

RESEARCH ARTICLE / ARTICLE DE RECHERCHE

Emerging Data Management Roles for Health Librarians in Electronic Medical Records¹

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Abstract: Objective: To examine current and developing data management roles and opportunities for health librarians to become involved in electronic medical record (EMR) initiatives. This paper focuses on the Canadian context but has implications farther afield. **Methods:** To accomplish a state-of-the-art review, searches were conducted in the library and information science databases (LISTA, LISA), biomedical databases (MEDLINE, CINAHL, EMBASE), and on the web for grey literature. Keywords included: clinical librarian, health science librarian, medical librarian, hospital librarian, medical informationist, electronic medical record, EMR, electronic health record, EHR, data management, data curation, health informatics, e-science, and e-science librarianship. MeSH subject headings used were: Medical Records Systems, Computerized/, Electronic Health Records/, and libraries/. **Results:** There is little evidence of Canadian health librarians' current involvement in EMR initiatives, but examples from the United States indicate that health librarians' participation is primarily in system implementation, creating links to the medical literature, and using EMRs to provide patient health information. Further roles for health librarians are emerging in this area as health librarians draw on their core competencies and learn from e-science librarianship to create new opportunities. Data management examples from e-science librarianship, such as building data dictionaries and data management plans and infrastructure, give further direction to health librarians' involvement in EMRs. **Conclusion:** As EMRs gradually become more popular in Canada, Canadian health librarians should seek further opportunities for education and outreach to become more involved with these EMR initiatives.

Introduction

Before we delve into the current state of electronic medical record (EMR) initiatives in Canada and potential data management roles for health librarians, it is important to define the terms. EMR and electronic health record (EHR) are often used interchangeably, but incorrectly so. An EHR is a patient's digital medical record "that is shared through a network that can link information from different locations" [1]. An EMR, however, is an electronic and local record for use within only a specific, local health care centre that enables access to a patient's information online [1]. EHRs in Canada are currently being implemented at both the national and provincial level. The process of establishing provincewide and nationwide EHRs, however, is often costly; the British Columbia Office of the Auditor General estimated that by 31 March 2013 the cost of implementing EHR systems in British Columbia had reached \$222 million [2].

In Canada, EMRs are increasingly being implemented at the practice, hospital, or health region level. They are used more frequently by general practitioners rather than by specialists [1, 3]; in 2010, 16% of physicians in Canada

said they exclusively use EMRs in their work compared with 10% in 2007 [4]. The rising popularity of EMRs in Canada indicates that physicians find EMRs useful in the management of their practices, but they also find these records to be beneficial to their patients [5]. However, use of EMRs varies between provinces; 28% of physicians in Alberta exclusively use EMRs, whereas only 19% do in British Columbia [6]. Canada also lags behind EMR use in other countries: 23% of primary care physicians in Canada use EMRs as opposed to 28% in the United States; an overwhelming 89% of primary care physicians in the United Kingdom use EMRs.

Nonetheless, the use of EMRs is becoming more frequent in Canada, and consequently new initiatives have emerged to use the data from the EMRs for research purposes. Much of the literature concerned with EMRs discusses their benefits in relation to assisting physicians at the point of care, but EMRs have direct value in clinical research as well. The Canadian Institute of Health Information [6] observes that health data, which can be mined from sources such as EMRs, can improve front-line care and provide support to research for clinical programs and public health initiatives [6]. Essentially, EMRs are

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¹This article was the recipient of the 2013 Login Canada Student Paper Prize. This article has been peer reviewed.

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relatively untapped sources of large amounts of valuable data after patients' identifying personal information is removed.

The work of the Physicians Data Collaborative (PDC) in British Columbia is a good example of the potential of EMR initiatives. As an opt-in, nonprofit organization for physicians in British Columbia, it currently represents nearly 3,000 physicians in the province [7]. The PDC uses a distributed data network to collect data such as demographics, medications, and lab results that do not remain linked to patients; eventually, this data will support both evidence-based clinical research and local health care initiatives [7]. Although the PDC is focused on collecting, managing, and synthesizing data from EMRs, there are no health librarians involved.

This paucity of health librarians in EMR initiatives is reflected more broadly in the literature. In their 2011 article on EHRs and librarians, Barron and Manhas [8] observed that there is a lack of research about the role of health librarians in relation to EHR initiatives, and within this research there is "nothing specifically about Canadian health librarians". Our research indicated the same results in 2013. However, Barron and Manhas [8] suggested that Canadian health librarians already possess, or may develop, the skills required to be involved in EHR implementation. Further, their observations apply to Canadian health librarians working with EMRs. This paper expands on Barron and Manhas' research by considering emerging data management roles for health librarians in EMRs and related initiatives and examining how the necessary competencies for such work may be achieved.

