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The Current State of Electronic Consultation and Electronic Referral Systems in Canada: an Environmental Scan

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Abstract. Access to specialist care is a point of concern for patients, primary care providers, and specialists in Canada. Innovative e-health platforms such as electronic consultation (eConsultation) and referral (eReferral) can improve access to specialist care. These systems allow physicians to communicate asynchronously and could reduce the number of unnecessary referrals that clog wait lists, provide a record of the patient's journey through the referral system, and lead to more efficient visits. Little is known about the current state of eConsultation and eReferral in Canada. The purpose of this work was to identify current systems and gain insight into the design and implementation process of existing systems. An environmental scan approach was used, consisting of a systematic and grey literature review, and targeted semi-structured key informant interviews. Only three eConsultation/eReferral systems are currently in operation in Canada. Four themes emerged from the interviews: eReferral is an end goal for those provinces without an active eReferral system, re-organization of the referral process is a necessity prior to automation, engaging the end-user is essential, and technological incompatibilities are major impediments to progress. Despite the acknowledged need to improve the referral system and increase government spending on health information technology, eConsultation and eReferral systems remain scarce as Canada lags behind the rest of the developed world.

Keywords. Specialist care, electronic consultation, e-health, electronic referral, primary care, eConsult, wait times

Introduction

Accessing specialist care is a major challenge for Canadians. Patients report excessive wait times [1,2], uncoordinated care, and duplicate testing [3]. Both primary care providers (PCPs) and specialists report dissatisfaction with the referral process [4]. These issues can result in significant breakdowns in continuity of care, inappropriate treatment, and potential harm to the patient [5].

There is an opportunity to improve access to specialist care through the use of innovative e-health platforms such as electronic consultation (eConsult) and electronic

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referral (eReferral). Electronic consultation links the PCP and the specialist electronically, enabling specialists to offer advice directly, often without the need for a face-to–face visit [6-8]. Electronic referral refers to automation of the referral process, including scheduling, and may or may not have eConsultation capabilities. Many electronic systems are being implemented around the world [9,10], most of which are specific to one specialty or expansions of shared electronic health records (EHR). For example, eReferral has been implemented as an extension of shared EHRs within the San Francisco General Hospital network [11]. This web-based system integrates directly into the hospital's EHR to populate referral forms, allowing specialists to review the referral request and determine appropriateness and urgency for scheduling, communicate directly with the referring PCP, and—if possible—answer the referral question without a face-to-face visit. The system has been shown to reduce no-shows, increase referrals per day, and contribute to significant cost savings [12-14].

In Canada, while there has been increasing adoption of electronic medical records (EMR) within primary care [15,16], the use of technology within the specialist community is limited, with only 21.5% of GPs and 10.1% of specialists using EMRs exclusively in 2010. The consultation and referral process still relies on faxing requests and telephone scheduling [17]. A recent report by the Canadian Medical Association suggests that "there has up until now been very little coordination on this front between various stakeholders which more often than not can lead to duplication of efforts" [18].

As part of a broader program aimed at building access to specialist care in Ontario [7], the purpose of this study was to identify other eConsultation and eReferral systems in Canada. It was initiated as a systematic review of the literature; however, the lack of published Canadian data led to the employment of an environmental scan methodology which included an online search for grey literature and key informant interviews [19-21]. This first national overview of asynchronous eConsultation and eReferral systems provides an in-depth perspective of the development and adoption challenges for eConsultation and eReferral systems within Canada.

1. Methods

1.1. Systematic Literature Review

We searched Medline and EMBASE on January 29th, 2013 using combinations and variants of keyword terms to identify eConsultation and eReferral systems in Canada. Selection criteria required the system to be asynchronous and to connect primary care and specialty physicians through electronic means. The focus on asynchronous communication systems between physicians excluded real-time telemedicine systems. A grey literature search was performed on February 4th, 2013 using the Google search engine. Websites belonging to Provincial Ministries of Health, health quality organizations, and national professional organizations were searched using their embedded search engines with the previously described search terms, or parts thereof. The search was repeated by a second reviewer to ensure thoroughness of results and reproducibility of the search strategy.

