permanent part of HELPS sessions, the librarian liaison has since been involved in a multitude of honors and graduate student instruction and projects as well as invited to contribute to faculty research endeavors.

To address the seemingly counterproductive results reflecting declines in participants' abilities to find (-13%), understand (-9%), and evaluate (-9%) health information pre to post workshop, the author speculates variances are attributed to the Dunning-Kruger Effect where high performers tend to present inversely related confidence levels and underestimate abilities due to the awareness and acknowledgement of unknown information [35]. Although this cognitive bias-based theory is evident in multiple disciplines, Mahmood highlighted its existence when systematically reviewing information literacy skills assessment in 2016 [35]. In the case of the current research, participants may have been exposed to unfamiliar concepts and examples through workshop interventions and may have begun underestimating their confidence and abilities handling health information available through the formerly assessed platforms reviewed in the intervention.

While healthcare providers are indicated as the top source for health information among participants, websites (like WebMD, Healthline, and the Mayo Clinic) and organizations (like the CDC and the American Heart Association) are close contenders both pre- and post-workshop. Intuitively, the assumption is that responders trust these sources and are able to understand and use this information to inform health related decisions. Trust is a highly debated belief among researchers and information consumers particularly in the realm of online health information [36]. As previously noted in the Assessment and Data Analysis section, results from the Likert-style question requesting trust information from participants, are not included in results reporting of this research. These responses produced varied and insignificant results and may or may not be related to the websites, organizations, and social media responses reported in the sources for health and medical information section. Results may be due to the complex nature of trust behaviors especially when considering experiences and biases. Future research may garner some level of consistency with the existing literature. For instance, how

do medical experiences or stories influence trust in online health information source selection? Or how do health information sources support and enhance trustworthy experiences for users?

More consistent and notable data was collected in this study relative to pre-post workshop differences in social media (Facebook, Instagram, TikTok), mobile app (MyFitnessPal, MyPlate, CalorieKing), and database (MedlinePlus, PubMed, YouTube) use for health information seeking. Social media and mobile app usage decreased, and database usage increased after HL workshops. The likelihood of these results could stem from both MedlinePlus demonstrations and extensive group discussions around the quality and verifiability of health messages produced on social media. Many participants admitted they were unaware of MedlinePlus as a resource for valid health information and noted its ease of use during demonstrations. Additionally, demonstrations, discussions, and lateral reading exercises provided a practical approach to vetting health information messages on social media platforms. These two primary workshop components influenced a change in a participant's approach to health information messages delivered on social media platforms. Although discussions related to mobile apps were minimal, the potential impact of quality, availability, and bias of information on free versus subscription-based apps was addressed during the workshop.

Interestingly, but perhaps not surprisingly, most respondents reported similar tendencies to obtain health provider, product, or service referrals from FFC and online satisfaction posts before and after workshops. Data suggests this age-old process in which humans participate as they gather information about anything – including health choices. Implications include the demand for more work in health literacy awareness and education at all levels being individuals, as members of families and both in-person and virtual communities, will continue to procure health information from one another.

Three major initiatives have developed from this study. First, workshops have bolstered the partnership between the library and WFU HES department. Workshop content has been embedded into HELPS employee wellness curriculums where it can continue to impact participant experiences. Although future workshops may not collect survey data before and after each session, there will now be additional opportunities for instruction method practice. Additionally, existing HELPS administered surveys can include a section relating to the HL workshop portion of the program. Second, the author has developed a curriculum for a credit-bearing library course for WFU undergraduate students: LIB290 Topics in Health Science Information. As a half-semester, 1.5-credit current course offering, LIB290 includes content driven by the HL frameworks utilized in this study; one module covers HL concepts as well as the methods utilized and findings

obtained in this study. Lastly, the author is a part of the WFU Office of Civic & Community Engagement (OCCE) two-year Academic Community Engagement (ACE) Fellowship where academic instruction is strategically embedded into community programs. As a part of WFU's commitment to Winston-Salem and North Carolina, the OCCE champions community-based activity while assisting faculty and staff to practice teaching, research, or scholarship with community partners through training, development, and outreach support [37]. From 2023 – 2025, the author expects to develop and facilitate adapted HL workshops to high school students, new parents, or older adults with the intent to publish methods and findings.

LIMITATIONS

While methods, tools, and content may offer guidance in similar academic worksite settings and wellness programs, survey responses produced statistically insignificant data ($p < 0.05$) in most information seeking attitude and behavior indicators. Statistical significance has been reported in studies relating HL with biometric effects [16,38], the selection of weight management strategies [39,40], and micronutrient intake [14]. Although research literature document positive experiences and effects following HL interventions [12,14,16,21–25], with the complex nature of HL concepts and the acknowledgement of the many external and preexisting factors that may influence HL levels [20], statistical significance is not often an outcome of these efforts [41]. The use of convenience sampling reduced the ability to broadly generalize findings. As noted in the Methods section, workshop cohorts were predetermined and consisted of faculty and staff at a post-secondary academic institution. Several assumptions can be drawn from the nature of this sample. Accessibility, professional position and affiliation, and social and geographical demographics may contribute to survey participation and responses. For instance, a biology faculty participant who is active in their research community could be more adept to finding and scrutinizing information than a non-faculty peer in the same cohort. In this case, prior knowledge, bias, experience, and skill can pose significant limitations to data collected. The absence of a control group makes determining the impact of the intervention without considering other external factors, such as personal experiences and cultural influences, impossible. Also, a larger study population size could lend itself to more generalizable findings. Lastly, the survey created for this study has not been validated. Although the use of a new instrument was justified because no survey which captured information related to HL behaviors and attitudes was found in the literature, the lack of validation caused inherent limitations with findings which aligns with many previous attempts to quantify both HL levels and affects [42]. One example of this would be the

delineation between health and wellness versus medical information appearing in two out of the six survey items. Although the author did not field questions from respondents during or after intervention sessions regarding the difference between these types of messages, they acknowledge the possibility of confusion. Repeated tests and measures could find fundamental flaws with questions requiring discernment between the two.

CONCLUSION

Instruction and support informed by health literacy concepts are linked to improved health outcomes in employee wellness programs [12,14,16]. Specific instances of librarian-developed and facilitated curriculums in employee wellness settings, however, have yet to be documented in the literature. This study aimed to examine health information seeking attitudes and behaviors in participants before and after health literacy workshops developed and facilitated by an academic health sciences librarian. Although not without limitations particularly with sampling and the absence of a control group, intervention design and content provide examples for librarians with interests in enhancing instructional methods and building diverse partnerships. Survey results indicate the positive influence of educational and practical activities on information seeking behaviors among participants. While this study was performed in the workplace wellness environment, methods, tools, and content may be adapted to various educational settings. More practice and research are needed to further develop and disseminate validated tools and procedures related to health literacy education and in more diverse populations. These efforts can engage the public and elicit constructive health information seeking practices to inform decision making and foster favorable health outcomes.

DECLARATION OF INTERESTS

The author reports there are no competing interests to declare.

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DATA AVAILABILITY

The data supporting the findings of this study as well as the instruments used in its execution (pre-post survey,

workshop outline, sample slides) are available on the Open Science Framework at <https://osf.io/dvrw8/>. A project website is also available at <https://sites.google.com/wfu.edu/healthinformationliteracy/home>.

AUTHOR CONTRIBUTIONS

The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

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SUPPLEMENTAL FILES

- **Appendix A:** [Presentation Slides](#)
- **Appendix B:** [Lesson Plan and Script](#)
- **Appendix C:** [Survey Instrument](#)

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Promoting nutrition literacy in children: a case study of a community partnership between a university and an elementary school

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See end of article for authors' affiliations.

Background: Health literacy outreach is commonplace within public and hospital libraries but less so in academic libraries, where it is often viewed as not integral. Academic health science libraries may collaborate with public libraries to provide public health information literacy programming or “train the trainer” sessions, but examples of academic health science librarians leading community health initiatives are still limited.

Case Presentation: This case report discusses a collaborative project between Gonzaga’s Foley Center Library, the School of Nursing and Human Physiology, and a local elementary school to promote health literacy for students and their families, led by an Academic Health Sciences Librarian. The project scope included delivering nutrition education to elementary school students and their families, but pandemic closures limited plans for in-person programming. Conversations with stakeholders led to additional project opportunities, including tabling at the local block party, collaborating on a campus visit for 5th and 6th graders, supporting middle school cooking classes, and the creation of a toolkit for elementary and middle school teachers to support curriculum about healthy body image and potential disordered eating.

Conclusion: This project demonstrates one example of how academic libraries can partner with other campus departments to support health literacy outreach in their local communities. The pandemic made planning for in-person programming tenuous, but by expanding meetings to include staff from other areas of the university, the project team was able to tap into additional outreach opportunities. This work fostered close relationships with the local elementary school, providing the groundwork for collaborative health programming in the future, though more thorough assessment is suggested for future projects.

Keywords: Academic libraries; Community Engagement; Community Outreach; Health Information Literacy; Nutrition; children’s health

BACKGROUND

Healthy People 2030 defines personal health literacy as, “the degree to which individuals have the ability to find, understand, and use information and services to inform health-related decisions and actions for themselves and others” [1]. Libraries have been involved in health literacy collaborations for decades; much of this work has been supported by the National Library of Medicine, which has been a leader in providing funding for health literacy outreach programming [2]. In Duhon and Jameson’s 2013 survey, only 28% of general academic libraries supporting four-year institutions participated in health information outreach, with 61% reporting little or no need for health information outreach; although budgetary and staffing limitations were listed as reasons for not participating in health outreach, some felt that health outreach was not a part of the institution or departmental mission [3].

In a 2016 literature review of library participation in health literacy programming, the vast majority of studies reviewed were conducted by public or hospital libraries; in cases where academic health science librarians were involved, programming was primarily done in collaboration with public library partners [4]. Health science librarians have advanced knowledge of finding and evaluating health resources and experience in developing curriculum, while public librarians are able to communicate effectively with diverse communities that have varying levels of information literacy, and combining these skillsets and resources provides the opportunity to serve a larger sector of the community [5]. Partnerships with public libraries allow academic health science librarians to utilize their expertise by providing health literacy programming to the general public; in particular, many workshops have been geared towards providing seniors with the basic health literacy resources [6–9]. Examples of innovative programs involving academic

health science librarians and public libraries include inviting medical school staff and students [10] or library science students [11] to deliver public health literacy programming; in particular, many workshops have been geared towards providing seniors with the basic health literacy resources [6–9]. Examples of innovative programs involving academic health science librarians and public libraries include inviting medical school staff and students [10] or library science students [11] to deliver public health literacy programming.

The involvement of academic libraries in community health literacy often takes the form of a “train the trainer” program, where health sciences librarians provide training to public librarians or community members who may interact with health questions [11–17]. Additionally, academic health science librarians can be involved in health literacy through the creation of online research guides and toolkits; this includes consumer health websites that support the local community [11,18,19], as well as health literacy resources for healthcare professionals [11]. This case study describes a grant funded project to enhance health literacy within a local community, managed by an academic health science librarian at a university not affiliated with a medical school or hospital.

The primary goal of this project was to promote community health partnerships, with health promotion as the core function. The bulk of this work was conducted in the form of nutrition literacy sessions with elementary school students, and while learning outcomes were not developed for each class, student learning was not measured. Outside of the classroom, success was measured through the ability to distribute nutrition education information to community members; the scope of this project focused on promotion of information, which could be seen through point of contact with the community and in particular, the handing out of print materials.

A secondary outcome of this project was to further situate Gonzaga University as a source of support for health education projects. Gonzaga’s Center for Community Engagement has previously collaborated on many health and wellness programs within the local Northeast Spokane community, including hosting a health resources fair for residents at Gonzaga Family Haven (a housing project for previously unhoused Spokane residents) and funding a part-time mental health counselor at the local Elementary School. While health partnerships are not uncommon at Gonzaga, this program was the first to involve the Foley Library as educational partners and to provide classroom programming in collaboration with teachers at Logan Elementary. Additionally, this project specifically focused on classroom teaching, and helped further develop the University as an educational partner in health literacy programming.

This project also allowed the author, a Health Sciences Librarian who was brand new to the institution, the opportunity to build relationships with administrators in the School of Nursing and Human Physiology, positioning them as a potential collaborator in future health literacy projects. As a white academic, the author was concerned about the power structures and privilege embedded in community health outreach initiatives, which could potentially impact relationships with external partners. To mitigate this, the author viewed their role not as an expert instructing the direction of the project, but as a facilitator, consulting Logan Elementary teachers about specific needs and gaps that could be addressed throughout the grant period. The author hopes that this case study can help other librarians navigate similar situations in their own institutions.

CASE PRESENTATION

Gonzaga University is a private Jesuit liberal arts institution; while the School of Nursing and Human Physiology (SNHP) provides undergraduate, graduate, and doctoral degrees, the University is not affiliated with a medical school or hospital and the Foley Library supports graduate and undergraduate programs across a variety of disciplines. Gonzaga University is a Jesuit institution with a strong commitment to social justice and community enrichment, but also resides on stolen land and was built on the broken promise of providing education for Native American students [20]. With this legacy in mind, it was important to build programming that did not situate the project team (white faculty and staff at an private academic institution) as intellectual heroes, but instead allowed for nuanced conversations in partnership with the elementary school educators who best understand the needs of their students. Rather than building completely new and innovative programming, the goal was to work alongside the teachers to supplement the health literacy work that was already taking place.

Gonzaga University resides in the Logan neighborhood in Spokane, Washington, where 25% of residents live below the poverty level; food insecurity in children has increased alongside the COVID-19 pandemic, and access to healthy food continues to be a concern [21]. The Washington Food Security Survey found that during the pandemic, the number of households in the Logan neighborhood that use food assistance programs rose from 32% to 41%, with 40% of respondents saying their diets had worsened during the pandemic [22]. Gonzaga supports multiple programs to address food insecurity in the Logan neighborhood, including partnerships with Spokane Public Schools, Second Harvest Food Bank, Sodexo food services and the University’s Campus Kitchen. In conversations between Elementary school administrators and Gonzaga’s Center for Community Engagement about how Gonzaga can help support students, it was recognized that in addition to access to healthy food, there

was also a need for education around nutrition literacy, and administrators requested that the University provide support for health literacy education with students and their families.

Description of the Project

In response to this request for health literacy support by school administrators, leadership in the SNHP and the Foley Center Library collaborated on applying for American Rescue Plan Act (ARPA) grant funding through the Institute of Museum and Library Services (IMLS) to support this work. Over a six month period, this grant provided \$9,960 in funding, which was used to purchase materials to support in-person educational programming, print materials used for outreach, pre-packaged healthy food for distribution at community events, and the hiring of a graduate research assistant. The author of this case study, a Health Sciences Librarian at Gonzaga's Foley Library, was not involved in the writing of the grant application, as they were not employed by the institution during these early planning stages. Instead, they inherited management of the program upon their arrival at Gonzaga in late 2021.

This collaborative project focused on increasing the ability of students and families to understand health information, potentially leading to more informed health decision making. Health literacy is a broad topic, but the group chose to initiate this work through basic nutrition education. While students were the primary target audience for health literacy programming, school officials noted that health literacy education should extend to student families as well, as children generally do not have control over meal planning or health decisions.

The project team, which consisted of the author, the Assistant Dean for the SNHP, and the SNHP Program Manager, met bi-monthly with members of Gonzaga's Center for Community Engagement (CCE) and Logan Elementary School administrators and teachers. Approximately 6-10 people were in attendance at these regular meetings, where the author (as the project lead) provided updates and sought out feedback from community partners. The CCE has partnered with Logan Elementary on a number of other programs, and these regular check-in meetings provided the opportunity for program leads to share updates, get feedback, and coordinate schedules. Through these conversations, two primary venues were identified by our community partners for conducting this work: Educational programming with children at Logan Elementary and community outreach at the Logan Family Dinners.

Elementary School Programming

The first major component of the grant was to provide nutritional literacy programming to students at the local elementary school, to be developed and delivered by the

author. In 2021 The author and the project team began meeting regularly with administrators and the physical education and health teacher from Logan Elementary to discuss the development of this program.

Numeracy literacy was initially listed as a program objective, specifically in teaching students how to read and understand nutrition labels. Upon joining the team and reading the project description, the author was deeply uncomfortable with introducing concepts that could easily slide into supporting disordered eating behaviors [23] or unintentionally shaming children around food choices (of which they generally had no control over). Through conversations with school administrators, the author had numeracy literacy removed as an objective and the group decided to focus specifically on nutrition literacy. Following suggestions for promoting healthy food, the team centered programming on the joys and positive benefits of foods rather than applying moral judgment to foods [24].

The author created a tiered curriculum for K-6 students, much of it modified from the USDA's MyPlate curriculum [25]. Lesson plans from MyPlate curriculum were modified to meet the needs of each grade level, and student understanding was assessed by reviewing completed assignments. Health Education Curriculum Analysis Tool (HECAT) was used to help identify learning outcomes for each grade level [27]; Table 1 describes each learning outcome and the associated lesson plan for each level.

Health literacy programming for K-4 classes took place at Logan Elementary. The project team planned to host the 5th and 6th grades in Gonzaga's Foley Library for the health literacy programming. When the team learned that the CCE staff was also planning on hosting the 5th and 6th grades on campus in a similar time frame, the two teams collaborated in planning the campus visit.

While pandemic infections did affect student attendance at the start of the winter term, as the year progressed, rates of attendance began to return to near-normal levels, and in-person programming was delivered to approximately 260 elementary school students. The team collected basic data on the student health literacy sessions by reviewing student work and collecting feedback from elementary school teachers who participated in the program. Some general indicators of the positive impact of the program were found in this data. For example, almost all the first and second grade students were able to correctly identify the food groups for their favorite foods. Another example was that all grade 3 and 4 students successfully completed the assignment that included creating a recipe fit for an athlete, making a poster advertising their product, and explaining how the vitamins or minerals found in each ingredient could contribute to increasing athletic performance.

Table 1 Summary of K-6 Learning Outcomes and Activities

GRADE LEVEL	LEARNING OUTCOMES	ACTIVITIES
Kindergarten	<p>Explain the importance of trying new foods</p> <p>Identify some nutritional benefits of eating fruits</p>	<p>Storytime: <i>I Will Never Not Ever Eat a Tomato</i>.</p> <p>Students walk to different stations to try fruits (each of a different color) and learn one nutritional fact about what that fruit does for their body (i.e., helps with vision, provides energy, etc.).</p>
1st - 2nd	<p>Explain the importance of choosing nutrient-dense foods and beverages that help people feel good.</p> <p>Explain the importance of eating different foods from all the food groups</p> <p>Demonstrate ability to place foods in one of the five food groups</p>	<p>Dance and sing along to "Alive with Five!" song.</p> <p>Students complete a worksheet describing their favorite food, what other food they might eat it with, and what food group it is in. Students then draw a picture of their food choice.</p>
3rd - 4th	<p>Describe the benefits of eating plenty of fruits and vegetables.</p> <p>Describe how to make or choose good-tasting, nutrient dense snacks.</p>	<p>Provide a short presentation about how vitamins and minerals affect their body.</p> <p>In small groups, students create a recipe for a snack fit for an athlete; write out the recipe, describe why they chose it and what it can do for their bodies. Groups then create a poster advertising their product and share it with the class.</p>

Table 2 Summary of All Program Activities

ACTIVITY	DESCRIPTION	REACH / NUMBER OF PARTICIPANTS
K-6 programming	Delivered educational programming to K-4 students at Logan Elementary; programming for 5-6 grade students delivered at Foley Library	260
Tabling at the Logan Block Party	<p>Provided to-go bag with:</p> <p>Healthy snack (a smoothie)</p> <p>Recipe cards</p> <p>Body positivity stickers</p> <p>Handout detailing healthy food options in the Logan neighborhood</p>	252
Educational placemats and handouts for the Logan Family Dinners	<p>Provided handouts for both to-go and in-person dining (marketed towards adults):</p> <p><i>Health Literacy: What It Is and Why It's Important</i></p> <p><i>Eating Disorders and Disordered Eating in Adolescents</i></p> <p><i>Nutritional Guidelines: Vitamins</i></p> <p><i>Intuitive Eating</i></p> <p><i>Healthy Body, Healthy Mind</i></p> <p>Provided placemats for in person dining (marketed towards youth)</p>	500 handouts and 100 placemats
Partner in supporting nutritious cooking classes for middle school students	Purchased cooking kits (mixing bowls, utensils, etc.) for students to take home	40
Build a toolkit for teachers	Toolkit built for elementary and middle school teachers on the topics of mental health, bullying, and body image. Included resources such as lesson planning and workshop curriculum.	From 8/22 - 12/22: 24 visits to the homepage; 293 visits to the Body Image resources page

Halfway through the six-month grant period, the school principal asked for assistance in creating an intervention for 5th and 6th grade students to combat potential disordered eating; as no one on our team was qualified to teach this topic, we were unable to provide an intervention. However, the team was able to incorporate a facilitated discussion about body image and student attitudes about food to learn more about student feelings. Through these conversations, a small group of students was identified as having negative feelings about food, directly stating that they do not eat lunch, though this was not the majority of students in the cohort. The team also found that a group of students cooked for themselves, including doing most cooking for themselves, but because they didn't know how to cook, they ended up mostly eating "unhealthy foods."

The author also built a toolkit to support local teachers looking to introduce workshops or lesson planning around addressing disordered eating. Built on the LibGuides platform, this toolkit was shared with administrators at Logan Elementary, as well as Shaw and Yasuhara Middle Schools, and received nearly 300 visits in the first four months of being published.

Community Outreach

The second major component of this grant project was community outreach through a preexisting program supported by Gonzaga, the Logan Family Dinners. The program provides free weekly dinners at Logan Elementary and acts as a community gathering space that has historically been well-attended. Partnering with an established program allowed for a connection between health literacy education and the specific meals being offered. When COVID-19 infection rates began to spike in January of 2022, the Logan Family Dinners canceled all plans for in-person dining and instead provided to-go dinners. The project team was disappointed that they would be unable to connect with people in-person. However, the event organizers noted that people who attended the dinners were very receptive to print materials in the past and suggested that handouts be created to be distributed with to-go dinners. The project graduate research assistant, who was pursuing a degree in Clinical Mental Health Counseling, created five separate handouts geared towards parents on topics such as intuitive eating, nutritional guidelines, and disordered eating in adolescents, while the author designed placemats for students that included information about nutrition and healthy bodies (see Table 2).

To seek out other ways of connecting with the public, the project team scheduled multiple meetings with staff in the CCE. Through these conversations, the team was invited to have a table at the Logan Block Party, an annual event hosted by Gonzaga University, to be held in the spring of 2022. Though they were unable to give in-person presentations at the Logan Family Dinners, the project

team was able to meet with members of the community through this new opportunity. Outreach funding from the grant allowed the team to build to-go bags that included ready-to-drink smoothies and printed materials, such as smoothie recipe cards and information about healthy food options in the Logan neighborhood; 252 bags were distributed at this event (see Table 2).

Additional Opportunities: Making Connections

As they approached the end of the grant period, the project team met with administrators at Logan Elementary and the two local middle schools to discuss other ways grant funds could be utilized to support existing student health literacy efforts. In this meeting, the team learned that Gonzaga's Campus Kitchen was planning on providing nutrition literacy and cooking classes for 40 students during the Shaw Middle School summer programming; as this aligned with the project goals, the team partnered with Campus Kitchen to provide financial support for this program.

DISCUSSION

As its primary goal, this project sought to promote health through two educational avenues: school programming at the local elementary school, and the distribution of health literacy materials to adult community members. The project team was successful in meeting this goal, delivering nutrition literacy education by providing educational sessions to approximately 260 students and distributing over 750 handouts to adults attending the Logan Block Party and the Logan Family Dinners. For the original grant writers (who came from a public health communication background), the focus of this grant was not necessarily about providing a measurable intervention for a problem, but about general public health communication and fostering community relationships. In this secondary goal the project was successful, as it further situated Gonzaga University as a potential partner for future community-based health projects, evidenced by the fact that the university has been asked to participate in another similar project.

A major strength of this project implementation was the constant communication not only with external organizations, but also within the team's own institution. This project initially detailed only two avenues for providing health literacy education, but through conversations with both internal and external stakeholders, the project team was able to identify additional ways of reaching the community, such as tabling at the local Block Party. The author met with elementary and middle school administrators to discuss other ways the team could assist with health literacy initiatives, which led to partnering with the Campus Kitchen at Gonzaga on healthy cooking classes for middle school students.

However, the methods for how this project was accomplished are potentially problematic, as it was built on the assumption that this intervention was necessary. The aims and outcomes of this project were determined by educators and administrators from Gonzaga and the local elementary school, but the voices of community members were not consulted. The issue of low health literacy in students was not fully defined, nor was it evident that providing nutrition education to students and families would address a specific deficiency. While the Washington State Food Security Survey found that people in Spokane self-reported a decrease in healthy eating during the pandemic [22], there was no evidence that this was caused by low levels of health literacy, or that nutrition literacy would help remedy this problem. The survey also noted that during the pandemic, respondents reported seeing an increase in food prices and in using food assistance programs, suggesting that food insecurity was a key factor in the consumption of unhealthy foods [22]. Nutrition literacy was identified as an issue, but additional research is necessary to ascertain whether there is a true correlation between health literacy and healthy eating in this community.

Without consulting the community, the project team did not have the opportunity to take into consideration common reasons behind the food choices that people make. Food choices may be highly influenced by cultural norms, including social identity, ethnicity, religion, gender identity, and ethics [28]. Access to healthy food may hinge on a number of factors, including the financial privilege of purchasing more expensive healthy foods and having the time and physical ability to prepare meals. Additionally, access to healthier food options can be challenging for those who live in a “food swamp,” where there is an abundance of fast-food chains and convenience stores, but little access to affordable healthy food. These factors could have been identified by using community-based participatory research (CBPR), which engages residents in the process of identifying and planning community health interventions [32]; long-term processes such as CBPR can help to ensure that community health programs are conducted in full partnership with the community.

CBPR could have also helped mitigate the potential for educational elitism or saviorism. Colleges and universities have immense power within their local communities. Lopez and Romero outline two major issues with academics’ civic engagement work: this work frames the community as having a deficiency, and it perpetuates savior mentalities amongst members of the academic institution, situating academic elites as intellectually superior [29]. The author was concerned about the possibility of perpetuating unexamined power and privilege in this project, and while methods for addressing community health literacy through an actively anti-racist framework are beginning to be discussed [30,31], scholarship in this area is still lacking.

The project also suffered from poor assessment planning and a lack of continuity from the initial grant writing to project implementation. As management of the project changed hands first from the School of Nursing & Human Physiology, then to Foley Library administrators, and finally to the author, a newly hired Health Sciences Librarian, vital information was lost in translation. The author had extensive project management experience as a former small library director, and while their leadership experience aided in navigating a project with a moving target, it did not change the fact they were new to the institution and did not yet fully understand the needs of the community or how the project originated.

Opportunities for Academic Health Science Librarians

Despite the challenges of this case study, this project and the existing literature highlight various opportunities for academic libraries to be involved in health literacy outreach in their local communities. Pandemic-era projects have demonstrated innovative ways that academic health science librarians are promoting health literacy, such as planning and coordinating a healthcare conference for a large, multi-state health sciences university [33], or collaborating with medical school staff and students to provide public library health programming [10].

With these new opportunities, it is important that health science librarians approach this work with care and examine their roles in community health projects. While a primary goal in the field of public health is to improve health outcomes, public health initiatives have the potential to be incredibly harmful, especially for marginalized groups [34,35]. Viewing this historical context in combination with the power structures inherent in public health initiatives where an institution is situated as the experts within a community, there are many opportunities for missteps in community health programming. While risk and failure are commonplace and even expected, asking questions about potential harm to a community is vital for anyone conducting this work. A long-term, collaborative assessment process, such as the CBPR work done by Foell et al. [32], may be helpful in providing a collective framework for identifying ways to address community health needs. This process is time consuming, but successful health partnerships require time to build relationships, establish trust, and create programming that is long-lasting and sustainable.

For health science librarians, it is also important to identify library-specific skills and limitations and ask what the role of a library professional should look like in this context. For this particular project, the author had project management experience but did not have a public health background, a specialized knowledge of nutrition, or experience creating curriculum and teaching primary school children. Building a toolkit for educators was an excellent use of a health science librarian’s specialized skillset, but other areas of this project could have been

much better managed by individuals with experience and skills in those particular areas. The specialized knowledge of health science librarians in educating people about accessing information and assessing the reliability of online information is incredibly valuable in public health education, so finding opportunities to share those skills will better serve the communities we are working in. Health science librarians with project management skills also have the opportunity to help lead community health projects, but librarian project managers also need to ensure that they are not taking on work that would be better suited to another. This may mean being honest about limitations and seeking out expertise outside of their immediate circles. As new opportunities continue to arise with new funding opportunities, health science librarians can leverage their unique resources and knowledge to help build sustainable and mutually beneficial partnerships in the community.

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DATA AVAILABILITY STATEMENT

There are no data associated with this article. Requests for lesson plans or outreach materials can be made by contacting the author directly.

The associated toolkit, Addressing Mental Health in Children: A Health Literacy Toolkit for Educators, is built on LibGuides and is licensed under a Creative Commons Attribution 4.0 International License. Public access to the toolkit can be found at <https://researchguides.gonzaga.edu/health-literacy-toolkit>.

AUTHOR CONTRIBUTIONS

Candise Branum: Conceptualization, data curation; investigation; methodology; project administration; supervision; writing—original draft; writing—review & editing.

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How to modernize without compromising history: a case study of the Franzello Aeromedical Library's journey in updating collections, capabilities, and facilities

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See end of article for authors' affiliations.

Background: Academic libraries play a significant role in the student learning process. However, student needs and preferences as well as new paradigms of learning are driving libraries to transition from quiet book repositories to places of collaboration and open information. This descriptive, mixed methods case presentation explores the transition of one library, the United States Air Force School of Aerospace Medicine Franzello Aeromedical Library, in three key areas: collection, capability, and facility. Due to the niche subject matter and audience the library serves, this case also describes how the Franzello Aeromedical Library's distinct collection and capability remained intact throughout modernization.

Case Presentation: The Franzello Aeromedical Library's modernization project aimed to augment the library as a cutting-edge resource supporting USAFSAM's education, consultation, and research mission to equip Aerospace Medicine Airmen with the skills and knowledge for healthcare delivery in austere environments. This project was approached using five phases: 1) best practices baseline, 2) baseline evaluation of library visitor needs, 3) collection weeding, 4) capability, and 5) space design and construction.

Conclusion: As a result of this complex two-year project, several recommendations were gleaned. Use the effort as an opportunity to market library services to new audiences. Ensure all stakeholders are at the table from day one and in perpetuity to save time, and consider using purposeful decision-making models, such as Courses of Action, to make tough calls. Be prepared for delays by padding your timeline and compromise where necessary to keep the project alive. Finally, the authors recommend using in-project discovery and findings to plan for future need justification.

