Interoperability in Theory and Practice

Records Management and Ontario’s e-Health Fiasco

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Abstract

“Interoperability in Theory and Practice: Records Management and Ontario’s e-Health Fiasco” looks at the Electronic Medical Record from theoretical and practical perspectives with a specific focus on the importance of interoperability. It introduces the Electronic Medical Record (EMR) in the context of eHealth Ontario’s widely publicized fiasco in which the provincial government failed to implement a working EMR policy despite massive spending and the services of many highly paid management consultants.”

Keywords: Records Management, Project Management, e-Health, Electronic Medical Records (EMR), Interoperability, Ontario, Healthcare, Metadata, Change Management.

This article examines the impact of Electronic Medical Records (EMR) in the electronic medical clinic environment, focusing specifically on the benefits and difficulties of EMR interoperability for doctors, patients and governments. The article concludes that successful implementation of overarching systems in a social healthcare context demands substantial project management that addresses the needs of interoperable records and the systems they exist within. It begins by looking at the conceptual nature of electronic medical records before turning to theoretical approaches to their benefits and implementation paradigms. Finally, the case of Ontario’s e-Health project is examined, and it is found that a central aspect of its failure was in addressing records interoperability. Other important aspects surrounding EMR such as confidentiality, security, system refusal, patient comfort and technical implementation, will not be addressed below as the scope would be too large for this paper.

The Electronic Medical Record

The Electronic Medical Record (EMR) is a digital record designed to replace the paper medical charts that have traditionally been used by physicians to manage the care of their patients. EMRs are usually used in the context of primary care, between a physician and patient, and in the context of
a professional medical clinic. The term can also be used to refer to the Information System (IS) that manages interaction with the EMRs (OntarioMD, 2011, p. 3). Electronic Health Record (EHR) is another term, sometimes used interchangeably with EMR, that refers to more general information about a patient that can be accessed by disparate sources – for example, by physicians in an emergency room. The EMR is used in primary care and contains the “story” of a patient’s health history while the EHR is useful in broader interactions where quick access to patient data is critical. The distinction is important as a focus on EMR or EHR by a medical IS can determine whether it is more useful to primary or secondary care workers and how patients may benefit from how their information is shared across systems (Lombardi, 2010). For clarity, the term “EMR system” is reserved for the IS, while “EMR” is used to reference the records. e-Health is a general term used to describe the application of electronic and digital systems and technology to medicine and healthcare, a distinction from the term eHealth Ontario – which is the specific governmental body devoted to implementing e-Health in Ontario.

The EMR, while tremendously significant in modern medical history, is not a paradigm shift in medical practice. Digital records, information systems and databases have been part of Ontario’s medical landscape for decades. Even the concept of an EMR has existed for over 40 years, and various EMR systems have appeared over this time (Keshavgee, 2007, p. 2). The website Canadian EMR, for example, currently lists 25 separate EMR vendors physicians may choose from to aid them in their practice (Canadian EMR, 2007). Importantly, medical institutions such as the College of Physicians and Surgeons of Ontario and the Canadian Medical Association regard the EMR as an augmented form of the existing Medical Record, not a replacement, and as such the EMR is subject to the same guidelines, regulation policies and legal frameworks associated with the paper record (MD Physicians Services, 2012, p. 17). Vendors that provide EMR solutions must therefore implement EMR systems that can replicate and be situated alongside traditional medical records.

“Inevitable” Horizons

The shift to digital records is part of a broader and widely acknowledged trend throughout RM (Shepherd and Yeo, 2003, p. 4). Records across all professional spheres are now more likely than ever to be “born digital”; never to appear in paper form and thus requiring new ways of thinking about management methods and possibilities (2003, p. 271). For EMR, new developments in technology, especially in network infrastructures and storage capacity, have made the possibility of implementing province-wide metadata, format and information system standards possible within an already existing framework of hospitals, clinics and laboratories. The ubiquity of EMR in Canada reflects this trend, and it has been long recognized by health institutions in Ontario (and elsewhere in the developed world) that EMR is quite definitely “inevitable,” with the Canadian Medical Association describing EMR as

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1The term “inevitable” is used widely and across literature formats from newspaper articles to medical blogs to the official language of medical institutions in both positive and negative contexts. For example, the New England Journal
“definitely the present and future of medical record systems” (MD Physicians Services, 2012, p. 17).

