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DEPARTMENTS / DÉPARTEMENTS

Editor's Message

I am happy to be writing to you as the new Editor in Chief. Thank you to Christie Hurrell, our outgoing Editor, for all the work she did over the past three years to move the journal forward. Her willingness to share her expertise with members of the team has been greatly appreciated. I am also thankful for the support of Alison Farrell, Senior Editor, and Nicole Askin, Junior Editor, as I transition into my new role.

This issue features a column by Kim Clarke, Head of the Bennett Jones Law Library at the University of Calgary. Kim provides an overview of Canada's new Medically Assisted Dying legislation, and highlights some areas to watch. Suzanne Maranda, Brittany Harding, and Laura Kinderman of Queen's University share their research on the impact of a curriculum integrated information literacy program with medical students. We are also happy to feature the work of the 2016 CHLA/ABSC Student Paper Prize winner, Tess Grydoch. Tess has since graduated from the Master of the Library and Information Studies program at Dalhousie University, and we wish her all the best in her career.

Cari Merkley
JCHLA/JABSC Editor-in-Chief
Email: editor@chla-absc.ca

Message de la rédaction

C'est avec le plus grand plaisir que je m'adresse à vous à titre de nouvelle rédactrice en chef. Merci à Christie Hurrell, notre rédactrice en fin de mandat, pour l'ensemble de son travail effectué au cours des trois dernières années pour l'avancement du journal. L'empressement dont elle a fait preuve à mettre son expertise au profit des membres de l'équipe a été grandement apprécié. Je tiens par la même occasion à remercier Alison Farrell, rédactrice principale, et Nicole Askin, rédactrice adjointe, pour leur précieux soutien alors que je me familiarise avec mon nouveau rôle.

Le présent numéro propose une rubrique signée Kim Clarke, chef de la bibliothèque juridique Bennett Jones de l'Université de Calgary. Kim y présente une vue d'ensemble de la nouvelle législation canadienne sur l'aide médicale à mourir et met en evidence certains aspects à surveiller. Suzanne Maranda, Brittany Harding et Laura Kinderman de l'Université Queen's font part de leurs constats relativement aux effets d'un programme intégré de maîtrise de l'information auprès des étudiants en médecine. C'est aussi avec grand plaisir que nous publions les travaux du lauréat du Prix de l'exposé étudiant de l'ABSC / CHLA de l'année 2016, Tess Grydoch. Tess a depuis obtenu sa maîtrise en bibliothéconomie et en science de l'information de l'Université Dalhousie, et nous lui souhaitons tout le succès possible pour sa carrière.

Cari Merkley
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FEATURE/MANCHETTE

Apps and Mobile Support Services in Canadian Academic Medical Libraries[1]

Tess Grynoch, BSc, MLIS[2]

Abstract: Objective: To examine how Canadian academic medical libraries are supporting mobile apps, what apps are currently being provided by these libraries, and what types of promotion are being used. **Methods:** A survey of the library websites for the 17 medical schools in Canada was completed. For each library website surveyed, the medical apps listed on the website, any services mentioned through this medium, and any type of app promotion events were noted. When Facebook and Twitter accounts were evident, the tweets were searched and Facebook posts were scanned for mention of medical apps or mobile services/events within the past two years. **Results:** All 17 academic medical libraries had lists of mobile medical apps with a large range in the number of medical relevant apps (average = 31, median = 23). A total of 275 different apps were noted and the apps covered a wide range of subjects. Five of the 14 Facebook accounts scanned had posts about medical apps in the past two years, whereas 11 of the 15 Twitter accounts had tweets about medical apps. Social media was only one of the many promotional methods noted. Outside of the app lists and mobile resources guides, Canadian academic medical libraries are providing workshops, presentations, and drop-in sessions for mobile medical apps. **Conclusion:** While librarians cannot simply compare mobile services and resources between academic medical libraries without factoring in a number of other circumstances, librarians can learn from mobile resources strategies employed at other libraries, such as using research guides to increase medical app literacy.

Introduction

The world is becoming increasingly mobile, with 68% of Canadians and Americans reportedly owning smart phones in 2015 [1, 2]. This mobile-rich environment has provided grounds for many innovations within the field of medicine including telemedicine, medical software for smartphones and other mobile devices, and remote patient monitoring capabilities [3]. Academic medical libraries have been quick to respond to this trend from the inception of personal digital assistants (PDAs) by providing services and access to mobile resources [4].

Previous surveys of Canadian health science students and faculty have noted a number of barriers to mobile app use including spotty wireless internet connections, a lack of understanding of how to use the resources, and the negative perceptions of professionalism while referring to mobile devices in a clinical setting [5, 6]. Many respondents have also been unaware of library-provided mobile resources. In their recent survey of pharmacy students and faculty, Duncan et al. [5] found only 51% of respondents knew of library-supplied mobile resources. Similarly, only 43% of medical students and faculty surveyed by Boruff and Storie [6] in 2012 were aware of library mobile resources, and of those only 67.5% of those students reported using them.

To overcome the lack of understanding of how to use mobile resources, academic medical libraries have organized presentations, workshops, and drop-in sessions for students and faculty. For example, library staff at the University of Utah's Spencer S. Eccles Health Sciences Library set up a help desk in the high traffic area between the cafeteria and the hospital where library patrons can stop by for help with mobile device questions and hold a monthly "Appy Hour" where new apps are highlighted [7]. Mobile drop-in sessions where users have the opportunity to test drive different apps not only teaches users how to use apps but allows users to find the app that best suits them before downloading [8]. The success of such initiatives has been short term in some cases, with attendance at mobile drop in sessions at George Washington library declining after the first year of implementation [9]. Providing training for library staff is another important component of library services for mobile apps, ensuring patrons have a consistent experience when they request help [4, 9].

For users to take advantage of these wonderful services, they first have to know they are available. Therefore, promotion is essential. Some of the promotion for mobile apps is built into the various forms of library instruction from reference interactions to class visits, but electronic and other marketing methods are needed to reach users outside of this realm. This paper addresses the questions of

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how Canadian academic medical libraries are supporting mobile apps, what apps are currently being provided by these libraries, and what types of promotion are being used.

Methods

In March 2016, the library websites for the 17 medical schools in Canada were reviewed (Dalhousie University, McGill University, McMaster University, Memorial University of Newfoundland, Northern Ontario School of Medicine, Queen's University, Université de Montréal, Université de Sherbrooke, Université de Laval, University of Alberta, University of British Columbia, University of Calgary, University of Manitoba, University of Ottawa, University of Saskatchewan, University of Toronto, and Western University). A search was conducted using the website or research guide's search bars for keywords such as apps, applications, mobile, medical, medicine, applis, médicales, and médecine. The medical apps listed on each website were noted along with any app-related services and events promoted through this medium. The focus was on apps supporting current/future physicians—apps targeting nurses or other health professionals were not noted unless they were integrated into a single medical apps page. For the purposes of this study, productivity tools such as citation managers, cloud storage, and flashcard apps were excluded, but any journal readers such as EBSCOhost were included. When library-sponsored Facebook and Twitter accounts were evident, tweets from the past two years were searched using Twitter's search bar, and Facebook posts were scanned from 2014 onwards for mention of medical apps or mobile services/events. If the health science library had a separate account from the main library, only the health science library social media account(s) were searched. Once the data were collected, the liaison librarian responsible for the medical app list at the institution was emailed to confirm the accuracy and completeness of the information gathered in March–April 2016. If the contact information for a medical librarian was not available, the contact information for the health science library was used. If there was no response to the email after two weeks, the medical library was contacted by phone to confirm that the email was directed appropriately. An example of the email sent to the medical librarian is provided in Supplementary Appendix A.

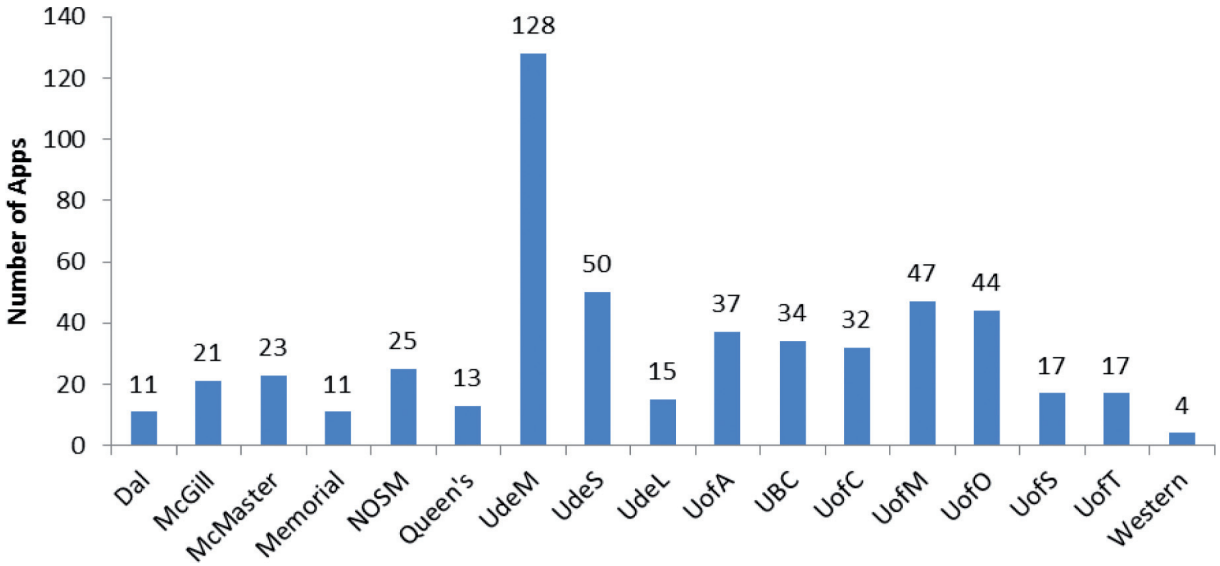
Results

All 17 academic medical libraries had mobile medical app information on their websites, and librarians from 15 out of 17 libraries responded to the email or follow-up phone call and corrected or verified the information found. Where no response was received, the data presented are limited to the information found on the institutions' websites, and therefore may be incomplete or inaccurate.

Canadian academic medical libraries support mobile medical apps through a number of services. All 17 libraries had a list of mobile medical apps that generally took the form of a research guide (Supplementary Appendix B). The number of apps promoted by each library ranged widely from 128 apps at the Université de Montréal to 4 apps at Western University (Figure 1). The average number of apps listed per university library is 31, while the median number of apps is 23. A total of 272 different apps were noted during the course of this survey, covering a wide range of subjects from general medicine and pharmacy to medical specialties such as ophthalmology. Some mobile medical app lists also included the university's app as well as those aimed at patients. The top 11 most noted apps were, in order: Dynamed, Medscape Mobile, EBSCOhost Mobile, Micomedex, Epocrates Rx, AccessMedicine, Calculate by QxMD, Diagnosaurus, UpToDate, Lexi-Comp, and PubMed.

The research guide often included other relevant information such as tip sheets on how to download apps,

Fig. 1. Number of apps highlighted on academic medical library websites at the 17 Canadian medical universities.



configure mobile devices with the university proxy, and how to use a particular resource. The guides would often provide links to app review resources, the most popular of which was www.iMedicalApps.com with mhq.dmdpost.com as a frequent site for French app reviews. Contact information for help was also a common feature on mobile medical app research guides whether the contact information was for an individual librarian, the health sciences library, or the information technology department. One of the guides even had an embedded chat function. A unique feature on the Université de Montréal and the Université de Sherbrooke's guides were sections on security and privacy considerations when using apps in a clinical setting. These two guides also provided tips on how to evaluate apps for clinical use.

Outside of the app lists and mobile resources guides, Canadian academic medical libraries are providing workshops and presentations on mobile medical apps. Some appear to be one-time events while others, such as the library instruction provided at Memorial University of Newfoundland, are embedded into the medical curricula. Some of the libraries have put together engaging mobile app drop-in sessions such as the App Petting Zoo at the University of Toronto where users where encouraged to try out some of the library's apps on an iPad stationed outside of the library and Download Day at Queen's University where users were encouraged to drop by the library for help downloading apps.