Keywords: Library modernization; library redesign; library capability; collection weeding; aerospace medicine

BACKGROUND

Libraries are unique and play a variety of roles for their users [1]. Special libraries face challenges in adapting to the ever-changing needs of their users and evolving technologies. Unlike general academic libraries, special libraries house specific collections tailored to niche subject areas. These focused collections can become outdated, cluttered, and underutilized without periodic evaluation and modernization. The twenty-first-century library must continually reinvent itself as an environment that cultivates curiosity, participation, teamwork, and continuous education [2]. While renovation and modernization both involve improving the physical space, infrastructure, and user experience, modernization efforts go beyond basic renovations to holistically transform library services, collections, and workflows along with evolving user needs and best practices.

In a special report funded by National Library of Medicine, National Institutes of Health, and Department of Health and Human Services, Lynn, FitzSimmons, and Robinson wrote that library users will have less time, more needs, and a desire for information rapidly [3]. Thibodeau also suggested that future roles of librarians should be expanded to include partner, collaborator, advisor, evidence-based medicine expert, educator, and information filter. Librarians should be informers of system designs and make libraries more valueable [3].

Currently, the National Library of Medicine is underway with a six-year renovation effort that includes converting underutilized space into a variety of team huddle spaces, state-of-the-art training areas, a central reading room, workstations, and offices [4]. Its modern design is expected to improve the workplace experience and focus on team collaboration [4].

Libraries are service organizations that embody their institution's mission and vision [5]. Librarians must be stewards of the library building and remain proactive and creative in negotiating space for the library and its services [6]. Library leaders must recognize the need to build and sustain libraries through activities like collection assessments, user surveys, digital archiving, advocacy, and strategic planning [7]. To meet this need, the United States Air Force School of Aerospace Medicine conducted a descriptive, mixed methods case presentation that explored the modernization of the Franzello Aeromedical Library (FAL) in three key areas: collection, capability, and facility. Due to the niche subject matter and audience the library serves, this case also describes how the FAL's distinct collection and capability remained intact throughout modernization.

CASE PRESENTATION

The Franzello Aeromedical Library (FAL) is the most extensive aeromedical library in the world, with over 300,000 volumes [8]. Originally known as the AeroMedical Library, the Franzello Aeromedical Library was rapidly moved in its entirety from Brooks City-Base, Texas to Wright-Patterson Air Force Base near Dayton, Ohio after the relocation of its associated academic institution, the United States Air Force School of Aerospace Medicine (USAFSAM) under the 711th Human Performance Wing (711HPW). On June 24, 2011, the library was renamed the Franzello Aeromedical Library (FAL) in honor of its former director, Joseph Franzello. During the dedication, USAFSAM's commander, Colonel Christian Benjamin, noted the continued mission of the FAL as "not to lose the aviation medicine lessons that we learned over the years" [9].

Due to time restrictions, the FAL's holdings were moved in their entirety, resulting in a collection that consumed most of the library's 13,000 square feet from day one despite being in a newly constructed building. By 2017, the FAL completely outgrew the existing space, and lack of weeding resulted in an abundance of items no longer needed in the collection and a space not suitable for students or faculty. Shelving reached the entryway blocking easy entry and most natural light. There was no space for a formal circulation desk, and student study spaces were crammed between the stacks.

Discussions on library modernization began in 2015, but the project had neither a champion nor funding. It was not until the fall of 2020, after the hiring of USAFSAM's first civilian dean, Dr. Melanie Lazarus, and the development of the school's first strategic plan, that the library team was officially tasked and funded by the Office of the Dean to complete modernization of the FAL.

The FAL's modernization project aimed to augment the library as a cutting-edge resource supporting USAFSAM's education, consultation, and research mission to equip

Aerospace Medicine Airmen with the skills and knowledge for healthcare delivery in austere environments [10]. Under the leadership of its library director, Ms. Kristen Young, this project was approached using five phases: 1) best practices baseline, 2) baseline evaluation of library visitor needs, 3) collection weeding, 4) capability, and 5) space design and construction.

PHASE 1: BEST PRACTICES BASELINE

In 2017, members of the USAFSAM Office of the Dean visited six libraries including academic, federal, public, and research institutions to benchmark modernization best practices (Table 1). These institutions were chosen because they: 1) represented libraries with a similar population and comparable resources, 2) had completed a recent large-scale modernization, or 3) were located within the local area.

Findings were presented to the FAL team to inform the modernization effort in collection, capability, and facility. The team determined that the library needed to be functional to meet today's mission. Best practices included the need to update the collection through digitization and updated materials and to re-design the physical space to support the needs of current students and staff for comfort, relaxation, and collaboration.

PHASE 2: BASELINE EVALUATION OF LIBRARY VISITOR NEEDS

In order to identify areas within the library that needed to be updated, the FAL released an anonymous, online modernization survey to students and faculty and established a team to guide the modernization project.

FAL Modernization Survey

The FAL Modernization Survey was developed by librarian staff and administered using LibWizard software. All surveys were voluntarily completed, and participants could skip questions if desired. Participants were asked to rate the importance of different aspects of the library space, technology, and librarian services (see Table 2). Responses were scored on a scale from 1 (not important) to 5 (extremely important), and mean responses for each item were calculated. Questions in pre-determined checklist and open text box formats were also included to collect participant preferences such as library hours, librarian assistance, and physical spaces.

A total of 30 surveys between December 2020 and November 2022 from researchers (n=19), consultants (n=2), nurses (n=1), contractors (n=2), staff members (n=4), and non-affiliated users (n=1) were completed. Overall, responses suggested that library patrons to the FAL most valued librarian availability and capability (M=5), the journal collection (M=4.67), databases (M=4.54),

Table 1 Library Best-Practice Site Visit Results

Library	Location	Findings
Herman B. Wells Library, University of Bloomington	Bloomington, Indiana	The University of Bloomington’s newly renovated library created separate glass enclosed areas specifically for faculty collaboration to discuss curriculum enhancements without student ears and a quadrant matrix to ensure that library traffic matched physical space needs.
McDermott Library, United States Air Force Academy (USAFA)	Colorado Springs, Colorado	The United States Air Force Academy’s modernization effort conducted a user-survey on modernization and found that faculty, staff, and cadets desired dedicated work, study, and research space; extended hours with 24-7 access; and enclosed collaborative rooms. The modernization effort culminated in the library’s ability to function as a “marketplace” for the exchange of knowledge and ideas, and a repository of accumulated knowledge. The library reorganized 130k sq ft. including a physical space for a 150k volume active collection with additional closed stacks and an archive collection, seating for 1,200 patrons with spaces for both focused work and informal interaction, reading rooms, multi-use meeting spaces, an expanded academic success center, experimentation spaces to support digital scholarship, and enhanced access and visibility to special collections.
Air Force Medical Service (AFMS) Virtual Library	Virtual	The virtual library had resources to support the clinical needs of hospitals. It has point of care tools and multiple databases.
D’Azzo Research Library, Air Force Research Laboratory (AFRL) and the Air Force Institute of Technology (AFIT)	Dayton, Ohio	The AFRL library encompasses 40k sq ft and was awaiting funding to complete a re-design of its physical space based on a space utilization survey to include additional conference space and a large collaboration area.
Wright Brothers Institute Innovation and Collaboration Center/Tec^ Edge the Air Force Research Laboratory's (AFRL) Discovery Lab	Dayton, Ohio	The Wright Brothers Institute was designed to connect people, support collaboration, and hold meetings. It has an idea lab and a command center for staff with rooms that seat 20-50 persons depending on configuration. The center of the building is home to a café with beverages and snacks available for purchase, three microwaves, a toaster, toaster oven, and a refrigerator for guest use.
Air Force Libraries (AF)	Nationwide	Seventeen base libraries across the Air Force underwent modernization projects, highlighting Department of Defense support and justification for a fresh physical space to connect with users with televisions, media screens, furniture, etc.

Table 2 Franzello Aeromedical Library Modernization Survey

Survey Item n=30	Mean Response
Please rate the importance of patron computers to you	3
Please rate the importance of technology to you	3.75
Please rate the importance of study space to you	4.25
Please rate the importance of meeting space to you	2.5
Please rate the importance of the general collection to you	3.83
Please rate the importance of the journal collection to you	4.67
Please rate the importance of databases to you	4.54
Please rate the importance of E-books (not course books)	3.62
Please rate the importance of librarian availability	5
Please rate the importance of librarian capabilities to you	5
Please rate your satisfaction with library hours	4.58

and personal study space (M=4.25) highly. Meeting space (M=2.5) was rated lower.

Anecdotal library patron comments indicated that patrons desired library space upgrades to include secluded areas for private studying; smartboards; designated areas and equipment for video conferencing; hands-on technology such as virtual reality headsets, gamification tools, and makerspaces.

Modernization Team Meetings

To guide the modernization project, the FAL built a modernization team of 12 subject matter experts and stakeholders from across the 711HPW. A project charter was developed to establish the scope of work, requirements, deliverables, and project objectives. More specifically, the charter defined the mission requirements to preserve library archive materials and update the library space. Specific goals of the renovation such as assessing holdings and current space, enhancing the library’s layout, and preserving archive media were provided. The final document was approved by the dean and deputy commander to provide guidance and hold the team accountable.

The team met twice a month for one hour from February 2019 through December 2022 to assess: 1) the standing of current and outdated physical holdings, 2) physical space needs, 3) the shift to digitization, and 4) renovation needs while adhering to Department of the Air Force building constraints.

Although the response rate for surveys was extremely low due to self-selection and the ability to skip questions in the survey, this data provided the FAL team with a starting point for stakeholder discussion. Patron comments, best practices seen at other libraries, and resource availability was also used. Ultimately, the team concluded that the modernized space must include comfortable study and research areas, a digitized collection, both private and group collaboration rooms, rest/relaxation areas, reconfigurable presentation monitors, a Mezzanine/2nd floor, and glass walls to sustain daylighting in the space.

PHASE 3: WEEDING THE COLLECTION

A review of the physical collection was conducted to reduce the footprint of the stacks. The team opted to keep, discard, or donate items using the following guidelines: 1) holdings available in other libraries, 2) usage statistics, 3) duplicate copies, 4) outdated materials, 5) electronic availability, and 6) not considered to be pertinent to aerospace medicine.

Circulating books and journals were targeted for weeding while the archives, office collections, and textbooks remained unaltered. The FAL elected to keep a large portion of journal holdings to continue supporting the robust interlibrary loan program. Moreover, to maintain a more accurate representation of actual holdings, the FAL completed an extensive reclamation project with the Online Computer Library Center and reviewed both the physical holdings and catalog records in WorldCat/DOCLINE. These were time-stamped, and holdings no longer remaining in the collection were deleted.

The circulating book collection was ultimately reduced by 60% to 13,380 items. Although journal deselections were tracked by title not by the number of volume holdings, approximately 30% of the journal collection was reduced to a total of 1,318 titles. Items were withdrawn and donated to other libraries and the remaining collection was shifted to its new location.

PHASE 4: CAPABILITY

Next, the FAL team focused on capabilities, both in services and personnel. The library did not have a digital presence necessary to package and showcase content and resources, but the library lacked funding to purchase new systems.

As a creative solution, the FAL team applied for an Air Force-based research grant to provide both the financing and evidence-based approach needed to select the most appropriate platforms for librarians and patrons alike. The team purchased one-year licenses for four platforms using the \$204K awarded. Fortunately, the timing was incredibly apropos as the technology allowed the FAL to offer off-campus resources during the COVID-19 pandemic.

As part of the research project, the FAL team moved all electronic content from an intranet website to a popular library content management system (CMS). In addition to an updated look for marketing purposes, this CMS provided new features including ticketing queues for services such as literature reviews and interlibrary loan requests, a help desk, custom information hubs, three customer service dashboards, and usage analytics.

PHASE 5: SPACE DESIGN & CONSTRUCTION

Facility modernization began once the FAL team relocated items to the archive and removed selected items for donation, discard, and disposal.

The original library space was approximately 13,000 square feet with a separate administration area including three offices, two cubicles, and a reference counter (Figure 1). It had a separate technical reports room, archives area, and a reading room with more than 2,000 square feet of compact and fixed shelving. There were three computer kiosks with 12 workstations that provide customers with wired internet access.

Removal of the nine double-sided, free-standing shelving units located under the high ceiling was completed by the in-house USAFSAM's Facilities Division (Figure 2). Removal of the 20 double-sided Spacesaver High-Density Storage Rolling Shelving Units in the FAL's entryway required an external contractor due to being secured into the original concrete flooring. Before relaying the carpet, the contracting team had to return more than once to ensure the flooring was level and not an unnecessary tripping hazard.

Figure 1 Comparison of Franzello Aeromedical Library Versus Modernized Floor Plan

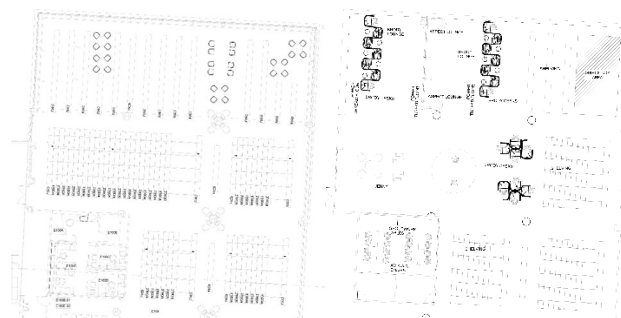


Figure 2 New entrance to the FAL with featured collection and circulation desk. Previously, rolling and fixed shelving blocked visibility into the library from the front entrance glass and prevented sunlight exposure from the North-side windows



Figure 3 New state-of-the-art collaboration room with seating for 16 patrons. The room can be separated into two spaces using a movable dividing wall and is outfitted with two computer workstations, wall-mounted screens, dry-erase boards, and virtual collaboration technology.



Figure 4 Cleared the North side of the library, previously occupied exclusively by rolling and fixed shelving. Furniture pictured includes individual study lounges with ergonomic chairs, footstools, bag cubbies, swivel lap desks, lamps, and power stations; workstations with fixed desks, chairs, and lamps; digital collaboration spaces for two with desks, mounted monitors, and HDMI connections; and a relaxation space with armchairs, sofas, ottoman, and rug.



The construction team created a new collaboration space with a glass front and two entry doors for student and faculty engagement (Figure 3). This space included a folding wall divider to split the room into two for user flexibility. It was also outfitted with folding conference tables, dry-erase boards, two 86-inch screens, two video teleconferencing units, and two instructor stations.

Having recently completed their own modernization effort of similar scope for a similar patron audience, USAFSAM turned to the United States Air Force Academy McDermott Library for inspiration, who had recently partnered with an experienced, national architecture firm with healthcare and library redesign experience. The firm had reviewed USAFA's McDermott Library to create a plan that included project guidelines, goals and strategies; summary of findings; building recommendations; concept development; implementation and budget. The previous space reflected late twentieth-century models and did not meet user demands that define a twenty-first-century library with technology-rich, flexible study and learning spaces. Guidelines included: provide a twenty-first-century learning environment; develop a functional, integrated, sustainable, and future-ready library; promote flexibility and interdisciplinary collaboration; protect the architectural heritage and key historical features; re-establish monumental circular stairs as a focal point; leader in energy and environmental stewardship. Cadets desired varied space options such as enclosed collaborative study rooms and places for individual work. To accommodate these changes in the existing 130,000 sqft space, the McDermott Library allotted 25% to 50% of the total square footage for services, while decreasing the space allocated for print collections from 50% to 30% of the total. Similar to FAL, this decision was possible due to 75% of the collections not being circulated in the past 15 years.

The in-person visit to the McDermott Library at the United States Air Force Academy largely inspired the FAL's furniture selection. With 40,000 USAFSAM patrons annually, the modernization team believed that the furniture design should be ergonomically designed, timeless, durable, and versatile. In addition, the modernization team made selections based on inclusivity of body types and variable studying styles. The furniture ultimately selected was a combination of private, pair, and group study spaces with ergonomic considerations and a minimalist look, arranged to create defined spaces. These new spaces included: 1) formal entry with seating; 2) circular style reference desk for two librarians; 3) high-performance workspaces with built-in lighting, power ports, cubbies for personal belongings, footstools, and an ergonomic chair; 4) high back sofa booths with integrated work surfaces, power, and panel-mounted monitors to review work with a colleague; 5) comfortable living room "fireside chat-style" seating area with couches, footstools and chairs on accent rugs; 6) enclosed ergonomic pod desks with power and lighting for studying; and 7)

oversized swivel chairs with cupholders and large rolling dry erase boards.

The team also designated a climate-controlled room for archived materials and office space for assigned staff members.

While FAL staff was reluctant to begin a project of such great scope, magnitude, and cost, the overall benefit of creating a smaller, more streamlined, and mission-focused physical collection was quickly recognized. FAL now has a much more versatile space with a large, open floor plan that can be easily reconfigured, positioning USAFSAM as more of a learning commons in support of an agile work environment that sparks collaborative learning, scholarship and engagement where visitors can come to connect with one another (Figure 4).

Furthermore, this additional space has given FAL the capacity to host both internal and community-based events. Since the recent completion of the renovation, FAL has hosted library-related instructional sessions, collaboration events, book clubs, open houses, holiday engagements such as a trick-or-treat event for families, large courses, and student breakout sessions. Additionally, FAL has added a small number of items to its collection that support collaboration and stress reduction such as leisure reading titles, games, coloring, and sensory materials, share a card with your colleague, and affirmation cards. The affirmation cards have become very popular and are being utilized in morning meetings and classes to further reflect and connect with one another.

DISCUSSION

The FAL modernization project took place over two years with dedicated work from a team of subject matter experts and leaders within the 711HPW. The FAL required a complete re-design to encourage learning, collaboration, socialization, and quiet working. Consistent with previous literature and survey results, a centralized circulation desk, group collaboration rooms with large glass windows and multi-media tools, comfortable individual carousels, and a seating area for socialization were included [4,8]. As a result of this long and complex project, the authors have several major recommendations for those seeking to undertake a similar effort.

Capitalize on the Redesign for Marketing

To market the new space to patrons, the modernization project culminated in a grand re-opening held on Tuesday, March 21, 2023. Sixty-five attendees were provided an overview of the modernization effort, invited to view historical items from the archive, and offered a tour of the space. Attendees spoke highly of the reconfigured space and décor specifically.

Furthermore, the FAL team established a marketing plan that will be reevaluated every six months to promote its services, resources, and space in perpetuity.

Facilitate Multi-Level Stakeholder Engagement

A project of this magnitude requires robust teamwork and frequent meetings. Modernization team composition must be considered upfront, and all stakeholders with a vested interest in the project need to be invited to the table on day one. The FAL team found that a strong champion in a position of authority, such as the dean, was needed to advocate for funding and sustain momentum for the multi-year effort. It is also highly recommended that IT and facilities be regular modernization meeting participants to avoid timeline delays and ensure feasibility discussions occur. For continuity, meetings should include an agenda specifying old and new agenda items. Touchpoints on complex tasks should be discussed frequently to prevent overlooked details.

Use Purposeful Decision-Making Methodology

A purposeful methodology is recommended to ensure a holistic approach to decision-making.

The authors recommend using Courses of Action (COAs) and Plan of Action & Milestones (POAMs), unique high-level stakeholder engagement formats widely used throughout the Department of Defense. These informal tools convey a set of defined options and tasks to enable leadership to make an informed decision rapidly that will ultimately lead to desired outcomes [11]. COAs are written documents used to highlight executable options including a proposed action, timeline, resources, manpower, and costs to influence a predicted outcome, while POAMs are figures that illustrate action steps along a timeline. Following the same format, academic institutions can use COAs in a similar manner by systematically evaluating the pros and cons of each option that can be feasibly carried out to achieve the desired outcomes.

Moreover, the FAL used baseline recommendations from public and military-specific libraries; current student, instructor, researcher, and visitor surveys; and team meetings with a diverse group of subject matter experts (SMEs). Member checking was conducted through team meetings with the dean, known in the Air Force as "vector checks," to confirm findings and overall modernization direction. The FAL team ensured that a distinct collection remained by further consulting departmental and operational field subject matter experts for unique collection areas. Data triangulation and member checking was used to ensure multiple points of observation and interpretation [12]. This methodology was critical to increase our trust in the decisions made, ultimately enabling the modernization effort to be seen to fruition.

without losing the heritage, culture, and operational mission of the library.

Expect Delays and Be Flexible

Building projects are prone to delays. One must remain flexible and patient and pad timelines to facilitate stakeholder return on expectations. Supply chain issues due to COVID-19 and building requirements significantly impacted both project direction and timeline. To maintain momentum, the team selected a COA that would allow them to make significant changes in a timely manner. Although not the ideal COA, it was the most feasible. For awaiting items, as much preparatory work as possible was completed in anticipation of sufficient funds and leadership approval. Additionally, due to the high expense of the project in a resource-constrained environment, financing had to be split amongst several stakeholders including the Office of the Dean, IT, and Facilities. The team also used as many low-cost options as possible such as the use of in-house recycling using Defense Logistics Agency Disposition Services for select textbooks and in-house muscle through a “library clean out day.”

Uncover Future Needs

Finally, it is recommended to use in-project discovery and findings to plan for future need justification. In the final year of this effort, a particular concern was uncovered during the construction phase: a waterline running throughout the library’s archive which could threaten historic materials and one-of-a-kind items. Fortunately, the probability of water damage was determined to be extremely low due to the waterline being a secondary feed activated only in times of an emergency. Thus, leadership opted to wait on this final portion of the space project due to lack of funding. However, this discovery enabled the team to plan for their next project and provided the justification needed to continue to innovate and modernize.

Future modernization projects should consider the findings and lessons learned from the FAL modernization effort to build a team, gather the best data and resources, communicate effectively, and address challenges early.

As a result of this modernization, the FAL library will play a much larger role in the USAFSAM community moving forward. Plans are already underway to add more historic artifacts to the library’s collection, sourced from over 100 years of aerospace history in buildings throughout Wright Patterson Air Force Base. FAL library leadership is already engaging with community libraries in a new way, with plans for rotating unique showcase collections monthly. More courses are being hosted in the space regularly, and school engagement activities such as a recent event centered around the solar eclipse are being executed. The next major renovation project under consideration is a

complete overhaul of the archives, which would provide a more organized and secure space for one-of-a-kind items.

Since the completion of the modernization effort, the FAL has seen a 50% increase in foot traffic with a gate count of 16,182 in 2022 to 24,276 in 2023. At a time in which many libraries are struggling to even maintain their pre-pandemic in-person throughput, the success of the FAL is an ideal case study for patron engagement success. In summary, the FAL modernization has opened the door to increased productivity, collaboration, and networking within the organization, while maintaining the FAL’s distinct collection, historic facility, and capabilities. Despite being a cumbersome and often stressful endeavor requiring tremendous time and resources, revitalizing a library can be worth the effort. Libraries interested in better engaging with existing patrons, attracting new audiences, making their space more relevant, and better showcasing their capabilities should consider a similar effort as a way forward for future success.

DISCLAIMER STATEMENT

The views and opinions presented herein are those of the authors and do not reflect the official guidance or position of the United States Government, the Department of Defense, the United States Air Force, or the United States Space Force.

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DATA AVAILABILITY STATEMENT

Data associated with this article is property of the United States Air Force School of Aerospace Medicine and cannot be made publicly available. Access to the data can be requested from the corresponding author.

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Melanie M. Lazarus: Conceptualization; methodology; formal analysis; writing – original draft; supervision; project administration. Theresa Bedford: Methodology; formal analysis; writing – original draft. Sara Craycraft: Investigation; Elizabeth Irvine: Investigation. Cathy Stahl: Investigation. Kristen L. Young: Funding acquisition; investigation; supervision; formal analysis; writing – review and editing.

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MEDLINE citation tool accuracy: an analysis in two platforms

Laurel Scheinfeld; Sunny Chung

See end of article for authors' affiliations.

Background: Libraries provide access to databases with auto-cite features embedded into the services; however, the accuracy of these auto-cite buttons is not very high in humanities and social sciences databases.

Case Presentation: This case compares two biomedical databases, Ovid MEDLINE and PubMed, to see if either is reliable enough to confidently recommend to students for use when writing papers. A total of 60 citations were assessed, 30 citations from each citation generator, based on the top 30 articles in PubMed from 2010 to 2020.

Conclusions: Error rates were higher in Ovid MEDLINE than PubMed but neither database platform provided error-free references. The auto-cite tools were not reliable. Zero of the 60 citations examined were 100% correct. Librarians should continue to advise students not to rely solely upon citation generators in these biomedical databases.

Keywords: Auto-citation generator; librarians; information literacy; citation on demand; biomedical databases; PubMed; Ovid MEDLINE



See end of article for supplemental content.

BACKGROUND

Librarians in academic health sciences libraries support research at their institutions in myriad ways [1]. The integrity of the research process is an essential element of research and librarians often include research integrity as part of their instruction [2]. Proper attribution of prior work is one component of trustworthy research and it is important for students to learn both the purpose and the mechanics of accurate citation [3]. Most academic libraries provide support for properly citing sources in the form of style manuals and online style guides, while some libraries provide additional services including tutorials, workshops and individual consultations [4]. Though some librarians may feel it is the responsibility of the course instructor to teach the mechanics of proper citation, others embrace a team approach among instructors and academic support centers on campus, including libraries and writing centers. Even without agreement on how much responsibility should fall to librarians to teach proper citing, students and faculty naturally look to us for help. Regardless of personal preferences, librarians will inevitably be approached for assistance with citations [5, 6].

Formatting citations is often considered frustrating as well as time consuming, and one of the last tasks completed in preparing a research project [7]. Software tools have been

developed to alleviate some of the burden of applying the rules for proper citation in a particular style. These tools include free-standing online citation generators, citation generators within databases and discovery tools, and bibliographic management software that creates formatted references as one of its functions. Studies show that many students make use of these tools. [7,8,9,10].

The features and functions of these tools vary, but all are meant to generate accurately formatted citations. Accuracy is crucial for academic and research endeavors, but the reliability of citation generator tools has come into question. Several studies have shed light on the limitations and shortcomings of various citation resources, raising concerns among librarians. In a recent study of the accuracy of three free online citation generators (ZoteroBib, CiteMaker and Cite This For Me), Ho [11] found that all the citations generated had errors. Six sources taken from student papers were used to generate citations in each tool and the eighteen citations were analyzed for ten different errors. Based on the results, Ho concluded that none of the tools could produce perfect references. Users were advised to be prepared to correct common formatting errors such as capitalization, punctuation, and indentation [11]. In a separate investigation by Laing and James, the focus shifted to the accuracy of citations generated by EBSCO and Summon Discovery Services. The researchers examined sixty

sources, including print books, eBooks, and journal articles. They generated citations in three different citation styles using both platforms. Out of the total 180 citations, EBSCO produced 86 correct citations, while Summon managed only 31. The authors cautioned that neither platform could reliably generate accurate citations [12]. In 2005 and 2012, Van Ullen and Kessler conducted studies examining the citation support available in various humanities and social science databases. Their analysis encompassed citations on demand and other citation assistance provided within the databases. Although a minor improvement was observed in the 2012 study compared to the earlier one, the number of errors was still considered unacceptably high. The researchers expressed their disappointment, stating that citation help in databases continued to be compiled with little attention to detail. [13,14]. Even bibliographic management software, with its robust features for importing and saving data and creating citations in dozens of styles had disappointing results when studied for accurate formatting. Kratochvil [15] compared the accuracy of citations generated by EndNote, Mendeley, RefWorks and Zotero. The four different software platforms produced citations with 882, 679, 937 and 575 errors, respectively, out of 1084 references. Multiple errors in each citation were deemed completely unacceptable, as citations are fundamentally reliant on accurate details [15]. Collectively, these studies paint a disconcerting picture of the current state of citation generators. Despite their convenience and widespread usage, these tools often fall short in producing accurate and reliable citations.

At Stony Brook University Health Sciences Library, we provide multiple publication and style manuals as part of our reference collection, and we regularly point students to the Library's online citation guide. Of the various citation styles, the American Psychological Association (APA), is by far the style that we are most frequently asked for help with. Among our various patrons, those from the School of Nursing, the School of Social Welfare, and the undergraduate Health Sciences major request the most help with APA style. They are often concerned about receiving lower marks on assignments for inaccurate citation formatting. We offer workshops on APA Style each semester at the Health Sciences Library. Registration and attendance have been high compared to other library workshops offered so it seems to fill a learning need. The workshops include instruction about the importance of accurate citation and provide guidance on the proper formatting of citations. The workshops lead to requests for additional assistance since they establish the library as a place to go for help with citing. Questions about the accuracy of tools that automatically generate citations frequently come up in workshops and consults. We have always encouraged patrons to learn the rules of the citation style they are writing in, and we caution them to carefully review citations created with any citation

generator, based on the evidence in the literature showing poor accuracy for these tools.

In reviewing the previous literature, we found no assessment of citation tools in biomedical databases. Users may expect citation tools embedded in biomedical databases to be superior to citation tools in other databases. These platforms have sophisticated technology for creating highly complex searches [16] so users may assume they have a higher degree of accuracy in citations as well. It is important for librarians to know whether the same caution against relying on automatic citation tools also applies to the tools in more advanced medical databases. Our study examines the accuracy of the 'citation on demand' tool in the PubMed and Ovid MEDLINE platforms. We specifically concentrated on APA Style and journal articles. This decision was made as these are the predominant style and source type requirements for assignments in the School of Nursing, School of Social Work, and the Health Sciences major at our institution. MEDLINE indexes a large number of psychology, psychiatry, social work and nursing journals. PubMed is freely available and frequently used by all health sciences students at our institution to search MEDLINE. Although Ovid MEDLINE may be utilized less frequently by students, it offers automatically generated citations in APA 7th edition style making it suitable to compare the same citations in both platforms.

CASE PRESENTATION

Study Preparation

To gather a convenience sample of journal article citations, PubMed's trending articles webpage <https://pubmed.ncbi.nlm.nih.gov/trending/> was utilized to gather articles for this analysis. It was suggested as a viable source of citations for bibliographic analysis by several colleagues on MedLibEd, an online forum for medical librarians. We chose to sort the articles by the 'Best match' option to obtain a more varied sample than sorting by other available options ('Most recent', 'Publication date', 'First author' or 'Journal'). We then limited to articles published from 2010-2020 and collected the first 30 articles. There was one retracted article which we did not include. Authors then checked that all selected articles were available in Ovid MEDLINE as well.