Methods

We conducted a "state-of-the-art" review, which is defined by Booth [9] as a review that "tends to address more current matters in contrast to other combined retrospective and current approaches. Typically narrative, it may offer new perspectives on issues or point out areas for further research". We reviewed the existing information science literature with a focus on health librarianship and e-science librarianship data management practices to demonstrate additional areas of professional development for health librarians. To support our state-of-the-art review on information about EMRs in Canada, health librarian participation in EMR projects, and e-science librarianship, we conducted searches in two of the library and information science databases (LISTA, LISA), three biomedical databases (MEDLINE, CINAHL, EMBASE), and various sources of web-based grey literature (blogs, Canadian government web sites). We searched using a combination of keywords and subject headings. Our keywords included: clinical librarian, health science librarian, medical librarian, hospital librarian, medical informationist, electronic medical record, EMR, electronic health record, EHR, data management, data curation, health informatics, e-science, and e-science librarianship. The medical subject headings (MeSH) used were: Medical Records Systems/, Computerized/, Electronic Health Records/, and libraries/. These were used in combination with the keywords listed above

in MEDLINE. The trends and skills identified in these articles informed our discussions and recommendations.

Results

The literature search indicated that few Canadian health librarians have participated in EMR initiatives. This is likely because the use of EMRs has only grown in popularity in recent years. However, the literature indicated that health librarians have been involved in several EMR projects in the United States, although there was a lack of literature about similar initiatives in other locations that use EMRs, such as the United Kingdom. Health librarians' work with EMRs in the United States is primarily through participation in system implementation, creating links to the medical literature, and using EMRs to provide patient health information. Although there are differences in our medical systems, Canadian health librarians may be able to look to the United States for examples of health librarians' involvement in EMR initiatives.

Many hospitals and healthcare centres in the United States have relied on librarians' database expertise when choosing and implementing EMR systems. Librarians are uniquely qualified to lead in this area, by "encouraging adoption and lending expertise in the selection, evaluation, application, and use of these systems" [10]. Librarians can help to ensure that a new EMR system will be compatible with the health care centre's library system, which is essential if a library's resources are to be linked to EMRs [11].

Examples from the literature indicate that after a health care centre selects an EMR system, many libraries have then worked to create links within the EMR to specific databases or a library web site. The forms of these linked resources can differ from system to system. Some librarians, such as those at the University of Washington Medical Centre, have added direct links to point-of-care tools (in this case, UpToDate) [12]. Health librarians at the University of Pittsburgh took a different approach and embedded a search box within the EMR to link to library resources and to search for information on diagnosis, disease, drugs, and evidence-based medicine [8]. Other organizations, including Louisiana State University Health Centre, implemented an "Ask a librarian" link, which allows health care workers to seek answers to clinical questions from within the EMR [8].

Health librarians have also been involved with EMRs in patient care. Many EMR systems have a patient interface that librarians can use to share consumer health information [11]. In this way, librarians use EMRs to "[provide] customized groups of relevant and trusted healthcare resources and web sites" [11]. Although this is still in the early stages of development, it already allows health librarians at Vanderbilt University's Eskin Biomedical Library to explore new ways of sharing health information. Health librarians there have created a patient portal with links to authoritative resources for different health topics, and they have integrated consumer health information into lab results and immunization records, making it possible to click on a lab test to learn more about the test or interpret results [13].

Librarians in the United States are currently working with many different aspects of EMRs, and Canadian health librarians should consider recent progress with the implementation of EMRs and related initiatives across Canada as a chance to assume these roles as well. There are, however, also opportunities for health librarians to move beyond their current roles to more fully engage with EMR research and researchers.

Emerging roles for health librarians

The literature indicates that health librarians in the United States have been successful in collaborating with faculty, clinicians, and hospital departments to increase the efficacy and educational opportunities of EMRs [14, 15] and in supporting patient care with additional information tools [16, 17]. Beyond these early successful EMR collaborations, data management is an emerging area of EMR initiatives in which health librarians can become involved. EMRs produce a great amount of patient data that creates opportunities for librarians to be involved in “curat[ing] and provid[ing] access to [this] data in new ways that support the clinical enterprise” [18]. Data management librarians help researchers to understand the broad life cycle of data from inception to management, curation, preservation, and sharing [19]. Understanding the lifecycle of data and a librarian’s potential role in that lifecycle is essential to current and future EMR data initiatives due to the challenges of having large amounts of data that now need to be managed [20]. Martin [20] argues that health science librarians, with the right education and skill development, can support scientists and researchers in this area. The following paragraphs discuss potential ways in which health librarians can adapt their current expertise and acquire new skills and education to support data management in EMR initiatives.