Promotion of apps through social media varied between institutions. Fourteen of the 17 libraries scanned had active Facebook accounts, whereas 15 had active Twitter accounts (Table 1). Five of the Facebook accounts had posts about medical apps in the past 2 years, whereas 11 Twitter accounts had tweeted about medical apps (Figure 2). Other noted promotion methods include the use of other social media platforms such as Tumblr, digital displays, bulletin boards, blogs and library news outlets, banner advertisements on the library's home page, or posting on departmental Facebook accounts. In their responses to the follow-up email, many librarians stated that mobile resources were also promoted through library workshops and orientation sessions. The Université de Montréal also promotes their expertise in mobile apps through publishing in local professional journals for clinicians and in interviews with local newspapers and radio.

Table 1. Canadian academic medical libraries with Facebook and (or) Twitter accounts.

University	Facebook account	Twitter account
Dalhousie University	Yes	Yes
McGill University	Yes	Yes
McMaster University	Yes	Yes
Memorial University of Newfoundland	Yes	Yes
Northern Ontario School of Medicine	Yes	Yes
Queen's University	Yes	Yes
Université de Montréal	Yes	Yes
Université de Sherbrooke	Yes	No
Université de Laval	Yes	Yes
University of Alberta	Yes	Yes
University of British Columbia	Yes	Yes
University of Calgary	Yes	Yes
University of Manitoba	Yes	Yes
University of Ottawa	No	Yes
University of Saskatchewan	No	No
University of Toronto	No	Yes
Western University	Yes	Yes

Discussion

Certain factors prevent a fair comparison of apps at different academic medical libraries. Such factors include the language(s) used to teach courses at the university, as French apps were only listed for libraries that supported Francophone universities. Some medical departments have a mandatory device, which limits the number of mobile apps to the applicable operating systems, or they host their own list of mobile resources. The responsibility of some academic medical libraries to support surrounding medical institutions may have also led to a higher number of patient-targeted resources promoted. If all medical apps currently available were placed on a research guide, users would not only be overwhelmed, but the guide would also need to be updated every week. The optimal number of apps would depend on the local context of the library.

Although there was a large variation in the number and types apps provided at Canadian academic medical libraries, the most popular apps listed on library websites aligned closely with the most popular resources identified in Boruff and Storie's survey [5]. Eight of the top 10 favorite resources from Boruff and Storie's survey [5] also appeared as the top most frequently listed apps on the library websites studied including UpToDate, Epocrates, Medscape/eMedicine, LexiComp, PubMed, DynaMed, a medical calculator, and Micromedex (Table 2). The only app from the top 10 in Boruff and Storie's survey [5] to not make the top 11 in this study (besides the web browser) was PEPID, which was 15th. Not all of the apps listed on the library websites needed library subscriptions. A recent survey of medical

Fig. 2. Number of academic medical libraries that support medical programs with Twitter and Facebook accounts and how many libraries used the respective accounts to promote mobile apps.

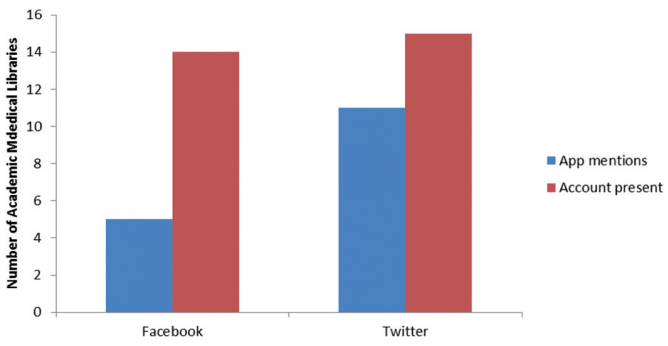


Table 2. Top 11 most frequently listed medical apps on library websites surveyed compared with how frequently apps were mentioned by participants in Boruff and Storie's survey [5].

App	Number of libraries that listed app (out of 17)	Percentage of participants that listed app as a favorite in Boruff and Storie's survey [5]*	Percentage of participants that mentioned app when asked about the last time they used mobile device to lookup medical information in Boruff and Storie's survey [5]*
DynaMed	15	5.6	5.8
Medscape Mobile	14	11.4	12.8
EBSCOhost Mobile	13	NA	NA
Micromedex	12	1.7	NA
AccessMedicine	11	NA	NA
Epocrates Rx	11	11.4	8.7
Calculate by QxMD (medical calculator)	10	5.0%	7.7%
Diagnosaurus	8	NA	NA
Lexi-Comp	8	10.2	9.8
PubMed	8	6.8	9.9
UpToDate	8	18.6	20.9

*In Boruff and Storie's survey, participants were allowed to choose more than one app.
Note: NA, not available.

students in 2014 revealed that two of the most used apps, ePocrates and Medscape, were free apps [10].

Canadian medical libraries have addressed app promotion in numerous ways. Many of the promotional tools employed were similar to those cited in the literature such as social media, public display screens, websites, printed material, outreach, and training [7, 11, 12]. One promotional strategy noted in the literature that was not mentioned by respondents in this study was the use of email [11]; although, one librarian did note that they chose not to use email for promotion due to users complaining of email fatigue. Social media, while an easy method to promote services and resources to a large audience, is problematic in terms of reaching an academic medical library's target audience. Not only does hospital IT frequently block access to social media sites for privacy and security reasons [11], students and staff are viewed as unlikely to follow the library on social media [13]. One respondent indicated that they felt resources were best reallocated elsewhere. Other potential methods suggested through the literature include using campus- or organization-wide events as potential platforms for promoting mobile resources [12] and reaching out and developing connections with internal resources such as IT departments and education departments [11]. Université de Montréal did this by using the medical department's Facebook page to post information. If students do not follow the library, they may be more likely to follow their student group or department. Université de Montréal also expanded their promotion beyond the university through use of public mass media such as radio and newspapers and professional newsletters.

The survey revealed some variations on app support services that were not highlighted in the literature such as the addition of tip sheets, links to mobile app review resources, contact information for help, and app literacy information on the same mobile guide. The presence of sections on security and privacy on the Université de Montréal and the Université de Sherbrooke's guides along with tips on how evaluate apps for clinical use appear to address the concerns of professionalism [6, 10]. The area of app literacy has already produced a set of app evaluation criteria created by DeRosa and Jewell [12] that includes: subject relevance, quality of content (quality in content, format, and merit), reputation of producer/publisher, cost, access (functionality and usability), legal issues (access to terms of service should be quick and easy), copyright, and fair use issues. These evaluation criteria could be used to provide further mobile app support as tips during a mobile app literacy session or guide for health professionals and patients [12]. A similar app literacy course was taught at the Preston Medical Library at the University of Tennessee [14].

Conclusions and further research

Future research on mobile app support could include schools that support other professional health education streams such as nursing, physiotherapy, and natural medicine. The survey could also be expanded geographically to locations beyond Canada such as the United States. In the benchmarking survey for mobile app services performed by the New York University Health Sciences Libraries in 2010, they also looked at where users were directed to help [15]. A similar question could be added to the website scan, noting if a specific contact person or a generic university email is provided. The data collected through this survey could also be combined with mobile app usage statistics at different libraries to compare the effectiveness of different mobile app services and promotion strategies, although these data would need to be considered in light of the differences in populations served by the various libraries.

Further usability testing could also be performed to discover which method of mobile app guide organization is most conducive to users finding the app they want and determine how symbols and icons used in the guides could be used to their best advantage. The same testing could determine how to indicate apps that require an internet

connection, which was one of the barriers noted in previous research [5].

While librarians cannot simply compare mobile services and resources between academic medical libraries without considering the local context, librarians can learn from the promotional strategies employed at other libraries. For example, the survey revealed how commonly used tools such as the research guide can be employed to increase medical app literacy and raise awareness of security and privacy concerns associated with their use. In the wider field of academic librarianship, other subject-specific libraries can learn from the successful services and promotional strategies used by these early mobile app adopters.

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RESEARCH ARTICLE / ARTICLE DE RECHERCHE

Evaluation of the Long-Term Impact of a Curriculum-Integrated Medical Information Literacy Program[1]

Suzanne Maranda[2], Brittany Harding, and Laura Kinderman

Abstract: Introduction: Medical libraries have long provided educational programs to support evidence-based practice. Medical students at Queen's University, Kingston, Ontario, participate in a curriculum-integrated information literacy program during the first two years of medical school. Do they retain, improve, or forget the skills? Do they continue to use the library resources during clerkship? Did they encounter barriers to prevent them from using the resources? **Methods**: A short survey was administered to 99 students at the end of medical school. The survey included questions about medical students' attitudes and behaviours, their use of information resources, and their medical information literacy knowledge. Some of the knowledge questions were compared to pre- and post-tests that the same class completed in first year. **Results:** Fifty-three students completed the survey. The students rated their abilities very highly but there was only a weak positive relationship with the knowledge scores. Information resources were well used, both for clinical questions and to complete the mini-scholar exercises. **Discussion:** Medical students feel better prepared to answer clinical questions and their skills improved or remained the same for the content that could be compared between first and fourth year. Different resources were used for day-to day information needs and for the completion of the mini-scholar exercises. The results will inform changes to the Medical Information Literacy program at Queen's University. The librarians will explore some of the barriers to access to ensure that future students can use information resources with more ease while away from campus.

Introduction

Academic libraries are facing financial challenges. In addition to carefully considering collections decisions, they must examine the value of investing in the delivery of education programs. Medical and health libraries have long provided educational programs to support evidence-based practice. At Queen's University, Kingston, Ontario, a medical information literacy (MIL) program has been integrated in the undergraduate medical curriculum since 1991. Over time, this integration has been linked to the evidence-based medicine (EBM) curriculum. Student assignments and course evaluations consistently show that students learn the MIL skills and can apply them successfully in various endeavours. What has not been assessed is the long-term retention of the MIL knowledge and skills and the long-term use of the library's purchased information resources.

Evidence-based medicine (EBM) training is a regular occurrence in health care professional education. Many research projects have tried to assess EBM skills of practicing physicians, junior doctors, medical residents, and undergraduate students usually soon after an educational intervention. Maggio et al. [1], Shaneyfelt et al. [2], and Just [3] have compiled teaching methodologies and assessment procedures that are as diverse as each article included in their reviews of the literature. One common thread across many of the articles surveyed is that very few studies tested participants after a significant amount of time had elapsed after their EBM training. Gruppen et al. [4] and Just [3] both recommended that more research is needed to examine the long-term retention of skills. Dorsch et al. [5] concluded that medical graduates who were trained in their undergraduate program "retained EBM skills in residency and maintained a positive attitude about the importance of applying EBM principles to patient care." However, Green and Ruff [6] found that health care professionals were having difficulties formulating clinical questions and translating them into effective searches. A few years later, Cullen et al. [7] observed that junior doctors rated their skills higher than assigned by the study raters. These young professionals were relying on synthesized

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sources of information and did not remember how to search Medline.

This study aimed to determine whether the Queen's University medical students retained their medical information literacy knowledge and skills two years after the last curriculum component offered by the librarians as part of their EBM training. The study also aimed to identify which purchased information resources were being used during the clerkship years and to determine any barriers that might have prevented the students from using them. The results of the study will inform MIL curriculum change, influence collections decisions, and help the library improve access to the academic health information resources while the students are away from campus.