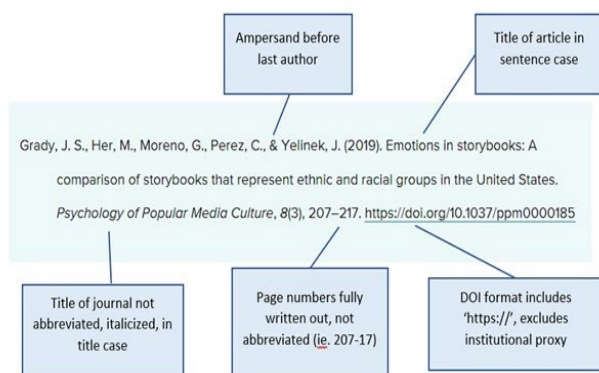
Citations were generated in APA 7th edition style from both databases using the 'citation on demand' or 'auto-cite tool' and were then copied and pasted into a shared document. (see supplemental materials). The 7th edition of the APA Manual was published in late 2019 and data for this study was collected in 2022, which we felt provided ample time for databases to make updates.

Data Collection

The sixty journal article citations were carefully reviewed by two independent reviewers. Discrepancies were resolved through discussion. Fourteen elements of each citation were checked for accuracy. The 14 elements analyzed for errors were chosen by reviewing a sample of APA style journal citations and listing all elements that reviewers determined could contain errors. Both format and content were analyzed as both are necessary for an accurate citation. The number of elements we reviewed varies from previous studies because our assessment was specific to journal articles in APA Style only. Previous research analyzed either a variety of source types [7] or a variety of citation styles [11], and more general categories were often used. For example, 'Name of Source' is an element assessed in other citation accuracy studies whereas for this research there are three separate elements related to the name of the source ('journal name not abbreviated', 'journal name in title case, with correct punctuation', and 'journal name italicized'). We felt this allowed for a more specific and comprehensive assessment, though it limits the ability to compare results directly with other studies.

Reviewers relied on guidance from the APA Publication Manual and contacted the style experts at the American Psychological Association as needed for clarification on the written guide. See Figure 1 for a sample APA 7th edition journal article citation from the APA Manual.

Figure 1 APA Style, 7th Edition Sample Journal Article Citation (Journal Article References, n.d.)



The 14 elements checked for accuracy include:

- presence of a hanging indent
- correct author last name(s) followed by correct first and middle (if available) initials, with correct punctuation
- ampersand sign before the last author

- correct year of publication, with correct punctuation
- article title in sentence case, with correct punctuation
- journal name not abbreviated
- journal name in title case, with correct punctuation
- journal name italicized
- volume number correct, with correct punctuation
- volume number italicized
- issue number correct, with correct punctuation
- page numbers correct and correctly formatted
- DOI is included if available
- DOI formatted correctly.

Reviewers discovered that in Ovid MEDLINE there were differences between citations that were copied by highlighting the citation versus clicking the “copy” button. Using the copy button feature resulted in journal names and volume numbers not being italicized. (See Figure 2) Ultimately, reviewers assessed citations based on the copy button results since it is available and featured by the database. If a user were to manually type what they saw on screen into their document, or highlight the citation to copy it, the italicization would be correct, but we felt users were unlikely to do that when a simple click of the “copy” button is available.

Figure 2 Comparison of sample journal article citation from Ovid MEDLINE citation generator (A) screenshot versus (B) same citation copied and pasted into a document using the ‘copy’ button. Note journal name and volume number are not italicized in the copied and pasted citation.

A.

Green, C. L., Evans, C. M., Zhao, L., Hills, R. K., Burnett, A. K., Linch, D. C., Gale, R. E. (2011). The prognostic significance of *idh2* mutations in aml depends on the location of the mutation. *Blood*, 118, 409-12. <https://dx.doi.org/10.1182/blood-2010-12-322479>

B.

Green, C. L., Evans, C. M., Zhao, L., Hills, R. K., Burnett, A. K., Linch, D. C., Gale, R. E. (2011). The prognostic significance of *idh2* mutations in aml depends on the location of the mutation. *Blood*, 118, 409-12. <https://dx.doi.org/10.1182/blood-2010-12-322479>.

Though effort was made to be thorough in choosing elements to review, two additional elements were not included in this assessment: font and line spacing. The reviewers found that when citations were copied and pasted, line spacing and fonts differed depending on the word processor used (Google Docs vs. Microsoft Word vs. Microsoft WordPad). It was beyond the scope of this study to assess accuracy for multiple document types so font and line spacing were excluded from the assessment.

Figure 3 Elements with the highest number of errors and Total errors per database

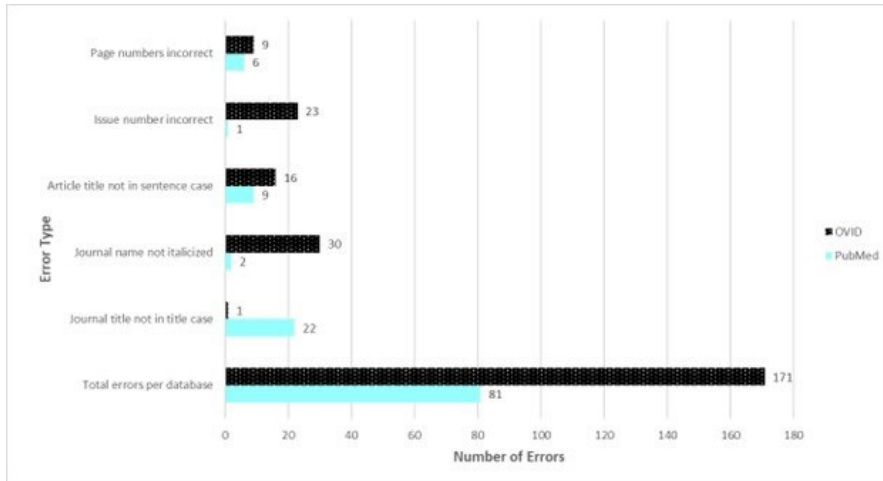


Figure 4 Percentage of errors in PubMed

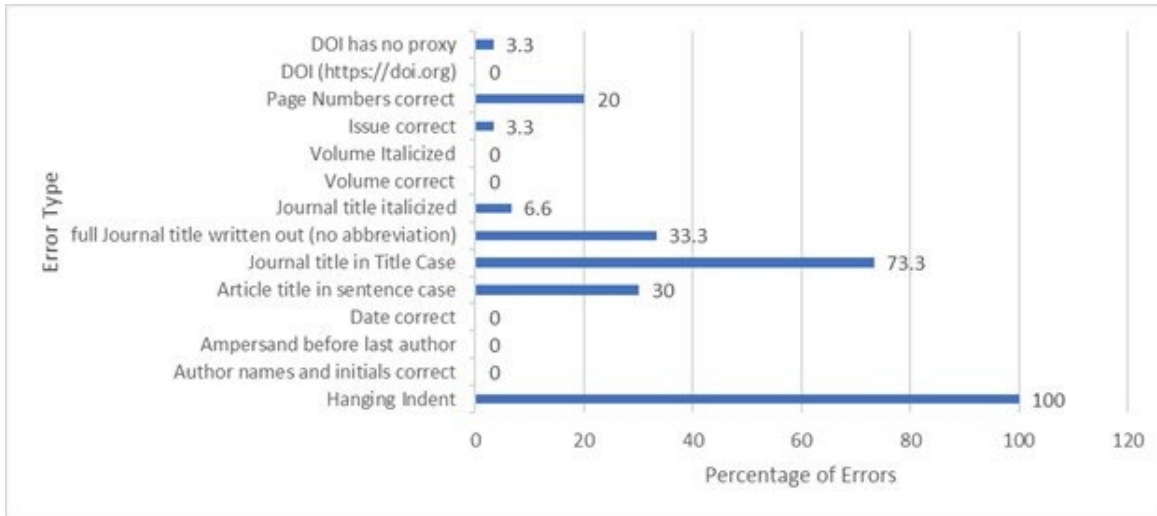
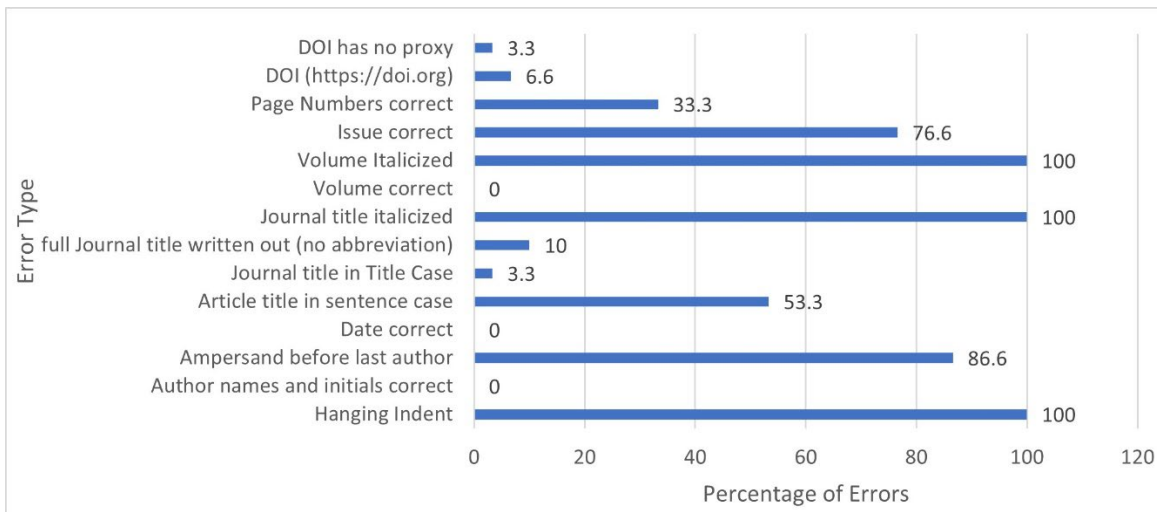


Figure 5 Percentage of errors in OVID



Each reviewer assessed the 60 citations independently and entered findings into a screening spreadsheet which included a row for each citation and a column for each element of the citation. Elements found to be incorrect were designated with a '1'; correct elements were designated '0.' The sum of each row was used to calculate the total number of errors per citation, which could range from 0 to 14. (See supplemental materials). Results were compared and discrepancies were resolved through discussion and consensus.

RESULTS

The total number of errors for both databases and the elements with the highest number of errors in each database are displayed in Figure 3. PubMed produced 81 total errors in the 30 citations, while Ovid MEDLINE produced 171. Errors in individual Ovid citations ranged from 4-9 with an average of 5.7 errors per citation, while the number of PubMed errors in individual citations ranged from 1-5; average 2.7 per citation. As mistakes per citation increase in the PubMed citations, there is a proportional increase in mistakes in the Ovid citations. This can be seen in Figures 4 and 5. No noticeable trends were noted in mistakes related to Journal, Publisher or Year.

The types of errors varied greatly by database. One of the frequent errors seen in PubMed was the journal name in the incorrect case. In 22 out of 30 PubMed citations, the journal name was in sentence case rather than the correct 'title case.' Additionally, there were 3 PubMed citations in which the journal name consisted of only one word (i.e., Blood). In these cases, those elements were marked 'correct,' though it is very possible that they would have been incorrect if the journal name consisted of multiple words. At variance with this finding were the Ovid MEDLINE citations, in which only one citation out of 30 was not generated in 'title case.' When assessing correct italicizing of journal names, PubMed yielded errors in 2 citations while Ovid generated errors in all 30 citations. For the article title element, 'sentence case' is the correct format; PubMed yielded 9 errors while Ovid yielded 16 errors. Ovid generated significantly more errors than PubMed in displaying issue numbers. Ovid consistently left out issue numbers from the auto-generated citations, totaling 23 errors. The Ovid citations that were correct were those from journals that do not use issue numbers. When displaying page numbers, PubMed produced 6 errors, while Ovid produced 9. Six of the errors in both databases involved online-only journals that use article numbers instead of page numbers. When that is the case, the APA guidelines direct authors to insert the word "Article" in front of the article's number, instead of the standard page numbers. These errors in the citations were due to the absence of the word "Article." The remaining 3 errors in the Ovid database were due to the abbreviation

of page numbers (i.e., displaying 561-8, rather than 561-568). A major source of errors common to both databases was the lack of a hanging indent. All 60 citations were missing this element. OVID also consistently omitted the required ampersand sign (&) before the last author's name, though both platforms otherwise had authors names and initials correct 100% of the time. We looked at punctuation within each element (author names, date, article title, journal, DOI). Neither database had punctuation errors and they both also did a good job of generating accurate publication dates and volume numbers. In our analysis, the DOI (digital object identifier), was generated accurately in both platforms, but subsequently we noticed that if using PubMed through our institution's website, the proxy link would be included within the DOI, which would be inaccurate according to APA guidelines. When patrons access PubMed through an institutional proxy, they need to check that the DOI does not contain the proxy link.

DISCUSSION

Each citation tool has its strengths, but neither is accurate enough to recommend using as a sole source of APA Style 7th edition citations. PubMed produced citations with an average of 2.7 errors. The common errors in PubMed citations were lack of the hanging indent, incorrect case for journal names and article titles, and using abbreviations in journal names. Ovid MEDLINE citations produced an average of 5.7 errors. Common Ovid errors were the lack of hanging indent, lack of ampersand in author element when there is more than one author, incorrect case for article titles, lack of italicization for journal names and volume numbers, lack of issue numbers, and incorrect page number format. Ovid's auto-cite tool generated more than double the number of errors as PubMed amongst all 14 of the criteria examined. A positive finding is that punctuation is reliable in the citation tools of these biomedical databases. That was not the case for other automatically generated citations in tools previously studied [7, 11] Despite this, we cannot say that databases with more sophisticated searching capability contain better citation tools based on our results. Though punctuation and content were accurate most of the time, the amount of formatting errors are problematic enough that these tools cannot be relied upon solely. They require the user to have knowledge of proper APA Style to make necessary corrections. Therefore, we recommend that students learn how to cite references correctly and that they regularly consult style manuals. If they choose to utilize a citation generator for convenience, the resulting citations should be checked and edited for accuracy, specifically focusing on the formatting errors noted above in each platform.

There was no noticeable correlation between the number of mistakes and Journal or Publisher, but the sample size is insufficient to definitively conclude the absence of any

association. Though we often hear that database citation tools can only be as accurate as the data imported from the publisher, that does not explain why the same reference displays with different formatting errors depending on the database. For example, in most of the 30 PubMed citations we looked at, the journal name was correctly formatted in Title Case, whereas in the same 30 citations generated in Ovid MEDLINE, most of the journal titles were not formatted in Title Case. Conversely, in Ovid MEDLINE, most Journal titles and issue numbers were correctly formatted in italics, whereas in PubMed most were not. This shows that the capability exists for the tools to manipulate data into the correct capitalization and italicization, but the capability appears to be underutilized and arbitrary. Whether this is due to lack of awareness or limited resources on the part of database creators is worth discussing with vendors. In addition, in Ovid MEDLINE, the discrepancy between the generated citations seen on the screen and those same citations copied and pasted into a document seem simple to correct and would decrease the error rate substantially.

We reached out to the NLM and Ovid to share our concerns. Both were very responsive and eager to improve the citation tools. Amanda Sawyer of NLM shared that “there are certain rules that-- in our experience--machines cannot produce with 100% accuracy. For example, there is no way to systematically capitalize proper nouns, acronyms, chemical formulas, abbreviations, etc., that is completely reliable and also complies with all rules.” Both NLM and Ovid asked for specific examples and expressed their intentions to investigate further and make improvements if possible. Librarians who would like to see these tools improved are encouraged to contact their database vendor representatives as well.

The conclusions of this report are consistent with previous research that the accuracy of auto citation generators is currently unacceptably low. Some limitations are the small sample size and testing a single citation style and resource type. Results cannot be directly compared to previous studies since methods of analysis have varied. Future research in this area could involve steps toward creating a standardized method of assessing the accuracy of reference entries.

We noticed a significant number of articles in our sample with electronic article numbers, rather than page numbers. Given the steady move away from print journals and towards increased electronic publishing of journals, this can be expected to increase. The citation generators in these two databases do not appear programmed to handle the format of the electronic article numbers correctly (see sample reference entry below from our analysis). In the sample reference entry, the word “Article” before the article number has not been inserted. Librarians are advised to familiarize themselves with the correct formatting of these electronic article numbers and to share this information when teaching APA citation style.

Salvo, F., Moore, N., Arnaud, M., Robinson, P., Raschi, E., De Ponti, F., Begaud, B., Pariente, A. (2016). Addition of dipeptidyl peptidase-4 inhibitors to sulphonylureas and risk of hypoglycaemia: systematic review and meta-analysis. *BMJ*, 353, i2231. <https://dx.doi.org/10.1136/bmj.i2231>.

The accuracy of word font and line spacing were difficult to assess for this analysis. We found that the font and spacing changed depending on whether we pasted the citations into Microsoft Word, Microsoft WordPad, or Google Docs. Additionally, when pasting a citation from the Ovid MEDLINE database into Google Docs, a different font and line spacing resulted depending on whether the user copied the citation by highlighting it, or by using the available “copy” button. See supplementary material for examples. In the end, it was decided not to include font and spacing in our assessment of accuracy. There are specific recommendations for fonts and spacing in the APA manual and it’s important for librarians to warn patrons to carefully check their formatting of these elements and to include the guidelines for correct fonts and spacing in any educational workshops on APA Style.

Though many software tools continue to be available to assist with creating a reference list, auto-cite tools in these two biomedical databases did not produce accurate citations in APA format. If students wish to use them for convenience, librarians can caution them to check for and correct common formatting errors. There is less need to check for content or punctuation errors as those elements were generally accurate. Being familiar with the correct formatting will enable students to more easily correct automatically generated citations. Based on this case study, Librarians still have a crucial role to play in teaching both the importance and the specifics of proper citation as part of research integrity and information literacy.

DATA AVAILABILITY STATEMENT

All data from this investigation are contained in the appendices. There are no additional data associated with this article.

AUTHOR CONTRIBUTIONS

Laurel Scheinfeld: conceptualization, methodology, formal analysis, investigation, writing-original draft, writing-review & editing, visualization, project administration; Sunny Chung: investigation, formal analysis, writing-original draft, writing-review & editing, visualization

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SUPPLEMENTAL FILES

- **Appendix A:** [Reviewer 1 Citation Screening Sheet](#)
- **Appendix B:** [Reviewer 2 Citation Screening Sheet](#)
- **Appendix C:** [PubMed Citations](#)
- **Appendix D:** [Ovid MEDLINE Citations](#)
- **Appendix E:** [Descriptive Breakdown of Articles](#)
- **Appendix F:** [Google Doc Fonts](#)
- **Appendix G:** [Word Fonts](#)
- **Appendix H:** [WordPad Fonts](#)

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Librarians' Electronic Resource Reviews Network (LERRN): a free citation database for resource reviews

Louisa Verma

See end of article for authors' affiliations.

Electronic resource reviews written by librarians are a valuable way to identify potential content platforms and stay current on new resources. Resource-focused articles can also assist with learning about useful features, training others, and marketing to potential user groups. However, articles evaluating or highlighting innovative uses of resources may be published in disparate journals or online platforms and are not collocated. Small or solo-staffed libraries may not subscribe to library and information sciences databases or journals that contain reviews of electronic resources. And many of these reviews or other useful articles are open access. With this in mind, the main aim of the [LERRN citation database](#) was to create a freely available citation database that brings together electronic resource reviews and other content that can assist librarians in appraising and using electronic resources.

Keywords: ERM; Electronic Resources; Reviews; Comparisons; Overviews; Databases

To build the database prototype, a list of journals was created from known journals, library association-related publications, [Directory of Open Access Journals \(DOAJ\)](#), and by searching on the [JournalTOCsv \(UK\)](#) website for library and information science-related titles. Citation and abstracts from journals containing content relevant to electronic resources are gathered into the free [Zotero](#) bibliography management tool through imported RSS feeds. Once articles are selected and tagged, they are imported into the Librarika online catalog (a low-cost, cloud-based integrated library system (ILS)) by a comma-separated values (CSV) template provided by the vendor. The LERRN database and website was created and is currently maintained, updated, and subsidized solely by the author.

The current database includes citations back to 2019 and focuses on electronic resources in the areas of science, technology, engineering, mathematics, and medicine. The author reviews selected journals' Zotero RSS feeds every other month to select citations that will go into the LERRN database. Once selected relevant citations are given four tag types in Zotero (year, resource name, topic, article type) to assist with browsing by Tags, Categories, Series, and Authors in the Librarika ILS. Articles are selected for inclusion based on their value in assisting with electronic resource purchasing, training, marketing, or use. In addition to reviews, article types also include overviews, comparisons, projects, search tips, book reviews, and general electronic resource management (ERM) articles. The database is updated six times a year in January,

Figure 1 Librarians' Electronic Resource Reviews Network (LERRN).

Title	Author(s)/Editor(s)	Publisher	Type	Copies
3D Organon VR Anatomy Year : 2022 Series : Journal of the Medical Library Association	Lily Jago		Publications	1
A Review of AccessMedicine Year : 2016 Series : Doody's Collection Development Monthly	Adler, Lisa A.		Publications	1
A Review of AccessPediatrics Year : 2022 Series : Doody's Collection Development Monthly	Rosenbl, Rebecca MD, PhD		Publications	2
A Review of AccessPhysiotherapy Year : 2019 Series : Doody's Collection Development Monthly	Debra Dillon, MS		Publications	2
A Review of AccessSurgery Year : 2019 Series : Doody's Collection Development Monthly	Eric Kovar-Gough, MA, MLIS, MSP		Publications	2

March, May, July, September, and November. A [website](#) was created on Google Sites to highlight the rationale, scope, and update frequency of the database. A [list of journals indexed](#) is also available on the website or under the Librarika series link. The [What's New](#) blog from the LERRN website can be subscribed to for update announcements.

The LERRN database, implemented in 2022, is in its early stages of development. Limitations include the use of the Librarika platform as an index & abstract database. Librarika is intended as an online catalog and, as such, it

provides less flexibility for tailoring searching, browsing, or highlighting content but offers importing citations, automatic browsing, and linking to full text. Future development plans include expansion to include reviews for the social sciences and humanities and adding reviews further back than 2019 for resources that do not have a more recent review. To date, the database has over 8,000 page views and includes 920 articles (a majority published from 2019 to the present). It is the author's expectation that

as content continues to be added to the database, it will become a useful tool for librarians.

Contact the author for more information.

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The DMPTool NIH DMSP Templates Project

Nina Exner; Seonyoung Kim; Katy Smith

See end of article for authors' affiliations.

The DMPTool NIH Data Management and Sharing Plan (DMSP) Templates Project was launched in response to the 2023 NIH Data Management and Sharing (DMS) Policy. This new policy introduced a more structured framework for DMS Plans, featuring six key elements, a departure from the 2003 NIH DMS policy. The project aimed to simplify the process for data librarians, research administrators, and researchers by providing a template with curated guidance, eliminating the need to navigate various policies and guidelines. The template breaks out each Plan section and subsection and provides related guidance and examples at the point of need.

This effort has resulted in two NIH DMSP Templates. The first is a generic template (NIH-Default) for all ICs, complying with [NOT-OD-21-013](#) and [NOT-OD-22-198](#). More recently, an NIMH-specific template (NIH-NIMH) was added based on [NOT-MH-23-100](#). As of October 2023, over 5,000 DMS Plans have been written using the main NIH-Default template and the NIH-NIMH alternative template.

Keywords: Research data management; Data management and sharing plans; DMPTool; NIH grant compliance; NIH data management and sharing plans

CONTEXT, AIMS, AND SIGNIFICANCE OF THE VIRTUAL PROJECT

When the National Institutes of Health (NIH) announced that expanded Data Management and Sharing (DMS) Plans would be part of the Final NIH Policy for Data Management and Sharing, effective January 25, 2023, data librarians wanted support. An existing virtual platform – the DMPTool – was already established as a source of templates for writing data management plans (DMPs) from other agencies.

DMPTool templates are constructed manually, so a new [DMPTool NIH Template Working Group](#) formed. The working group (WG hereafter) combined librarians with different strengths. Together this WG worked to synthesize and curate NIH DMSP templates as the 2023 NIH DMS Policy rolled out.

The main goals of this initiative were to:

1. Develop a generic NIH template that aligns with the [NIH's Policy](#) and [optional Plan format](#).
2. Incorporate Genomic Data Sharing requirements, following [NOT-OD-22-198](#), into the generic NIH Template.
3. Offer expanded example language across various disciplines, helping researchers understand how each element applies to their specific fields.
4. Evaluate the necessity for tailored templates for specific NIH Centers and Institutes (IC) and create IC-specific NIH DMS templates if deemed necessary.

The new 2023 NIH DMS policy affects multiple disciplines, from basic sciences to clinical and biobehavioral. The WG aimed to help researchers see how the new Plan format connects to their disciplines via example answers in the template. To support the increasing number of new medical centers joining the DMPTool, the WG also developed training materials ([slide deck](#) and [flyers](#)) and collaborated on a [DMPTool training workshop](#) for the Network of the National Library of Medicine.

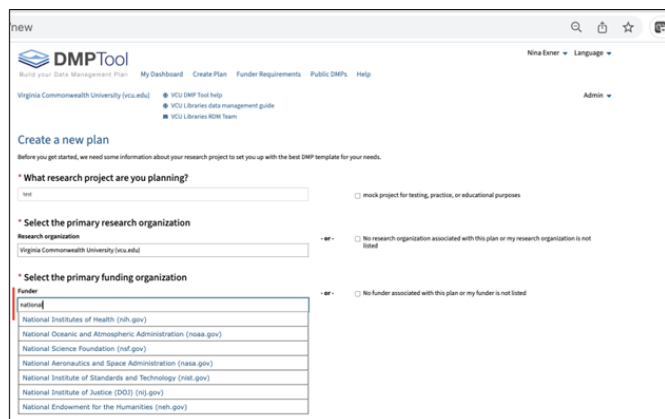
BRIEF DESCRIPTION OF THE VIRTUAL PROJECT

As the DMPTool was well-established before the NIH template project began, the NIH template goal was to use it to create a useful, standalone Plan template based upon the 2023 NIH DMS policy. The template provides not only writing prompts based on the NIH's [Elements of a DMS Plan](#) but incorporates other NIH documentation to support the writing prompts. Synthesized information plus example answers are labeled as “from DMPTool” to delineate them from NIH official text.

As shown in Figure 1, a user starts by selecting a funder to open the template tailored to that funder's guidance. For example, the template for writing DMPs for nutrition research funded by the USDA is different from that for nutrition research funded by the NIH. This project focused solely on a template for the NIH DMSP.

The user then encounters tabbed options. The “write plan” tab opens an accordion-menu-style screen with options

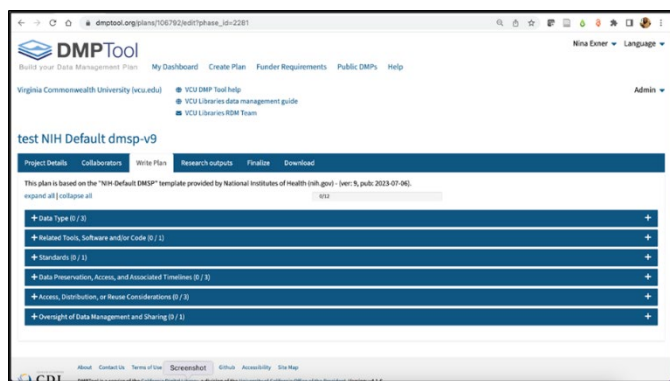
Figure 1



Clicking on one section bar opens the WG curated content. Each element or sub-element includes the official prompt from the Policy above the text-entry box followed by example answers below the text-entry box, with curated guidance in the right column under the NIH Guidance Tab. Figure 3 provides an example of the layout of Element 4 section.

The template has grown iteratively. In 2020, the DMPTool’s Editorial Board created an initial 6-part template. Then a UC/Stanford-based team built the initial Example Answers version (v2), followed by the current WG version (v3), documented in an [August 2022 DMPTool blog post](#). Evolutions such as integrating NIH sharing website content, harmonizing GDS policy considerations, and reflecting the [optional Plan format \(v4 - v9\)](#) were described in the [January 2023 blog update](#). It has taken many librarians with various expertise to create the evolving product.

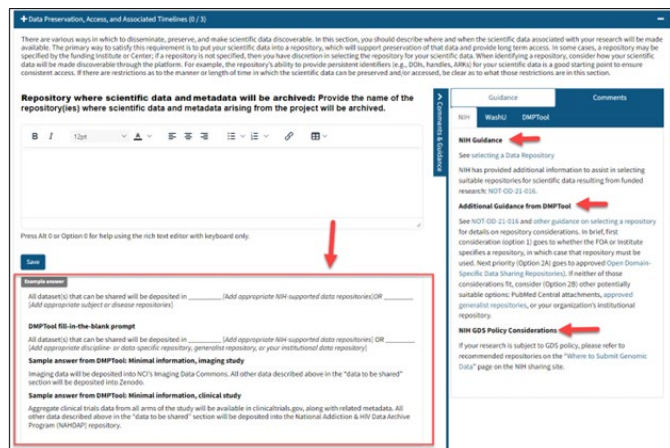
Figure 2



TECHNOLOGY USED

The DMPTool is a free digital template platform provided by the California Digital Library (CDL). Anyone with an email can sign up to use it, at no cost. Institutions can become institutional participants if they work with the CDL/DMPTool team to integrate single sign-on and assign an administrator to run the institution-specific functions. The DMPTool also allows users to do collaborative authoring and route for feedback from the institutional DMPTool administrator(s) who are often data librarians.

Figure 3



IMPACT

The primary impact is how many DMS Plans have been created using the templates we designed. Over 1,854 test or mock plans have been created from the NIH-Default template, plus 12 test plans from the NIH-NIMH template, which had been out for less than two months at count. Users can flag plans they create for test or mock-project uses like exploration or instruction.

Ultimately, the impact is in the non-test plans created. As of October 2023, DMPTool NIH Data Management and Sharing Plan (DMSP) Templates users have created 54 non-test plans with the NIH-NIMH template and 5,122 non-test-flagged plans with the main NIH-Default template.

AUTHOR CONTRIBUTIONS

Nina Exner: conceptualization; writing – original draft; writing – review & editing; Seonyoung Kim: writing – original draft; writing – review & editing; Katy Smith: writing – original draft; writing – review & editing.

specifically reflecting the NIH DMSP structure. This is where the value of the template becomes apparent: menus are based on the WG-created template. Figure 2 illustrates the menu of the main sections, with the sub-section menus closed.

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Generalized overview infographic: a customizable library instructional material on the NIH Data Management and Sharing Policy

Katy Smith

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The Generalized Overview of the NIH Data Management and Sharing Policy Effective 2023.01.15 (Generalized Overview) is an instructional material that provides a basic, clear, and linear understanding of the NIH policy and its requirements. While not developing or utilizing new technology, the Generalized Overview is innovative and notable for creatively using a freely available graphic design tool to translate government policy language into an accessible and understandable infographic that can disseminate important information about the NIH DMS Policy needed by researchers and by those who support them. Shared via a Creative Commons license, others may fully adapt the infographic or may simply add their own institutional contact information. The Generalized Overview can be used by any who find themselves responsible for publicizing and/or teaching the NIH Data Management and Sharing Policy at their respective libraries and institutions. It is intended for educational purposes only and should not be used as a substitute for official guidance from the NIH.