1.2. Key Informant Interviews

A list of potential interview candidates was generated from the results of the literature review and online scan. The participants were stratified based on location and system type (maximum variation sampling) [22]. These candidates were invited to participate in semi-structured telephone interviews conducted between April 16th and 23rd, 2013. Verbal consent was provided by the interviewees at the time of the interview. The interview guide was developed by adapting the RE-AIM framework [23] and the questions were structured to obtain a better understanding of the system in question as well as the process of designing, implementing, and maintaining it. Interviews were recorded and transcribed. Copies of the interview transcripts were sent to each interviewee for approval to increase the trustworthiness of the results. Thematic synthesis analysis was performed [24]. Three members of the research team (MH, VB, CL) independently reviewed and coded the interviews. Codes were discussed and developed into descriptive themes and subsequently into analytical themes. Descriptive saturation was deemed to be achieved by the reviewers when no new descriptive codes, categories, or themes were emerging from the data [25]. At this time it was determined that no additional interviews were required. Ethics approval was obtained for this study from the Ottawa Hospital Research Ethics Board and Bruyère Research Institute.

2. Results

Three asynchronous electronic systems to facilitate consultations/referrals in Canada were identified in the environmental scan: the Bridging General and Specialist Care (BGSC) eReferral system in Manitoba, the Ambulatory Referral Management (ARM) system in Toronto, and the Champlain BASE (Building Access to Specialist through eConsultation) system in Eastern Ontario (Table 1).

The Manitoba eReferral system (BGSC) streamlines the consultation and referral process by ensuring properly directed referrals and creating an auditable electronic trail. Through 2010, 22% of the 1000 referrals submitted through BGSC were recognized as inappropriate on submission, with 60% of those being properly re-directed and 40% returned to the practitioner for resubmission [26]. Family physicians and specialists rated the referral process more favorably when referrals were made electronically [26]. BGSC is now in the process of re-launching within Manitoba eHealth.

The eReferral system (ARM) was initially deployed locally by The Hospital for Sick Children in Toronto. In 2012 it was integrated into the Electronic Child Health Network (eCHN), a provincially-accessible pediatric patient information portal. ARM has improved the quality of referral information submitted and decreased the number of incomplete/ rejected referrals, improved efficiency and workflow at both ends of the referral submission process, and provided a mechanism for capturing wait time information [27].

The Champlain BASE system allows a PCP to submit a patient-specific clinical question to a specialist. The PCP can attach relevant electronic files (e.g. lab results, images, information generated from EMRs). If a direct answer cannot be provided, the specialist can request more information or suggest a face-to-face referral [28]. In 43% of cases, a face-to-face specialist visit was originally planned but avoided as a result of the system [28]. User satisfaction is high with satisfaction ratings of 4.63/5.

Table 1. Asynchronous electronic systems to facilitate consultations/referrals in Canada

Name	Year	System Type	Number of PCPs	Number of Specialists	Number of Referrals/ Consults Processed
BGSC	2008	Web-based	177	55 specialists	1906 referral requests
BGSC (re-launch)	2014	Web-based	20	39 specialists	140 referrals
ARM	2006	Fax-based	5000	54 specialty clinics	67000 referrals
BASE	2010	Web-based	200+	26 specialty services	843 eConsults

In the other provinces there is much activity focused on improving referral with the intent to implement full eReferral systems (Table 2). For example, the Alberta (AB) Closed Loop Referral system (launched in 2014) will facilitate the electronic submission of referrals to multiple specialty services and maintain an electronic log of patients' progress through, and status within, the referral process. Pooled referrals with central intake processes and electronic specialist physician databases are also being widely implemented.

The goal of central intake systems employed in British Columbia (BC), Saskatchewan (SK), and Newfoundland (NL) is to diffuse the patient demand for specialty service across the entire load of specialist providers, as opposed to allowing wait lists to grow with certain specialist providers but not others. In most systems, PCPs (in consultation with patients) may forgo the next available specialist if they prefer a specific physician.