Background and interventions

At Queen's University's Medical School, medical information literacy is integrated in the EBM curriculum throughout the four years of the undergraduate program (Table 1). However, the teaching portion by the librarians is concentrated in the first two years. There are a number of embedded assessment opportunities during these two years. A pretest, consisting of 5 multiple-choice MIL knowledge questions, is completed online by all incoming students ($n = 100$) in the first few days of medical school (see Supplementary Appendix 1). At the end of the first year, during which the students participated in three online modules and three face-to-face classes, the same test is administered again as a post-test. These two tests are not graded, but used as program evaluation tools, and they document a consistent improvement in student performance in the post-test over the pretest scores each year. The MIL grades are assigned via a quiz and an assignment marked by the librarians, as part of a larger project completed for the course instructor. There is another assignment in second term, linked to a project in the Fundamentals of Therapeutics course. The students are asked to prepare a patient, intervention, comparison, outcome (PICO) question and search the Medline and EMBASE databases for a specific assigned drug. Class averages for this first-year culminating assignment usually hover around 80%. In second year, the students prepare a Critical Enquiry research project working with a faculty tutor. Again, they need to prepare a research question (although not necessarily in PICO format) and a review of the literature. In the past these searches were marked by librarians, but in recent years, a peer-tutor model has been in place and is being evaluated as part of a separate study.

During the two clerkship years, when the students are placed in hospital and other clinical settings, the students complete a mini-scholar exercise (MSE) during each of their eight rotations. The MSE was designed by faculty to ensure continuity in the practice of EBM and the librarians were not involved in the design or assessment of the literature searching portion of this assignment. However, a few questions about this critical incident (defined by Stevenson [8]) were included in this study expecting that the MSE contributed to the students' application of MIL skills during the last two years of their training. It was also important to find out which information resources they searched to answer a question about a "real-life" topic during this assignment, especially considering findings such as that by McKibbon and Fridsma [9] in a 2006 study of information resource usage by health care professionals, which concluded that "physicians did not choose resources wisely." Furthermore, the Library needs to know how the information resources are used to complement usage statistics provided by vendors. During medical education, the university offers various information resources, some essential to all health care programs, while others require careful assessment to be retained during a period of contracting budgets. This study is the first at our university to report on the long-term usage of the resources provided by the Library and the barriers that may prevent students from using them.

How is EBM assessed?

Shaneyfelt et al. [2] compiled various instruments and classified them for their validity and reliability, as well as indicating which instruments would be best for assessing individuals or to assess the impact of complete EBM programs. The Berlin and Fresno tests are often mentioned as valid EBM tests, but were unfortunately not applicable to this study. The Berlin test [3, 10] does not include assessment of skills, such as literature searching, and the Fresno test [11] is very demanding in time and resources. The EPIC scale [12] only has one question about the perceived ability to conduct a literature search, whereas the ACE tool [13] asks four questions about the PICO question and search strategy for a given patient scenario. These tools were not detailed enough to capture the students' MIL attitudes, behaviors, and skills that would inform potential curriculum

Table 1. Medical Information Literacy curriculum at Queen's University.

	Year 1	Year 2	Clerkship, years 3+4
Course(s)	CARL: Critical Appraisal, Research, and Learning; Fundamentals of Therapeutics	Critical Enquiry (CE)	Clinical rotations
Integrated Medical Information Literacy (MIL)	3 online modules and 3 in-person sessions. Content: e-books, POC tools, Medline/PubMed searching, drug information resources	2 in-person sessions: 1 peer-tutor training and 1 whole class workshop on CE searching (with peer tutors and librarians)	Quick review of point-of-care tools and mobile apps (Fall of Year 3)
Assessment	CARL assignments with MIL components; Drug Literature Evaluation project	CE projects. Lit searches assessed by peer-tutors	Mini-scholar exercises test MIL as well as EBM skills. One per rotation (8)

improvements, and therefore a survey instrument was developed for this research (Supplementary Appendix 2).

Methods

Medical students of the 2016 graduating class ($n = 99$) were chosen as the target population as they could be surveyed before leaving the university and scattering across the country for their residency training. Ethics approval was granted by the Queen's University Health Sciences Research Ethics Board and the survey was administered at the end of March 2016. At that time, the students had completed all the rotation requirements of the clerkship and were meeting in class for a few weeks before their final qualifying exams. The survey was anonymous and the results would have no bearings on their class standings. During a free 30-minute period, the students who agreed to participate ($n = 53$) completed the paper survey. The 10 minutes planned for the survey were sufficient with the exception of one student who did not complete the True/False section at the very end of the questionnaire. A draw for five small financial incentives ($20) was performed immediately after completion.

Data used in the current study were derived from three sources; a pretest of knowledge, a post-test of knowledge, and the post-program evaluative survey. Where possible, analysis compared results of all three measures to examine evidence of longitudinal effects of the MIL program at Queen's University.

Pre- and post-tests

As noted earlier, students were asked to complete a short, 5-item multiple-choice test both before and after the MIL program in year 1 (pretest, administered in September 2012 ($n = 100$) and post-test, administered in March 2013 ($n = 59$)). Two knowledge questions were consistent across the pretest, post-test, and the survey. The concepts being tested were the same: Boolean logic and choice of resource for a particular clinical scenario. The question format was also the same, only the topic of the scenario varied slightly.

Post-program survey

The School of Medicine recommended a short 10-minute survey. It was therefore decided to conduct a quantitative study, mostly using multiple-choice and easy to complete charts or scales. The survey instrument was designed to include two main components. Part 1 focused on attitudes and behaviours and part 2 required the students to answer some knowledge questions based on the Queen's University medical information literacy objectives. Although many authors [7, 10] mention that self-rating of EBM skills is not reliable and does not correlate to knowledge, this survey asked the students to rate their confidence levels with the two components of EBM of interest: question formulation and information searching. The goal was to link the confidence levels to the knowledge questions within the survey, attempting to either confirm or disprove the results of earlier studies. A 4-point Likert scale used: strongly agree, agree, disagree, or strongly disagree. The same scale was also used to ask a few questions about the impact of the medical information literacy training and about participants' thoughts regarding the MSE. Stevenson [8] found that the "work environment influences the learner" so the less traditional barriers of "lack of role models," "lack of continued exposure," and "peer pressure" were included in the list.

The survey instrument was tested with four medical students from years 1 and 2. These students are the designated scholar role reps for their classes and were keen to participate. Five librarians at the Health Sciences Library also completed the survey. Based on the feedback from these novice and expert testers, the survey was edited to create the final version. The students also affirmed that a paper survey would be more likely to be completed seriously, referring to the fact that medical students are surveyed so often that they don't want to spend much time completing an online survey. As such, data were collected using hard copy surveys and manually input to electronic software for analysis. All statistical analyses were completed using SPSS.

Methods of analysis

Pre- and post-tests

Overall scores for the pre- and post-tests were calculated as a sum of correct answers to all questions. Pre- and post-test scores were then compared using a paired t test to assess for change in knowledge through the EMB program.

Post-program survey

Primary analyses of the post-program survey included a review of descriptive statistics for all variables (program of study, educational background, confidence levels, knowledge, frequency of resource usage and barriers encountered). Aggregate scores for test variables were then calculated for use in comparative analyses. Overall knowledge scores were calculated as a sum of responses, where correct answers were scored as a positive 1, incorrect answers as a negative 1 and a response of "I don't know/remember" as 0. Frequency of resource use and confidence were calculated as an average value across all relevant survey items.

Secondary analyses consisted of an ANOVA, assessing for differences in knowledge, confidence, and frequency of resource use by educational background and chosen specialty for residency, as well as a Pearson's correlation analysis assessing relationships between knowledge scores and overall confidence in one's ability.

Comparing pre- and post-tests with the post-program survey

As noted earlier, two of the pre- and post-test questions were aligned with content in the post-program survey (Supplementary Appendix 2 Questions 5b and 6). It should be noted that students were not given the correct answers after the pretest (fall 2012), but did immediately receive them after the post-test (spring 2013). Although overall scores have not been compared due to the insufficient detail available in archived data, pre- and post-test scores on these two questions were compared to that of the survey (spring 2016) using descriptive statistics.

Table 2. Participants' residency programs compared to whole-class matches.

	% in survey	% in class
Family Medicine	34.0	36.7
Internal Medicine	30.2	22.4
Surgical specialties: Anaesthesia, General Surgery, Plastic and Reconstructive Surgery, Orthopaedics	13.2	14.3
Other Specialties: Emergency Medicine, Neurology, Obstetrics and Gynecology, Pediatrics, Psychiatry, Radiology	22.6	26.5

Results

Demographics

From the total class of 99 students, 53 agreed to complete the survey (53.5%). They ranged in age from 24 to 33 years (mean = 26.5; SD = 2.1). The gender split was almost equal with 51% male and 49% female. This is a representative sample from the class, which in total has the same age range and gender split with 48.5% male and 51.5% female.

Prior to enrolling in their current medical program, 25 of the student participants (66%) held an undergraduate degree, 16 (30.2%) held a Master's degree, and 2 (3.8%) held a PhD or higher. At the time of the survey, students had already received their residency matches. The residency disciplines also follow the total class assignments with about one-third of students going to Family Medicine, less than a third to Internal Medicine, whereas the last portion could be divided into four surgical specialties and six "Other" specialties (Table 2) [14]. ANOVA found no significant differences in knowledge, confidence, or frequencies of resource use between students of different academic backgrounds or who are currently enrolled in different specialties.

Confidence

Students rated their confidence in their own abilities high, either agreeing or strongly agreeing with each of the statements shown in Table 3.

Students also felt more confident now than at the beginning of medical school in their ability to locate reliable medical information (mean = 3.53, SD = 0.67), and that they were more efficient in searching for medical information because they knew how to choose appropriate resources for their information needs (mean = 3.36, SD = 0.71).

Knowledge

Table 4 shows the compilations of knowledge questions. Only six questions (11 in total) were answered correctly more often than incorrectly or with "I don't remember."

Relationships between knowledge and confidence

A Pearson's correlation analysis assessing the relationship between knowledge scores and confidence found a very weak, nonsignificant positive relationship ($R^2 = 0.17$; $p = 0.25$).

Comparing knowledge across pre- and post-tests, and the post-program survey

A paired t test comparing scores on pre- and post-tests found a significant increase in overall knowledge scores through the program ($t(58) = 5.95$, $p < 0.001$). Although statistical analysis could not be performed to compare frequency of correct responses on the two items across the pre- and post-test, and the post-program survey, comparison of frequencies does show an increase in the proportion of correct responses over time. Scores on a question on Boolean logic increased from 42%, to 59.3%, to 60.4% correct, whereas scores regarding selection of resources increased from 43%, to 47.8%, to 71.7% correct across the pretest, post-test, and post-program survey respectively (Table 5).

Resource usage

Mobile applications were the most frequently used resources. Most students indicate that they use them weekly or daily. Figure 1 displays the frequency of usage for each resource in decreasing order of the mean usage frequency. It should be noted that the survey was specific about the point-of-care (POC) tools being the ones purchased by the university, and we gave the example of Up-To-Date as a resource that would fit in the "Individually purchased" category since it is not offered on campus. Considering the cost of these resources, it was important for the Library to know if the purchased POC tools were continuing to be used during clerkship. Similarly a separate query for drug information resources was prepared, although many are integrated in POC tools. Most of the "Other" responses related to the cost of purchasing resources, no doubt

Table 3. Confidence in knowledge and skills ($n = 53$)*.

Question	Mean	SD
a. I feel confident that I can formulate a searchable clinical question	3.42	0.570
b. I feel confident that I can formulate a searchable research question.	3.42	0.570
c. I feel confident that I can perform a thorough literature search in a citation database such as Ovid Medline or PubMed.	3.32	0.613
d. I feel confident that I can locate independent drug information.	3.09	0.687
e. I feel confident that I can assess the quality of information provided on a web page.	3.40	0.531
f. I feel more confident now than at the beginning of medical school in my ability to locate reliable medical information	3.53	0.668
g. I am more efficient in my searching for medical information because I know how to choose appropriate resources for my information needs.	3.36	0.710
h. The medical Information Literacy sessions gave me the skills to search reliable medical information resources.	3.02	0.571
i. During clerkship, I continued to use the information resources highlighted in the CARL, Fundamentals of Therapeutics and CE courses.	3.04	0.808

*Mean and SD were calculated using a 4-point Likert-type scale: 1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree.

Table 4. Compilation of knowledge questions.