Keywords: NIH Data Management and Sharing Policy; Infographic; Flow-chart; Decision Tree; Canva

CONTEXT, AIMS, AND SIGNIFICANCE OF THE VIRTUAL PROJECT

As library services evolve to meet the expanding user needs related to publicly mandated and/or privately required data management and sharing policies, librarians, particularly many-hatted liaison librarians, may find themselves with new responsibilities supporting data services. While some librarians may have previous knowledge and experience in research data management, others may have only a limited working knowledge. Attempting to publicize and teach policies while simultaneously learning said policies – as well as data services in general – can be overwhelming. However, other knowledge and/or past experiences can prove beneficial by enabling the application of different approaches to library instruction and services, as in the following development of a simple instructional visual representation of the 2023 NIH Data Management and Sharing Policy (NIH DMS Policy) as released via the [Final NIH Policy for Data Management and Sharing](#) [1] and the [Supplemental Information to the NIH Policy for Data Management and Sharing: Elements of an NIH Data Management and Sharing Plan](#) [2].

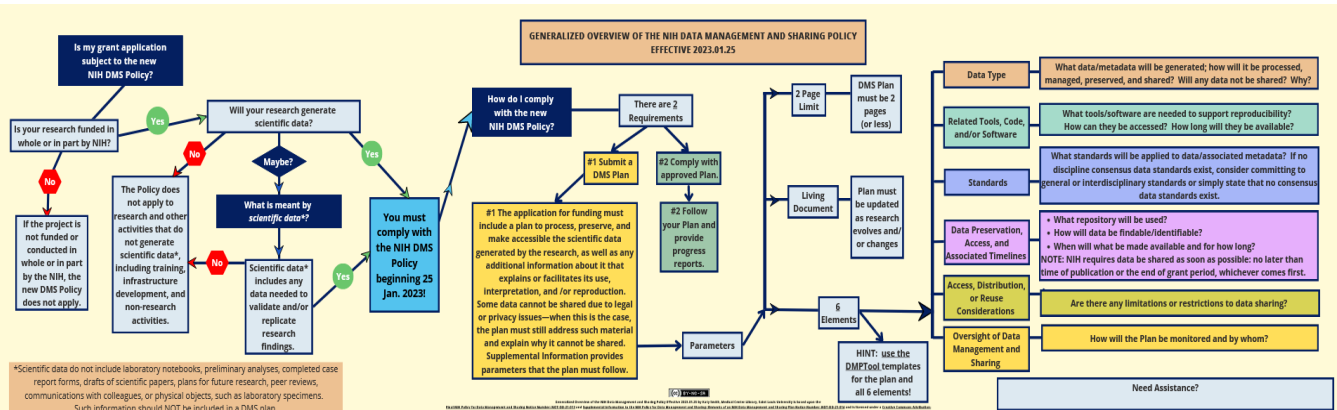
Joining a medical center library in November 2021, the author found herself responsible for data services (among other traditional liaison areas) with little data sciences background beyond that used with personal dissertation

research data. After finding encouragement and coaching from newly found brilliant and gracious colleagues in the Medical Library Association Data Caucus, the author utilized past public and secondary school/junior college library experiences in information literacy instruction to effectively and efficiently visualize and to share the basic information of the NIH DMS Policy within an infographic. While not developing or utilizing new technology, the Generalized Overview is innovative and notable for creatively using a freely available graphic design tool to translate government policy language into an accessible and understandable infographic that can quickly – and more importantly, accurately – disseminate the important information needed by researchers and by those who support them.

BRIEF DESCRIPTION OF THE VIRTUAL PROJECT

Inspired by a fellow data librarian's example of color-coding pertinent portions of the DMS Policy [3], the author initially sought to solidify a personal basic understanding of the policy by breaking down the policy language and mind-mapping it within Canva, a freely available online graphic design tool. After a few false starts, Canva was further used to transform the policy into an easy-to-follow flow chart infographic – the Generalized Overview – providing a basic, linear, and clear understanding of the NIH DMS Policy and of its

Figure 1



colleagues, the author received multiple requests to share it. It has since been well received by librarians,

requirements. As illustrated in Figure 1, the infographic begins with addressing the question of whether or not one's grant application is subject to the NIH DMS Policy, then leads the viewer via a flow-chart/decision tree process through th

e two compliance requirements (submitting a plan and complying with said plan) and the parameters of the plan (two-page limit, evolving documentation, and the six required elements: data type; related tools, code, and/or software; standards; data preservation, access, and timelines; access, distribution, or reuse considerations; and oversight).

TECHNOLOGY USED

[Canva](#) [4] is an online tool that simplifies graphic design with an intuitive platform that can be used via any web browser as well as via an Android/iOS supported mobile application. Free to use after registering with an email account, Canva provides a straightforward drag-and-drop editable interface to create or to customize 100+ design types (such as posters, slide decks, and infographics) using 250,000+ templates and over a million free photos and/or graphic elements. Users can also freely create designs with uploaded personal content. With 5GB of cloud storage, users can share designs, invite others to view and to edit, and can order printable products featuring their designs. Canva Pro, at \$119.99 per year, provides additional features, including expanded collections of templates and graphics, stock audio and video, AI-based tools, and 24/7 customer support; however, the elements used to create the Generalized Overview were all available within the free version.

ADVANTAGES, LIMITATIONS, AND IMPACT

After basing a brief on-campus overview instruction session around the Generalized Overview and describing the successful instructional use of the infographic to

researchers, and other stakeholders at and beyond the author's library and institution. Licensed under Creative Commons, others may fully adapt the infographic or may simply add their own institutional contact information before sharing with their communities via Canva, Microsoft PowerPoint, or .pdf versions – each downloadable via a Library Guide [5]. Although limited in scale and providing only the bare basics of the NIH DMS Policy, the Generalized Overview can be efficiently and effectively used by any who find themselves responsible for learning, publicizing, and/or teaching the NIH DMS Policy at their respective libraries and institutions. The Generalized Overview is intended for educational purposes only and does not act as a substitute for official guidance from the NIH.

AUTHOR CONTRIBUTIONS

The author confirms sole responsibility for the following: project conception and design, writing, reviewing, and editing.

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Learning on the job: using Artificial Intelligence to support rapid review methods

Kristin Rogers; Leah Hagerman; Sarah Neil-Sztramko; Maureen Dobbins

See end of article for authors' affiliations.

Keywords: Public health; rapid review; Artificial Intelligence

BACKGROUND

The National Collaborating Centre for Methods and Tools' (NCCMT) Rapid Evidence Service [1] conducts rapid reviews on priority questions to respond to the needs of public health decision-makers. Given the vast quantity of literature available, a key challenge of conducting rapid evidence syntheses is the time and effort required to manually screen large search results sets to identify and include all studies relevant to the research question within an accelerated timeline. To overcome this challenge, the NCCMT investigated the integration of artificial intelligence (AI) technologies into the title and abstract screening stage of the rapid review process to expedite the identification of studies relevant to the research question.

The NCCMT is funded by the Public Health Agency of Canada and affiliated with McMaster University.

PROJECT

The NCCMT leveraged existing AI features within the DistillerSR [2] systematic review software to develop a standard approach that can be used to support relevance screening in rapid reviews on a variety of public health topics. These include DistillerSR Artificial Intelligence SYstem (DAISY) Re-Rank, Re-Rank Report, AI Screening, and Check for Screening Errors.

The DAISY Re-Rank feature has been used in 30 rapid reviews on 18 topic areas to re-order the search results set throughout title and abstract screening and prioritize references that are more likely to be relevant to the research question. This has enabled the NCCMT team to initiate the full-text screening and data extraction stages earlier in the rapid review process by quickly identifying the studies most relevant to the research question.

The Re-Rank Report feature acts as a checkpoint to inform decisions around when it is appropriate to start using the AI Screening feature by predicting the probability that all included studies have been identified. The Check for Screening Errors feature provides an additional layer of confidence that all included studies have been identified

and minimizes the risk of incorrectly excluding relevant studies. The results of each of these features inform the use of the AI screening feature as a single screener or in duplicate with human manual screening.

The AI Screening feature uses a threshold-based prediction score to identify relevant or irrelevant references to the research question. The NCCMT has used the AI Screening feature on 6 rapid reviews, including three living rapid reviews. In one of the living rapid review updates, the AI Screening feature automatically excluded 80% of the search results (5,744/7,196 references). This saved a substantial amount of time during the manual title and abstract screening stage and allowed the Rapid Evidence Service team to be reallocated to full-text relevance screening, data extraction, quality appraisal, and synthesis stages earlier, thereby making faster progress to review completion.

TECHNOLOGY

DistillerSR [2] is a literature review and evidence management software that aims to automate the literature review process.

DAISY Re-Rank uses Natural Language Processing to learn manual relevance screening patterns and apply learnings to the remaining references to predict potentially relevant studies.

Re-Rank Report predicts the total number of included studies based on previous screening patterns.

AI Screening automatically screens studies based on prediction scores.

Check for Screening Errors identifies studies that were potentially falsely excluded.

ADVANTAGES

There are several key advantages of developing a standard process to integrate AI technologies into rapid evidence syntheses.

These include:

- Reducing staff time spent on manual title and abstract screening.
- Automatically excluding the most irrelevant references from large search results sets.
- The transferability of the process that can be used on a variety of different topic areas.
- The flexibility in how different AI technologies can be used for each individual rapid review based on confidence in the training set and accurate functioning of the AI features.

LIMITATIONS

There are important limitations to this novel approach for using AI technologies in evidence synthesis.

These include:

- The need to retrain the AI features with each new research question, and the importance of a quality training data set.
- The reliance on human input for validation and the limited time to do multiple rounds of testing within accelerated timelines.
- A lack of consistency around appropriate thresholds for decision making, which can be moderated by applying learnings on the strengths and limitations of each of the AI features gained over many reviews.
- The inability to apply AI technologies to other stages in the rapid review process, such as full-text screening, data extraction, quality assessment, and synthesis.

CONCLUSION

As of August 2022, NCCMT has successfully integrated a standard process using DistillerSR's AI features into rapid reviews on various public health relevant research questions to reduce the manual screening burden, saving time and resources. This has allowed for more timely access to high-quality synthesis evidence to inform public health decisions.

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1. National Collaborating Centre for Methods and Tools. Rapid Evidence Service, Suite 210A - 175 Longwood Rd S., Hamilton, ON, Canada, L8P 0A1; <https://www.nccmt.ca/rapid-evidence-service/>; free.
2. DistillerSR. DistillerSR: Literature Review Software, Suite 450 - 505 March Rd, Ottawa, ON, Canada, K2K 3A4; <https://www.distillersr.com/>; contact vendor for pricing.

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Data Policy Finder: an easily integratable tool connecting data librarians with researchers to navigate publication requirements

Anthony J. Dellureficio; Eric Willoughby; Donna S. Gibson

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The Data Policy Finder is a searchable database containing librarian-curated information, links, direct quotes from relevant policy sections, and notes to help the researcher search, verify, and plan for their publication data requirements. The Memorial Sloan Kettering Cancer Center Library launched this new resource to help researchers navigate the ever-growing, and widely varying body of publisher policies regarding data, code, and other supplemental materials. The project team designed this resource to encourage growth and collaboration with other librarians and information professionals facing similar challenges supporting their research communities. This resource creates another access point for researchers to connect with data management services and, as an open-source tool, it can be integrated into the workflows and support services of other libraries.

Keywords: Research Data Management; Editorial Policies

INTRODUCTION

The Data Policy Finder (DPF) is a searchable database containing information, links, direct quotes from relevant policy sections, and notes to help the researcher search, verify, and plan for their publication data requirements. The entries are librarian-reviewed and curated with the intention of adding new content and updating existing information.

Based on conversations with Memorial Sloan Kettering (MSK) researchers about their publishing challenges, a new resource was launched to help them navigate the ever-growing body of policies by publishers regarding data, code, and other supplemental materials. The project team designed this resource to encourage growth and collaboration with other librarians and information professionals facing similar challenges supporting their research communities.

BACKGROUND

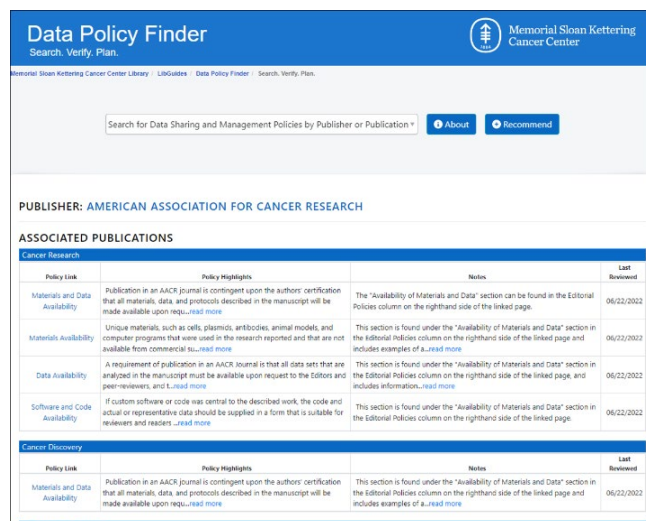
The publication process can often include untimely roadblocks, such as publisher-specific requirements for depositing minimal datasets and identification of datasets, code, and other supporting research materials. These publication policies can be difficult to find, understand, and compare in advance of publishing, and often prolong the publication timeline.

The following use cases have driven the design and resource purpose:

- Researchers are being asked to identify data repositories and expected data output from intended research at increasingly early stages in the research lifecycle. With the National Institutes of Health's (NIH) new Data Management and Sharing Policy, this information would be included in a data management plan. Since the research proposal often presumes a goal of publication, understanding the requirements of intended journals can help researchers align their data plans to lower the eventual burden of publishing.
- Journal publication policies, especially regarding data and other supplemental research output, can be challenging to find and are often buried deep within the interior pages of a publisher's website. They can be presented as PDFs, static HTML pages, or bundled into other author policies. Prospective authors would benefit from a resource to help them discover relevant policies for their specific journal and point them directly to the policies on a publisher's site.

Resource benefits:

- Saves time in identifying publication policy information.
- Highlights critical components of the publisher's policy.

Figure 1 Data Policy Finder

- Links to the complete policy, often difficult to discover.
- Provides curated list of journals in which MSK authors most frequently publish.
- Adds insights and recommendations for repositories via Librarian “Notes.”

Searching the Data Policy Finder

Anyone can search and use this resource by simply typing in the name of a Journal or Publisher. Search suggestions based on the entered text will appear and at any point, the user can browse through the list of Publishers and Publications. When selecting a title, the results will display the publisher and all their associated publications with their nested policies.

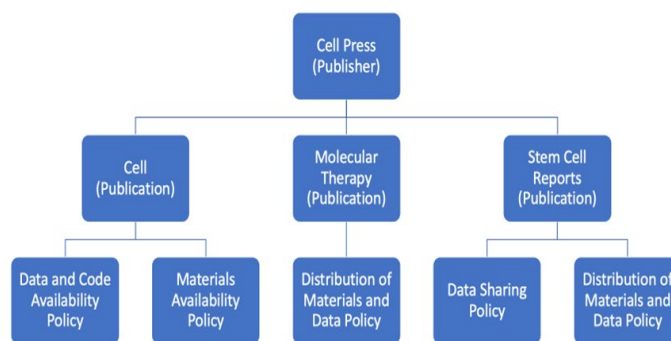
Development Process and Decisions

The project team made technology design choices to maximize the versatility of usage, interaction, and integration to facilitate adoption and collaboration by other institutions. The DPF is presented as a basic search, however the user interface is also available in a simplified form connected to a backend application programming interface (API). The minimalist search interface was designed to be embedded in another page while still allowing the user to browse or search existing policies. Separating the backend (data) from the front-end (search interface) allows the DPF to integrate flexibly with an institution's resources and needs, maximizing future growth and integration potential.

[Instructions](#) for implementing the DPF are included within the “About” section of the resource.

Table 1 Data Policy Finder Record Fields

Policy Link	Type of policy and a link to it on the journal's website
Policy Highlights	Relevant quoted text from the policy
Notes containing	Additional guidance added and curated by Library staff
Last Reviewed	Last date the policy was reviewed or updated in the Data Policy Finder

Figure 2 Nested Policy Relationships

A publisher may have many publications, each with multiple unique or shared policies across multiple publications

Community Development

The authors believe this resource will bring value to others outside the MSK Library community and are seeking external library partners to collaborate with to enhance resource interface and support timely content revisions and additions. To date, [Hofstra/Northwell](#) and [Stanford University](#) have incorporated this application within their own resource offerings. The vision of the project team also includes partnerships with publishers and standards organizations.

Since the launch of the Data Policy Finder, the project team are now focus on identifying future enhancements to include:

- Augment the back-end interface
- Capture and track usage metrics
- Add new content
- Create and foster a community for data policies and related initiatives
- Establish metadata standardization
- Develop ingest process for policies – the dream!

Publication policies will continue to grow and change, and researchers can save time using the DPF to better understand manuscript submission requirements for data

and associated supplemental materials. This resource creates another access point for researchers to connect with data management services, and as an open-source tool, can be integrated into the workflows and support services of other libraries creating potential collaborations.

AUTHOR CONTRIBUTIONS

Anthony Dellureficio: conceptualization, data curation, writing – original draft; Eric Willoughby: software, writing – review and editing; Donna Gibson: writing – original draft, writing – review and editing.

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Research networking and the role of the medical librarian

Robyn Reed, AHIP; Matthew J. Eyer; Megan M. Young; Sarah K. Bronson

See end of article for authors' affiliations.

Medical librarians work collaboratively across all units and missions of academic medical centers. One area where librarians can provide key expertise is in the building and maintenance of Research Information Management Systems (RIMS). At Penn State, the RIMS implementation team has included a medical librarian, research administrators and marketing staff from the College of Medicine (CoM) since its inception in 2016. As our peer institutions implemented or expanded their own RIMS systems, the CoM team has responded to their questions regarding details about the Penn State RIMS instance. The goal of this commentary is to describe how the CoM team has worked collaboratively within Penn State to address questions related to research output, with special emphasis on details pertaining to questions from other institutions.

Keywords: Research networking; collaboration; biomedical research

BACKGROUND

Research networking systems in academic institutions may be called Current Research Information Systems (CRIS), Research Information Management Systems (RIMS), Research Networking Systems (RNS) or other similar terms [1]. The motivations for building a research networking system are varied but likely include identifying research collaborators and mentors, reporting on institutional research, and strategic planning for the research mission. A 2017 survey by Online Computer Library Center (OCLC) Research found that additional reasons for having a RIMS include internal tracking, publication compliance and grants or awards management [2].

A primary reason for having a RIMS in place is to learn about individual or institutional research output. This allows faculty, staff and students as well as interested external inquirers to gain an understanding of the research initiatives at that organization. In 2012, Boland et al. conducted an analysis of RIMS usage at Columbia University. They found that searchers located researcher profiles much faster in a RIMS when compared to Google and spent more time engaged with the RIMS than Google [3].

Over the last few years, the Penn State CoM RIMS team has presented aspects of their system at research networking, library and translational science conferences. Additionally, the team has assisted other medical school RIMS committees by answering specific questions about their system configuration. Most of these committees were comprised of medical librarians. The goal of this publication is to summarize the queries the team has

received and our responses to highlight system considerations for current or future RIMS applications and assist medical librarians involved in these initiatives.

The [Penn State RIMS](#) can be viewed publicly [4]. The authors' intentions in sharing details of the RIMS are not to serve as an endorsement or criticism of any one type of system or vendor but rather to highlight features and details of a working system.

Stakeholders and Teams

Launching or maintaining a RIMS will ideally have broad stakeholder participation to maximize relevance for all entities. Research and education administrators along with other units may have specific uses for a RIMS. While librarians will be familiar with the publication output data, IT specialists may play a role with establishing or updating a RIMS, and in programming to extract or input data via application programming interfaces (APIs) for use in other applications. Vardell et al. describe the implementation of a research networking system in the Miller School of Medicine at the University of Miami by noting a collaborative effort between the library and the Office of Research [5]. The partnership formed between these entities resulted in the library being responsible for marketing and training of the product while the Office of Research maintained technical features.

Penn State maintains a single RIMS, which was established with the goal of representing researchers across all campuses and disciplines to advance interdisciplinary research. Since the RIMS includes over 5000 faculty across 24 campuses and more than a dozen academic colleges, it is managed by two teams: one from

the College of Medicine (with over 1500 profiles) and another from University Park (flagship campus). The Penn State CoM RIMS team is comprised of a Medical Librarian, a Multimedia Specialist from the Office of Strategic Marketing and Communications, an Assistant Director of Research Development and the Associate Dean for Interdisciplinary Research. The CoM team is responsible for College of Medicine data while working collaboratively with the University Park team, who maintain the remainder of data from other colleges and campuses across Penn State [6].

Librarians can be meaningful collaborators in RIMS operations, primarily due to their in depth understanding of bibliometrics analysis and publications and can also assist with the maintenance and expansion of RIMS. Research administrators share their knowledge of the research enterprise and have access and knowledge to clean up the often incomplete and incorrect data on faculty researchers. Research administrators benefit from a quality RIMS to collect research data, identify collaborators and mentors for research faculty, help connect students or trainees to research supervisors, and to engage appropriate reviewers for internal award programs and limited submission opportunities. The availability of faculty researcher profiles in the RIMS allows marketing and communication team members to employ direct links to relevant profiles on websites, in news stories, and in other materials about a researcher's projects, grants or initiatives.

Penn State RIMS Features

Reporting on output by individual researcher and academic unit is the primary utility of the Penn State RIMS and, therefore, requires a significant amount of attention. The RIMS was originally set up with each campus, college and department represented in the hierarchy. Over time, clinical divisions, academic centers and institutes along with research facilities were added to the existing structure. Initially, human resources data with unique identifiers enabled researchers to be added to the RIMS and affiliated with their respective campus/college/department. As additional tiers were added to the hierarchy, such as clinical divisions and institutes, outreach to units to determine membership became required as those data are often not centrally recorded.

The question of which researchers are given profiles does not always have an easy answer. Most universities employ faculty with a range of titles and roles. The overall determining factor in the Penn State RIMS is having a research-intensive position that generates research output. The finer points of faculty inclusion may vary by college or department. Over time, issues such as reaching a maximum profile limit likely will result in modifying criteria for Penn State as its RIMS has a maximum number of allowable profiles. As such, establishing guidelines for

profile inclusion and vigilance in removing faculty who have left the institution has developed over time.

Publication data in the Penn State RIMS is primarily driven by Scopus (Elsevier) imports via Scopus author IDs. Until new faculty members are established at the university, it may be necessary to assist with Scopus author ID cleaning so that the correct data are imported and associated with their RIMS faculty profile. The imported Scopus data include citation counts and the interface generates an h index on faculty profile pages [7]. Currently PlumX and Altmetric donuts are available for publications in the RIMS and are connected to publications via Scopus data or digital object identifiers (DOIs).

The College of Medicine RIMS team follows unique workflows for updating and editing content. One of the major differences between the CoM data and the rest of Penn State is that College of Medicine faculty profiles are locked for editing so that the CoM RIMS team makes all profile edits and individual faculty members are not directly involved in their updating or maintain their profiles. A collaboration between the CoM RIMS team and the Marketing department generated an opportunity to build the RIMS around institutional branding, creating a consistent look and feel while maintaining data quality. The Marketing department hosts a form <<https://research.med.psu.edu/pure/>> for faculty or their proxies to use to update profile data [8]. In this way, the faculty are able to highlight what they deem to be important aspects of their work.

While Scopus captures the majority of biomedicine publications of the faculty, some publications need to be manually entered by the CoM RIMS team. Non-Scopus indexed publications are provided by the faculty using the update form and are manually added to the RIMS to appear in the faculty member's profile. Non-Scopus publications, however, do not display citation counts from Scopus as those publications are not indexed there. To allow faculty to have more comprehensive and forward-looking content that may not be part of their publication history, text boxes for narratives describing researchers' current and future research, clinical and teaching interests are available and faculty members write their narratives and submit them via the RIMS form.

Awards and education and training can also be provided by the researchers. Awards (prizes) are listed in profiles, and the CoM RIMS team allots eight awards per faculty member to limit manual data entry by the RIMS team. Grants and projects are also part of the Penn State RIMS and are auto populated from Elsevier's database. The team is not able to add internal grants at this time due to the amount of manual labor it would require so the grants and projects tab highlights only external funding that is monitored by Elsevier.

To keep the data as up to date as possible, the CoM team conducts monthly profile additions and deletions from the RIMS based on personnel data from the dean's office. The team also implements annual updates to acknowledge promotions and tenure. The task of updating the ranks (e.g. assistant to associate professor) is performed in bulk at their effective date, whereas title changes for leadership roles are done on an ongoing basis. Additional collaborations include quarterly updates from the Office of Development on researchers holding endowed titles. New or updated information provided by faculty occurs on a continuous basis, including changes to narratives or adding an award.

As a member of the RIMS team, the medical librarian plays a significant role in maintaining profiles, performing edits, adding and deleting profiles and consulting about current and future features of the RIMS. It is difficult to estimate the amount of time required in this role, as it varies over time. One example is requiring more time in the summer to create profiles when more hiring takes place. Also, with the change of the fiscal year in July, faculty promotions go into effect, requiring many title changes. Together, the four-member CoM RIMS team likely invests an average of 15 hours a week to manage the resource at its current state.

Persistent Identifiers in a RIMS

The Penn State College of Medicine Biomedical Research Core Facilities are institution-funded services which require assessment pertaining to their utility as well as marketing of the services to encourage usage. The CoM RIMS team worked with the Director of the Core Facilities to add those units to the university hierarchy in the RIMS, with the desired outcome of featuring relevant publications resulting from core services. The goal of the initiative was to publicly showcase products of the tools and methods from the core facilities, encouraging additional collaborations among researchers. Furthermore, equipment is listed on core facility RIMS profiles so researchers can see the available tools and services. Relevant core facility publications are being captured through the use of Research Resource Identifiers, or RRIDs, and associated with the units.

The use of persistent identifiers in biomedical research and publications to enhance research reproducibility has been on the rise; and assigning RRIDs to equipment, and in this case facilities, is an example of this practice [9]. Researchers include RRIDs in their publications when citing resources such as antibodies, cell lines and select research equipment. To capture CoM core facility publications, the medical librarian on the RIMS team created search strategies comprised of RRIDs, core facility names and the institution name to query Scopus (Elsevier) and Dimensions (Digital Science) databases. A multi-database approach was needed to capture this data, as RRIDs and associated core facility data may be located in

the funding section or body of the publication text. Alerts of new publications from the databases are delivered to the core facility manager and librarian on a recurring basis, and the relevant publications are assigned to the appropriate core facility within the RIMS (example of Cryo EM facility <https://pure.psu.edu/en/organisations/cryoem-and-cryoet-com-biomedical-core-facility>). The efforts of the CoM RIMS team collaborating with the director of the biomedical core facilities have improved internal return-on-investment analyses while publicly demonstrating applications from research core usage on the RIMS. As uptake of RRID usage increases, reporting on the impact of individual core facilities may be simplified to searches employing only RRIDs.

ORCID iDs are another example of a persistent identifier that can be integrated into a RIMS [10]. The Penn State RIMS allows researchers to have a hyperlink to their ORCID iD in their profiles, although, the RIMS is not currently configured for direct export to and import from ORCID. However, this functionality is available, as Research Triangle International in North Carolina requires the creation of ORCID iDs that are linked with RIMS profiles to assist with the administrative processes associated with grant applications, as well as connecting associated publications with researchers [11].

Data Reuse and Reporting

A RIMS can ease the burden of finding and cleaning publication data. Specialized reporting on research output and other data by unit can aid in internal and external reporting, accreditation reporting, as well as helping with metadata reuse.

One example is the Liaison Committee on Medical Education (LCME) accreditation standards among medical school programs. Required data include collecting research output data by department such as number of peer reviewed articles and books/book chapters [12]. Since each new faculty member in the RIMS is assigned to their appropriate department(s) and other units, it is possible to extract department-level data. The librarian on the College of Medicine RIMS team was approached to provide research output data by department, which was made much easier by having a system in place designed to host these data.

Running unit reports on publication output is another area where a librarian can be an asset to the RIMS team. Unit heads or administrative staff frequently approach the CoM RIMS team to run reports on research output from the RIMS. The librarian on the RIMS team has established a sustainable workflow to manage these requests. Upon request, the librarian exports an up-to-date list of Scopus author IDs by unit from the RIMS and conducts one on one Scopus training with the requester using Scopus author IDs from the unit to be queried. This approach has

empowered several individuals to set up alerts of interest and provides the ability to run reports as needed without having to ask the RIMS team for every request. Thus, the efforts the team makes to clean Scopus author IDs and to assign the faculty and their IDs to the correct units in the RIMS feeds forward for accurate internal reporting. Rarely does the team provide the manually entered non-Scopus indexed publications for these reports as these publications are a considerable minority, but it is possible to do an export for a requester if that need arises.

Metadata reuse from a RIMS and librarian involvement may be possible for initiatives such as dashboards and use on websites. A 2021 OCLC case study of five US institutions showed metadata reuse from RIMS in various stages of operation, with two reusing metadata and others planning use [6]. In the case of Penn State, the RIMS provides publication and researcher profile data for reuse on the Penn State Cancer Institute website [13]. (sample profile <<https://cancer.psu.edu/researchers/individual/-/researcher/5B6500F63D2438DBE0540010E056499A/jay-raman-md>>).

Reuse of RIMS data within the College of Medicine is also demonstrated with an internal college-specific administrative dashboard. The dashboard integrates various data sources, including research output from the RIMS, teaching statistics from internal systems, and grants and projects data from other Penn State sources. The librarian on the RIMS team meets with IT and research administrators to clarify the types of data available for hosting on the dashboard and serves as a liaison between the RIMS host (Elsevier) and the academic IT team for issues like API keys and clarification about data structure.

CONCLUSION

The many roles that medical librarians play in maintaining research networking systems underscore the necessity of integrating librarians within all of the missions of academic health system. On a RIMS team, librarians will assist with explaining aspects of scholarly communications, describe database coverage (e.g. Scopus) and play key roles in data export. Having a team of diverse, interprofessional stakeholders able to share the maintenance and assist in developing future initiatives, ensures that the goals of the networking system are met as well as a robust return on investment.