The goal of specialist directories such as the system in place in Nova Scotia (NS) is to provide a guide that will help physicians connect their patients to the most appropriate specialist and reduce misdirected referrals [29]. This may reduce the time patients spend seeking specialist care and reduce some of the burden on specialists' wait lists.

Table 2. Referral improvement initiatives

Prov	System Name	System Type	Specialty Services	Number of users	Impact/Results
BC	OASIS: Osteoarthritis Service Integration System	Fax-based Central Intake/Triage	Orthopedic Surgery	1200 PCPs have access; Over 26000 "client encounters" (2011)	Improved access to services and access to first available specialist, improved use of system resources
AB	AHS Closed Loop Referral*	Fax-based Central Intake/Triage	Multiple	TBD	TBD
SK	Pooled Referral Project	Fax-based Central Intake/Triage	Surgery (7)[1]	70 surgeons participating	19 - 20,000 referrals/year go through central intake
NB	Provincial Surgical Access Registry	Real Time Information Management	Surgery (12)[2]	15 surgical centers, 240 surgeons have access	34% decrease in median wait time for all surgery, 92% surgeries completed in 6 months
NS	Surgeon Directory	Specialist Directory	Surgery (11)[3]	1200 FPs[4] in NS have access to the public website	TBD
NL	Orthopedic Central Intake Project	Fax-based Central Intake/Triage	Orthopedic Surgery	22 specialists	Reduction in median wait time for high-priority (72%) and routine-priority referrals (45%), 80% compliance rate

* eReferral system implemented in the fall 2013; [1] CVT Associates (cardiovascular & thoracic), Dept. of Obstetrics & Gynecology, Regina Spine Pathway Clinic, Urology Associates, Saskatoon Spine Pathway Clinic, Dept. of Orthopedics, Dept. of General Surgery (Prince Albert Parkland Region); [2] Cardiac Surgery, General Surgery, Gynecology Surgery, Neurosurgery, Ophthalmology Surgery, Oral Maxillo Facial Surgery, Orthopedic Surgery, Otolaryngology Surgery, Plastic Surgery, Thoracic Surgery, Urology Surgery, Vascular Surgery; [3] Cardiac, General, Neurological, OB/GYN, Ophthalmology, Orthopaedic, Otolaryngology, Plastics, Thoracic, Urology and Vascular; [4] Family Physician.

2.1. Key Informant Interviews

Semi-structured interviews were performed with seven individuals involved in the design and/or maintenance of the systems described above. Four themes emerged: eReferral as an end goal, the importance of re-organizing the referral process before automation, engaging the end user, and technological incompatibilities as impediments to progress. Most were focused on eReferral without consideration of eConsultation as a feature. eReferral was identified as an end goal of consultation and referral redesign. Engaging the end user throughout the design and implementation process was cited as a key enabler. Many technological barriers were discussed, such as incompatibility between electronic health systems.

Informants from Saskatchewan, Nova Scotia, and Newfoundland who worked with establishing pooled referral systems and physician directories stated explicitly that the evolution of their system into an eReferral platform was a desired objective. Each interviewee recognized the efficiency of an eReferral process, and the importance of an auditable electronic trail that would enable PCPs to remain informed of patients' status. Development of an eReferral system is underway in Saskatchewan and in the planning stages in Nova Scotia. Newfoundland is farther from making an eReferral system a reality, but its importance as an objective was stressed during the interview.

Many informants stated that the referral process in their province needed to be reorganized before an eReferral system could be implemented Recognizing and improving upon the workflow challenges was considered a crucial step prior to automation: "we're designing our processes first, and then we'll bring in an electronic system to automate that process later." An often-repeated observation was that automation of a system that was already dysfunctional would not lead to any improvements and would likely complicate the referral process even more. It was this observation that drove the development of the pooled referral systems as a stepping-stone in the progression to eReferral.