Question	Correct (%)	Incorrect (%)	I don't know/don't remember (%)
Question formulation and search strategy			
5a. PICO question ($n=48$)	16.7	77.1	6.3
5b. Search strategy—Boolean logic ($n=53$)	60.4	39.6	N/A
Identify the resource			
6. Resource for recent peer-reviewed articles ($n=52$)	71.7	11.3	17.0
7. Resource for patient education ($n=52$)	37.7	22.6	39.6
8. Resource for drug interactions ($n=53$)	69.8	11.3	18.9
True/false questions			
9a. Medical Subject Headings (MeSH) are assigned to each article in Medline/PubMed using the most specific term for each concept discussed in the article. ($n=52$)	43.4	20.8	35.8
9b. MeSH are organized in a hierarchy to allow searchers to find articles on all the concepts of that Tree in one operation (explode). ($n=52$)	60.4	3.8	35.8
9c. Some MeSH are assigned as the focus of the article to restrict the number of headings assigned. ($n=52$)	9.4	41.5	49.1
9d. Since MeSH are only in American spelling, one must use truncation to improve the results of the search. ($n=52$)	24.5	18.9	56.6
9e. The Canadian drug tool, the Compendium of Pharmaceuticals and Specialties (CPS, renamed online to RxTx in 2015) contains independent information about drugs sold in Canada. ($n=52$)	28.3	52.8	18.9
9f. The Cochrane Database of Systematic Reviews contains the type of publication at the top of the evidence-based pyramid because Cochrane reviewers aim to prepare meta-analyses of quality individual studies. ($n=52$)	83.0	5.7	11.3

referring to the fact that this university does not offer access to all POC tools.

Almost all students agreed (52.8%) or strongly agreed (45.3%) that they would explore available medical information resources at the universities of their forthcoming residencies.

Barriers to access

Students were asked to select any factors that prevented them from accessing and using information resources, other than the ones they purchased individually while they were not on campus. Only 9.4% of participants felt they had never encountered any challenges.

Figure 2 shows the proportion of students who encountered barriers, in descending order of prevalence for each barrier.

Discussion

Confidence and knowledge

Medical students who completed the survey were very confident in their ability to prepare a searchable question for research or clinical needs. However, when asked to identify which portion of a given PICO question would need to be more detailed, only 15% identified that the intervention was not clearly defined. This was a question about drug therapy, something quite common, so the survey authors were sure that students would realize that the dosage would be an essential part of the question and that it was missing. On the other hand, the search strategy question based on this same scenario was answered correctly by 60% of the respondents. The authors were expecting a better response rate considering that the "logic" was clear in the leading information. There were still many students (36%) who were not applying Boolean operators appropriately, echoing Gruppen's findings over 10 years ago [4]. The survey results, when matched to the pre- and post-tests completed by the same students in 2012 and 2013 (Table 5), confirm that the skills improved after the pretest, but remained almost constant with the post-test results (59.3%) and therefore did not deteriorate over time. These findings confirm the need to include search strategy formulation in MIL programs, especially since this skill is applicable to many databases and search interfaces.

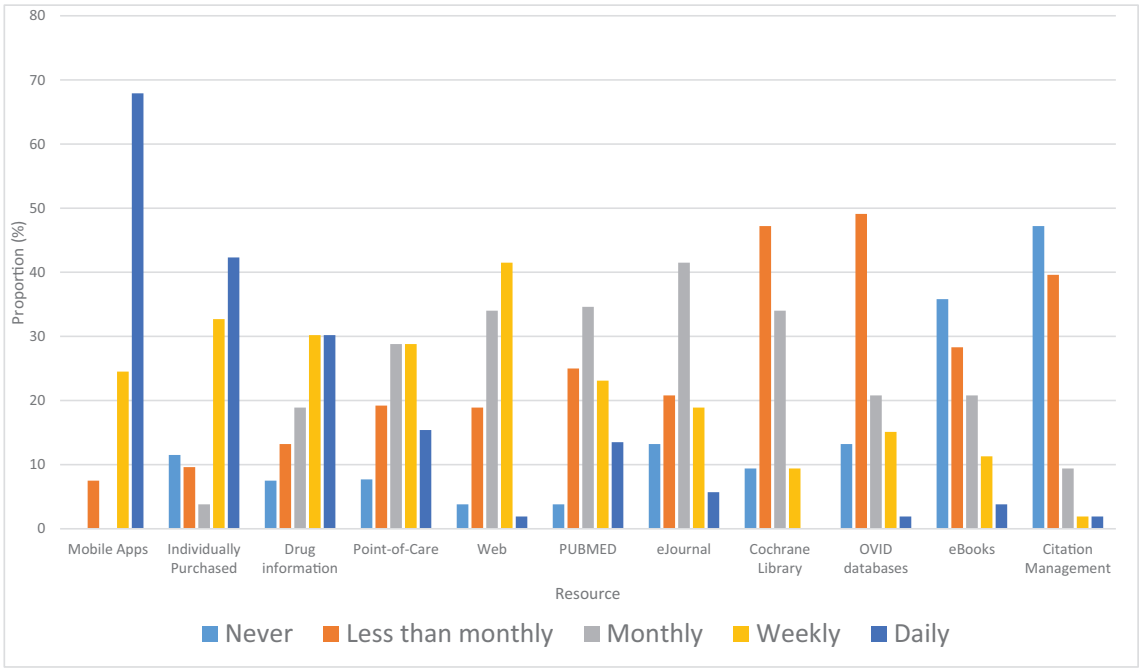
Table 5. Pretest, post-test, and survey comparison.

Question	Answer	Pre-test, $n=100$ (%)	Post-test $n=59$ (%)	Survey $n=53$ (%)
5b. Search strategy—Boolean logic	Correct	42	59.3	60.4
	Incorrect	58	40.7	39.6
6. Resource for recent peer-reviewed articles*	Correct	43	47.5	71.7
	Incorrect	57	52.5	11.3

*Survey proportions fail to add to 100% due to "I don't know" response option.

Another survey question was compared to the pre- and post-test results. Question 6 asks the students to select the best resource to find recent peer-reviewed articles on a topic. The post-test (47.5%) showed a modest improvement over the pretest (43%), whereas the survey results show a significantly marked improvement with 71.7% of the respondents choosing the correct answer. Prior to the MIL program, students believed that the best source of articles was to go directly to a journal covering the appropriate topic. The advantages of database searching are demonstrated time and again during the MIL program. The timing of the post-test, during the first year, probably does not yet allow the students to internalize that fact. With additional assignments, the Critical Enquiry project in second year and

Fig 1. Frequency of resource usage during clerkship.



the MSEs in clerkship, the students search databases more often and must then realize that this is more efficient than choosing journals individually.

Medical students indicate that they are heavy users of drug information resources and they do feel confident that they can find independent drug information. Although almost 70% of the respondents were able to identify the resource with a drug interaction tool, only 28% of respondents were correct when they disagreed with the statement that the Canadian drug tool (e-CPS, recently renamed to

Fig. 2. Barriers to resource usage.

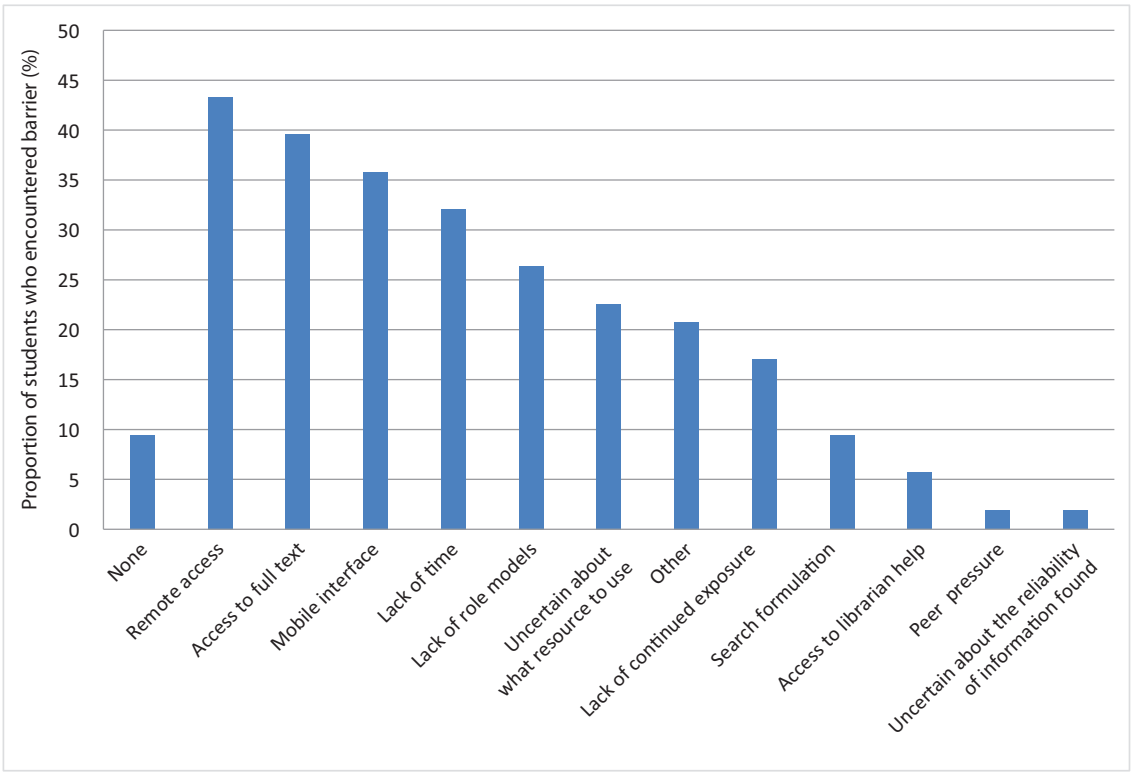


Fig 3. Resources consulted for the mini-scholar exercise.

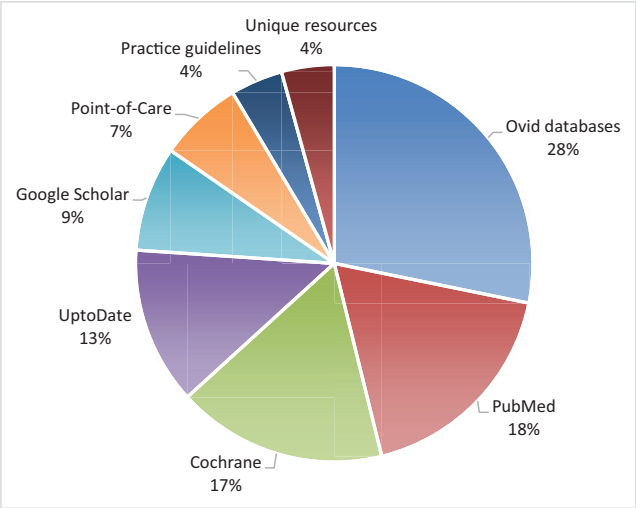
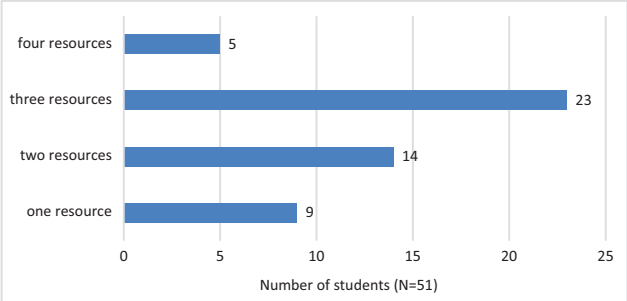


Fig 4. Number of resources used in mini-scholar exercise.



RxTx) contained independent information. This resource is a compilation of the drug monographs supplied by the manufacturers. This result will prompt the librarians to stress that information as part of the teaching about drug information resources. For the last six years, class time has been reduced and content about drug handbooks was moved to an online tutorial. From now on, during the class time, librarians will need to include this important fact about the Canadian drug information resource as part of the discussion of the highlights of the online tutorial.