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Mobilizing health equity through Computable Biomedical Knowledge (CBK): a call to action to the library, information sciences, and health informatics communities

Nancy J. Allee; Gerald Perry; Gabriel R.Rios; Joshua C. Rubin; Vignesh Subbian; Deborah E. Swain; and Terrie R. Wheeler

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The twin pandemics of COVID-19 and structural racism brought into focus health disparities and disproportionate impacts of disease on communities of color. Health equity has subsequently emerged as a priority. Recognizing that the future of health care will be informed by advanced information technologies including artificial intelligence (AI), machine learning, and algorithmic applications, the authors argue that to advance towards states of improved health equity, health information professionals need to engage in and encourage the conduct of research at the intersections of health equity, health disparities, and computational biomedical knowledge (CBK) applications. Recommendations are provided with a means to engage in this mobilization effort.

Keywords: Health Equity; Health Inequalities; Health Status Disparities; Computing Methodologies; Algorithms; Artificial Intelligence; Machine Learning; Library Science; Information Science

The twin pandemics of COVID-19 and structural racism have surfaced and brought into sharp focus critical health disparities and disproportionate impacts of disease on communities of color [1, 2, 3, 4]. Health equity as an area of scholarship and activism has subsequently emerged as a priority [5, 6, 7, 8, 9]. Recognizing that the future of health care will be informed by advanced information technologies including artificial intelligence (AI), machine learning, and algorithmic applications, [10] the authors, all active in the Mobilizing Computable Biomedical Knowledge (MCBK) community, [11] argue that in order to advance towards states of improved health equity, knowledge workers, health and biomedical researchers, healthcare practitioners, government agencies, philanthropy, industry, consumer health advocacy and community-based organizations all need to be engaged in and encouraging the conduct of research at the intersections of health equity, health disparities, and computable biomedical knowledge (CBK) applications. CBK broadly encompasses knowledge related to human health that is explicit and machine interpretable. Examples include machine-readable and processable clinical care guidelines, predictive and interpretable models, calculators, statistical and logic models, among others [12, 13]. Accessible examples can be found through the PCBK, described as “a public repository mobilizing Computable Biomedical Knowledge artifacts,” [14] or the University of Michigan’s Knowledge Grid [15].

CBK allows for knowledge to be “represented and reasoned upon using logic, formal standards, and mathematical approaches” [16]. In this perspective article, we call on health information professionals, including librarians and informaticians as specialized knowledge workers, to join and fully engage in this work and the surrounding movement to bring advanced computational and information technologies to bear on improving health care delivery, outcomes, and ultimately health equity. We believe the library and information science (LIS) communities have relevant, tangible skills to contribute. CBK as artifacts need to be curated and preserved, archived, deposited into accessible repositories, described using metadata, and rendered findable – all activities aligned with the skills and approaches commonly deployed by librarians and information science professionals.

HEALTH EQUITY AND COMPUTABLE BIOMEDICAL KNOWLEDGE

Health equity and computable biomedical knowledge are interconnected, as access to accurate and comprehensive biomedical knowledge is critical to achieving health equity. CBK, which refers to knowledge representations that are both machine readable and actionable, can provide valuable insights about health disparities. That

knowledge can inform models that clarify patterns and trends, potentially predicting outcomes based on factors such as race, ethnicity, socioeconomic status, or geographic location. In addition, CBK can also help to develop more timely and targeted interventions to address health disparities. For instance, by analyzing evidence on the effectiveness of different treatments for specific subpopulations, researchers can identify which interventions are most effective for addressing health disparities.

The authors argue that it is important to ensure that CBK is accessible to all communities and that it is used in a way that promotes health equity. This means that efforts must be made to address biases and ensure that data used to inform CBK artifacts are collected and analyzed in ways that are inclusive and representative of all communities. Additionally, efforts must be made to ensure that the insights gained from CBK are used to develop interventions that are accessible and appropriate for all communities, particularly those that have historically been marginalized or underserved.

Access to evidence is a critical component of health equity and is advanced by open frameworks in healthcare. Without access to accurate, reliable, and timely information, individuals and communities may face barriers to accessing healthcare services and to making informed decisions about their health and advocating for their own health needs.

THE HEALTH EQUITY IMPERATIVE

As cited, a body of literature has emerged describing the disproportionate impacts of the COVID-19 pandemic on Black, Indigenous, and People of Color (BIPOC) [17], and a related corpus has emerged documenting pervasive BIPOC mistrust of healthcare writ large and healthcare delivery, specifically, including COVID-19 related treatment [18, 19]. At the same time, popular media [20, 21, 22] and scientific venues [23] have published and broadcasted findings that AI, machine learning, and algorithmic applications can and do perpetuate biases, including harmful racist tropes. Based on these knowledge sources, we see a need to act grounded in the values of both the medical and LIS professions, and an understanding of ethics of care as a frame of reference for advancing moral action.

Briefly, an ethics of care approach is centered around relationships and dependencies between individuals. It encourages us to consider the notions of “care” and “compassion” as moral behaviors [24]. Within the healthcare realm, to care about and have compassion for individuals potentially impacted by disease and illness become moral imperatives [25]. If we recognize the uncontested moral assertion that all individuals equally deserve care and compassion, then health equity must be fundamental to healthcare.

Within the LIS realm, to care and have compassion for the information and decision-making needs of individuals similarly becomes a moral imperative. For health information professionals these imperatives converge. Further, if we recognize that the future of healthcare will be manifestly informed by emerging advanced information technologies such as AI and ML, [26] then those technologies must be interrogated for the degrees to which they advance health equity. These are the imperatives that drive the need for LIS professionals to engage in and lead CBK-related work.

LIBRARIANSHIP AND THE MCBK COMMUNITY

The MCBK community of practice was largely launched at a foundational meeting held in 2017 in Ann Arbor, MI, sponsored by the Department of Learning Health Systems at the University of Michigan (UM) [27]. The founding leaders were prescient in inviting thought leaders from the health sciences library community to participate in that meeting, recognizing that health sciences librarians’ roles and expertise in organizing and providing access to evidence-based knowledge was foundational to the work of the movement. According to the MCBK Manifesto “Knowledge has the potential to improve healthcare, the health of individuals, and the health of populations. Every decision affecting health should be informed by the best available knowledge” [28].

As the MCBK movement was launched, those LIS thought leaders became active in the leadership of the effort, taking roles on the Steering Committee and co-chairing and serving as members of the various MCBK Working Groups that eventually emerged [29]. Those librarians quickly became advocates within the movement for explicit engagement in health equity issues as they related to CBK, honing in on the MCBK Manifesto’s equity statement: “For moral and ethical reasons, it is imperative that each and every member of society have access to what is known at the time they are making health-related choices and decisions” [30].

CALL TO ACTION

The authors advocate that research and engagement at the intersections of advancing health equity, reducing health disparities, and mobilizing CBK need to be equitably and transparently organized and structured to involve impacted stakeholders in ways that recognize and prioritize the interests of communities most adversely impacted by health disparities. We see this as fundamental to an ethics of care-informed approach [31] to solving for the persistent problem of equitable representation in the development of solutions to complex, often intractable problems in healthcare. The conduct of research at the intersections of health equity, health disparities, and CBK should address unequal economic and power dynamics and seek to establish a level healthcare playing field. Given the profound and widespread levels of mistrust

around healthcare and biomedical research among communities of color, [32, 33, 34, 35, 36] failure to approach CBK with anything less than a humble, anti-racism strategy would be untenable, unethical and risk rendering the promises of CBK moot for entire communities.

The authors are addressing this call to action to LIS professionals because we see very clear connections between the fundamental work of health sciences librarianship, including the culture and values of the profession as articulated in codes of practice and ethics [37, 38], with the goals of the MCBK movement [39]. Those values include commitments to: diversity, equity, inclusion, and antiracism [40, 41], open science including open access, data, and research [42, 43], and longstanding commitments to dynamic emerging roles for librarians in the work areas of metadata, repositories (including knowledge bases), information stewardship and knowledge management, instruction, and engagement through outreach with impacted communities, especially those who have been consistently, structurally marginalized, minoritized, and oppressed. Librarians as boundary spanners [44] and champions for open access are well-positioned to help lead the MCBK community to consider the issues of health equity and equitable protocols for problem-solving engagement.

Both the LIS and MCBK communities have recognized the need to address equity in the provision of healthcare. The authors believe that the twin pandemics of COVID-19 and racism add urgency to the need for proactive engagement by the library and information sciences community in MCBK-related work. We believe librarians can especially contribute to “Mobilizing” functional work that is needed, and we believe that work must start as outreach to the LIS community. We see this as imperative and the ethical thing to do. We recognize the complexity of issues at hand and the need to advocate. We write with the purpose of encouraging the library, information sciences and health informatics communities to recognize the importance of engagement in this work and to act now.

These needs are clearly in evidence as we consider recent public health emergencies. We posit if there ever was a need for evidence to substantiate the potential for LIS involvement in health equity and CBK research and advocacy, the twin pandemics of COVID-19 and racism offer such and in consequence, we offer the following recommendations.

RECOMMENDATIONS

1. LIS professionals must support, and amplify the need to support, health disparities research using ethics of care approaches. We must also expand our focus to consider the search for solutions, embracing the “Quintuple Aim” of transforming patient

care to include improving patient experiences, seeking better outcomes, reducing costs, better ensuring clinician well-being, and embracing health equity[45]. One way to do this is by taking a holistic and inclusive view of CBK artifacts, i.e.,

considering the interdependencies between the technical and social components involved in the development and deployment of CBK artifacts. We believe MCBK is a solution in that advanced technological CBK artifacts, when created with an explicit consciousness of diversity, equity, inclusion, and antiracism values, can be used to deliver at scale bias-resistant benefits to the users and consumers of CBK.

2. LIS professionals must commit to training and educating the future research workforce in areas related to CBK and health equity. This can be done by applying domain skills in instruction and outreach to formal undergraduate and graduate training programs.
3. Health equity should not be an afterthought in biomedical research, particularly during the experimental design stage. Researchers engaged in CBK-based solutions need to better define what is health equity in their specific MCBK context. How is health equity advanced? This can be done by asking: whose experiences are centered in the data, application, algorithm, model, or artifact we are generating or using? Whose experiences are explicitly or implicitly missing?
4. LIS professionals, must ask, how do we involve the most significantly, and, potentially, severely impacted constituencies whose experiences are the focus on our CBK-related work? What is the governance supporting the artifact we are generating? How might we make that artifact equitable, in its creation, deployment, and future management?
5. LIS professionals, must ask, how do we apply open science frameworks to this work, such that transparency and visibility into how the artifact was created and is deployed is fundamental to the effort?
6. LIS professionals must also ask themselves; how can they learn about AI, ML and other advanced technologies and their implications and potential to enhance health equity? How might they apply their skills in metadata schema and ontology development, data management and curation, semantics and the relationships between knowledge artifacts, repositories and iteration controls, and knowledge

dissemination, to be part of the future of healthcare and biomedical research that will largely be informed by AI and ML technologies?

CONCLUSIONS

Readers wishing to learn more and engage in the MCBK community are encouraged to contact the authors or visit the University of Michigan's Learning Health System's MCBK website at: <https://mobilizecbk.med.umich.edu/>. By actively participating in the Mobilizing Computed Biomedical Knowledge community, librarians can contribute their expertise, promote information literacy, and facilitate access to resources, thereby fostering a more inclusive and collaborative research environment.

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Fostering change, empowering faculty: comments on the NURSLITT study and the five-year rule

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The five-year rule must die. Despite an extensive literature search, the origins of the five-year rule remain unknown. In an era when the nursing profession is so focused on evidence-based practice, any approach that arbitrarily limits literature searches to articles published in the previous five years lacks scientific basis. We explore some reasons for the pervasiveness of the practice and suggest that librarians need to engage with nursing faculty, who are well-positioned to be change agents in this practice.

Keywords: 5-year Rule; Date Limits; Date Range; Literature Searches; Search Limits; Nurses; Nursing Faculty; Nursing Education; Nursing Research

Experienced librarians know the search habits of their patrons are as varied as the people they assist. One such idiosyncrasy is the persistent practice of “the five-year rule” search limit within the nursing profession. During our recent study on this topic, members of our research team noted a few not readily apparent influences that may have some bearing on this entrenched habit. Our objective is to deepen librarians’ understanding of the five-year phenomenon with a view toward fostering change.

“The five-year rule” is the stipulation that references used within a paper (if a student) or a publication (if professional) be no older than five years from the date of the assignment or piece. Health sciences librarians have long objected to the stringent date ranges imposed by nursing faculty upon their students for nursing literature searching; the subsequent persistence of this “rule” after entering their professional nursing careers remains a concern.

Despite an exhaustive literature search, the only sources found that discuss this limitation were a few editorials written by nursing professionals decrying this very practice. In our study (Truex et al., 2022) we interviewed nursing students, faculty, direct care nurses, and health sciences librarians to assess their thoughts on literature searching practices by those in nursing. In general, all nursing participants (regardless of status) viewed the five-year rule favorably; only the librarians were tempered in their evaluation of its application [1]. Reasons posited by faculty for the use of the five-year rule included: it provides boundaries and structure, variations on “this is what I learned, so this is what I teach,” five years is ideal because nursing skills change and evolve, and remarkable claims like “if we said 10 years, [the students] would find twice as many articles.” [1]. Five years can be an

appropriate date range for some topics, but that context is key: selecting appropriate date ranges for literature searches is entirely topic-dependent.

Through these focus groups, the elements that coalesce to perpetuate this practice became apparent. Given human behavior, there are no absolutes, but we believe awareness of these elements will assist librarians to foster change. Three factors appear to be involved in this tenacious convention: research literacy, the human response to task complexity, and the characteristics of innovation that affect its diffusion rate.

RESEARCH LITERACY?

The factors that influence the information searching behaviors of nursing students, faculty, and practicing clinicians are complex. Nursing is a relatively young scientific discipline. It has been using modern research methods only since the 1980s and 1990s, and the responses to those studies, as well as the replication and furtherance of them, is still ongoing [2]. Given nursing research’s relative youth, research literacy is vital. Beaudry and Miller define research literacy as: “... the ability to locate, understand, discuss and evaluate different types of research; to communicate accurately about them; and to use findings for academic and professional purposes” [3].

Research literacy facilitates the ability to assess, plan, implement, and evaluate gaps in process or knowledge across the profession: the essence of nursing. However, it is an overarching concept addressing competency, not a process to achieve that intention. General consensus within the literature advocates increasing nursing students’ and practicing nurses’ research literacy [4] via differing pedagogical approaches [5, 6]. Hypothesis or

PICO development, for which the review of the literature is a crucial element, is rightly emphasized in nursing pedagogy. It is the tactics currently used for the literature exploration portion that can hamper the nursing research process with a subsequent deficiency in research literacy. The practice of instructing nursing students to use stringent date limits when searching the nursing literature is standard for many undergraduate nursing programs. It is a “rule” of long standing: one of the authors was taught it in her BSN program in the 1980s. Medical librarians in our study shared comments such as “[A nursing assignment reference] cannot be 5 years and one month old.”

It can be difficult to find something that is not there. In reviewing a range of nursing research textbooks (1959-2020), along with a variety of chapters dealing with reviewing the literature that were sent to us via colleagues subscribed to the MEDLIB-L mailing list, we found no evidence to support the use of the five-year time frame when conducting literature reviews for academic or research purposes. Burns and Grove (2009) sum up the general view held in these books: “Students repeatedly ask, ‘How many articles should I have? How far back in years should I go to find relevant information?’ The answer to both questions is an emphatic ‘*It depends.*’” (emphasis ours) [7]. Other textbooks recommend 10 years or simply state that for fundamental works the year of publication should not be a concern. This is a far cry from the strict parameters taught in many nursing schools. In addition, the APA, the primary citation tool used in nursing schools, declares:

“Many writers incorrectly believe that sources cited in APA Style papers must have been published recently, such as within the last 5–10 years. That’s a myth. There is no timeliness requirement in APA Style guidelines. We recommend citing reliable, primary sources with the most current information whenever possible. What it means to be “timely” varies across fields or disciplines.” [8]

It is not solely in research practice that the five-year rule can be problematic. The two primary accreditation bodies in nursing education, the American Association of Colleges of Nursing (AACN) and the Accreditation Commission for Education in Nursing (ACEN), both appear to reinforce this rule. The representatives we contacted at these accrediting bodies affirmed this. We were unable to determine if this date range is stipulated in the actual site visit standards or by the nursing faculty interpreting terms such as “current” to indicate no older than five years for reference material. This tenet is passed, not only through nurses, but among medical librarians. One of our authors relates that when she began her career, a veteran nursing school librarian advised preparing for an accreditation site visit by removing or discarding anything on the shelves older than five years, resulting in hundreds of books being thrown out. These sorts of collection development strategies built around the five-

year rule have proliferated throughout the profession, despite the AACN’s Commission on Collegiate Nursing Education not stipulating a date range: “The 2018 CCNE Standards for Accreditation of Baccalaureate and Graduate Nursing Programs does not specify any type of timeframe for purging library materials” [9].

This emphasis on dismissing literature older than five years, along with the inadvertent reinforcement by institutional policy, affects nursing researchers. We found several articles positing that nursing information doubles every five years, all based on a source that provides no evidence or citations for this claim [10, 11, 12]. This limitation on five-year data has other effects as well, such as adding unnecessary (and limiting) bias into nursing evidence synthesis studies. For example, Lu et al. 2019’s examination of nursing job satisfaction scrupulously limited their searches of ten unique databases to within five years [13], while DeVon’s 2007 literature review methodology notes that, “Nursing research articles were eligible for inclusion if they were published in the last 5 years...” [14]. There are likely more such examples elsewhere in the literature.

This disconnect between what is taught/practiced versus what is used in actual academic nursing research reveals an issue central to research literacy: effective searching of the available literature is required to foster skills needed for competency in understanding nursing research. Search skills as currently taught in nursing schools at the undergraduate level are inadequate. Sakalys in 1984 said, “A single, isolated intervention (i.e. a research course taught at the end of a nursing program) is not likely to promote development of cognitive processes fundamental to scientific inquiry” [15]. In speaking to the librarians in our focus groups, common practice appears that a basic introduction to EBP and research unit is given, but what is practiced is not the same as what is preached. Schuessler echoed Sakalys’ stance, stating that the basic introduction to EBP and research may be the nurses first (and only) exposure to this information, adding that when nurses are in need of information, their preference is to ask colleagues rather than conduct a literature search, and emphasized, “Nurse participants from these studies believe that patient care should be based on research but lacked the skills, comfort, and resources to access, appraise, and implement research” [16].

HUMAN RESPONSE TO TASK COMPLEXITY

Human behavior and response, coupled with the need for appropriate applied searching skills, must be factored into research pedagogy, our second factor at play. Bystrom found that increasingly complex information acquisition makes it more likely that people will turn to other people as sources, rather than to documentary sources [17]. Wakeham elaborates on this issue while speaking to the librarian’s role. Nurses rely on colleagues when seeking

complex information related to their practice, which is problematic because there is no quality control. Wakeham goes on to say, “The librarian has a contribution to make here.... They could achieve a great deal by becoming more skilled themselves in personally imparting information to the user, and in making themselves more prominent in [their] environment...” [18].

Despite no published evidence for the five-year rule in the decades we reviewed, it is still taught in class lectures, and reinforced via assignment parameters. Furthermore, when faced with the complex task of searching nursing literature, nursing students appear to rely on their instructors’ guidance rather than what their course readings recommend. Burns & Grove alluded to this: “When writing a course paper...clarify with your professor the publication years and type to be included” [19], unknowingly reiterating the Bystrom and Schuessler’s contentions regarding people vs. documentary sources. This inclination hampers research literacy as nurses self-limit, decreasing their awareness of relevant resources and the context of the accessed material. When these same nurses later ask a work colleague for suggestions on searching date ranges, it is likely that five years or fewer will be recommended, perpetuating the practice.

This commentary is not a how-to guide for librarians; there is no specific strategy that will guarantee the use of topic-dependent date limits by nursing personnel, but librarians are not without agency to end the five-year rule dominance. Dismantling this ubiquitous “standard” will take time, but if presented with the facts and rationales as laid out here, nursing pedagogy should embrace this change. In the presentations by the authors made to groups of nursing faculty, they have been receptive to considering discontinuing the use of the five-year rule in nursing education.

DIFFUSION OF INNOVATIONS

The third and final factor, diffusing innovations, is useful to foment change. Everett Roger’s theory of “diffusion of innovation” is applicable to the five-year rule shibboleth. The theory posits five characteristics of innovations that influence the rate at which they are adopted. To be rapidly adopted, an innovation must be perceived as being advantageous, compatible with existing values, easy to understand and use, “trial-able,” and visible to others [20]. We apply it here both to nurses in academic and direct care settings, and to the librarians who serve them. The five-year rule easily meets all these criteria: it’s certainly “trial-able” – the results are observable immediately. It’s our opinion that dropping the use of strict date limits hinges on considering Roger’s first two characteristics. The first characteristic is likely the stickiest: a narrow five-year window may be perceived as providing a relative advantage over broader ranges for limiting literature

searches, given that novice researchers feel inundated by data and information. Also, the five-year rule can be seen by novice nurses as aligning with the values of their nursing faculty and mentors. This perceived alignment is especially important, as nurses weigh the models provided by their instructors and mentors more heavily than recommendations in print sources, a weighting that is further reinforced at the institutional level via accreditation standards.

CONCLUSIONS AND RECOMMENDATIONS FOR LIBRARIANS

Our proposal for medical librarians: adapt this “diffusion of innovation” to promote appropriate use of date limits among nurses at all levels. We should also address the need for such “innovation” from more than one angle; by educating nursing students, faculty, and direct care nurses, and we should also use this diffusion of innovation to persuade. Librarianship is a profession that sits at the hub of many others, a position favorable to truly make a difference in the healthcare sciences, but a more concerted effort than commentary or concern amongst ourselves is needed. Librarians should take initiative by contacting nursing faculty with their concerns prior to the start of the academic year. Within our research guides and other digital learning offerings, librarians should provide rationales on how to think critically during literature searches to discourage the use of inappropriately applied date limits. Librarians should petition to be included on the committees that work toward nursing school accreditation and educate those members on the importance of broader date ranges for reference material and literature searching. Library orientations during new faculty onboarding should discourage use of stringent date restrictions. Sharing Op-Ed content such as the following may help faculty alter their view:

“Our pioneers’ names are not on reference lists because we have the absolutely stupid 5-year-rule in nursing! Students are told that their references are to be no older than 5 years. Why? Because some well-meaning but narrow individuals[sic] decided that nursing is a “science”; therefore, only recent publications need apply (in truth, it’s an art and a science). As my colleague and associate editor Dr. Eleanor Covan points out, “Even in the so-called ‘hard’ sciences there is no such rule; if the research is about telescopes, Galileo[sic] is always cited.” [21]

Librarians can point to our original research and this commentary, or check within their own collections’ nursing research textbooks, if they feel the need to cite their sources. In the clinical setting, librarians should educate staff on the use of pertinent date restrictions (if applicable) for references in hospital policies, quality improvement projects, and unit-specific evidence-based practice pilots. Once a sufficient number of “early adopters” and “power brokers” within the faculty or clinical nursing leadership are persuaded to make this

change, the judicious use of date ranges will be seen as advantageous for all. If people are the preferred source for expert knowledge, librarians certainly qualify. Individual situations vary, but a persuasive approach, rather than a simply factual one, should prove more successful. The nursing groups our research team has spoken to since publication have all welcomed this discussion. Persistent and consistent messaging from librarians will foster acceptance and change among faculty and clinical nurses.

We cannot state with certainty that the persistent application of the five-year rule to nursing literature searches negatively impacts nursing research literacy, but neither can it be said that relying on any rigid time frame fosters progress in nursing science. Common sense dictates that circumstances alter cases. One new trend noted in our updated literature review for this commentary was to find that many nurse authors now include "no date limits were used" in their abstracts. We hope this trend of delineating whether date ranges were imposed becomes a standard; librarians know that too many nursing projects do not start this way.

Unless librarians initiate the appropriate use of date limits in nursing literature searches, progress will be nonexistent, given the human response to task complexity and innovation. In fact, the status quo has worked for the nursing profession so far, so it's unlikely they will change this practice on their own. We hope that with a deeper understanding of the factors at play, health science librarians will feel more resolute and empowered to foster critical thinking in literature searching among their nursing colleagues at all levels.

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Revitalizing medical schools in late sixteenth-century China: Lü Kun and the medical reform program in his *Shizheng Lu*

Jiao Kun

See end of article for authors' affiliations.

This article takes a glance at the medical reform program recorded in the book *Shizheng Lu* 實政錄 (Records of Practical Policies for Governing) by Lü Kun, a scholar-official from Ming China who was active more than 400 years ago. The *Shizheng Lu* is a compilation of varied policies and plans designed by Lü Kun as a local official to restore and improve administration of civic affairs. A sub-chapter in this book is devoted to the subject of public health service. Analysis of this text yields knowledge of how the local public health system in Ming China was supposed to operate, pivoting on the key role of medical schools and highlighting the severe malfunction of this system in Lü Kun's time. The same text also sheds light on a handful of popular medical books from the era that could have been used for medical education.

Keywords: Lü Kun; *Shizheng Lu*; Ming China; Medical School; Public Health System

INTRODUCTION

The history of China is rich with the development of institutions for centralized administration of public affairs, of which medical care for the people has constituted an important branch. A nationwide public health system designed and run by the state can be traced back at least to the Northern Song period (AD 960–1127). Traits of this system were inherited or replaced with new ones by successive dynasties and governments, but the general practice of centralized medical administration has continued through almost all the historical periods thereafter into the current time.

In recent years, the public health care and medical administration system in pre-modern China has received growing attention from historians of China, especially those interested in traditional Chinese society. However, despite the plentiful and insightful works so far by scholars from both within and outside of China, in light of the lengthy span of the tradition of centralized medical administration in China, as well as rather sporadic and scattered records pertaining to this subject, much remains to be explored and discussed in this field of research.

The Ming dynasty (AD 1368–1644) existed for nearly 300 years and constituted an important phase of late imperial China. Its medical care system is hence rightfully worthy of observation and discussion. Nonetheless, people sometimes find the Ming to be a weak link in the study of Chinese medical history, compared both to the preceding two Songs and the following Qing. As for Ming China's medical administration at the local level, our

understanding is even more vague. Fortunately, a scholar-official named Lü Kun from the late sixteenth century left future generations with a book recording his policies in various aspects as a local official and providing a glimpse into how public health affairs were managed in localities of China about 400 years ago.

ABOUT LÜ KUN AND THE BOOK SHIZHENG LU

Lü Kun 呂坤, from Ningling 寧陵 County, Henan 河南 Province (the same county and province still exist today), was born in 1536, or the fifteenth year of the reign of Emperor Jiajing 嘉靖, the eleventh monarch of the Ming dynasty. In 1574, Lü Kun passed the highest level of the civil service examinations to get his *jinshi* 進士 (metropolitan graduate) degree, immediately allowing him to become an official of the empire. Lü started his political career as magistrate of different counties and then served in a series of positions, ranging from mid-rank court official to provincial top. After twenty years of service, Lü was promoted to a high-ranking position at court and summoned to the capital, Beijing. However, in Beijing, he soon got entangled in factional struggles within the court of Emperor Wanli 萬曆 and was forced to retire in 1597. Lü Kun spent the rest of his life in his hometown until his death in 1618, never returning to officialdom.

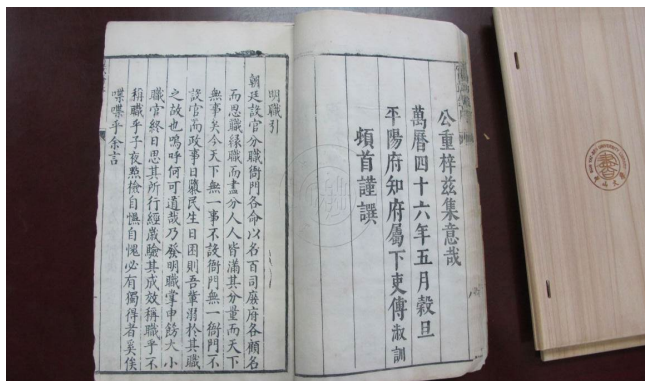
Lü Kun both launched and finished his political career under the reign of Emperor Wanli, who ruled for forty-eight years, only to see the Ming dynasty traveling along the trajectory of decline and eventually onto the precipice of collapse. Social, political, and military crises kept

mounting. An expanding population consumed all the extra products made available through economic growth, which further drove impoverished people into vagrancy as well as anti-government religious sects. Mongols and Jurchens encroached on the northern frontier, and there was increasing military pressure from a reunified Japan. Finally, fierce factional disputes over policies and personnel arrangements within the court almost paralyzed the Ming high politics.

As pointed out by Joanna F. Handlin, Lü Kun like many of his contemporary politicians shared in the then-prevailing strong sense of crisis [1]. In addition, his posts as a local official were all in the north, a much poorer land with an inadequately maintained social infrastructure compared to the wealthy southeastern part of China. All these factors added up to Lü Kun's clear proclivity for statecraft, as embodied in the book *Shizheng Lu* and many other of his works.

According to Xie Yang [2], the *Shizheng Lu* was initially compiled and published not by Lü Kun himself, but by a certain Zhao Wenbing 趙文炳 who claimed to be Lü's student. Zhao first collected stand-alone works of Lü Kun and compiled them into a seven-chapter version of the *Shizheng Lu*; soon after the publication of this version, he added another two chapters and republished the book. About twenty years later, a local official named Fu Shuxun 傅淑訓 compiled and published a ten-chapter version. The above-mentioned three versions are extant today, but the earliest seven-chapter version was the most popular one until recently, while the rarest ten-chapter version leaves only one copy today in its original form, which is now kept at the library of Sun Yat-sen University, China.

Figure 1 Two pages from the sole extant copy of the ten-chapter version *Shizheng Lu*. The page on the right, which marks the end of a preface by Fu Shuxun, carries the date of the fifth month of the 46th year of the Wanli reign (June or July 1618), the year Lü Kun died. Courtesy of the library of Sun Yat-sen University.



During the following Qing dynasty, the *Shizheng Lu* gained popularity among officials and was frequently

reprinted, sometimes with adaptation, or it was incorporated into different versions of collected works of Lü Kun. In 2008, a revised and punctuated version of the *Lü Kun Quanji* 呂坤全集 (Complete Works of Lü Kun) was published by Zhonghua shuju 中華書局 in Beijing. It should be regarded as the most reliable and accessible edition of Lü Kun's works for today's readers. Of course, it contains the *Shizheng Lu*, the text of which is in essence based on the nine-chapter version by Zhao Wenbing. Considering that the ten-chapter version is in fact an abridged nine-chapter version with only one additional chapter, the following discussion will be based on the text in *Lü Kun Quanji*.