A critical element to understanding the referral workflow process, designing system improvements, and implementing a new system was to engage the physicians involved in those processes. Five of our informants assembled focus groups or committees composed of family physicians and specialists to discuss areas for improvement and to design a better system. All five emphasized the importance of that process. The two key informants that didn't engage physicians from the beginning described this as a missed opportunity and something that they would do differently. Informants also spoke to the importance of having physician champions on their team. As they understand and relate to the physician role, physician champions offer an advantage in the recruitment of potential users and are thus able to increase user uptake.

Extracting data from EMR and EHR systems emerged as a major impediment to the design and development of both eReferral and pooled referral systems. The ability for a physician to submit their referral request directly from an EMR system was

viewed as an important design element from the user's perspective. In reality, designing a system able to draw information from multiple different EMR systems was a significant challenge: "the lack of IT integration and synchronicity is the real barrier to making [eReferral] always work the best it can."

3. Interpretation

Despite the demand for improvements in the referral process and the investments in health technology, eConsultation and eReferral systems remain scarce in Canada [30,31]. eConsultation and eReferral systems have been implemented and tested in the United States [10,32-34], Ireland [35], England [8], the Netherlands [36], and Finland [37,38], among many other countries. According to the 2012 Commonwealth Fund Survey, Canada was last among the 11 countries analyzed in the percentage of doctors able to exchange patient summaries and test results electronically with other doctors [39]. These results suggest a need to examine the challenges in implementing health information technology in Canada, and develop a new implementation strategy.

The key informant interviews identified a number of important factors consistent with other reports investigating the challenges experienced in implementing and integrating e-health initiatives in other healthcare settings [40-42]. Socio-technical interaction, or the ability of technology to integrate into standard workflow, is an essential component to the success of an e-health initiative [40]. Exploring this interaction when implementing a new initiative can uncover process inefficiencies. The importance of understanding and improving the referral process was one of the themes uncovered in this study, and a major reason why many of the systems identified had yet to evolve into full eReferral platforms.

The importance of engaging the end users and identifying physician champions was also spoken to extensively in our interviews, and is an important consideration identified in other studies [40-43]. The re-emergence of these common implementation challenges stresses the need for better knowledge sharing. The CMA, in an attempt to improve coordination of referrals/consultations and minimize the duplication of efforts, has stated that improved knowledge sharing is a goal within their organization [27].

Many informants in our study described EMR interoperability as a significant impediment, a finding which has been reported elsewhere [44]. The push from the federal and provincial governments to adopt EMRs within primary healthcare practices, combined with the minimal regulation and direction guiding EMR selection, has resulted in the adoption of a variety of different EMR systems that are unable to communicate with one another or provide common information to other systems. The Canadian Institute for Health Information has recently released a draft proposal for EMR content standards [45], and Canada Health Infoway has committed to providing assistance for upgrading EMR systems to improve their interoperability [31]. These are important steps, as ensuring that EMR systems can provide standard, easy-to-read information is a critical element of successful eReferral systems.

This study was subject to several limitations. There is an overall lack of reporting on eConsultation/eReferral systems in Canada. It is possible that a system meeting our inclusion criteria exists and has either not been reported on or did not turn up in our scan. The key informant interviews, with the exception of two interviews that involved two interviewees, relied on the input from one individual per system. All key informants were involved in the design/implementation of their system and thus may

have been inclined to overstate the impact of the system/understate the challenges and barriers encountered, although where available, we relied on published results.

Conclusion

Despite the current lack of eConsultation and eReferral systems in operation in Canada, several provinces are in various stages of implementing their own eReferral systems. The lessons learned from these projects should be disseminated in order to decrease the duplication of efforts and mistakes. Improving interoperability of EMR systems is becoming a bigger priority. As drawing data from EMRs into eReferral systems becomes easier, designing eReferral systems will become more practical and physician buy-in will likely increase. Improvement is needed in the specialty referral process, and eConsultation and eReferral systems offer the potential to meet these needs.

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