It is important to notice that despite the high confidence recorded at the beginning of the survey, the students did use the "I don't remember" or "I don't know" quite frequently to answer the knowledge questions at the end of the instrument. The True/False questions in particular had a very high percentage for this choice except for the question about the Cochrane Library, which was answered correctly by the highest percentage of respondents among all the knowledge questions. Although overall knowledge scores were not high, and many students chose the "I don't remember" option, there were five questions that were answered correctly by a majority of the students.

Although one may expect to find a relationship between confidence and knowledge, the current study revealed only a very weak relationship between these two variables. This finding reflects what others have found: confidence in abilities is not reflected in knowledge even after two years post intervention. Considering the findings by Salbach et al. [12] that health care professionals "describe a waning in confidence in their ability to access and critically appraise the literature over time," one would think that confidence would have diminished after that amount of time; however, the fact that this did not occur may reflect a desirability bias: medical students rate their confidence high because they feel it is expected or desired.

The discrepancy between confidence and actual knowledge could also be explained by the Dunning–Kruger effect [15]. The authors state "that people who lack the knowledge or wisdom to perform well are often unaware of this fact." Although the Queen's University MIL program is quite comprehensive, with multiple opportunities for assessment, the students are still considered novice users of information resources such as Medline and PubMed. Perhaps future MIL programs should focus less on teaching students the complexities of using Medical Subject Headings and concentrate more on the difficulties of navigating the substantial world of medical information. How to select and evaluate an appropriate source of information, for the practitioner or for the patient, remains a challenge that librarians must address with future medical students.

Using information resources

Overall, medical students agreed that their skill in locating reliable medical information had improved during the undergraduate years, and over 80% agreed or strongly agreed that they continued to use the resources presented in the preclinical years during clerkship (question i. in Table 3). They reported using appropriate resources to complete their MSEs (Figure 3), and the survey results found usage in all categories of resources (Figure 1) with the least used being the citation management software and e-books. Citation management is encouraged, but librarians do not spend a lot of time covering this in the MIL program. The increase in freely available software for this purpose and the declining usage of the university-wide offering led the librarians to believe that students would be choosing their own software to suit their individual needs. Further questions will need to be explored with other classes to determine why the students are not users of e-books. One could surmise that the POC tools and mobile apps are replacing during clerkship the e-books used in the preclinical years. However, based on the recent study by Pickett [16], it is also possible that students simply do not like using e-books. This has far-reaching implications for collection development at this university, as the preference has been to purchase e-books over print for many years.

Mobile apps and individually purchased resources are understandably the highest used of all resources. These would include resources that are easily accessed, potentially without the need for an internet connection, and so would be most convenient in a clinical environment. Point-of-care tools and drug information resources were also used most frequently on a daily or weekly basis. It is important for collection maintenance in a difficult funding environment to confirm that both of these resource types are among the highest used by the clerks.

The high use of web resources is not surprising. Not only do librarians know from observing students that they search Google and Google Scholar to locate articles, but they also learn to use practice guidelines and reliable association or government websites recommended by faculty. Librarians at this institution have observed during recent classes more reluctance to learn and use the Ovid databases (Medline, EMBASE). It seems that structured, but still simple search strategies are not considered to lead to better search results compared to "google-style" searching in PubMed. This finding is influencing the decision to include advanced PubMed searching in term 1, building on the fact that the students all start medical school having searched PubMed before. When and if to introduce Ovid searching is still a debate among the librarian-teachers at this university. Although Ovid searching was ranked low, being used less than monthly by most students responding to that part of the survey, it should be noted that Ovid databases were the most used resources when students were working on their MSEs (Figure 3). It would be safe to assume that the MSE, requiring them to locate articles, would lead them to use databases, whereas day-to-day questions may well be answered by POC tools or other quick reference resources. Similar to findings by Shanahan [17], almost half the students reported using two or more databases when working on their MSE assignments (Figure 4). Verifying information from more than one source is one of the teaching points of the Queen's University MIL curriculum.

Students also feel confident that they know how to choose appropriate resources and 98% of them agree or strongly agree that they will explore resources available to them during residency. Although Green and Ruff [6] found over 10 years ago that health care professionals were not aware of resources available to them, medical students graduating now face such a wide range of resources that it is perhaps clear to them that it is to their advantage to look into the reliable resources offered at the university.

Barriers to access

Contrary to findings about faculty use of information resources [6, 8, 18], lack of time was not a highly ranked barrier. The most common barriers referred to access and use of online resources: remote access, access to full text, and mobile interface difficulties. The first two barriers need to be investigated with the affiliated hospitals and clinics to ensure that appropriate internet access and bandwidth are available to the clerks. Mobile interfaces would need to be discussed with future classes to ascertain what the issues are before contacting the content creators.

The lack of role models, which was qualified in the survey with "no guidance on the use of the resources in clinical practice," was also mentioned frequently, confirming findings in the studies by Cullen et al. [7] and Stevenson [8]. Chosen less frequently was the lack of continued exposure (17%) meaning that for some students they would have liked more obvious use of information resources by peers, residents, and faculty working with them in the clinical environment. However, it is reassuring to find that peer pressure (no one else is using them) was not a highly ranked barrier (1.9%).

Limitations of this study

The first key limitation in the current study was the time allotment available to students to complete the survey. A short time allotment (10 minutes) may have impacted students' opportunities to think or reflect through knowledge questions, and could potentially have contributed to lower than expected knowledge scores. Consideration of these short timelines also drove the selection of multiple choice and true/false knowledge question format, which are not optimal to assess MIL skills. In the future, additional time will be requested to allow students the opportunity to think deeper about responses and to allow for open-ended questions.

The second limitation of the current study was the lack of available detailed pre- and post-test survey data. Had detailed responses been available, more rigorous statistical comparisons could have been conducted to assess differences in scores across time. Future studies will remedy this limitation through implementation of consistent measures conducted at multiple points in the program, and intentional retention of data for a longitudinal study.

Conclusion

This study aimed to answer a number of research questions. Did medical students retain their MIL skills two years after the last intervention? Did students change their information seeking practices? Did they continue to use the resources shown to them during the MIL program? Although the results of the knowledge portion of the survey are not encouraging overall, there are some areas of significant change. More encouraging is the positive attitude of students towards the use of information resources presented during MIL sessions and their self-perceived confidence that they can locate more reliable information at this time in their education compared to when they started medical school (Table 3). Their choice of resources for the MSE also demonstrates an acceptance in the use of databases to locate articles that was not evident at the beginning of their program.

With these survey results, the librarians will be able to target improvements to the MIL curriculum specifically related to drug information, consumer health resources, PICO question formulation, and Medline/PubMed searching, including the translation of a question into a search strategy with appropriate Boolean logic. Curriculum revisions will also need to include more content on how best to select a resource for varying information needs.

There are some important barriers to investigate that can hopefully result in improved access for all students. Environmental barriers will be discussed with faculty in charge of the clerkship curriculum.

This survey will be repeated with future fourth year students to gather more evidence about the long-term use of information resources and retention of medical information literacy skills.

A more detailed MSE review is planned for the fall of 2016 which will hopefully provide more information about the use of information resources, the barriers to usage and

preceptor feedback for the information research section of the MSE.

Although this study was conducted at a single university, most of the results confirm previous studies. The authors believe that the conclusions may be applicable to other medical school information literacy programs and would be interested in future collaborations. The survey instrument as well as the collected data are made available to encourage others to reproduce this study, using the instrument in its entirety or adapted to local needs.

Note

The pre-test, survey instrument, and dataset are available at https://ejournals.library.ualberta.ca/index.php/jchla/rt/suppFiles/28115/0.

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COLUMN/CHRONIQUE

Medically Assisted Death in Canada—Unsettled (and Unsettling?) Law

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Canada joined an exclusive group of jurisdictions that allow medical assistance in dying (MAD) upon the passage of *An Act to amend the Criminal Code and to make related amendments to other Acts (medical assistance in dying)* [1]. The *Medical Assistance in Dying Act* amends the *Criminal Code* by introducing a MAD exception to its culpable homicide and counselling or aiding suicide provisions. The statute was enacted in response to the Supreme Court of Canada's decision of *Carter v Canada* [2] in which the Court found these *Criminal Code provisions* to be unconstitutional as unreasonably restricting an individual's right to life, liberty, and security of the person.

This paper explores several controversial and unresolved provisions of the new statute that health librarians may have to assist their patrons in researching. The former provisions are requiring that the patient's death be reasonably foreseeable, differentiating between the recorded cause and manner of death, and allowing someone other than the patient to sign the MAD request form. The identified unresolved terms relate to the law's application to mature minors and to psychological disorders, and allowing assisted-dying provisions in personal directives.

Reasonable foreseeability

Adults suffering with a grievous and irremediable medical condition may request medical assistance in dying. To establish that a person has a grievous and irremediable medical condition, the medical personnel must determine, among other things, that "their natural death has become reasonably foreseeable ... without a prognosis necessarily having been made as to the specific length of time that they have remaining" [3 at s. 241.2(2)].

Constitutional law experts believe the reasonable foreseeability requirement will likely be found unconstitutional as it "is not consistent with the constitutional parameters set out in the *Carter* reasons" [4], a supposition bolstered by the Alberta Court of Appeal's interpretation of *Carter* in *Canada (Attorney General) v EF* earlier this year. The Alberta Court said "[n]owhere in the descriptive language [in *Carter*] is the right to physician assisted death expressly limited only to those who are terminally ill or near the end of life" [5 at para 33]. The reasonable foreseeability of death requirement would have the effect of reducing the number of eligible patients, contrary to the underlying rationale in *Carter*. A constitutional challenge to this provision was filed within two months of the Act becoming law [6].

Canada is not alone in requiring death to be foreseeable. The American model, based on the Oregon statute, contains an imminent death provision requiring a prognosis that the patient's illness will "produce death within six months" [7]. The Canadian reasonable foreseeability requirement is obviously less prescriptive than the American test, but it is also open to subjective interpretation. The Minister of Justice said the "language was deliberately chosen to ensure that people who are on a trajectory toward death in a wide range of circumstances can choose a peaceful death instead of having to endure a long or painful one" [8]. According to the Department of Justice, reasonably foreseeable means "there is a real possibility of the patient's death within a period of time that is not too remote.... While medical professionals do not need to be able to clearly predict exactly how or when a person will die, the person's death would need to be foreseeable in the not too distant future" [9]. As with any ambiguous phraseology in statutes, it will likely be left to the courts to determine the outer limits of the patient's lifespan where their death could be determined reasonably foreseeable.

Cause and manner of death

The Act also requires the Minister of Health to establish guidelines regarding the information that is to be included on death certificates, including whether the cause and manner of death should be identified as MAD or the underlying illness [1 at s.3.1]. The Minister will need to consider provincial laws when devising the guidelines as provincial law requires either a coroner or medical examiner to determine the cause and manner of death for all unnatural deaths. Cause of death relates to why an individual died and manner of death to how the person died.

A hint regarding what the Minister will likely decide regarding the cause of death can be found in the Act.

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The Act amends three statutes other than the *Criminal Code* by adding a cause of death deeming provision. Any persons governed by these statutes (such as inmates and members of the armed forces) who receive MAD will be "deemed to have died as a result of the [underlying] illness, disease or disability" [10]. This suggests that the guidelines will likely stipulate the underlying illness to be identified as the cause of death on the death certificate.

The manner of death could, and arguably should, be recorded as MAD as that accurately reflects how the individual died. Differentiating between cause and manner of death in this manner will allow for more accurate records of medically assisted deaths as well as the underlying medical reasons for these deaths.

Inability to sign

Unique to Canadian legislation is a provision that states if the person requesting MAD is unable to sign the request form, another adult may sign on the patient's behalf if the adult signer understands the nature of the request [3 at s. 241.2(4)]. The signing of the form must be done in the presence of the patient and an independent witness. This provision may raise concerns about vulnerable persons being taken advantage of for financial or other reasons; however, the provision must be read in conjunction with the safeguard section. Among others, the safeguards require medical personnel to ensure the patient gives express consent for the assistance and to take all "necessary measures" to ensure a person who has difficulty communicating understands the information provided to them and can communicate their decision [3 at s. 241.2(3)]. The onus is on medical personnel to ensure that the patient is requesting MAD voluntarily and without undue influence. Presumably, medical personnel whose patient did not personally sign the request would take more care than usual to ensure that the patient truly wishes MAD to be provided.