The *Shizheng Lu* consists of policies as well as reform plans devised and implemented by Lü Kun in different periods, all of which are compiled as chapters pertaining to a certain area of civic administration or organization of local government. In the second chapter titled "Minwu 民務 (Civic Affairs)," which focuses on supporting the livelihoods of commoners, Lü Kun set a sub-chapter titled "Zhenju Yixue 振舉醫學 (Revitalizing the Medical Schools)." This sub-chapter provides us with key information about local medical administration in Lü Kun's time.

Figure 2 A View of the ancient book section of the library of Sun Yat-sen University, which possesses a vast collection of books published in China before 1912, including the ten-chapter version *Shizheng Lu*. Photographed and provided generously by Huang Youhao, PhD Candidate at the Department of History, Sun Yat-sen University.



LOCAL MEDICAL ADMINISTRATION IN MING CHINA

The chapter “Minwu” in the *Shizheng lu* is believed to have been originally written by Lü Kun between 1592 and 1593 [3], while he served as the Grand Coordinator of Shanxi Province, a post powerful enough to supervise all the civic affairs in that province. The sub-chapter “Zhenju Yixue” includes a short introduction and sixteen specific orders or instructions issued by Lü Kun, aiming to restore local medical administration and improve public health service to the ordinary people. What first strikes as shocking when reading these paragraphs, however, is the miserable picture of declined or even decayed local public health service depicted by Lü Kun. He deplored that “the buildings of medical schools have remained collapsed or even been sold out” [4]; “the officials cared so little about medical affairs” [5] as to leave town residents without the most fundamental medical knowledge in the post of medical officials; and quacks who could not even read were killing numerous patients every year. Lü Kun blamed the malfunction of the local public health system on the neglect of duty and indolence by local officials, and he introduced a series of policies trying to restore medical administration in the localities, centered on the goal to “revitalize the medical schools.”

Figure 3 Front covers of the three-volume *Lü Kun Quanji* published in 2008 by Zhonghua shuju, Beijing. Photographed by the author.



China’s astonishingly long history of state-run medical institutions allegedly dates back to the Western Zhou (1046–771 BC) period, and medical schools set up by the court are said to have first appeared as early as the year 443 CE [6]. In the Tang (AD 618–907), Song (AD 960–1279), and Yuan (AD 1271–1368) dynasties, medical schools run by the government were expanded to localities. The Ming dynasty inherited this trend and ordered shortly after its foundation the establishment of a medical school in every county, sub-prefecture, and prefecture [7]. From records in

the sub-chapter “Zhenju yixue,” it is clear that Ming medical schools functioned not just as educational institutions but actually as the hub of the local public health system: the principals of medical schools were at the same time local medical officials; the schools sent teachers and students out to treat patients, making themselves public hospitals; and they also prepared and disbursed medications as public pharmacies. This is the reason that Lü Kun viewed restoring medical schools as the keystone to his reform plan for medical administration.

EFFORTS TO REVITALIZE THE MEDICAL SCHOOLS

In the sixteen carefully crafted policies listed in the sub-chapter “Zhenju yixue,” Lü Kun offered a series of specific instructions to local officials under his jurisdiction on managing public health affairs. He ordered these officials to repair and rebuild medical schools; put conscientious, reputable doctors in charge of them as medical officials; and make sure medical schools had enough funding to operate. He also made it clear that medical officials should purchase medical materials personally every month and supervise students preparing medications. Local officials and their family members were forbidden to embezzle medications from the charity pharmacy (Huimin Yaoju 惠民藥局), which was charged with handing out medicines to the poor for free. The charity pharmacy as a branch of the public health system had a long history that dated back to the Northern Song [8]; entering the Ming period it became a facility affiliated with the medical school.

Along with these instructions, Lü Kun also put great emphasis on improving the education of students at medical schools and then sending them out to treat patients once they achieved a certain level of professionalism. To our great convenience and of great value, Lü Kun meticulously recorded the titles of two dozen medical books he considered suitable for use as textbooks at the medical schools. These books range from ancient texts deemed classics of traditional Chinese medical theory, such as *Suwen* 素問 (Plain Questions) and *Lingshu* 靈樞 (Spiritual Pivot), to works on materia medica, medical formulas, books of prescriptions, and comprehensive medical books from the Song, Yuan, and Ming periods. The full list includes: *Suwen*, *Lingshu*, *Dongyuan Shi Shu* 東垣十書 (Ten Books of Dongyuan), *Yixue Gangmu* 醫學綱目 (Detailed Outline of Medicine), *Yixue Rumen* 醫學入門 (Introduction to Medicine), *Yilin Jiyao* 醫林集要 (Essentials of Medical Knowledge), *Yijing Xiaoxue* 醫經小學 (Primer on Medical Classics), *Yixue Zhengchuan* 醫學正傳 (Correct Teachings about Medicine), *Yuji Weiyi* 玉機微義 (Profound Teachings of the Big Dipper), *Renzhai Zhizhi* 仁齋直指 (Explicit Guidance by Renzhai), *Mingyi Zhizhang* 名醫指掌 (Handbook for Renowned Doctors), *Danxi Zuanyao* 丹溪纂要 (Collected and Revised Works of Danxi), *Shanghan Liu Shu* 傷寒六書

(Six Books on Febrile Diseases), *Shanghan Zhizhang* 傷寒指掌 (Handbook for Treating Febrile Diseases), *Yifang Jiejing* 醫方捷徑 (Short Cuts to Prescriptions), *Lizhai Waike* 立齋外科 (Lizhai's External Medicine), *Douzhen Jingyan Liangfang* 痘疹經驗良方 (Empirical Excellent Medical Formulas for Pox), *Caishi Douzhen* 蔡氏痘疹 (Doctor Cai's Book about Pox), *Mingyi Fangkao* 名醫方考 (Research on Medical Formulas by Renowned Doctors), *Yifang Zhaiyao* 醫方摘要 (Summaries of Medical Formulas), *Bencao Faming* 本草發明 (Clarification on Materia Medica), *Bencao Mengquan* 本草蒙筌 (Materia Medica for Beginners), *Bencao Fahui* 本草發揮 (Elaboration on Materia Medica), and *Danxi Maijue* 丹溪脈訣 (Danxi's Pulse Formulas). Lü Kun ordered that every student pick one of these books for study under the supervision of medical officials and master the book before they were officially permitted to perform treatment as proper doctors.

CONCLUSION

Writings on statecraft such as the *Shizheng Lu*, which also functioned as guidebooks for officials, were not rare in Ming and Qing China. Yet few among them has transmitted so richly and vividly the reality of local medical administration as Lü Kun's work. Generally, historians have seen the Ming Dynasty as marked by the state's waning interest in maintaining a costly nationwide public health system [9]. Records from the *Shizheng Lu* undoubtedly support this opinion, as they attest to the thorough malfunction of the public health system in localities. However, they also show that officials like Lü Kun considered public medical service to be an important part of the government's responsibilities and actually worked to restore it. We do not know how well Lü Kun's reform program worked, but since no existing resource tells about any conspicuous resurrection of the local public health system in late Ming, and the scale of the system shrank greatly in the following Qing period, it is at least safe to say that Lü Kun's efforts did not leave in their wake a lasting impact.

Moreover, the value of the *Shizheng Lu* lies also in preserving the titles of medical books popular and considered practical in late Ming. Lü Kun did not randomly choose the two dozen books for the teaching program at medical schools; he apparently possessed a relatively high level of medical knowledge and could even be called a medical expert in certain areas. The evidence is that among all the extant works of Lü Kun, there is a book titled *Zhenke* 疹科 (On Exanthema) that discusses the pathology and treatment of diseases including measles and chicken pox. Lü Kun also mentions in the sub-chapter "Zhenju yixue" that he was preparing to publish a book titled *Bianmin Fang* 便民方 (Medical Formulas for the People's Convenience), which clearly would have collected medical formulas for common diseases in the local society. All these testify to Lü Kun's enthusiasm

toward and expertise in medicine; thus, he must have picked the textbooks for medical education out of professional insight. A closer look at Lü Kun's list may shed light on interesting historical facts: for example, he took in several works on febrile diseases and pox, probably indicating the existence of endemic infectious diseases in Shanxi Province at the time. As to the medical knowledge contained in and progress in medicine represented by these books, further examination and discussion are naturally in order.

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123rd Annual Meeting

Medical Library Association, Inc.

Detroit, MI

May 16-19, 2023

Ellen Aaronsen, AHIP; JJ Pionke

See end of article for authors' affiliations.



See end of article for supplemental content.

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INTRODUCTION

The Medical Library Association (MLA) held its 123rd annual meeting May 16-19, 2023, in Detroit, Michigan. This was also a joint meeting with the Special Libraries Association (SLA). The meeting was entitled "MLA | SLA '23: Looking Back, Forging Ahead" and utilized a hybrid model with some events in person, and some virtually. The virtual meeting was again broken into segments, all available using a variety of online platforms. Total attendance for the meeting was 1,321 with 806 attending in-person, and 515 virtually. Additional meeting content—including the meeting program and various electronic presentations from the business meetings, plenary sessions, poster sessions, and program sessions can be accessed by all meeting registrants via the MLA '23 website.

OPENING SESSION (FACE TO FACE AND LIVESTREAMED)

Wednesday, May 17, 2023, 9:00 a.m. - 10:30 a.m., eastern time

- Shannon D. Jones, AHIP, FMLA, 2022/2023 MLA President
- Seema Rampersad, SLA President
- Kate Flewelling, AHIP, MLA '23 Cochair
- Ryan Harris, AHIP, MLA '23 Cochair
- Ann Cullen, Leiter Lecture Committee Member
- Michele Mason Coles, Leiter Lecture Committee Member
- Craig Robertson, Leiter Lecturer

Shannon D. Jones: Good morning! Thank you all for being with us today! I am Shannon Jones, 2022-23 MLA President. We are thrilled to welcome both our virtual audience and those of you here in Detroit.

We are excited about our conference collaboration with the Special Libraries Association. The collaboration means access to sessions on topics that transcend medical librarianship, like leadership and management, taxonomy, DEI, improving outreach and engagement, recruitment, hiring, job searching, and more. And it means the chance to network with our colleagues who face similar challenges in different settings.

We are also happy to begin our year-long celebration of MLA's 125th anniversary. The MLA 125th Retrospective Task Force has planned many fun activities for us that take place at this meeting and throughout 2023-2024.

As of this morning, we have 1,654 registrants and exhibitor representatives for MLA | SLA '23, and almost 1,200 of you are attending in-person, even if only for one

day. I want especially to thank the 38 institutions who are supporting your staff with both in-person and virtual registrations.

For those of you who are unable to attend in-person, the National Program Committee and conference staff have planned yet another new meeting format with a robust and interactive virtual component taking place at the same time as we meet in Detroit. There are more livestreamed sessions, live virtual sessions in the afternoons, and, since none of us can be in two places at once, many recordings and on-demand sessions are available for later viewing.

Both of our associations will continue to experiment, so stay tuned for what may come next! We will keep learning, adjusting, and moving forward, always with our professional needs and interests in mind. And now it's my great pleasure to introduce Seema Rampersad, 2023 President of the Special Libraries Association. Please join me in giving her a warm welcome.

Seema Rampersad: Thank you, Shannon. Good morning! I am equally glad to welcome you all to our first collaborative conference! I certainly look forward to connecting with information professionals from both our organizations and to meeting new colleagues from so many US-based institutions.

Many of you have shared how great it was to connect in-person last year. Your time spent getting together with colleagues, participating in onsite sessions, and taking in the sights, sounds, and smells of New Orleans (for MLA) or Charlotte (for SLA) was a highlight of your professional year. What better place to bring us all together than "Detroit Strong" - a city filled with the glorious and soulful sound of Motown music, art, history, fabulous sightseeing opportunities, and exceptional cuisine. I noted the subtle "Power to the People" from the streets of Detroit on the cover of our Official Program for this meeting as I looked through the schedule for all the extraordinary sessions contributed by both our organizations' powerful and creative members. And I am delighted that so many exhibitors from both our organizations have come together to support us. This will be an amazing conference—and I look forward to sharing it with all of you!

MLA Statement of Appropriate Conduct

Shannon D. Jones: Thank you, Seema. Now for a bit of housekeeping. This conference is governed by the MLA Statement of Appropriate Conduct, which you'll find on pages 6 and 7 of your Official Program.

It applies to all our activities including conferences, meetings, workshops, online forums, social media, continuing education, and all means of communication. It applies to all of us at this conference. I encourage all of you to read it in the spirit of an open, inclusive, and collaborative environment; for diversity, equity, and

inclusion in professional practice; the leadership of information professionals; accessibility for all stakeholder groups; and the ethical standards that call for us to conduct all professional relationships with courtesy and respect.

Sponsors

Please join me in giving a heartfelt welcome and thank you to our sponsors and exhibitors who have demonstrated their outstanding support for this conference, and for the value they see in information professionals. They contribute to both our organizations in so many ways and help us thrive. Exhibitors and sponsors also engage and collaborate with our members on multiple initiatives and provide education and knowledge sharing sessions that advance our profession. We are grateful for their support and invite you to take time to personally thank them for their support throughout the meeting and afterwards.

Our Bronze-level sponsors are:

- Science AAAS (American Association for the Advancement of Science)
- BMJ
- Clarivate
- Covidence
- LUCIDEA
- McGraw Hill
- OpenAthens
- Rittenhouse
- Siam
- SLACK Journals
- Springer Nature
- WILEY

Our Silver-level sponsors are:

- Couranto
- JAMA Network

Our Gold-level sponsor is:

- Elsevier

Our Platinum-level sponsor is:

- Wolters Kluwer

I'd like to welcome to the stage, representing our gold-level sponsor, Emily Singley, MLIS, Vice President, North American Library Relations at Elsevier, to share a few words with us.

[Emily Singley - 1 minute for remarks].

Shannon D. Jones: Thank you so much, Emily.

We are grateful to our Platinum-level sponsor Wolters Kluwer, who is sponsoring multiple areas of this conference. Please welcome Gareth Williams, VP of Sales

for Wolters Kluwer, to the podium to share a few words with us.

[Gareth Williams – 2 minutes for remarks]

Shannon D. Jones: Thank you, Gareth, and thank you to the very supportive Wolters Kluwer team.

We are energized by the enthusiasm of our members, organizers, presenters, MLA staff, and technology partners who have been so committed in preparing this meeting. We salute the hard work and vision of the organizers for their creativity, building on the success of last year's hybrid conference to design yet another "new and improved" experience for all of us to enjoy. The words "incredibly creative" and "awesome" come to mind for both the amount of effort involved and the fabulous content that is coming your way.

Looking Back, Forging Ahead

Shannon D. Jones: Here to talk to you about the awesome virtual conference you are about to experience, and the extra-awesome in-person conference in Detroit, please welcome your NPC23 co-chairs, Kate Flewelling and Ryan Harris.

Kate Flewelling: Thank you, Shannon. I am Kate Flewelling, your NPC '23 Cochair.

Ryan Harris: And I am Ryan Harris, your NPC '23 Cochair.

Kate Flewelling: On behalf of our SLA Program Committee Liaisons Nabi Hasan and Andy Shimp, and the entire National Program Committee, welcome to "MLA | SLA '23, Looking Back, Forging Ahead." In keeping with our conference theme of Looking Back, Forging Ahead, we will be looking at the past and future of the Medical Library Association. But it is also instructive to look at the past and current occupants of this conference location. People have been coming together on the Detroit River for thousands of years and we are on the ancestral and occupied home of the Anishinaabe nations. This land is currently governed by the 1807 Treaty of Detroit between the United States and the Odawa (Ottawa), Ojibwe (Chippewa), Wyandot, and Potawatomi nations. Today, Michigan contains 12 federally recognized tribes represented by The Inter-Tribal Council of Michigan, Inc. Land acknowledgment is a small part of supporting and celebrating Indigenous communities. In addition to this acknowledgment, we hope you will join us in donating to the North American Indian Association of Detroit, the American Indian Library Association, or a local group in your area led by Native people. Beyond this meeting, use resources from the Native Governance Center and others to research on whose land you occupy and identify concrete action items to humbly support Native-lead initiatives.

Recognition

Ryan Harris: Thank you, Kate. When we invited you all to this conference in August, it was just days after MLA and SLA had signed an agreement to collaborate on this meeting. It was time to pivot, yet again!

Our NPC '23 team has been extraordinary and has selected programming to appeal to both MLA and SLA members. Please join Kate and me in recognizing them and the dozens of content reviewers who reviewed the hundreds of submissions for this meeting. You can also find all names on page 10 of your Official Program.

Kate Flewelling: We also want to recognize the two special program committees who assembled impressive Collection Development and Leadership symposia for this conference. We look forward to seeing these sessions being held here in Detroit throughout the week, with several of each being livestreamed to virtual attendees. You can also find their names on page 10 of your Official Program.

Those of us here in Detroit have been amply prepared by our extraordinary Local Assistance Committee (LAC), led by LAC Chair LaVentra E. Danquah, AHIP. From blog posts to dining guide, transportation advice to volunteer wrangling, the LAC has done an awesome job in sharing information about our host city. LaVentra, many thanks to you and your whole team.

Ryan Harris: When you work so closely with the MCI staff conference team to organize this hybrid event, you get a real appreciation for the breadth and complexity of the task. Please join us in showing our appreciation for what they do. Thank you.

Conference Overview

Kate Flewelling: Many of you have already been exploring the online planner. The planner and the app are the easiest ways to navigate and keep track of the large number of sessions at this conference. Just so you know, the Online Planner home screen will change throughout the conference. We've always been a ribbon crowd, so don't forget to add virtual ribbons to your profile!

For our virtual attendees and virtual sessions: use time zone support! All live sessions are then shown in your time zone so you can plan your time effectively and not miss sessions you want to see. If you are attending in person, revert your preferred time zone to Eastern time while you are onsite and use the app to keep track of your schedule.

Ryan Harris: The app will also let you play MLA | SLA '23 Quest – whether virtual or in-person – and keep track of everything onsite you want to see. You can easily take notes during sessions to download later. The app also hosts the audience response system, so you can ask

questions throughout many sessions, whether virtual or in person. Look for icons at the bottom of the App.

There's no doubt: MLA | SLA '23 has a lot of programming, and I can't wait to get started this afternoon.

We really thank our speakers and contributed content presenters for being so flexible and for going the extra mile to make this conference a success for both our virtual and in-person attendees. Your participation is essential to strengthening our community.

Ryan Harris: A final few words: make sure to not overdo, please take breaks, have snacks, or visit the Quiet /Recharge room, and make sure to spend time with your frolleagues!

Kate Flewelling: Ryan, thank you—I second all those suggestions! It is now my great honor and pleasure to transition to the next and highly anticipated segment of today's program: the MLA/NLM Joseph Leiter Lecture. Please join me in welcoming Leiter Lecture Committee Member Ann Cullen to the podium to introduce our speaker.

Joseph Leiter NLM/MLA Lecture

Ann Cullen: The Joseph Leiter NLM/MLA Lectureship was established in 1983 to stimulate intellectual liaison between MLA and the National Library of Medicine (NLM). Lectures are chosen for their ability to discuss subjects related to biomedical communications. As is our tradition, there will be a question-and-answer session after the lecture. This is being managed through the meeting app, where you may enter your own question, or like and upvote someone else's question. Index cards are available for those not using the conference app.

This year's speaker, Craig Robertson, is an associate professor of communication studies at Northeastern University. He has a PhD from the Institute of Communication Research at the University of Illinois, Urbana-Champaign. An award-winning author, Robertson researches the history of information. He focuses on the relationship between paper and information, specifically how the recording, classification, and storage of information on paper affects not only who gets to handle and access information, but also how information is conceptualized as something people can use. I discovered his work five years ago when I was redesigning and started teaching Simmons University's "Special Libraries" course and found it profoundly transformative in my understanding of the history of our profession. The Atlantic described his most recent book, *The Filing Cabinet: A Vertical History of Information*, as a "captivating history." In addition to writing two monographs and editing two volumes of essays, Robertson's research has been published and reviewed across a wide range of fields and disciplines including

communication studies, design studies, library and information science, history, surveillance studies, immigration studies, and legal history and policy. An internationally recognized scholar, Robertson has been interviewed by multiple media outlets including the New York Times, National Geographic, NPR, BBC, and the Australian Broadcasting Corporation.

Please join me in welcoming my colleague and friend, the amazing Craig Robertson.

[View the Joseph Leiter NLM/MLA Lecture: "The Filing Cabinet: A Vertical History of Information" by Craig Robertson, PhD in the Plenary Sessions section. The session was livestreamed for virtual attendees and is available on demand.]

Conclusion to Opening Session

Shannon D. Jones: Let's give Dr. Robinson another round of applause for his amazing presentation. I never knew some of the things that he shared. Thank you for an illuminating, engaging, and insightful history of information.

I also want to thank you all for coming to the kickoff this morning. We look forward to spending more time with you here on site and spending time with our attendees who are with us in the virtual landscape. They're going to be a lot of fun events and a lot of engaging events. And I hope you enjoy each and every one of them that you get to attend.

Dr. Robertson is going to be available to sign copies of his book in the back of the room. We hope that you all will go and support him and get to actually meet him in person, but also get to support our local bookstores, source booksellers who is here providing? Well, not providing because that'll make you thank you. Getting a free coffee, selling his books in the back of the room. With that, this session is concluded. Have a good meeting!

MLA '23 ANNUAL BUSINESS MEETING AND OUTGOING PRESIDENTIAL ADDRESS

Thursday, May 25, 2023, 2:00-4:00 p.m., eastern time

MLA Board Members:

- Past-President Kris Alpi
- Executive Director Kevin Baliozian
- President-Elect Amy Blevins
- Secretary Heather Holmes
- Treasurer Dale Prince
- Directors:
 - Emily Hurst
 - Janna Lawrence
 - Brenda Linares
 - Tony Nguyen
- Community Council Chair Adela Justice
- Chapter Council Chair Keith Pickett

Incoming MLA Board members

- Andy Hickner
- Irene (Rena) Machowa Lubker
- Tamara Nelson
- Dede Rios

Others

- Kate Corcoran
- Erin Fuller
- Maria Lopez

Agenda

Shannon D. Jones: Good afternoon, everyone. I am Shannon Jones, your 2023 MLA President for about 40 more minutes. It's my pleasure today to welcome you to the 122nd Annual Business Meeting of the Medical Library Association. Last year more than 500 members attended our third virtual business meeting, continuing to surpass our previous attendance records from in-person business meetings. We are thrilled that so many of you attended, and that being virtual, is helping us to be more inclusive, so that many more of our members can attend. It's wonderful to see so many of you all participating with us today.

Here's the agenda for today. We're going to start this meeting today with my Presidential Address so that I can tell you what I've been doing this year. Then we'll move on to the business portion of the meeting which will include the presentation of your current MLA Board of Directors, reports by the MLA Treasurer and Executive Director, election results in the presentation of your new MLA Board, and this year we will address proposed revisions to the MLA Bylaws. New this year, the incoming President, Inaugural Address will be held as a separate virtual meeting for separate virtual events on June 21. More details about that event will be shared later in this session.

MLA's Statement of Appropriate Conduct

Before we get started today, here are a few guidelines. All MLA gatherings and interactions need to respect MLA's Code of Appropriate Conduct. Please consult it online. Someone may be putting it in the chat box, too. If you need to report a violation, there is a link to do so on the web page. We are using Zoom Webinar today, with which, by now you are all likely familiar with after three years of COVID. We will be using Zoom polls for voting as well as the "raise your hand" feature for official business. We'll walk you through the procedures in a few minutes. We will not be using the Q&A feature today. Parliamentarian Chris Schaffer will share the formal business meeting process for raising an issue soon. During the year we offer topical open forms on many areas of MLA to invite conversations and questions and offer a better experience for dialogue. Feel free to use the chat,

but please note that we will not be monitoring the chat for questions. If you have a question that you would like to address after the meeting, please email president@mailmlahq.org. Now we are going to shift to my Presidential Address.

Outgoing Presidential Address

Shannon D. Jones: I am going to share my journey as the 22-23 MLA President. I'm Shannon Jones. I am also the Director of Libraries at the Medical University of South Carolina, and also the Director of Region 2 of the Network of the National Library of Medicine. My favorite quote, often credited to An African proverb is, "It takes a village to raise a child." In essence, this quote communicates to support a leader who needs to show up and to stand in their leadership role. Those who have served as leaders in any capacity know that know the commitment and support required for a leader to succeed. Therefore, as I did last May, I'm going to start this address with my village.

My sincere gratitude and respect go out to those who walked with me during my presidential journey. Those who showed me kindness offered words of affirmation and encouragement, stood in my place when I could not, said yes when I asked for assistance, pushed me when imposter syndrome showed its ugly head. Your patience and understanding and grace were appreciated.

The first group that I will thank is my home team, the Medical University of South Carolina Libraries staff. During my presidency, it was the perfect storm of events. We became the newest Regional Medical Library, as part of the NLM. We were displaced due to COVID-19, we were displaced because of our renovation, and I also completed my doctorate. I was away a lot, and we had a lot going on, so I could not do this without their support and their commitment to keep our ship afloat while I took care of MLA business.

I want to thank all the people that you see on the screen. The next group that I want to thank is the mentors who modeled the way for me. A quote from John C. Maxwell says, "A leader knows the way, goes away and shows the way." A sincere thanks to Tom Basler, Sandra Franklin, Teresa Knott, Sandra Martin Beverly Murphy, Jean Shipman, M.J. Tooley, and John E. Ulmschneider. I would not be where I am today without the leaders who pushed, encouraged, loved, supported, and challenged me to show up as the best version of myself.

The next group is the African American Medical Librarians Alliance Caucus, or, as we affectionately note, call ourselves, AAMLA. I offer them heartfelt thanks for love, encouragement, and support, and most importantly, I thank them for reminding me that this Presidency was not just about me. It was about the collective we. I'm so proud to stand amongst this group, and as our T-shirt says in this picture, "I'm so proud to do it for the culture."

The next group that I want to thank is the MLA Reads family. Thanks to the planning team for keeping the program rolling so that I could focus on my MLA work. If any of you have ever participated in one of the discussions, you know that it takes a lot of work to execute a book club where you have 150 people participating. I am grateful to Kelsea Bartley, Melissa De Santis, Ryan Harris, Don Jason, Tamara Nelson, Dede Rios, and Jenny Pannebacker for their tireless dedication to executing the MLA Reads program. I could not have, you know, made this happen this year without their commitment, and they're stepping in and stepping up and leading it so that I could step back.

The next group that I want to thank is our pioneering Black library leaders in health sciences. Their advocacy, their resilience, and their power allowed me to find my place in the profession. I stand in reverence to luminaries that you see on the screen that came before me. Josephine G. Morton is not pictured on the screen. I couldn't find a picture of her, but she was the first Black librarian to attend an MLA conference in 1940. Arlene May was the first Black librarian elected to the MLA Board of Directors in 1979. Dr. Gwendolen Cruzat was the first Black librarian to deliver the prestigious Janet Doe lecture in 1979. I was able to meet Dr. Cruzat at the MLA | SLA '23 meeting. Just standing in her presence was the absolute highlight of my conference. You know I've written about her in my dissertation, I've read about her, and to actually meet her and talk to her was wonderful. She is sharp and she had a lot of good things to say (and a lot of funny things to say). Madeline V. Taylor was instrumental in reorganizing and restructuring the MLA to allow us regional chapters to become a part of the association. Finally, we all know Beverly Murphy, who served as MLA's first Black President from 2018 to 2019. I know all too well that representation matters – that you cannot be what you cannot see. Because of them, I could see, believe, and become a leader in health sciences librarianship. So, I thank them, too.

The next group is the MLA headquarters team because none of us leaders can do this without the work of the MLA team. I am grateful for them for everything they do to help MLA thrive and also to help us do the work of the association. I'm very grateful for the team that you see on the screen. You may not know everyone, but, believe me, they are behind the scenes, working very hard for the association, and on our behalf.

The next group is the '22-23 Board of Directors. We had a fantastic year. We have done important work. We've made meaningful decisions, and we have fun doing it. We like to laugh. Everybody on the screen loves to laugh, and we've all been colleagues for a number of years. I'm so very grateful for their ingenuity. I'm grateful for their laughter. I'm grateful for their insight and for their overall commitment to MLA.

Then, last and certainly not least, I am eternally grateful for each one of you who showed up today. I'm grateful for your continued commitment to MLA and just for you, continuing to show up and continuing to do this important work that we must do on behalf of the association.

One of the essential parts of the presidential journey is the opportunity to engage with MLA members and health sciences, colleagues, at the regional, at the national, and in some cases the international level. I've had the opportunity to provide MLA updates at in-person and virtual chapter meetings. I also had the opportunity to travel to Ontario, Canada, to represent MLA at the Canadian Health Library Association Conference last July. And then I traveled one state over to Charlotte, North Carolina, where I attended the SLA Annual Conference. And there's an IKEA in Charlotte. So also got to go to IKEA because it is one of my favorite places. Then I was invited to speak in September, to represent MLA at the Lindberg-King Lecture and Scientific Symposium. The Symposium honors the legacy and contributions of the former NLM Director, Donald A. B. Lindberg MD. And the former NLA Deputy Director for Research and Education, Donald West King, MD. Many of you know that for years Dr. Lindberg supported the mission and goals of the Medical Library Association and was a strong champion and advocate for health sciences librarians throughout the nation and in the world. I'm one of those librarians who benefited from Dr. Lindberg's leadership, service, and advocacy. The day of this session was September 1. It was the 20th anniversary of my arrival in Bethesda, and to NLM. As a member of the 2002 cohort of NLM Associates. And while I was at NLM you know launched my career as a health sciences librarian. I met some really wonderful professionals. I had the opportunity to participate in meaningful projects, and I was exposed to tools and information that made my journey as a health sciences librarian easier. And so just you know, it was a pleasure to represent MLA in that space. You all can watch that whole program. It was a day long program. The recording is on YouTube. And at some point, I will put the link in the chat box. You can go to the next slide Kevin. Then it's our advocacy work. You all know that role for MLA members and leaders for MLA members and our association leaders alike. Whether we do it on the local, or the regional, or the national levels. We know that advocacy works, but it takes time, and it's not an overnight process. In my inaugural address, I asked you to do like Beyonce Knowles, and to get information. And you all did in a variety of ways. While advocacy is happening throughout MLA, my goal today is to amplify a few of the areas to show the depth of work and areas in which the association is engaged.

You can go to the next slide. The first is the MLA issue Advocating for Authorship Librarians and Information Professionals as authors on Evidence, Synthesis, Publications campaign which encourages guideline

associations, journal editors, peer reviewers, and collaborators to ensure that all authors who met authorship criteria established by the International Committee of Medical Journal editors receive authorship credit for their contributions. The people you see on the screen Kris Alpi, Emily Brennan, and Heather Homes, were instrumental in writing this statement. And kudos to Emily Brennan because she was actually able to use this statement to get authorship with a society that had never granted a librarian authorship credit before. She blazed that trail for us. We say kudos to her because I know she put in a lot of work on the publication that she was initially not allowed to be an author on, and that association did change their perspective. So, you all have this statement so that if you're ever in that situation, you can go forth and have a piece of paper to show that there is a reason for you to have it.