The “inevitability” of EMR systems in industrialized or developed countries is not solely due to the driving force of technology – although influence from technology and information services companies cannot be discounted. That an EMR can bring qualitative and quantitative benefits to the daily practice of medical care has been acknowledged by governments, corporations and professional associations throughout Europe, Australia and North America. On a practical level, EMRs are recognized as having the potential to offer huge benefits to medical practitioners and patients, not to mention hospitals, governments, labs, tax-payers and other places involved in the management of the health of Ontario’s population. Cost-benefit, efficiency and improved patient care are generally considered to be the major benefits to the practice of medical care provided by EMR and EMR systems (Keshavgee, 2007, p. 2).

The Canadian Medical Association states in their guide to Medical Records Management that the “efficiency and effectiveness” EMRs can provide to a medical practice is “amazing” in terms of quality and comprehensiveness of care (MD Physicians Services, p. 17). One of the critical ways in which RM contributes to this somewhat panacean outlook is through the possibilities offered by records interoperability.

**Interoperability and Theory**

The concept of records interoperability refers to the ability of a record to instantaneously move between organizational and institutional information systems providing and gathering information that is understood by each. The information contained in a record, such as a CT scan, that needs to be delivered to and stored in another organizational structure’s information system, a physician’s office for example, has traditionally taken place via fax machines or the mailing of printed forms; necessitating stages of review and processing between the collection of information and its transmission and reception. Interoperability, facilitated by network connectivity, collapses these intermediary stages. Information at the diagnostic imaging site (in this example) and its entry into the physician’s record system can take place instantaneously as the record is captured the moment the diagnostic report is completed. Time and efficiency, as this example shows, contributes to better health care for the patient while eliminating the costs associated with paper, fax machines, photocopying and mailing. However, it is also important to note that existing systems of information sharing like this have been developed and continue to exist. Cerner Powerchart, for example, allows physicians to access up-to-date patient information from hospitals via a Remote Desktop experience within a Virtual Private Network. However, what does not make this interoperable, is that the information received by the

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of Medicine asserted in 2010 that “the widespread use of electronic health records (EHR) in the United States is inevitable… Once patients experience the benefits of this technology, they will demand nothing less from their providers.” (Blumenthal and Tavenner, 2010, p. 504); The Canadian Medical Association states, in somewhat more ambiguous tone to physicians, that “inevitably, you will be working with an EMR in the near future.” See (MD Physician Services, 2012, p. 17).
physician does not become part of or interact with their EMR system. The VPN simply ‘transports’ the physician into the information environment at the hospital.

One way to address the character of digital records within management systems is offered by theorist Frank Upward, who notes that records that involve activity-based information require an active integration management model – one that can take advantage of the fluidity of the record vis-à-vis the different points in its lifespan (Upward, 2015, p. 200). Upward describes records as existing within a continuum whereby they are created, embedded and re-embedded in information systems in which they embody “pluralization” and “routinization” as agents of activity and function (Upward, 2015, p. 200). Viewing the records in this way demonstrates their proactive nature and a measure of their benefit to medical information systems. Records containing demographic information, for example, can be cross-referenced with lab results to build automatic warnings or suggestions for proactive screenings within an EMR system. Another aspect of pro-activity identified by eHealth Ontario is how the exchange of information between medical information systems can actively prevent mismanagement of prescriptions or physician error (eHealth Ontario, 2016).

EMR interoperability relies on metadata for its potency as a proactive tool in health management systems. It is therefore only powerful if it can be understood by communicating systems meaningfully. At present, interoperability in Ontario is facilitated through standard guidelines such as Health Level Seven (HL7), Canada Health Infoway (CHI), or International Organizations for Standardization (ISO), among others (eHealth Ontario, Standard Reference Document). ISO defines two types of interoperability: functional, where two systems can exchange data in a useful way; and semantic, in which communication takes place where the receiving system can process meaning “accurately enough to produce useful results, as defined by the end users of both systems” (eHealth Ontario, Standard Reference Document). The latter means that the two systems may have agreed upon outcomes from datasets, rather than just the ability to share blocks of data. Furthermore, standards like HL7 have a flexibility built into them to accommodate specialized data sets where needed or when facilities require customized processing (eHealth Ontario, Standard Reference Document). HL7, which was established in the 1980s, continues to provide much of the standards for Ontario’s eHealth platforms in which many systems are required to communicate.