Unresolved matters

The Act requires the government to initiate an independent review to determine whether MAD should be available to mature minors, to persons utilizing a personal directive, or to individuals solely suffering from a mental illness. This review must begin within 180 days after the Act became law on 17 June 2016 and must be completed within two years [1 at s. 9.1].

Applicability to minors

Currently, the Act only applies to persons at least 18 years of age. This provision will need to be reconciled with the established mature minor doctrine. This doctrine allows minor children who have the intellectual capacity and maturity to understand information relating to their medical condition and to appreciate the consequences of accepting or refusing medical treatment to make decisions regarding their medical treatment. Some provinces have enacted statutes guaranteeing minors with this right, whereas courts in other provinces have granted mature minors this same legal right.

It is impossible to predict what the independent review committee will recommend regarding mature minors. Three previous advisory groups each recommended different actions: not allowing minors to be MAD eligible [11], favouring the law applying to all competent persons regardless of age [12], and offering a two-stage implementation with MAD being extended to competent minors within three years after adults receiving that right [13]. Each advisory group reached their recommendations after consulting with interested parties and considering the experiences in other countries, all of which the future review team will also likely consider.

It is probable, however, that a lawsuit will be commenced at some point if the government fails to extend the Act's application to mature minors. While it is true that the Supreme Court limited its discussion of MAD to adults in the *Carter* case, it did so deliberately. The Court made clear that it was limiting its discussion to the specific facts of the *Carter* case (i.e., adult parties) and refused to make any "pronouncement on the other situations where physician-assisted dying may be sought," suggesting that there may be other situations where it would be appropriate [5 at para 127]. Constitutional law expert Peter Hogg has, in fact, predicted that "[t]he Court would have no reason to object to the widening of the entitled class perhaps to include mature minors, who could thereby acquire a statutory, but not a constitutional, right to physician-assisted dying" [4].

Advanced requests

Provincial governments began enacting advanced personal directive legislation in the 1990s. Personal directives allow individuals to provide instructions regarding future medical treatments when they are no longer mentally competent to make those decisions. Currently, these laws do not allow personal directives to include assisted suicide or any other unlawful instructions. As MAD is now legal, personal directives should, in theory, be allowed to include provisions relating to MAD, but this is not without problems. One difficulty would be melding the personal directive and MAD safeguards in a workable manner. For example, assuming the personal directive replaces the written MAD request form, will medical personnel be required to confirm at the signing of the personal directive that the individual's request was voluntary and without undue influence?

Psychological disorders

While the Act refers to a serious and incurable illness, disease, or disability that causes the patient "enduring physical or psychological suffering that is intolerable to them," the word psychological refers to the suffering the patient is experiencing, not to the illness itself. The Act does not allow individuals solely suffering from a serious and incurable mental disorder to seek medical assisted death. The Justice Minister explained that extending the law to psychological illnesses was beyond the *Carter* decision and required deeper consideration to ensure that the right protections are in place for "the most vulnerable and stigmatized persons in our society" [14]. In fact, the application of MAD to patients suffering with psychological disorders has already been adjudicated by a Canadian court. In May 2016, the Alberta Court of Appeal in

Canada v EF concluded that the *Carter* decision did not preclude patients with psychological illnesses from seeing medically assisted death. The Court concluded the "issue of whether psychiatric conditions should be excluded from the declaration of invalidity was squarely before the [SCC in *Carter*] … [but] the court declined to make such an express exclusion" [5 at para 59]. The Alberta Court confirmed that the plaintiff who suffered from a psychological movement disorder was entitled to receive MAD. That decision was rendered before the legislation was passed, however, so the Court did not have to consider how the reasonable foreseeability of death requirement would impact the law's applicability to psychological illnesses.

The passage of the *Medical Assistance in Dying Act* occurred on the Supreme Court of Canada's timeframe and after a change in government, arguably resulting in a less considered and debated statute than a controversial subject such as MAD would normally warrant. Legislation is not set in stone, however, and changes to the MAD laws in the next few years are highly likely, either as a result of further governmental review or through court actions. In time, the law will become more defined and settled and, one hopes, less unsettling to the majority of Canadian citizens.

While this article focuses on the federal government's new statute, Canadian health librarians should remember that provincial governments are constitutionally responsible for the administration of health care in their jurisdictions. Provincial governments and national and regional medical professional associations have significant roles in developing MAD laws, policies, procedures, professional guidelines, code of ethics provisions, and advisory opinions, potentially resulting in a patchwork of MAD implementation schemes across the country. The combination of the volume of applicable resources and the wide variety of people who may seek assistance in retrieving information on their rights and (or) responsibilities (patients, physicians, nurse practitioners, hospital administrators, nurses, police officers, and family members among others) defines the complexity of the research assistance health librarians may need to provide their patrons. This complexity and the unsettled aspects of the law means staying current on law over the next few years will be quite challenging for Canadian health and law librarians—and for our researchers.

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PRODUCT REVIEW / CRITIQUE

Mendeley Data

Purpose: General-purpose research data repository.

URL: https://data.mendeley.com/.

Cost: Free.

Bottom line: Elsevier's Mendeley Data product is attractive, easy to use, and functional. Nevertheless, its relatively late entry onto the research data repository landscape means that it lags behind competitors in terms of number of datasets published, search functionality, sharing features, and citation features. Further integration with Elsevier's lab bench notebook HiveBench, as well as forthcoming integration with Elsevier's research profiling tool Pure, may increase the appeal of Mendeley Data for researchers seeking a seamless, unified workflow.

Product description

Online research data repositories provide services that allow researchers to manage, publish, share, and access research data. Data repositories are becoming increasingly important as funding agencies adopt policies and make statements that promote the stewardship and reuse of digital data. For example, the Canadian federal granting agencies (CIHR, NSERC, SSHRC) published a Statement of Principles on Digital Data Management in June 2016 [1].

There are a number of different types of research data repositories, including discipline-specific data repositories (e.g., GenBANK, UniProt), institutional data repositories (e.g., University of Alberta Libraries Dataverse Network), and general-purpose data repositories (e.g., Dryad). Each type of repository has benefits and drawbacks in relation to both sharing data and long-term data preservation [2]. Research data repositories can be operated by noncommercial organizations (e.g., Zenodo, a project of CERN and OpenAIRE) or be owned by commercial companies (e.g., FigShare, a product owned by Macmillan Publishers).

Mendeley Data, a product of Elsevier, is one of the newest entrants in the research data repository landscape; the platform was released in April 2016 [3]. Mendeley Data is a general-purpose repository, allowing researchers in any field to upload and publish research data. Mendeley Data also allows researchers to share unpublished data privately with research collaborators.

Features

Creation and description

Creating a dataset in Mendeley Data is a simple, user-friendly process. After registering for a Mendeley account, users can create new datasets. Individual data files can be added to the dataset via drag and drop or by selecting files from the user's computer (Figure 1).

Users are prompted to enter a title, add contributors, and assign subject categories for the dataset. Users can also include steps for reproducing the experiment and related links. A DataCite DOI is automatically reserved for each dataset. The DOI becomes active upon publication.

In addition, users are asked to choose a license for data reuse. "Learn More" links provide further information about each license; descriptions are concise but they are easy to understand (Figure 2).

Any file format can be uploaded. File sizes are limited to 10 GB per dataset. I uploaded several files to test upload speed and file size limits. Mendeley Data performed well when uploading individual files with sizes of up to 2 GB. Tests with larger individual file sizes (4 GB and 7 GB) were less successful, as uploads stalled or displayed messages noting that only 10 GB could be uploaded per dataset. These results may not be typical.

Published datasets can be edited. Edited datasets receive a new version number.

Discovery and sharing

At present, Mendeley Data datasets can only be viewed by using the browse feature. Published datasets are listed in reverse chronological order (Figure 3).

The Mendeley Data FAQ notes that keyword searching and subject browse features are in development [4].

Mendeley Data displays view and download statistics for each dataset.

Storage and preservation

Datasets are stored on Amazon S3 servers in Germany. Mendeley Data has partnered with Data Archiving and Networked Services (DANS) to provide long-term preservation and archiving of submitted datasets. DANS is an institute of the Royal Netherlands Academy of Arts and Sciences and the Netherlands Organisation for Scientific Research.

Comparison with similar products

When choosing a data repository, researchers should consider a variety of factors including funder requirements, journal publisher requirements, institutional requirements, and disciplinary norms. Type of repository is important, as are the features of specific research data repository services.

As a general-purpose, commercially owned repository, Figshare is an appropriate comparator for Mendeley Data. Figshare was launched in 2011, and thus has a significant lead over Mendeley Data in terms of numbers of datasets published. Assante et al [5] reported that 72,818 datasets were published through Figshare in 2015. Mendeley Data has published less than 250 datasets at the time of writing. Figshare also provides a number of features that are not yet available in Mendeley Data including a variety of search functions, ORCID integration, display of Altmetric badges and citation statistics, and options for bibliographic citation export.

Fig. 1. Mendeley Data file upload page.

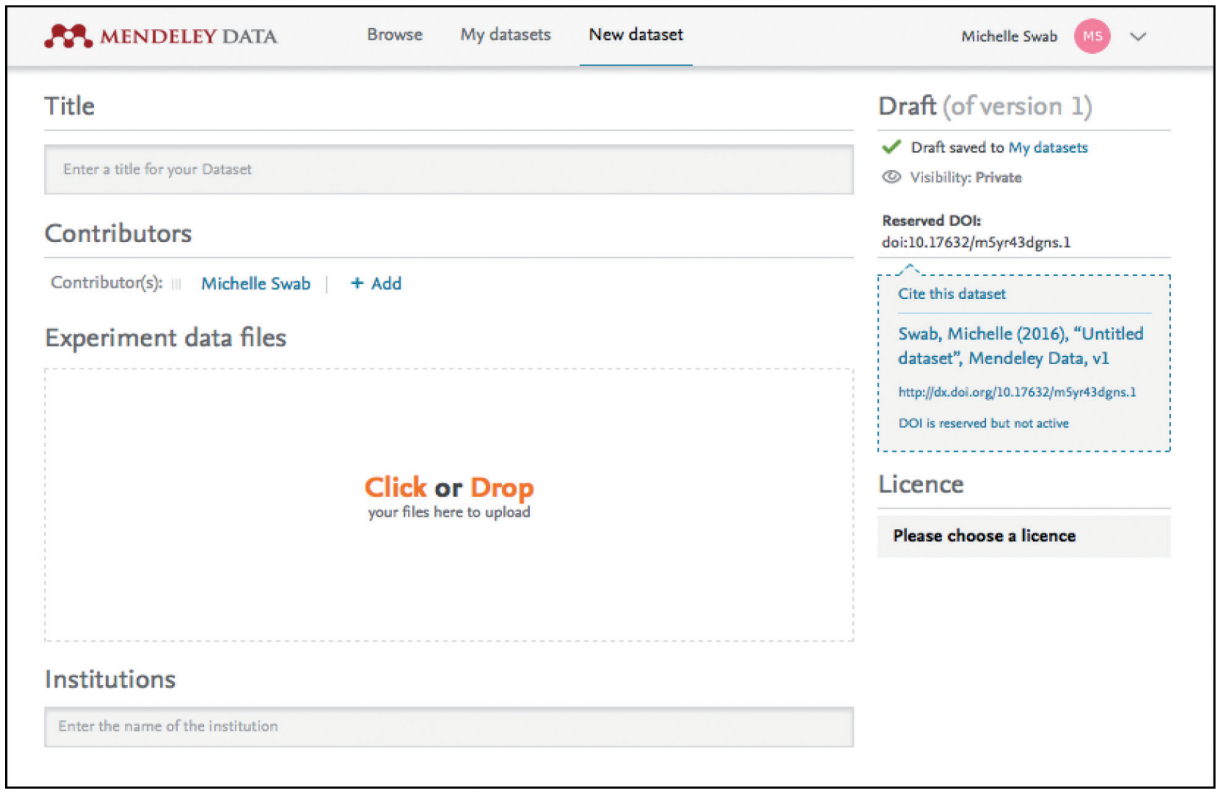
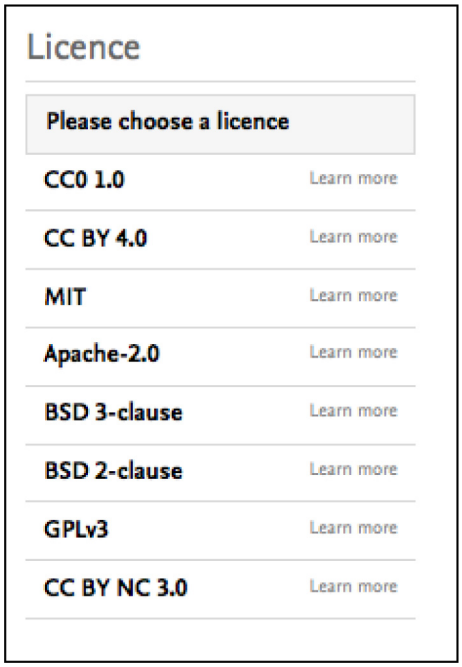


Fig. 2. A number of data reuse licenses are available.