The field of e-science demonstrates how librarians can successfully partner with scientists in research and offers suggestions for how health librarians may create further opportunities for collaboration with EMR initiatives. E-science is defined as the “application of computer technology to the undertaking of modern scientific investigation, including the preparation, experimentation, data collection, results dissemination, and long-term storage and accessibility of all materials generated through the scientific process” [21]. Data management in e-science is similar in some ways to EMR data management. Reznik-Zellen et al. [22] identified three tiers of data support services that librarians can offer researchers in e-science: education, consultation, and infrastructure. Education refers to the need to teach researchers about data management best practices, often by offering training and in-house expertise for minimal expenditure. Consultation involves the librarian consulting directly with researchers to develop data management/metadata plans and “provisions for data access and sharing, data publication and citation, and data archiving and preservation” [22]. Infrastructure may also come under the purview of the librarian. Librarians, depending on their institutional context, may be able to provide the technical infrastructure that supports data management and curation on the back end [22]. These

support services are similar to many of those that health librarians currently offer at many institutions regardless of size and mandate. They educate their community on information resources, consult on systematic searches and other literature reviews, and often support infrastructure for the provision of information resources. Before some of the more technical data management services can be applied health librarians must have the aptitudes and expertise to educate, consult, and (if possible) provide infrastructure for data management.

Data management may seem daunting but, as e-science librarians have discovered, it is similar to what librarians do in other ways including “organizing information, applying metadata standards, and providing access to information [and] developing data management plans” [23]. Health librarians can build on these skills to engage in EMR research. One example of a health librarian involved in data management and research is American informationist Sally Gore. Gore spends one quarter of her time at the University of Massachusetts Medical School working to improve communication between research team members by developing a “common, precise language in developing and interpreting requests for data analyses” [24]. Her duties include translating informatics or computer science literature to help the team with any technology issues that arise, leading systematic reviews, and increasing the team’s information literacy [24].

With respect to data, Gore has developed “a comprehensive data dictionary” and a “standardized data request form” to assist researchers [24]. Several researchers have identified data dictionaries or thesauri as important contributions in data management projects [25]. Librarians can also liaise with software developers to ensure “meta-data interoperability, authority control, and consistent use of controlled vocabularies” between library and EMR systems [26]. In EMR initiatives such as the PDC in British Columbia, doctors receive requests for data from other physicians across the province. Canadian health librarians can be involved in these initiatives by working to streamline requests through creation of a data dictionary and standardized request forms. To become involved in such initiatives will require outreach, advocacy, and collaboration. It will also require health librarians to be advocates of their existing skill sets and to continue to learn.

Health librarians must therefore continue to develop their core competencies to support researchers and EMR initiatives and to become involved in data management. Creamer et al. [27] surveyed general science librarians and found that the technical aptitude and skills to manage and curate data are lacking. Health librarians must further develop their understanding of all areas related to data management [27]. This can be done as a program of professional development informally in the librarians’ home library, if possible, or formally through courses. There are professional bodies that offer courses to engage librarians in building these technical competencies, including the Canadian Association of Research Libraries’ data management services course and the Medical Libraries Association data curation seminars [28, 29]. There are several online educational opportunities, some free, for librarians wishing to increase their data management

expertise. They include: DataOne educational modules [30], the New England Collaborative Data Management Curriculum [31], and MANTRA's Data Management Training Course and Librarian Tool Kit [32]. Librarians interested in this type of work are encouraged to seek further learning opportunities in these areas. In addition, Canadian professional organizations should also consider expanding their professional development opportunities to include data camps, webinars, conferences, and other avenues for health librarians to develop skills to manage data for researchers, and better prepare health librarians for new roles related to EMR initiatives and data.

Conclusion

New EMR initiatives in Canada could benefit from the knowledge and expertise of health librarians. This has been proven in the United States, where health librarians are participating in developing EMR initiatives and in the integration of library resources and databases into EMRs to support point-of-care decision making.

To become involved in EMR projects, health librarians must develop their core competencies and informatics and data management skills to be partners with clinical researchers. In particular, health librarians can learn from e-science librarianship about curating, managing, aggregating, and disseminating data (with the appropriate information security) in research. In consideration of the current roles of librarians in EMRs and the emerging roles and practices identified by e-science librarianship, we urge librarians to consider how they can contribute to EMR initiatives across Canada. At the same time, we acknowledge the need for more opportunities for professional development, education, and outreach in these areas to prepare health librarians for these new and developing roles.

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