We also appointed some task forces and work groups. One of the first actions that I took as President was to write solidarity emails to MLA members who lived in who lived or either worked in Buffalo, New York, or the State of Texas, due to mass shootings on May 14, 2022, in Buffalo, and on May 24, 2022, in Uvalde, Texas. As President, messages of comfort were sent to members just to express our express sorrow and solidarity, which is always the right thing to do. However, as a community we have to do more than write statements. We don't want to be performative in our social justice efforts. We endeavor this year to take action. For us, taking action resulted in the formation of multiple working groups. The first group, oh okay, good, you are there. The MLA role in Societal Issues Task Force was charged with developing and recommending guidelines, objectives, and processes to address social justice and human rights issues. The Board of Directors approved their statement in May 2023. You can see the members of the task force on the screen. So please give them kudos to them for serving on the group and completing their work. And the outcome of their work will be shared with the membership very soon. And I think you all will be impressed and pleased with their work.

The next group was the MLA Social Justice Statement on Work Group, who is reviewing MLA's Core Values Code of Ethics, previously released statements, and existing literature to develop an overarching statement. This statement will integrate guidelines, objectives, and processes created by the MLA Role of Society Issues Task Force. The goal is to create or to craft a collective social justice statement, to provide meaningful recommendations for the Association, to respond to societal situations suggest internal and external resources for action, and to intentionally align with MLA's 501(c)(3) status. A final statement from the group of individuals that you see on the screen should be available this summer. And so, I look forward to the outcomes of their work.

The next group is the Censorship of Library Practices Work Group. This group is working to develop guidance that provides librarians with the tools and resources to keep up with what is happening in their states, and how to be positive. That's reactive, when issues arise. A final toolkit will be ready for the Board's review in June. And once that happens, you will also all be notified, and I imagine through some *MLAConnect* articles. Please give this group a round of applause. Thank each one of these groups for the work that they are doing, because these are areas in which the membership has been pushing MLA. Advocacy works, but it takes time. Keep pushing, and you may be asked to serve on a group when you push, but it will be all for the greater good of MLA. We can go on to the next slide.

The next group, and you know this is my last segment. You know an important part of my presidency was wellness and wellbeing, my own and that of MLA members. And you know, one of the things that COVID-19 has taught us in that it did for many of us was encouraged us to reconsider the relationship that we have with work. Specifically rethinking and reshaping the sacrifices that we are willing to make for our jobs. And so, we came up with the Be Well MLA initiative. And the people that you see on the screen are the individuals that I invited out through the right emails. Or I sent a tweet out and said, hey, who are our experts and wellness and the association, or who is passionate about wellness. And these were the people who raised their hand, or they were volunteered by one of their colleagues that they were someone who was interested. From September '22 to April '23, the Be Well team invited MLA members to participate in the Be Well Wednesday's Webinar series. And in these sessions are our panelists shared lessons, learned strategies and tips about various wellness topics and which all this culminated in Detroit. I will say that if you all are into yoga, Kelsea Bartley has a really nice chair yoga recording in the meeting container or Events Scribe. Whatever the thing is called. Kelsey has a really nice recording there. The recordings for all of the Be Well sessions are on MLANET. So, you can go and watch those. Last year nearly 800 attendees participated in the webinar series. We recorded each session except for the book discussions. You can see the topics that we cover. By all means go back, watch those, use those in your wellness process. And you know I'm especially excited because we will continue this work in fall 2023. So, if wellness is important to you, please reach out to us as we are planning the next phase of the project.

It was my pleasure to serve as your President. Last year I shared with you that I would approach my association work through the lens of radical empathy as my new normal. In all my efforts, I've tried to be the light in my interactions while representing the Association to the best of my ability. I look forward to continuing to contribute to MLA initiatives as the Immediate Past-President, while supporting my dear friend and colleague, President-Elect

Amy Blevins, as she takes the helm of what I believe is the best association in the world.

Business Meeting

Shannon D. Jones: With that we will get the annual business meeting started! To get us started, I'd like to recognize Chris Schaffer, MLA's Parliamentarian. Chris will assist us with the business portion of our meeting. Chris, I turn it over to you.

Christopher Shaffer: Hello, fellow MLA members! This is our fourth electronic business meeting. So, we're getting to be pros at this. Before I get started in my official role, let's practice some of the Zoom Webinar features to make sure you're familiar with them before the real deal. First, let's practice hand raising. During the meeting, there will be times when you will have the opportunity to raise your hand to speak to an issue on the floor in the context of the official business of the meeting. Here's the fine print.

A written motion is introduced. The presiding officer restates the motion and asks if there is discussion. Members wishing to address the motion can raise their hand, as you can see on the screen there. Staff will let the presiding officer know you wish to address the motion. And the presiding officer will give you permission to speak for up to two minutes. And you'll be temporarily promoted to be a panelist in the webinar to do that. Please announce yourself before you ask your questions or raise an objection. So please let us know your name and your institution, and this process will be repeated until all those who have raised their hand have had two minutes to speak to the motion on the floor. Then after that anyone wishing to speak a second time may raise their hand and have one additional minute to speak. And then the presiding officer will repeat the motion and call for the vote which will happen after the meeting, electronically. As to the specifics of how to raise hand and speak in a Zoom Webinar, we'll monitor who has raised their hand, share this information with the President, who will then call on you by inviting you to speak by name. You'll see a button appear on your screen prompting you to turn your microphone on, and you may optionally turn on your video as well. Once you do, please announce your name and institution and speak. And once you've spoken, please use the raise hand feature to lower your hand. Now let's go through the specifics of voting. When the presiding officer calls for a vote on a motion which may not happen today, I will note that the vote on the Bylaws motions will happen electronically following this meeting, you will see a poll up here on the screen. You vote YES, NO, or ABSTAIN. And don't forget to press the submit button to make sure your vote will go in. You'll have 2 minutes to submit your vote, and after the vote the result will appear on the screen and will also be announced by the sergeant-at-arms.

Now let's practice. A poll will appear on your screen. Go ahead and vote. We're going to keep this one short—30 seconds.

Shannon D. Jones: I'll just say I oppose chocolate.

Christopher Shaffer: [Laughs] Here's the results of the votes. Well done. We got a good number of people there. Now that you know how to raise your hand and how to vote, let me share with you that we may not actually have to do that today. We are going to be doing some things through unanimous consent which is permitted by Roberts rules of order. which removes the need for discussion and a full vote. Any member present may object to unanimous consent and require the President to open the floor for discussion and put the question to the members for a vote. Today we plan to use unanimous consent, and we'll use the raise your hand feature to allow any member who wishes to register an objection. All new business must be presented by a member in the form of a written motion and submitted to the President as announced on May 11. Members were strongly encouraged to submit motions in advance of the meeting, and the only motions that were submitted were the Bylaws motion submitted by the Board, and now I'll turn it back over to Shannon.

Shannon D. Jones: Thank you, Kris, and MLA headquarters staff. I think that if we have an ice cream social next year. Y'all got a lot of flavors, so make sure you check in the chat box. I am pleased to now introduce Linné Girouard, AHIP, FMLA, Sergeant-at-Arms, who will assist us with counting of the quorum.

Linne Girouard: Thank you, Shannon. I believe there are 233 participants. We have a quorum.

Shannon D. Jones: Thank you. There being more than 200 voting members present, we have a quorum. I now call our meeting to order. I would like to now welcome Heather Homes, MLA Staff, MLA Secretary. Hi, Heather, who's right down the hall.

Heather Holmes: Hi, Shannon. Yeah, I am representing South Carolina here, as well as MLA. Great to be joining you and all the membership today. Just as MLA's secretary I get the great joy (and I don't mean that tongue-in-cheek) of getting to review the Board meeting minutes. It's always nice to get a reminder of all the important work that we've done and that we've worked on. Our next secretary will get to take over this exciting role. I also get to present the agenda for the 2023 business meeting which you can now see on your screen, and it's also available on MLANET. And we've already done the first three items, so we're almost done—just kidding.

Shannon D. Jones: Thank you, Chris, Linne, and Heather. Please stick around as we meet. We may need to call on you. Now I am very pleased to welcome our Executive Director, Kevin Baliozian. Hello Kevin!

Presentation of the 2023-2024 Board of Directors

Kevin Baliozian: Hi, Shannon! Hello everyone! Great to be here. I have the honor of introducing your 2022-2023 MLA Board of Directors. As you saw earlier, we have an absolutely wonderful group of leaders. This Board of Directors has expertly led us through the third year—I believe it's three years now—of the pandemic, along with lots of issues that have significantly impacted you and MLA. Thank you very much. Shannon, you've been our wonderful leader this last year. We also have Amy Blevins as President-Elect. Kris Alpi, as Immediate Past-President. Dale Prince as our wonderful Treasurer. Thank you to Tara Douglas Williams, to Heather Holmes, our Secretary, to Emily Hurst, to Adela Justice, who is the Council, Community Council Chair, Janna Lawrence, Brenda Linares, Tony Nguyen, Keith Pickett, who joined the Board following the vacancy of P. J. Grier (he's been on the Board for a month or two, so welcome to the Board!), and I'm on the Board as your Executive Director. Here are pictures of everyone and the next one is a picture we just took in Detroit at the MLA | SLA '23 conference. Look at that, everybody's looking wonderful and very happy. That was before the conference, you should have seen how happy they looked after the conference! Back to you.

Shannon D. Jones: Thank you. And I will note that one of the most beautiful things about this picture that you all is that these are our amazing people, and you'll see from the new Board that we are welcoming the most diverse Board we have ever had in MLA history with our new additions to the Board once we get to that phase. But that makes me so excited about where we are. where we're going in our DEI journey, when it comes to representation. I'm excited about that. Thank you so much, Kevin.

Treasurer's Report

Shannon D. Jones: Now please join me in welcoming my favorite treasurer, J. Dale Prince. Your MLA Treasurer, and my colleague and friend who will spend the next few minutes updating us on our finances. Hi, Dale. I sure hope you got on the bow tie today.

Dale Prince: I do, Shannon, and thank you. Thank you. I want everyone to look at this picture the picture that was just up and note that that's exactly what I looked like before I became Treasurer. Don't believe him. And now look at the color of my hair. See?

As your Treasurer, I share the financial stewardship of our organization with Kevin, MLA's Executive Director and rely on the insights and review of the Finance Committee to ensure the Board of Directors can exercise its duty of care.

The Finance Committee was really busy this past year. We:

- reviewed the budget and financials prepared by the MLA staff

- worked with the MLA independent auditors to ensure compliance and best practice
- set MLA's investment strategy with the MLA's independent financial advisor
- examined key MLA pricing models
- analyzed contract terms with MLA's management company, MCI U.S.A.
- ensured the continued financial sustainability of MLA during COVID-19
- reviewed and approved funding requests from caucuses and domain hubs in collaboration with representatives of the Community Council.

I'm grateful to have been supported in my role as Treasurer by an experienced group of colleagues.

Please take some time to thank the members of the Finance Committee:

- Kristine Alpi, MLA's Immediate Past President
- Teresa Knott, an MLA member at large
- Janna Lawrence, a member of the Board
- Deborah Lauseng, an MLA member at large
- Tony Nguyen, MLA Treasurer-Elect
- Kevin Baliozian, MLA Executive Director
- Kristie Hammill, MLA's Director of Finance

We're going to start by reviewing financial numbers.

- 2019 was the last year prior to COVID-19, so it's useful to include it for comparative purposes along with the 2020 through 2022 COVID years and the 2023 budget.
- 2019 through 2021 numbers have been audited.
- 2022 numbers are pre-audit, so they may be adjusted later by MLA's audit firm.

The top 3 lines are what we refer to as “operating”: that includes all financial activities except investment revenues and disbursements from the MLA endowment for awards and grants.

- Revenues decreased in 2020 and 2021 because of the loss of the in-person conference, partially recovered in 2022, and are budgeted to significantly increase in 2023, higher than in the 2019 base year.
- Expenses remain high, because the cost of virtual delivery is high, and we opted not to cut programs. That in turn, creates a net operating loss for all 5 years, though significantly reduced to near breakeven in the 2023B budget year.
- The non-operating net margin is the difference between the financial revenue of our endowment and reserves and the disbursements from the endowment fund.
- As you can see, MLA has an excellent financial performance from 2019, or pardon me, had excellent financial performance from 2019 to 2021

more than offsetting the operating losses in those years.

- The financial markets were down in 2022, so the non-operating loss exacerbates the operating loss rather than offsets it for that year. When you add operational with non-operational, you get the net change in assets. In the 2019 to 2022 period, the total drop in net assets is \$650,000. Though this is a large number, MLA's financial strength is more than able to absorb this extraordinary financial disruption due to COVID-19, and we are set for rebuilding net assets in the coming years.

The prior slide was the accounting review, based on applying general accounting principles.

For a clear understanding of MLA's operating performance, we have adjusted the numbers to represent an adjusted EBIDTA. I regret that I won't be saying those letters anymore. Also known as Earnings Before Interest, Depreciation, Taxes, and Amortization, amortization. The adjustments include the list on the right side of the graph which are important to note.

- We excluded the investment revenue. It's real, but it doesn't reflect operations.
- We excluded the investment in EFTS and the associated depreciation. This is a technical adjustment to reflect EBIDTA. Note that the investment of \$157,000 in the technology platform supporting efts was fully funded by participating libraries.
- We also excluded the investment in education. Note that we invested \$191,000 in new education programs, as part of the MLA strategic initiative.
- MLA received \$233,000 from the Paycheck Protection Program from the Federal CARES Act, which was forgiven. This is actual money that we will not have to pay back, and it was designed to support associations in our situation. We are grateful for it.
- We removed an additional \$43,000 in miscellaneous investments.

Take a look at the graph.

- In 2018 we were balanced.
- In 2019 we had a \$275,000 deficit, which we had intended to address over the following years. Then COVID-19 hit.
- 2020 was the first year of COVID, with obvious financial damage, mostly linked to cancellation of the in-person conference in 2021. The COVID negative effect was even higher. Exhibitors did not value the virtual conference, so they pulled back in year 2.
- In 2022, we showed a partial recovery from COVID disruption and in 2023 our budget is positive, with a \$136,000 margin, should we miss the mark. This is an extraordinary turnaround.

- As a result of MLA's continuing to invest in its members and its future, we are a stronger association in 2023 than we were in 2019, though with lower net assets.

MLA net assets represent the cumulative net revenues and losses over the years. 3 million dollars is a strong number, split between the endowment in blue and reserves in orange. An increase or decrease in the value of our investments directly affects that number. Our reserves did decrease, and it is essential to rebuild them over the next 5 to 10 years.

Let's understand the foundation of MLA's 2023 turnaround. An overall price increase of MLA membership dues to keep up with the inflation. We realize that these increases are challenging for you, our members, to absorb. They are, however, essential for MLA to maintain the level and quality of services and are contributing an additional \$100,000 to 2023. This year MLA membership counts are at 2022 levels, and we hope that we may exceed them. The return to in-person conferences is an essential part of MLA's financial sustainability. We expect to increase the contribution margin of the 2023 conference by \$150,000, though we may miss the \$300,000 improvement mark set in the budget. The EFTS program is a significant contributor to MLA, margin as well an essential service, as well as an essential service to libraries. MLA's investment in the new technology platform has been successful on all fronts. MLA continuing education continues to grow. 2022 was the first year CE positively contributed to MLA margin, and 2023 builds on that trend. Note that MLA did not increase CE prices in 2023.

Analyze turnaround is a result of multi-year strategy of a multi-year strategy and MLA is working on the following key areas: expansion of MLA's reach in both specific health scientist segments and selectively in segments beyond health sciences, where the value of diversity of practice can benefit our core constituents. We have to continue to rebuild and even grow our in-person conference presence, which is essential to high quality interactions and learning, and to vendor support through exhibits and sponsorships. As mentioned earlier, continuing education is an important pillar of both mission and finances. We need to further position MLA as the learning destination for specific segments of members and non-members. Managing our overall cost is also essential, and those are directly related to the scope of what MLA does. To reduce costs, we have to prioritize programs that contribute to the mission. This means that we should consider eliminating those that are marginal contributors, especially if they are high in cost. Ultimately, MLA must address its many unfunded initiatives. So recapping, MLA has a long-term strategy to balance revenues and expenses and rebuild net assets.

Regarding MLA investments, and even taking into account the large \$508,000 lost in 2022, the average annual gain over the last 5 years is \$175,000 per year. Our cash position is strong. We also applied for and received a \$500,000 COVID-19 economic injury, disaster, loan or EIDL in 2021 and a 2.75% fixed interest rate. That increased our flexibility. We are paying it down monthly and can reimburse it at any time over the 25 years of its term.

In summary, I'm happy to report that the state of MLA finances remains strong.

Shannon D. Jones: Thank you, Dale. The Board is grateful for your diligent stewardship of the entire financial team. And just, you know, kudos to you all for just making sure that we are sustainable and a viable association, and that there will be an MLA here in 5 to 10 years, and so thank you so much.

Executive Director's Report

Shannon D. Jones: The next order of business is the Executive Director's report, and so I welcome Kevin back to the virtual stage.

Kevin Baliozian: Thank you, Shannon. And thank you, Dale, for your wonderful report. So here we go, the Executive Director's report.

We'll talk about all of the annual reports which you should absolutely read, and we'll talk about that in a couple of slides. But when it comes to the part that headquarters does, there are all these different sections in the annual report, and there's lots of great information. If you're interested in just the data behind everything, that is a good reference in place to go to, and you can go back multiple years as well.

Quick picture on membership and other important metrics as of May 19, 2023.

- As of a few weeks ago, we had 2,346 members. Obviously, we get more members throughout the year. Our estimate of membership counts for this year, which peaks August 30, is to be at 2,500 members. We also have what we refer to as customers, a non-member, people who interact with MLA in various ways: take a course register to the conference, sign on to EFTS. But they have an account that they log on to MLANET to do something other than being a member. That's 5,000 additional people over the last 3 years. Now those individuals may not be active every year. Those are people who may take an NLM course, and then get a CE credit from us.
- Our community has 7,500 people and that's a very good number to have. It's a very diverse group, as well.
- Eighty-nine percent of members participate in caucuses as of May 19. That's a staggering

number. I mean, let's run it up to 90%. You're not just a member, you're a member and you're joining communities. And if you are joining a caucus, you're joining just under 5 caucuses on average, 4.8 caucuses. So, that's quite a quite a bit. That number has steadily increased since we moved from the sections to the caucuses, because we removed the paywall where you have to pay an additional \$15- \$20 depending on the caucus, depending on section, to join. So that has affected the number of people who joined caucuses, and how many caucuses members join. So that's wonderful.

- The last section of actual stats from the conference last week. We had 803 in-person attendees, which includes exhibitors. We used to have only an in-person conference, and that was about 1,050 attendees. We have 300 and 300 attendees, or 250 fewer than that. But we do have 514 virtual attendees so far. And we know that with the virtual, since a lot of it is on demand, we're going to get more people. Right now, we have 1,317 and we expect that that number should go up to 1,400 in the next few weeks and month. So, all in all, that combination of virtual and in-person was, and has been, very successful.

I want to just go to a survey that most of you or certainly all of you were asked to reply to last September, which was an engagement index survey. That was a survey done by the management company MCI with 50 other associations. And so, it provided us with benchmarking information to see how MLA is doing with respect to other associations, similar associations in the US and globally. The engagement index is a number that is the result of how many questions are answered. You can see that the MLA's Engagement Index is 78. It's in line with similar organizations. It's considered to be in the moderate category. That includes members and non-members. And when you look at professional associations of MLA's size, that is a very respectable number. That of course, we strive to increase but is certainly great. We have an engaged community.

The Net Promoter Score is also a concept that is a standard it takes the difference between the promoters and the attractors and gives that number. But you want to have more people who promote your association that you say do not come to MLA. That is a positive number. That's good. 17. We'd like to see that higher, but we generally have a robust 41% of our participants in the survey who actively suggest that promote MLA as a go to place. We do have 24% and, you know, that's something we need to work on. This is rather small.

I will just highlight a few items about the data around the performance evaluation. These are the different types of activities. And they're very generic across multiple associations. You're not going to see names of MLA

programs here. You're going to see general things. And so, what do people care about? The absolute top-ranking thing is subject matter expertise at 87%. And that includes 88% of non-members who clearly look at MLA for knowledge. The second one is reputation at 83%, you know. And you can see our we're blue and in gray as other associations. You can see these things kind of vary accordingly. We're at below, slightly above the norm. But reputation and subject matter expertise is like, why people go to MLA. So that's great. Providing opportunities for online engagement is third at 83%. And providing relevant content is also important at 80%. None of this is surprising, but it's good to actually see the data behind it, and it's good to know.

Now the lower rankings. Value for money at 47%. That is likely a reflection of tight library budgets, and all personal budgets, and the fact that we often are competing against free offering, supported by government funding outside of MLA. And yes, for a lot of the quality content there is a charge, and that is likely a response reaction to that. So at least we don't have a specific reason why, but certainly what we're inferring. Fostering innovation at 54%. With the interesting observations that non-members scored MLA at 61% for innovation higher than members. So non-members think MLA is a lot more innovative than our members. I'm not sure what to do with that number, but this is interesting: support and transition during COVID, you can see in blue. We did well, compared to other associations. We actually outperformed in providing online education. We were ready for it because we had started investing and having all the infrastructure for online education starting in 2019 and even earlier. We were ready for that. So, we did well.

Community needs, I'm going to just read the highlights. This slide displays what members and customers are looking for from MLA. Not surprisingly, MLA ranks high and above the benchmark in a couple of areas. The first one is increasing my knowledge and professional skills at 89%, you know, people want that. MLA is achieving that. That number goes up to 96% for non-members. When non-members come to MLA, 96% of them come to MLA for increasing their knowledge and their professional skills. We have a role also for non-members in terms of being the provider for that knowledge and skill and that's a staggering high number. 96% is phenomenal. Being part of a community of like-minded professionals at 87% is quite typical from associations that have strong online communities and other communities. That number goes to 90% when looking at members only and goes down to 50% for non-members. That makes sense because non-members don't have access to our online communities. But for members, 90% look at MLA communities and being surrounded or connected with like-minded individuals as an important item.

This next slide looks at in-person versus virtual engagement. And you know, not surprisingly, the

combination of the fact of being hybrid, or the ability to have both in-person and virtual, which is what MLA has done, ranks the highest. So what MLA is doing and what people are looking for is in line with what people are hoping for or expecting. So, that's great. So that's an interesting report. The Board looked at a lot more detail. We will also find other ways of communicating the deal of that report to everyone. But I wanted to give you some highlights. And last in my presentation – big drum roll – is MLA technology. We've been hinting about it, talking about it for years. This is actually happening this year. It's a very exciting project. Hard to summarize on the slide. But I'll give it a shot. We're changing 100% of our technology. And we're looking for to starting to roll that out in September. There will be some pre-launches and tests with some subgroups of MLA to give feedback and try things out on various things, so that we integrate that when we actually launch. And there will be multiple re-launches as we stage this and integrate a lot of feedback, so the idea is to get it out and then also then improve it in stages over the following year. For the user experience, we want to have best in class and things like membership, e-commerce communities, learning, recognition, events, those kind of key things. Content integrated from everywhere, easy to find, I'm hearing claps from many of you, and the site point content, content from everywhere. We also want MLA to be easy to do business with. That means a whole bunch of different things. But it also means flexibility in membership, in subscription models, bundles, volume discounts, ability to pay by installments. All those different types of things that we have had a hard time doing, because, frankly, of technology. We also want to be engaged through data driven future development decisions. We don't take the data for people like, and don't like into account enough to drive decisions for future content. We should and will. We also want to give you action dashboards, reminders, incentive, suggestions, all those types of things, so that things are easier for you to get to. And there's also this big concept of journeys. You know whether you're a new member or new to the profession, whether you have those preferences, and we want to be able to have a more relevant experience depending on what you're looking for, so that you're not drowned in too much content. Though you would have access to the whole contact. You may have some suggestions, those types of things or some identified areas that are more specific to your interest, that you've decided on that. You're interested in this or that. For the association, it's really important to have a good return on investment. That we're not spending too much. We're managing our cost so that we're much more productive in how the staff is able to work on the back end of these different things. All of that we're working on. You'll see on the column on the right that we are relying on the platform that is based on 80% open-source technology. That is all integrated together through a middleware and a back end. We're doing this in partnership with our management company, MCI. The reason the math works

is because MCI is doing this as a multi-tenant platform for dozens, and eventually hundreds of clients. MLA is going to have a sweet deal because we've been here from the grounds up. We're going to have the really the best of the best at a wonderful price, because of our early engagement. So, look forward to that! That does it Shannon for my report.

Shannon D. Jones: Thank you, Kevin. You got a lot of fanfare in the chat box because all of us are excited and looking forward to the new technology. Thank you for your whole report. We are especially excited about the new technology.

Annual Report

Shannon D. Jones: The next order of business is to present the 2023 Annual Report. The MLA annual reports are valuable for all of us to read. You may discover parts of MLA you did not know about, or incredible things your colleagues have enabled. Take time to read them, even if it's just the executive summaries. Those reports show the immense diversity of our communities and our programs. They're also part of MLA 's archives. So, if your name is in there, you are officially recorded for prosperity. This slide shows all of the MLA components that contribute to this comprehensive document.

Reports are available on MLANET, along with reports from past years. And I see in the chat box you all were getting those links correct. And we're already ahead of us. Thank you all for your engagement. And we also had a request that Kevin read all of the annual reports out loud on this call today, so I don't know how much time you all got, but you know, Kevin has a good reading voice. Kevin, I don't know if you want to honor that request or not. I'll do it after the Chris reads the Bylaws, and that would be just fine. Excellent!

Recognition of Retiring Directors

Shannon D. Jones: Those who are nominated each year as potential members of the MLA Board of Directors are selected, by virtue of their experience and reputation, to serve the association. But few can imagine beforehand the level of commitment the election to the Board requires. And it seemed like even more so this year. Directors have completed their term on the MLA Board and have served our association with enthusiasm, dedication, grace, good humor, and perseverance. The Association and the Board of Directors express our appreciation and recognize each of you today for the extraordinary work and thought for leadership you've provided during your term of service. Thank you for a job well done to:

- Heather N. Holmes, AHIP
- Adela V. Justice, AHIP
- Brenda M. Linares, AHIP
- J. Dale Prince, AHIP.

Give them a round of applause. Though they are retiring from the Board of Directors, they are not retiring from their service to MLA. You will see them again, and in another capacity. We'll let them take about a week off, and then we'll put them back in the game.

Recognition of Immediate Past President

Shannon D. Jones: Now it is time to recognize our Immediate Past-President, and so it is my pleasure to and just an honor to express sincere gratitude to Kris Alpi.

To Kris Alpi, AHIP, FMLA. MLA's '21-22 President.

Kris, I am pleased to thank you on behalf of the MLA membership for your leadership during your Presidential year. We were impressed by all of the activities you undertook during your year as President, and this year as Immediate Past-President. To highlight a few, you have been a strong advocate for the voice of the members striving to ensure that everyone's voice is heard. Your diligence and commitment has led to the establishment of the hospital libraries, caucus advocacy, initiative to the to develop resources for hospital and health care administrators highlighting the mission-critical roles that health sciences information professionals provide in health care settings. One key outcome is the statement calling on hospital and health system, executives to fund libraries and library staff. Another initiative seeks to ensure that librarians and information professionals earn authorship on evidence census publications, such as guidelines and systematic reviews for the intellectual contribution to published works. And you all might remember that Kris and that team received the Presidential Award for their efforts with that statement.

Kris, you've also distinguished yourself in the area of research, generously sharing your knowledge and skills, most recently supporting the assessment of MLA's community's governance model in collaboration with Adela Justice, Helen Ann Brown Epstein and Melissa Rethlefsen. Your work with the MLA Insight Initiative helped lay the groundwork for the development of MLA's 2022 and 2023 Collection Development Symposiums.

This past year you worked with members to name our three scholarships in recognition of three distinguished MLA members for their lifetime achievements and for the efforts to further diversify to further diversity, equity, and inclusion. We are excited to name those scholarships after Gwendolyn S. Cruzat, Beverly Murphy MLA Scholarship for Underrepresented Students, and Ana D. Cleveland MLA Scholarship. Thank you for your leadership and accomplishments during your presidency and your year as Past-President, and for all you have done for MLA and the profession, and for all you will continue to do for the greater good of health sciences. And I look forward to seeing you in other capacities with MLA. Kris, I yield the floor to you in case you want to share any words.

Kris Alpi: Just a few. First of all, thank you, Shannon, for your kindness and everything you've had to say today to our members. It's been an honor and a privilege to be entrusted by our MLA members to represent and serve them. And I have to do a special shout out, like you did, to Beverly and Gwen Cruzat at seeing them together at the fellows meeting in Detroit, celebrating the scholarships with just a real highlight of my time in MLA. As well, that everybody working together on that and grants and scholarships, and awards and history and diversity, equity and inclusion made possible. I'm confident that you're going to rock this Past-Presidential year as well. So, I just want to thank everyone for electing me for this tremendous opportunity. And apparently, you're going to actually have a little check in with me and Adela at me at Amy Blevins' inaugural. So, you're not done with this yet. Thanks, Shannon.

Shannon D. Jones: You are absolutely welcome. Yes, Amy's inaugural address is going to be the best show in town in June. So, you know, be there or be square.

Announcement of Election Results

Shannon D. Jones: Next, we are going to announce the election results. You all probably have seen them, but we're going to announce them to you anyway. The MLA '23 election was conducted from March 8th to March 29, 2023. Voting statistics can be seen on the screen. Election results were announced on [April 13th, 2023, in *MLAConnect*](#). The following are the election results. Nine individuals were elected for a one-year term to the Nominating Committee. Their names appear on your screen [visit the *MLAConnect* link to view the names]. Please join us in congratulating them and offering them kudos in the chat box.

Brenda Linares, AHIP was elected to service President-Elect. We welcome Brenda back to the Board. Brenda's served on the Board from 2020 to 2023, and she retired off the Board for about 10 minutes, and now she's coming back. I look forward to getting to work with Brenda next year as President-Elect.