Costs of the two products are comparable. Mendeley Data is currently free, although the Mendeley Data FAQ notes that a Freemium model may be implemented in the future [4]. Figshare accounts provide unlimited public sharing space and up to 20 GB of private space for free [6].

Elsevier acquired laboratory notebook tool HiveBench in July 2016. Future plans include further integration of Mendeley Data with HiveBench as well as the integration of Mendeley Data with Elsevier's research profiling tool Pure [7]. Integration with HiveBench and Pure may be appealing for researchers interested in a seamless, unified workflow. The acquisition and integration of these products also allows Elsevier to compete with the integrated research workflow currently offered by Macmillan. The 101 Innovations in Scholarly Communications website provides sample workflows in the Elsevier and Springer/Macmillan/NPG/Digital Science environments [8, 9].

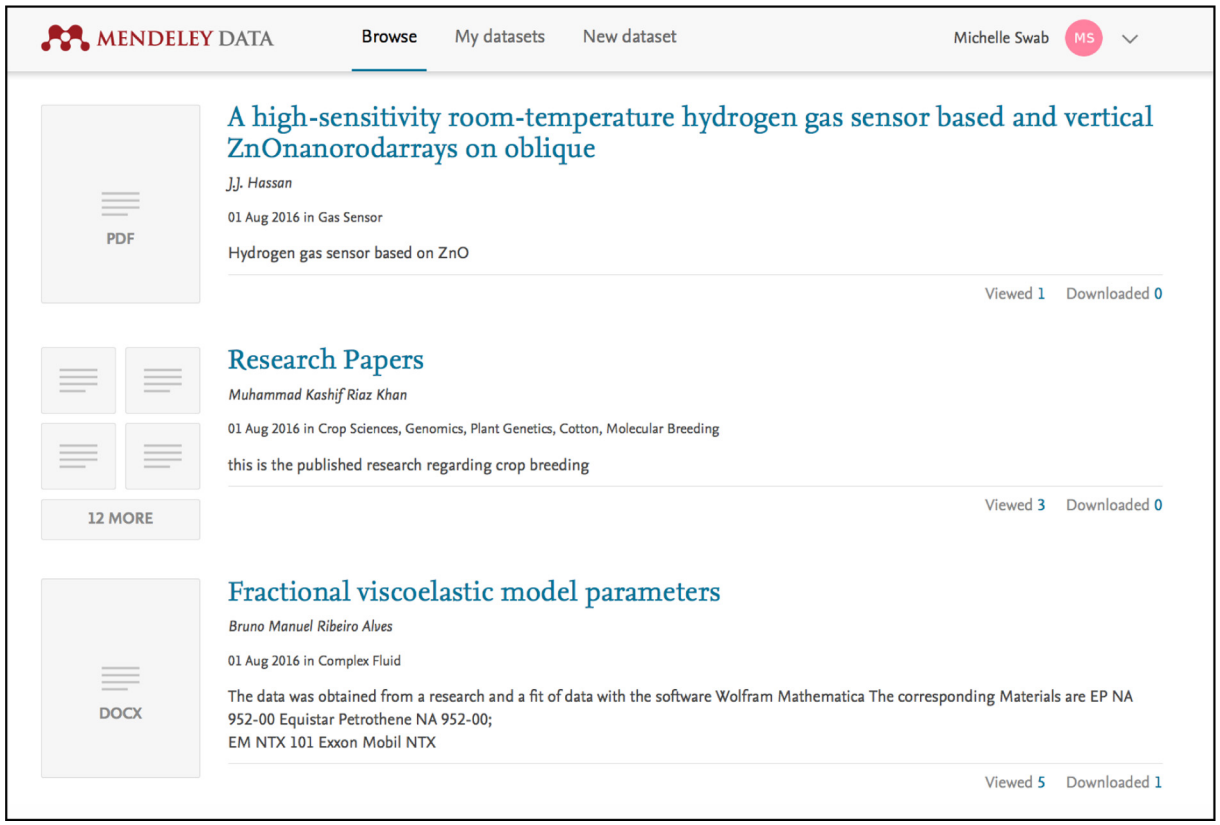
Strengths

- Clean, user-friendly interface
- Free, unlimited private and public storage space
- All file formats accepted

Weaknesses

- No searching options (browse only)
- Limited features in terms of sharing, bibliography citation export, and research metrics

Fig. 3. Datasets can only be viewed by using the browse feature.



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PRODUCT REVIEW / CRITIQUE

Covidence and Rayyan
Purpose: Systematic review software.
URLs: https://www.covidence.org/ and http://rayyan.qcri.org/.
Cost: Free.
Bottom line: Two new software products are making a splash in the world of systematic reviews, Covidence and Rayyan. Both have been developed from within the systematic review community, by and for users, on a not-for-profit basis. Rayyan is free for anyone, and Covidence is free for authors of Cochrane Reviews. Both are user-friendly and work well for title and abstract screening.

Purpose

The purpose of systematic review software is to facilitate the process of screening and data extraction from many studies according to prespecified criteria of the review. Where I work (McMaster University, Department of Anesthesia, Michael G. DeGroote Institute of Pain Research and Care, ICRP), large and complex systematic reviews are our major focus. We therefore rely on DistillerSR (Ottawa, Canada; http://systematic-review.net/), the excellent systematic review software developed by Evidence Partners. But I also run literature searches for other systematic reviews outside of the scope of the ICRP for various teams, and some review teams just don't have the funding to purchase licences for DistillerSR. In supporting these review teams, I have explored Covidence and Rayyan and found they both work beautifully to support the tasks associated with title and abstract screening and study selection. Covidence and Rayyan are user-friendly and a real improvement over other low-cost title and abstract screening approaches such as sorting references into groups in Endnote, entering codes in Reference Manager, making a table in a Word document, or printing them out and marking them in pen. If your team has a large set of records to screen for eligibility, then do yourselves a favour and learn to use Rayyan or Covidence.

Product description and cost

Rayyan is completely free and offers reviewers the capability to screen titles and abstracts offline using the mobile app, for even greater cost efficiency. Its unique machine-learning function lets Rayyan make suggestions for labels based on your pattern of selection, and it "learns" from your include/exclude decisions, giving a five-star rating to those articles you are most likely to include. This is a great way to offset the effects of reviewer fatigue, and the "similarity graph" visual display is just plain cool. Rayyan comes from Qatar Computing Research Institute, HBKU, a member of Qatar Foundation and is available at http://rayyan.qcri.org/.

Covidence has a free trial option (one review with two reviewers) and is free for use in Cochrane Reviews. In addition to support for title and abstract screening, it offers tools for quality assessment and data extraction that are optimized for Cochrane (or Cochrane-style) intervention reviews (wherein trial results of a specific treatment for a specific clinical condition are pooled). Covidence is produced in collaboration with the Cochrane Collaboration; Australia's Monash University, Alfred Hospital and, National ICT; England's University College; and Argentina's Instituto de Effectividad Clinica y Sanitaria. It is available at https://www.covidence.org/.

Intended audience

For this product review, I am focussing on individuals who would like to support the initial stages of a systematic review. The team librarian is typically involved in designing and running the literature search, but further delivering the search results in a format that facilitates title and abstract screening adds value and supports the review team, giving them more time to focus on data abstraction and analysis. If you are not familiar with the task of title and abstract screening for systematic reviews, a great way to learn more about it is on the Cochrane Crowd site, where anyone can screen records for inclusion in the Cochrane Library's Central database of Controlled Trials (http://crowd.cochrane.org/index.html). Both Covidence and Rayyan operate in a similar way to the Cochrane Crowd interface: a bibliographic record pops up on your screen with various keywords highlighted, you read the abstract of the record, then make a judgement about whether or not it meets your inclusion criteria. Click on the button that reflects your judgement (yes, no, or unsure) and move along to the next record. Because the interfaces for screening titles and abstracts are all so similar, if anyone on your team has ever screened abstracts for eligibility for a systematic review, chances are they will be able to figure out how to screen records in Covidence or Rayyan in about two minutes. If you are all newbies, take the time to review the introductory materials and plan for about 30 minutes to get the hang of it.

Platform, usability, and compatibility

JCHLA Product Review guidelines suggest that info on platform and usability be addressed for computer programs. Believe me, these tools are user-friendly. But if you need more detailed, specific technical information, some helpful resources to consult as you decide which software to use for your systematic review project are the Software for Systematic Reviewing page on the HLWiki (http://hlwiki.slais.ubc.ca/index.php/Systematic_reviewing_software) and the Sys-

tematic Review Toolbox (http://systematicreviewtools.com/). For compatibility, the key to success with all of these tools is that you need to map or parse the bibliographic information from the references into the correct fields in the database, and when your review team adds information to the references, you want to be able to export that information in a sensible and stable format. You might say that the entire purpose of Covidence, Rayyan, or systematic review software in general is to be more user-friendly than a basic spreadsheet, but the issues of compatibility are the same—your columns and rows need to line up.

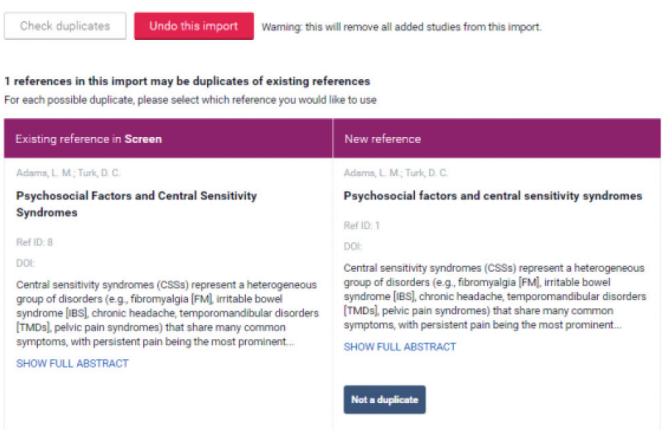
Special features, strengths, and weaknesses and comparison with other products

Jessica Babineau published a great review of how to use Covidence in JCHLA Vol. 35 No. 2 (https://ejournals.library.ualberta.ca/index.php/jchla/article/view/22892/17064) and while the basic how-to-do it steps are the same, there have been significant improvements to the interface since 2014, most significantly the excellent Knowledge Base of static help files available at http://support.covidence.org/help_center where they have short video clips showing how to do everything. I had never used Covidence, and in 2015 I had an urgent request from an international team with six reviewers. They were all up and running (screening articles for selection) on Covidence within a day. Other improvements to the Covidence interface include:

- identification of duplicate references (Figure 1),
- option to display reference numbers,
- option to enter inclusion and exclusion criteria text on the screening form, and
- ability to export PRISMA flow-chart data

When you import references into Covidence, you can choose which level of the review to import them to (i.e., screen, full-text review, included, excluded, or irrelevant), and reports can also be exported from every level as a text or .csv file. With these reports you can keep records of the screening process, saving reports at each step of the consensus project when work is performed in duplicate (this is important if you want to calculate agreement with, for example, the kappa statistic). The only feature still on the wish list at Covidence is the capacity to bulk import PDFs (coming soon!).