With respect to the above considerations, we must note that interoperability implementation needs to take place above the level of individual organizations and institutions. Medical records are shared between many institutions of all sizes and types. The number of records created by a hospital managing the health of inpatients, producing imaging data and results, and emergency room and surgery reports requires complicated RM and disposition structures. Hans Hofman describes this type of process as a “chain management” whereby “a chain of processes” is set in motion, for example, by a physician to a hospital and then back or onward to a rehabilitation centre or other body involved in the care of the patient (2005, p. 141). As Hofman elaborates, changes in technology have also enabled new organizational structures and by extension requires RM implementations to reflect this. In turn,
the digital record acts as a driving force against linear or hierarchical RM in organizations instead allowing horizontal exchange between institutions (or within institutions) (2005, p. 141).

Implementation and the Pain of Change

Health care governance in Canada is managed at the Provincial level. The organization “eHealth Ontario” was set up in 2008 to oversee the integration of existing information systems through standards compliance and workflow guidelines and to assess and provide public funding, much of it coming from the federal government, to facilitate the change across the province. This organization replaced existing governmental bodies dedicated to this task by merging the electronic health program of the Ontario Ministry of Health and the Smart Systems for Health Agency (SSHA). On the cusp of the creation of eHealth Ontario, EMR uptake in Ontario was seen as slow or “lagging behind.” Studies showed that in 2007, despite $150 million in subsidies since 2003, only 25% of physicians were using an EMR system compared to 60% in Alberta (Keshavgee, 2007, p. 3). However, Ontario Auditor General Jim McCarter identified in his 2009 Ontario’s Health Record Initiative Report that the efforts of the government in developing an EMR system in Ontario essentially comprised a massive failure characterized by financial and strategic mismanagement (McCarter, 2009). In the scandal that followed, the Ontario eHealth project was criticized for being badly implemented, a waste of $1 billion in public money, and as lagging behind the rest of Canada (Collier, 2009).

While it is beyond the scope of this paper to evaluate the e-Health initiatives and management strategies of the Ontario government, many critics point to the inability of the government to create an EMR as the crux of the failure (Picard, 2017). As noted in the 2003 Intel sponsored study to encourage EMR adoption in Ontario, without broad-based adoption of prescribed standards and changes, an overarching EMR system may not have value to medical administrators, physicians or patients (Keshavgee, 2007, p. 3). In his Report, McCarter noted that “Ontario’s EHR initiative is essentially a number of large, complex, and interrelated information technology (IT) projects,” noting that the “main concern is that the network remains significantly underutilized because as yet there is insufficient health-related information on it” (McCarter, 2009, p. 8). Media attention highlighted the non-transparent process of awarding consultancy contracts and their eventual strategic impotency (and the $3.26 one of them billed the taxpayer for muffin); arguing that bad management played a major role in ultimate failure (CBC News, 2009).

EMRs and their systems have been analyzed over the last few decades in countries with early adoption, such as the UK, Australia and nations in Europe. Many studies assert that EMR systems can deliver clear benefits in terms of cost-benefit, efficiency and patient care frameworks (Randeree, 2007). Others have looked at case studies and found much of these possibilities wanted in reality – finding fault with the implementation of systems, rather than structural problems with the concept itself (Kazley and Ozcan, 2008). RM theorists note the importance that records managers must pay close attention to the way in which organizations or institutions operate (Shepherd and Yeo, p. 34).
Studies of the Ontario eHealth initiative failure, point out that the central mistake made by the eHealth agency was its inability to address the interoperability of records province-wide, choosing instead to focus resources and analysis within individual areas (Bretscher, 2011, p. 67).

**Conclusion**

This paper has looked at the Electronic Medical Record from theoretical and practical perspectives with a specific focus on the importance of interoperability. Interoperability is made possible by technical developments, such as digitality and network ubiquity; facilitated by the implementation of metadata standards; implemented by information systems; and guided by government structures. The possible benefits of EMR are widely recognized by governments and corporations, and to a lesser extent by physicians and patients. However, interoperability holds a central place in describing these benefits. The drawbacks to interoperability have more to with the high-level scope in its implementation, especially in a province-wide social medicine context. Interoperability is just one of many aspects of EMR that may be addressed critically, however, it has a central place in the e-Health scandal in Ontario, where the importance of technical interconnectivity was badly implemented and improperly addressed.

**References**