Congratulations are also in order to Andy Hickner, Irene (Rena) Lubker, AHIP, Tamara M. Nelson, AHIP, who were each elected by the membership for a three-year term to the MLA Board of Directors. Keith Pickett was elected by the Chapter Council to serve as the 2023 to 2025 Chair, filling the vacancy that occurred when P. J. Greer decided to retire. We also offer congratulations to Dede Rios who was elected by the Community's Council to serve as its chair for 2023 to 2026. Both Keith and DeDe will serve three-year terms on the MLA Board of Directors in their roles as Community Council Chairs. Welcome Andy, Rena, Tamara, Keith, and Dede. And I got to spend time with them last week in Detroit. But on your screen, you see Dede, Rena, Andy, and Tamara right after our Board meeting in Detroit.

Now it is time for my year as President to come to a close.

Introduction of Incoming President

Shannon D. Jones: It is my honor and pleasure to introduce the 2023-2024 President, Amy Blevins, Associate Director for Public Services at the Ruth Lilly Medical Library at the Indiana University School of Medicine. She's also the Evidence Based Medicine Thread Leader for IUSM. Where she leads a team of library faculty and staff in support of the education, research, clinical translation and a professional education and population helped initiatives of the of the Indiana University School of Medicine. Amy's career has focused on teaching evidence-based medicine and critical appraisal as well as partnering on systematic reviews and meta-analysis. She is extensively involved in several continuing education initiatives as an instructor facilitator. For the last few years, she has been using her skills and information retrieval and critical appraisal to support the WISE COVID-19 Expert Review of Relevant and Emerging Literature, COVID-19 Expert Responses to Key Questions, and serves as a member of the WISE Indiana Internal Advisory Team. Amy's strong service record includes service on the Board of Directors, MLA Treasurer, Chair of the Professional Recruitment and Retention Committee Mentor and membership on several committees and task forces. She has also been an active leader in the Midwest Chapter, and many of MLA's caucuses. She has received numerous honors and awards, including the Lucretia W. McClure Excellent and Education Award, the Educational Media and Technology Section Annual Meeting, Grant, Section Project of the Year with EMTS, the Medical Informatics Section of MLA Annual Meeting Grant. Oh, I'm sorry, The Medical the Medical Informatics Section of Medical Library Association Annual Meeting Grant. That is a tongue twister and the ANCHASL Scholar of the Mid-Atlantic Chapter. Amy also has authored or co-authored more than 90 publications throughout her career. Please watch for the upcoming issue of *JMLA* to learn more about Amy.

Now I am very thrilled to pass the gavel to my distinguished colleague Amy Blevins. Amy, I am officially putting this gavel down, and yielding the floor to you. With that Dr. Jones is out.

[Shannon puts down her gavel; Amy takes up the gavel]

Recognition of Outgoing President

Amy Blevins: Thank you, Shannon, for passing the gavel. I hope you know that there's plenty of work still for you to do with all of us, so don't worry about getting bored, as you're finishing your term as President.

On behalf of the membership and headquarters staff, thank you for your strong leadership and countless hours of service this last year. I feel so fortunate to follow in your footsteps after you mentored me at my very first health

sciences library conference, back in Atlanta for the Mid-Atlantic Chapter of MLA. You've been a calm and studied presence, as you encouraged our MLA community to strive for work-life balance during the post-COVID pandemic. Your Be Well MLA series has gifted us with refreshment, emotional strength, and resilience. And I know I've personally benefited greatly from participating in these sessions and share my gratitude for you spearheading the program. And don't worry everyone we're going to continue on with Be Well in the next year, so we'll have some programming to talk about later. Long before and throughout your Presidency you've championed MLA's vision to foster excellence and commitment to diversity, equity, and inclusion in professional practice, leadership of health sciences libraries, and information professionals. We can all learn a lesson from your book by reminding ourselves to be more humble, compassionate, empathetic, and to have genuine care and concern for all of humanity. M.J. Tooley has described you as someone who 'takes chances on people valuing those others might not see as valuable.' This has been visibly transparent when you appointed everyone who applied for a 2022-2023 committee. And finally, I don't want to overlook some of the unique challenges that you faced during your Presidential year: dealing with all of our personalities on the Board of Directors, listening to people you know, joking around during our serious conversations. But seriously, I know you completed your doctoral degree. So now you're Dr. Shannon Jones. You've rebuilt your library. You keep serving as the director of your library, and I know you do a lot for your community through your involvement with the Girl Scouts. So, congratulations on a job well done. Don't relax yet. There's more work to do. And thank you so much, Shannon. And do you have your cup? Oh, there we go. I hope you display your cup proudly, because it symbolizes a year when we and MLA broaden our opportunities to build our future under your leadership.

Shannon D. Jones: Thank you, Amy. I do have this silver cup that says Shannon D. Jones, AHIP, FMLA. President Medical Library Association, 2022-2023. Also developed a habit during the year is that as I was traveling around, Starbucks has 'Been There' mug series so I have a whole collection of mugs to represent the places that I have visited. Unfortunately, none of the Starbucks in Detroit had one, so I'm still going to be hunting for that one.

Thank you all. Thank you to the MLA community who made this year possible. And just thank you to the whole array of people who made my Presidential year enjoyable, and who made it possible. So that I could actually do this. I am so eternally grateful to you all, and I look forward to seeing you all more on the virtual streets of MLA, or somewhere in person. If I didn't get to your chapter meeting, I hope you will invite me at some point to come visit you. But thank you so much, Amy, and I am going to fade into the background.

Presentation of the 2023-2024 Board of Directors

Amy Blevins: Thanks again, Shannon. MLA members I'm very pleased to present your 2023 - 2024 Board of Directors.

Congratulations to all the directors on being elected. If our names are not familiar to you, especially those of you who may have joined MLA after the election, I hope that you will look us up and connect with us via MLANET. Here are our photos to help put faces with our names, as you see us, either at future virtual forums, committee, caucus, chapter, or domain hub meetings, or in-person next year at MLA, or maybe in chapter meetings. And this is a photo of your Board taken last week in Detroit. I look forward to working together and thank you to the Board members for your commitment to MLA and dedication to the profession.

Let's congratulate our new Board Secretary, Tamara Nelson. Hi, Tamara. You're going to be busy on your first assignment with our next order of business. I hope you are ready for that.

Resolutions

Amy Blevins: I now have the honor to finish the remaining items of business before we adjourn. Next, we have resolutions.

We have no resolutions at this time so we're moving on to new business.

New Business

Amy Blevins: Our next order of business is to consider amendments to the MLA Bylaws. Please welcome our Bylaws Committee Co-Chairs, Amy Lyons, and Dave Duggar. Amy Lyons will introduce the Bylaws Committee members and give us background information on these proposed changes, and then David will read the motions.

Summary of MLA Annual Business Meeting Discussion re: Proposed Amendments to the MLA Bylaws

From time to time, the Medical Library Association (MLA) will revise its Bylaws to adjust with the times, align procedures with current or desired new practices and policies of the organization, and more generally to ensure that MLA's foundational governance document is as effective as possible for the fulfillment of the MLA mission.

In 2022, the MLA Board of Directors charged the Bylaws Committee to review and propose updates to the MLA Bylaws. As part of its process, the Bylaws Committee reached out to MLA components, exchanged with the Board of Directors, and organized two Open Forums with members on December 7, 2022, and January 17, 2023. The Bylaws Committee integrated the feedback from its

extensive dialog into the proposed modification of the MLA Bylaws it submitted to the Board of Directors.

The proposed modification of the MLA Bylaws was structured into two motions to allow MLA members to approve or reject those motions as separate items.

The Board of Directors approved the two motions for the proposed amendments to the Bylaws on January 25, 2023. As a result of the Board approval, proposed amendments could be shared with the membership for discussion.

On February 2, 2023, the two motions were presented to MLA members in MLA Connect (<https://www.mlanet.org/blog/revisions-to-the-mla-bylaws-proposed>), along with the process for amending the MLA Bylaws and rationale for the amendments.

On May 25, 2023, MLA members gathered for the MLA Business Meeting which included the agenda item for discussion and vote on the wording and direction of both motions. Members engaged with each other, members of the Board of Directors and members of the Bylaws Committee for 3+ hours in a constructive dialog that is summarized below.

Motion 1

The proposed Motion 1 groups a number of changes outlined as follows:

- Codification in the MLA Bylaws of diversity, equity, and inclusion (DEI) as MLA core values along with other changes to use modern language that promotes inclusivity;
- More flexibility and inclusiveness for MLA Chapters by only requiring MLA membership for select positions, rather than all officers and committee chairs;
- Allowance for electronic meetings in accordance with Robert's Rules of Order, 12th edition, September 2020;
- More flexibility in individual membership structure, allowing the MLA Board of Directors to modify the option to modify the membership year from the current and rigid "calendar" year schedule (January 1 to December 31) to the more flexible and association best-practice "annual" year schedule (join anytime for a year);
- More flexibility in the frequency of changes to individual dues, allowing the MLA Board of Directors the option to increase annual dues more frequently and by lower amounts instead of the higher dues increase every three years as currently specified; and
- Multiple changes to the MLA Bylaws language to match current practice and remove outdated information, including updates related to MLA Caucuses replacing MLA Sections (in the current Bylaws) and SIGs (not in the current Bylaws) and

the change of name of the council from Section Council to Community Council.

Summary of the MLA Member Discussion of Motion 1

- Members had no questions nor motions regarding incorporating DEI, allowing the Board of Directors to modify the membership year from "calendar" to "annual," and the cleaning up and updating of language.
- Members supported language that would allow Chapters to appoint non-MLA members to Chapter committees, ad hoc committees, task forces and panels. Chapter representatives on MLA committees would have to comply with the committee's stated requirements, which may include MLA membership.
- Multiple amendments were proposed and voted down regarding the article on dues changes, Article III, Section 6.: "The Board of Directors shall fix the amount of membership dues for all membership categories each year. Notice of a proposed change in dues shall be sent to each member at least nine weeks before the start of the Associations' fiscal year."

The members proposing amendments to the MLA Bylaws amendment expressed their concern with the ability of MLA Board of Directors to modify membership dues annually (versus every three years as specified in the current Bylaws).

MLA officials pointed out that the MLA Board of Directors already had the power to modify dues, that the Board has exercised restraint in raising dues even with higher inflation with the average annual dues increase of the last five years at 1.8% per year, that in some membership categories dues were actually reduced, that requirements for lower dues were relaxed, and that the objective is to avoid the sticker shock of larger more infrequent increases.

Some members indicated that the Board of Directors had MLA's best interest in mind, were well aware of the funding challenges of individuals and employers, that constraining the Board of Directors' ability to manage MLA finances could have adverse consequences such as insolvency, and that MLA members elect members of the Board of Directors to make decisions including at times unpopular ones.

Motion 1 was unchanged.

Post Discussion Point of Information

On July 25, 2023, the Board of Directors approved a motion that maintains 2024 individual dues at the 2023 level.

Motion 2

The proposed Motion 2 addressed changes to the Chapter and Community Councils and their representation on the Board of Directors.

Summary of the MLA Member Discussion of Motion 2

Members approved withdrawing Motion 2. The main rationale was that the problem Motion 2 was looking to solve (challenges in attracting volunteer leadership and their ability to commit time) was an outlier situation that had been resolved by other means (recruitment) and that modifying the Bylaws was therefore unnecessary.

Members approved withdrawing Motion 2 resulting in no proposed changes to the Bylaws.

Next Steps

In compliance with the current MLA Bylaws, MLA members are asked to vote on Motion 1 between July 27, 2023, and August 18, 2023, by electronic ballot, dates set by a motion of the Board of Directors approved on July 25, 2023.

The MLA Bylaws make the following provisions for amendment of the Bylaws:

ARTICLE XV. AMENDMENT OF THE BYLAWS

Section 1. Notification

- A. The Bylaws may be amended or rescinded by two-thirds of those voting by ballot on any properly proposed and considered amendment as specified in this Article.
- B. Notice of proposed amendments recommended by the Board of Directors (or petitioned by a minimum of one hundred fifty (150) voting members at least sixteen weeks before the start of the next Annual Meeting) shall be sent to each Voting Member at least nine weeks before the date of the meeting. The notice shall indicate the time and place of the next Annual Meeting where the proposed amendments will be considered.

Section 2. Consideration at Annual Meeting

Opportunity shall be given at the Annual Meeting for debating and amending any properly proposed amendments to any part of the Bylaws.

Section 3. Ballot

A ballot containing all proposed amendments, along with a transcription or summary of the Annual Meeting discussion on the amendments shall be distributed to each Voting Member. The time of the beginning and closing of the ballot and of the reporting of results shall be fixed by the Board of Directors. To amend or rescind any portion of the Bylaws, twenty-five (25) percent of the total ballots distributed must be returned properly filled in and on time, and two-thirds of these ballots must be affirmative.

Section 4. Effective Date

The Bylaws and any future amendments thereto shall become effective on January 1 of the year following their acceptance by ballot. [January 1, 2024].

Conclusion

Amy Blevins: This brings the discussion of our Bylaws to a close. The amendments and summary of your discussion on the Bylaws will be made available to all voting members for their consideration and vote this summer. I want to thank everyone who spent many long hours working on these issues. I especially would like to thank the Bylaws Committee, the Board of Directors, members of the Chapter and Section Councils, the Membership Committee, everyone who attended the two open forums, everybody who attended the Business Meeting today, and MLA headquarters staff for all of your hard work on behalf of the association.

Adjourn

Amy Blevins: This was quite a start to my year as MLA President. Is this the longest business meeting we've had online? I think it is. But you know, somebody else can tell me if that's true. Please join me on Wednesday, June 20. First for my inaugural address. It will be exactly the amount of time that it says on the screen here. I don't expect it to go long. We're doing something new and hopefully exciting this year. And I'm thrilled to say that you'll be hearing from not just me, but from the people who are working on several initiatives in the new year and finishing up on several of the initiatives that we had before.

Christopher Shaffer: Maria, if you could put up a quick poll? If Amy, as Chair of the Board of Directors, our President of the Board of Directors, puts forward a motion to withdraw the motion, because you are the original mover we can all very quickly vote on it, get the same result we just got, and it will be actually formally withdrawn.

Amy Blevins: And otherwise, as Kevin notes, we'd have to send a blank motion to the membership for a vote, which is silly. Oh, no, I can't imagine how confusing that would be.

Christopher Shaffer: Tell me again, what do you want me to do? You just say I move to withdraw the motion, on behalf of the Board. I move to withdraw Motion 2 on behalf of the Board. Okay, any discussion?

Amy Blevins: No, I don't see any.

Christopher Shaffer: Right, and it doesn't need a second, because it's coming from the Board. Maria, if you could very quickly put up a poll. Yes, is to withdraw the motion. No is to retain the motion and abstain is also an option. And that way we will have crossed all the T's and dotted all the I's for the Bylaws. And the reason we had to do it this way is because the person who submitted the original

motion to blank it all out, couldn't actually do the withdrawal because they weren't the original mover.

Amy Blevins: I'm just happy that we're moving forward. I'm going to motion to extend my inaugural address to five hours. I think that's the amount of time that I'm going to go. I'm just kidding everyone. That's a joke. Beverly, you'd stay for five hours of me talking, right? I'm also going to create a mandatory Bylaws listserv. I think that went over well last time. So, I think it's time to bring it back. Also kidding, I'm not creating any mandatory listservs for anybody. I'm just filling space while we all fill out that poll. Hopefully, everybody is voting appropriately, according to their heart.

Shannon D. Jones: Amy, while you are filling time, kudos to you and Chris for leading a robust discussion. I am so grateful that you led the discussion. So, kudos!

Amy Blevins: Well, I learned it from watching you, Shannon.

Amy Lyons: As I said, I think that you know the fact that we were able to have this discussion, I think, really speaks well to the organization in the membership. You and Chris did a really nice job of having it be very civil towards each other. And I think that was important because it could have gone haywire.

Shannon D. Jones: Yeah, especially with those of us who are hungry because we could turn into 'hangry' very easily.

Amy Blevins: Everybody, the motion to withdraw Motion 2 passed with 96% with 3% abstaining and 1% no. Tamara Nelson, can I welcome you back for our final business?

Tamara Nelson: Yes, you can, Amy. Okay, everyone. You know it was an amazing robust discussion and meeting. And I get to conclude. That's all, y'all. At this time, I move to adjourn the 2023 MLA annual business meeting.

Amy Blevins: Well, and it has been moved to adjourn. I propose to approve the motion by unanimous consent. Any member may object, and we will all know who you are, in which case call for discussion, and then vote. Please read your hand. If you object, you have 20 seconds.

Kris Alpi: Let's just wave goodbye to everyone.

Amy Blevins: The motion is passed, and the meeting is adjourned. Thank you for attending our MLA Business Meeting.

MLA 2023/2024 INCOMING PRESIDENTIAL ADDRESS (VIRTUAL)

[View the recorded virtual session of Amy Blevin's Inaugural address via MLANET.]

OTHER PLENARY SESSIONS

[The following plenaries were also livestreamed for virtual attendees.]

Wednesday, May 17, 2023, Joseph Leiter NLM/MLA Lecture

Keynote Speaker: Craig Robertson, PhD

The Joseph Leiter NLM/MLA Lectureship was established in 1983 to stimulate intellectual liaison between MLA and the National Library of Medicine (NLM). Lectures are chosen for their ability to discuss subjects related to biomedical communications. The lecture is presented every other year at NLM and in alternating years at the association's annual conference.

Craig Robertson spoke on his book, *The Filing Cabinet: A Vertical History of Information*. This session was livestreamed for virtual attendees and is available post conference on demand.

Thursday, May 18, 2023, John P. McGovern Award Lecture.

Keynote Speaker: Terri Givens

The 2023 McGovern Lecture was a structured conversation with our speaker and the 2023 National Program Committee Cochairs Kate Flewelling and Ryan Harris.

Terri Givens spoke on her book *Radical Empathy: Finding a Path to Bridging Racial Divides*. This session was livestreamed for virtual attendees and is available post conference on demand.

Thursday, May 18, 2023, Janet Doe Lecture

Keynote Speaker: Michelle Kraft

[For the Janet Doe lecture, please see Michelle Kraft's piece in the January issue of *JMLA*]

Symposium on Collection Development & Resource Sharing: Shifting Into Second Gear

Symposia sessions were held in person throughout the conference.

Wednesday, May 17, 2023

- The Great Debate on Controlled Digital Lending: And the Checkered Flag Comes Down On...
- To Merge Into the Resource Cost Sharing Lane or Not: Evaluating and Developing an Approach to Resource Sharing

Thursday, May 18, 2023

- On the Road to Transformative Agreements: National and International Perspectives (Livestreamed)

- Embracing Health Habits to Create Sustainable Library-Vendor Relationships: A Panel Discussion for Librarians, Publishers & Vendors

Friday, May 19, 2023

- Cruising in the “Non-Traditional” Collections Lane with Your MAAP: Challenges and Solutions
- From Manual to Automatic: Improving the Accessibility of Library Electronic Resources

The Symposia On Leadership & Management

Symposia sessions were held in person throughout the conference.

Wednesday, May 17, 2023

- Work & Lead More Effectively: Understand and Adapt Your Preferred Style
- Connecting With Stakeholders and Communicating Your Library’s Value Proposition (Livestreamed)

Thursday, May 18, 2023

- It’s Not Them, It’s Us: Understanding and Addressing the Factors that Negatively Impact the Recruitment, Hiring, and Retention of BIPOC Librarians
- Re-Thinking the Definition of Community and Connections in a Virtually Connected World (livestreamed)

Friday, May 19, 2023

- Improv and Librarianship
- Forging Ahead: Libraries as Engines of Innovation

PROGRAM SESSIONS

During the face-to-face portion of the annual meeting, there were 14 immersion sessions, 47 SLA education sessions 100 papers, 10 SLA-contributed papers, and 70 lightning talks. The live immersion sessions included interactive breakout sessions, Q&A, and virtual chat with presenters. There were 16 virtual papers, and 3 SLA virtual papers.

Paper abstracts that were scheduled to be presented are available on the MLA ‘23 website. The final version of the abstracts reflecting only those presented at the meeting is included as an online-only supplemental file to the April 2024 issue of the *Journal of the Medical Library Association* (see Appendices).

POSTER SESSIONS

The Poster Gallery featured 103 posters in an on-demand viewing format. There were 84 posters that were presented live in Detroit, MI over two sessions: Thursday,

May 18, 2023, 12:00-1:30 p.m. and Friday, May 19, 2023, 12:00-1:30 p.m.

Poster abstracts that were scheduled to be presented are available on the MLA ‘23 meeting website. The final version of the abstracts reflecting only those posters presented at the meeting is included as an online-only supplemental file to the April 2024 issue of the *Journal of the Medical Library Association* (see Appendices).

MLA Research Training Institute Poster Ignite Session

The MLA Research Training Institute had a dedicated in person poster session.

Thursday, May 18, 2023

- Trying Libraries on for Size: Mapping the Anti-fatness Literature in Library Science, Emily Gilbert
- Impact of COVID-19 on Solo Health Librarian Mentorships, Bridget Jivanelli
- A Graphic Medicine Reading Experience for Undergraduate Nursing Students, Michelle Ott
- Knowing how to See Behind the Data Points: Inclusive Data Ethics Competencies for Health Sciences Librarians, Nancy Shin, AHIP
- Pivoting When Burnout Burns Out Your Research Project, Ashley Michelle Thomas
- Consensus for Impact Variable Data Point Terms and Definitions: A Delphi Study, Gwen Wilson, AHIP
- Health Literacy Workshops: Librarian Support in Employee Wellness Programs, Colleen Foy
- Exploring Clinician Expectations and Preferences of Library Study Guides, Ann Biszaha
- Student Wellness Initiatives in Jesuit University Libraries, Claire Sharifi
- Working Toward a Lasting Impression: A Survey Protocol to Measure Recall of Undergraduate Nursing Library Instruction, Jason Wardell
- Moving DEI Forward: Does Cultural Competence Has a Place in Teaching and Learning?, Alessia Aznin-Yost

OTHER MEETINGS AND EVENTS

Due to the Covid-19 pandemic, the following meetings were held virtually prior to, during, and after MLA ‘23: Academic Librarians Caucus Business Meeting, April 21, 2023; African American Medical Library Alliance Caucus Business Meeting, May 10, 2023; Animal and Veterinary Information Specialist Caucus End of Year/Business and Networking Meeting, April 26, 2023; Experience MLA, February 16, 2023; Business Meeting, August 18, 2022; Business Meeting, October 20, 2022; Basic Science Caucus Business Meeting, April 19, 2023; Cancer Librarians Caucus Business Meeting; Clinical Librarians and Evidence-Based Healthcare Caucus Business Meeting;

Collection Development Caucus Business Meeting, April 27, 2023; Community Council Business Meeting; Consumer and Patient Health Information Services Caucus Meeting, March 24, 2023; Data Caucus Business Meeting, May 1, 2023; Dental Caucus Spring Meeting, April 27, 2023; Federal Libraries Caucus Business Meeting, March 29, 2023; Health Association and Corporate Librarians Caucus Business Meeting, April 11, 2023; History of the Health Sciences Caucus Business Meeting, May 3, 2023; Hospital Library Caucus Business Meeting, May 30, 2023; International Cooperation Caucus Business Meeting, April 26, 2023; Latinx Caucus Business Meeting, May 5, 2023; Leadership and Management Caucus Business Meeting, May 24, 2023; LGBTQIA+ Health Sciences Librarians Caucus Business Meeting, December 8, 2022; Libraries in Health Sciences Curriculum Caucus Business Meeting, April 27, 2023; Medical Informatics Caucus Business Meeting, May 31, 2023; NNLM Regional Meetings; New Members Caucus Business Meeting, April 26, 2023; Nursing and Allied Health Resources Services Caucus Business Meeting, May 24, 2023; Osteopathic Libraries Caucus Business Meeting, March 15, 2023; Pediatric Librarians Caucus Business Meeting, May 4, 2023; Pharmacy and Drug Information Caucus Business Meeting, June 13, 2023; Public Health/Health Administration Caucus Business Meeting, May 15, 2023; Public Services Caucus Business Meeting, May 9, 2023; Research Caucus Business Meeting, March 27, 2023; Scholarly Communications Caucus Business Meeting, April 28, 2023; Systematic Reviews Caucus Business Meeting, April 19, 2023; Technical Services Caucus Business Meeting, May 8, 2023; Technology in Education Caucus Business Meeting, January 25, 2023; User Experience Caucus Business Meeting, June 1, 2023; Vision Science Caucus Business Meeting, April 4, 2023.

PUBMED UPDATE

The PubMed Update and Q&A took place on Wednesday, May 17, 2023, from 3:30-4:30 p.m. and was also livestreamed for virtual attendees.

[Summary of text by AI: for complete item, please watch livestream]

Amanda Sawyer: Good afternoon, everyone! I'm Amanda Sawyer from the PubMed team at NCBI. Excited to share the PubMed update at MLA SLA. Today, I'll cover PubMed's growth, new features, and updates. We now have over 35 million citations, with 27 million linked to full text. In the last year, 1.6 million citations were added. We get 3.5 million visitors per weekday from around the world, conducting 5.5 million searches daily.

Now, let's look at recent updates. We introduced the PubMed Utilities API, aligning it with the website for better sync. This benefits users accessing data programmatically and products using PubMed data. We also enhanced the User Guide for large result sets.

Updates to the Journals Translation Table improve journal searching flexibility. Journal names without initial articles are now searchable, enhancing accuracy.

The Favorites button on PubMed's abstract page became the Collections button. It offers the same functionality, providing a unified user experience between PubMed and PubMed Central.

We refined the Additional Filters interface, renaming the Journal category and adding an Exclude Pre-prints filter based on NIH pre-print pilot feedback.

A significant update addresses lengthy author lists in search results. Author lists exceeding 1,200 characters are truncated with an ellipsis, improving readability.

We enhanced the warning for phrase searches not found in PubMed's phrase index, providing clarity, and linking to the User Guide. Users can suggest phrases for inclusion, meeting specific criteria.

A major update is the introduction of Proximity Searching in November 2022. Users can search for terms in any order within a specified distance in the title or title abstract fields. This powerful tool opens new search possibilities.

To stay updated, follow resources like the NLM Technical Bulletin, NCBI Insights Blog, and PubMed New and Noteworthy RSS feed. The PubMed User Guide remains a valuable resource, regularly updated to address user queries. Explore PubMed tutorials and the PubMed Trainers Toolkit for additional support.

For questions, bug reports, or suggestions, reach out to the PubMed Help Desk. Feedback informs PubMed's development, helping us enhance the user experience. Thank you for your attention and for helping us improve PubMed.

NATIONAL LIBRARY OF MEDICINE UPDATE

The National Library of Medicine (NLM) Update and Q&A took place on Friday, May 19, 2023, from 10:30 a.m.-12:00 p.m. and was also livestreamed for virtual attendees.

OTHER SPECIAL EVENTS AND RECEPTIONS

Wednesday, May 17, 2023, 7:30-9:00 a.m.

- New Members/First Time Attendee Program & Networking

Wednesday, May 17, 2023, 12:00-1:30 p.m.

- MLA Fellows Luncheon

Wednesday, May 17, 2023, 12:30-1:30 p.m.

- Communities Lunch for MLA & SLA

Wednesday, May 17, 2023, 4:30-5:30 p.m.

- MLA Leaders' Recognition and International Visitor Reception (by invitation)

Wednesday, May 17, 2023, 5:30-7:30 p.m.

- Welcome Reception & Opening of the Hall of Exhibits: Happy Anniversary MLA!

Thursday, May 18, 2023, 6:00-9:00 p.m.

- Networking and Gaming Night

Friday, May 19, 2023, 2:30-3:15 p.m.

- Closing Session and Welcome Our 125th Year!

EXHIBIT HALL

The Exhibit Hall was home to 90 vendors who presented various demonstrations of their products. The Exhibit Hall began with an opening reception on Wednesday, May 17, 2023, 5:30-7:30 p.m. that was sponsored by Wolters Kluwer. The Exhibit Hall was open on Thursday, May 18, 2023, 9:00 a.m. - 5:00 p.m. and Friday, May 19, 2023, 9:00 a.m. - 2:00 p.m.

Exhibitors held both sunrise seminars, lunch and learns, as well as technology showcases to highlight new products.

Thursday, May 17, 2022

Sunrise Seminars

- Wiley – The Shape of Wiley's Portfolio and How It Fits With Your Library
- Elsevier – Embase is Learning a New Language: Use the New Translation Tool to Transform Queries; and PICO Search Form for Systematic Reviews
- Rittenhouse – Meeting the Evolving Digital Needs Your STM Patrons

Lunch and Learns

- EBSCO
- Springer Nature – Empowering Knowledge Managers with Technology to Power Next Generation Discovery and Search Tools
- Third Iron – Is the Article Open Access Retracted of From a Problematic Journal? How LibKey Uses Article-Level Intelligence to Delivery the Fastest Most Accurate and Informed Linking to a Full Text
- Wolters Kluwer

Technology Showcase

- Clarivate – Introducing Endnote
- BMJ – Analyze and Evaluate Real Word ??, Clinical Guidelines, and Point of Care Data
- McGraw Hill – McGraw Hill: Preview the Access™ App

- McGraw Hill – McGraw Hill: A Discussion with Boarders & Beyond Founder Dr. Jason Ryan

Friday, May 19, 2023

Sunrise Seminars

- Wolters Kluwer – Connecting the Health Sciences Library with Institutional EBP, QI, and Research Efforts
- East View – Emerging Research from China: A Comprehensive Approach
- Covidence – Covidence: Better Systematic Review Management

Lunch and Learns

- OCLC – Leveraging Your Collection and Serving Your Community an OCLC Update
- Open Athens – Access Lab Forum by Open Athens
- Elsevier – Better Together – Bridging Non-Patent Literature (NPL) and Patents by Indexing

Technology Showcase

- Clarivate – Preparing Future Mental Health Practitioners with ProQuest One Psychology
- Clarivate – Bridging the Gap: Connecting Varied Sources via the Web of Science

CONTINUING EDUCATION COURSES

Tuesday, May 16, 2023

CE100 Effectiveness and Efficiency in Exhaustive Searches

CE200 Developing a Collection for All Your Patrons: A Workshop on Writing a Collection Development Policy

CE400 Conducting Difficult Conversations: Improving Workplace Effectiveness, Relationships, and Satisfaction

CE500 Research for the Non-Researcher

RESOURCES AND SERVICES

The online itinerary planner sponsored by Wolters Kluwer allowed attendees to peruse programs and events online. Live streaming was available on Twitter using the hashtag #mlanet23. The annual meeting blog posts are available on the MLA website. The MLA Professional Recruitment and Retention Committee (PRRC) is pleased to sponsor the MLA '23 Virtual Resume Clinic.

CLOSING SESSION

The Closing Session was held on Friday, May 18, 2023, from 2:30-3:15 p.m. and was livestreamed for virtual attendees. This session made an important note of the Medical Library Association's 125th Anniversary year.



SUPPLEMENTAL FILES

- **Appendix:** [MLA '23 Program Session Abstracts](#)
- **Appendix:** [MLA '23 Poster Session Abstracts](#)

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