Fig. 1. Screen shot showing duplicate identification in Covidence.



An interesting thing about Covidence that you should keep in mind is that it randomly "serves up" articles to be reviewed, rather than assigning sets of articles to each reviewer. As long as you are not used to assigning sets of articles to reviewers, this isn't a problem. It prevents the "clumping" of articles within sets, e.g., by the lead author's surname. On the other hand, if you are used to assigning a set of references to each reviewer, you will need to communicate with your team about the Covidence approach, otherwise you might find one eager beaver screening more references than you expected! Another thing that caused us a moment of dismay in Covidence was that we lost the Record Numbers when we exported our records using the Endnote format. A work-around for this was to export into .csv format instead.

Covidence has a mobile app, but you have to be online or at least using your mobile phone to use it, and this is where Rayyan really offers the "killer app" that will make it the software of choice for many review teams. With Rayyan, you can screen offline and then synchronize your work with the server the next time you login. I really like this feature, because screening titles and abstracts is a relaxing task ideally suited to such internet-free occasions as plane trips or on the bus. I ran a test review on Rayyan with two reviewers, and they both found it easy to use. One was a total newbie and he figured it out in no time, and the other was an experienced reviewer who noted that there is a handy Review chat function (Figure 2) which is a great place to record your inclusion criteria and make comments about the review.

When you upload or import your references to Rayyan, they first appear in an "undecided" folder. As reviewers make their decisions, the references move to included, excluded, or conflict folders. By exporting the articles from each of these folders as the review progresses, it is possible to keep track of consensus agreement and generate the values to calculate your kappa, if required. From the Rayyan Review Workbench, with the Blind ON, each reviewer proceeds independently. If you turn the Blind to OFF, each reviewer's includes (green) or excludes (red) are seen (Figure 3).

Records in Rayyan are assigned a seven-digit system identification number upon import. I'm not sure what happens to the record numbers for records exported from Endnote or other bibliographic software (they seem to disappear, but perhaps asking for this field to be displayed is already on the "Help us decide what to add next" list). Tech support at Rayyan is very helpful and responsive. For my test review in Rayyan, my reviewers did not screen enough records to trigger the machine-learning five-star rating process. You need at least 50 records with $\geq$10% included for this feature, which is a very helpful tool for reviews that have thousands of records. For example, if after you finish your screening, you find that certain five-star records should happen to be excluded, it will be easy to take a second look at them and verify whether or not they belong in the trash. Maybe someone was asleep at the switch, or maybe it is a false positive. For example an American College of Physicians Journal Club evidence summary of a randomized controlled trial (RCT) or an editorial about an RCT might rank high in similarity if the topic of RCT meets

Fig. 2. Rayyan Review Chat screenshot showing reviewer feedback.

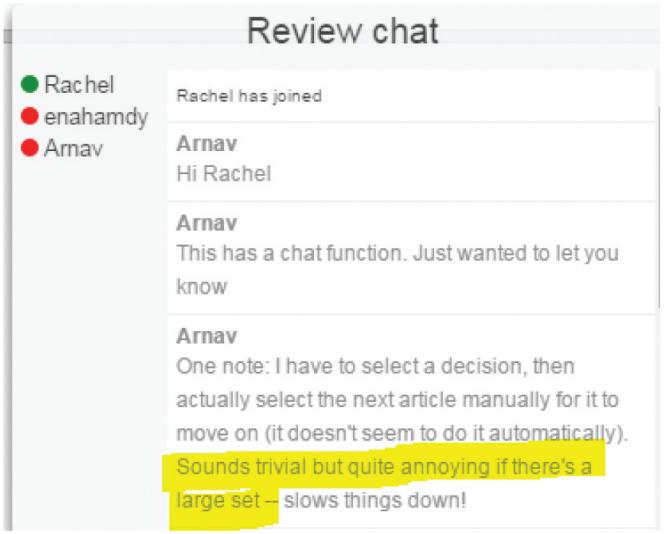
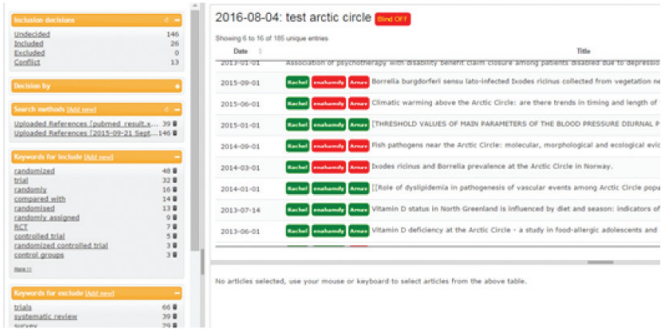


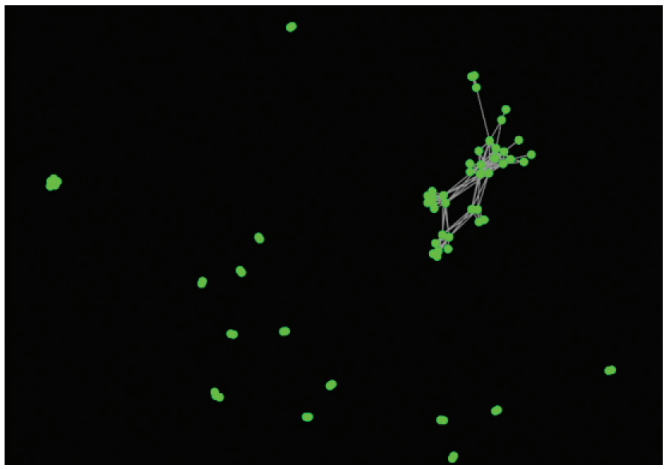
Fig. 3. Rayyan Review Workbench screenshot.



inclusion criteria, but it may be excluded from a systematic review. On the other hand a five-star RCT on your topic should be included. I explored the Similarity Graph, a unique Rayyan feature related to the five-star ranking algorithm, and think this picture of a set of references is lovely (Figure 4). Khabsa et al. [1] described what the Similarity Graph represents.

Once the studies have been selected the real work of the review begins: data extraction and analysis. At the MLA–CHLA conference I took the opportunity to converse with the Covidence representative on the topic of data

Fig. 4. Screenshot of Rayyan similarity graph.



extraction, and she used a bicycle metaphor to illustrate the trade-off that exists in software design, between simplicity or ease of use and the complexity to robustly manage complicated, customized queries. For data extraction, Covidence is like one of those bicycle-share vehicles found in cities, convenient and sturdy (useful for intervention reviews, with middle-of-the road outcomes.) However, it will not get you to the velodrome like a racing bike or up the Niagara escarpment like a mountain bike (complex or unusual data extraction with various or unusual outcomes.) Although they can't compete with DistillerSR for data extraction, for the tasks of managing citations for title and abstract screening and study selection, Rayyan and Covidence can be a great help and leave your team with greater energy to devote to the tasks that follow.

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Reference

1. Khabsa M, Elmagarmid AK, Ilyas IF, Hammady H, Ouzzani M. Learning to identify relevant studies for systematic reviews using random forest and external information. *Mach Learn*. 2016;102(3):465–482. doi:10.1007/s10994-015-5535-7

BOOK REVIEW / CRITIQUE DE LIVRE

Marketing for special and academic libraries: A planning and best practices sourcebook. Valarie S. Gordon and Patricia C. Higginbottom. Lanham, MD: Rowman and Littlefield; 2016. Softcover: 157p. ISBN 978-1-4422-6270-6. Price: USD$38.00, Hardcover: $75.00. Available from: https://rowman.com.

My first job out of college was in the marketing department at a large financial services company. It was thankless work, but what kept me there for five years was a keen interest in marketing strategies. Then I went to library school, but my interest in marketing never waned. It was my hope that reading this book and reviewing it might inspire other librarians to explore potential marketing initiatives and engage in new projects. *Marketing for Special and Academic Libraries: A Planning and Best Practices Sourcebook* is a must-have resource for any library (not just special and (or) academic libraries).

The authors of this book, Valerie S. Gordon and Patricia C. Higginbottom, write from extensive experience as academic librarians. They assert their intent for this book is to "help librarians narrow the gap between what users think librarians can do and what we have to offer" (p. xv). The book is divided into 10 chapters and includes tables, figures, and case studies. The case studies are particularly useful because they give first-hand accounts of the material that was covered in the chapter. For example, the first chapter is entitled "Strategic Planning" and it explores why strategic planning matters and how to create a strategic plan. So, the case study describes the activities of one institution's strategic planning process and how they used their strategic plan in the years since they developed it. This chapter structure illustrates for the reader how one can put the concepts into action.

The next chapter covers the marketing plan and directs the reader through common barriers to creating and following through on a marketing plan. Then it gives the reader tips on overcoming each barrier. For example, one barrier is "no skills" and it offers three concrete action steps to overcome the barrier of lack of skills:

1. Learn: See if there are classes on tools like Photoshop available through your organization or online via a massive open online course such as Coursera. Or look for something simpler such as Canva.
2. Practice: Try using a personal account first in a social media tool to become comfortable before you start using it for your library.
3. Borrow. Look at what others are doing, both those you admire and those you don't want to emulate. Find something you like and see if you can use the same general style or tone.

This approach to tackling issues that pop-up during the planning process is neither expensive nor complicated. The authors offer tangible advice stemming from their expertise and real-life examples. They are positive and encouraging in their tone and writing style. One example of this approach is in the same section on lack of skills where they pose the question, "What if you don't know how to do all of the things required to market your library?" and their answer is useful if not a little tongue-in-cheek, "Reading this book is a good start! Learn as you go, as we did."

Another highlight of this book is the list of references at the end of each chapter. I taught the students in my research strategies class that looking to the list of references of useful articles is a great way to find additional useful resources and to gain deeper knowledge on the topic you are researching. Aside from the case studies at the end of each chapter, the authors also provide the reader with real world examples of existing marketing activities. They lend examples of various marketing plan components which is useful in helping the reader get started on their own marketing plan by using the examples provided. This leg-up helps the reader not get overwhelmed by the amount of work that is associated with creating, implementing, and evaluating marketing plans, brand campaigns, digital publications, social media posts, events, and marketing materials.

To say I was simply inspired by this book is an understatement. A more accurate expression of my reaction to this book was energized. Some of the fun ideas presented were having an afternoon tea, hosting author events, and drawings for prizes such as a chalkboard mug. I also was impressed by how they explain how to develop a social media marketing strategy. This was particularly interesting to me because I have been struggling with the necessity of a social media presence for my library. I've often wondered why libraries should have Twitter accounts because I have not been impressed by the majority of library Twitter feeds I've seen. This book discusses making the best use of Twitter. It explores how Twitter can often work better than Facebook in terms of providing visibility and engaging users through Twitter chats, which they explain as "scheduled conversations on a specific topic usually run by a host and one or more special guests" (p. 93).

This book was written for varying levels of experience with marketing libraries. They assert that "Library marketing is outreach. It is making people aware of what we can do for them, in a language they can understand" (p. 15). I think this book uses this principle by making the concepts easy to understand and by giving step-by-step instructions and advice backed-up by real-life examples. I would highly recommend this book to anyone interested in having their library's message delivered to its core audience by building the library's brand. The authors assert, "Although the library as place still remains relevant for some users and libraries, many organizations are shifting their focus from what the library has within its four walls to what the library and library professionals can provide" (p. 50). The focus of

the brand becomes personal, they state that "a successful brand creates an emotional connection between users and services" (p. 50). Libraries need to evolve into a place that not only disseminates ideas but also a place that awakens the creative sides of its staff and its patrons. We can endear ourselves to our users by being places where unique inspirations are powered by shared ideas. Historically information distribution has been our signature dish, but it is my belief that by adding creative new side dishes we may revive our dulled palates.

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