



Realizing the Goal of Electronic Health Records in the United States – Lessons Learned from Canada

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Introduction

The United States and Canada each have visions of creating Electronic Health Records (EHRs) to support healthcare reform and enhance the quality and safety of their health systems. In planning its EHR strategies, the United States may find it beneficial to examine “lessons learned” from Canada and that country’s journey towards this ambitious vision. Three major themes have contributed to Canada’s success to date in implementing EHRs:

- The federal government has played an important role in accelerating EHR implementation and adoption by providing coordinated investment and tactical support programs,
- Early establishment of implementable technology standards and a repeatable solution framework has enabled the phased roll-out of an interoperable EHR system, and
- Excellence in program and project management is critical when managing initiatives that are considered to be transformation programs, with clear definition of anticipated outcomes and benefits.

More in-depth understanding of Canada’s strategies and experience may help the United States move more quickly and effectively to its vision.

The Vision of an Electronic Health Record for Every American

Many nations around the world are developing and implementing a variety of strategies to improve delivery of health care and to contain its spiraling costs. At the core of these strategies lies the Electronic Health Record – the lifetime record of an individual’s history and care within the health system. EHRs offer front-line healthcare staff with direct access to accurate and complete patient information, leading to better treatment decisions, improved patient safety and ultimately increased efficiency and effectiveness of a nation’s health system. The EHR is independent of the means of healthcare funding and is significantly different from claims processing systems.

The United States understands the benefits of the Electronic Health Record as a fundamental building block for tomorrow’s health system. The benefits of an EHR are compelling:

- For U.S. citizens, EHRs will enable improved quality of health care and decreased risk (e.g. reducing adverse drug reactions) due to the immediate availability of key clinical information to authorized health care providers;
- For health care providers, the provision of an integrated view of timely patient data will improve treatment decisions; and
- For administrators and policymakers, access to current data will support improved clinical and administrative governance and improve local planning.

Implementing an EHR infrastructure would be a vital step forward for the United States. Despite the will to achieve the benefits of Electronic Health Records, the U.S. lags behind most other developed countries of the world in its adoption. “The U.S. healthcare IT strategy has been reinforced by the President’s goal of every American having an EHR by the year 2014, but the burden of implementing this strategy has largely been left up to the private sector, including providers, payors and community-based organizations.”¹ To date, Regional Health Information Organizations and Health Information Exchanges have had limited success in moving the nation closer to the EHR vision.

There is no doubt that the nature, size and complexity of the U.S. health system are contributing factors to the speed at which the Electronic Health Record vision can be realized, however, the U.S. can look north to Canada to understand some important lessons learned in that nation’s transition to the EHR. The United States has the opportunity to inform its EHR planning and implementation efforts by considering key Canadian EHR success factors and the strategies employed to overcome many of the obstacles.

¹ *Healthcare Information and Management Systems Society (HIMSS), Electronic Health Records – A Global Perspective, August 2008*

Success Factors in Achieving an EHR

Funding - Electronic Health Record programs typically encompass a series of large, complex projects which require significant resources, infrastructure, technology and investment. Adequate funding of EHR programs and projects is an obvious critical success factor, and although a variety of models exist in many nations across the world, there is a strong case to be made for significant national or federal investment. Later in this paper, we will describe the role that Canada's federal government played in fueling EHR investment.

Clear Definition of Anticipated EHR Program Outcomes, Goals and Benefits - A jurisdiction's EHR program typically involves a large cross-section of stakeholders who will experience varying degrees of business change during and following the implementation of one or several EHR projects. Often the type and size of benefits that accrue to each stakeholder group will vary over time. EHR initiatives should be managed under the umbrella of a business transformation program. It is essential that the business strategy, the process changes required for success and the anticipated overall business benefits are carefully analyzed and understood by all stakeholders.

Governance - Strong program management must have the authority and the leadership capacity to effect the necessary business process changes that are inherent with EHR initiatives. This program management organization is typically a combination of both business/clinical and I.T. leadership. It is also imperative that the key stakeholders that will be impacted by the program each have adequate representation within the governance structure – clinicians should be “front and center” as champions responsible for leading the change.

Standards - Key objectives of local, regional or national Electronic Health Records are interoperability and comparability. Interoperability enables the seamless sharing of information across providers and geography. Comparability means that data can be used for monitoring and measuring performance across care settings. Nomenclature and messaging standards (such as HL7, SNOMED, LOINC) facilitate interoperability and comparability and must be addressed to ensure safe and successful outcomes for EHR programs.

Privacy - Privacy of Electronic Health Records is a key concern of all Canadians. Patients and health-care providers may not disclose necessary health information to EHR systems unless they can trust that the information will be private and secure and accessed only by authorized individuals. This issue is further complicated by the fact that the provincial, territorial and federal governments in Canada are responsible for their own governing legislation regarding the privacy of health records. This has created a patchwork of privacy protection that poses challenges for regional and national EHR programs. In order to achieve an appropriate balance between the individual's right to privacy and the health care provider's need for access to full patient information, EHR programs must invest considerable time and energy to fully analyze and resolve these critical privacy issues early in the planning cycle.

Clinical Will / Adoption - Clinical adoption is a critical success factor for EHR programs. The impact of EHR systems and processes on clinical workflows and roles within the health delivery process must be fully understood to successfully deliver results. Clinical leadership and support must be cultivated throughout these programs – to ensure that the end product adds value to the clinician (particularly doctors) and other key stakeholders.

Planning and Design for EHR Solutions - EHR projects require a substantial investment in “front end” architectural planning and design. Establishing a comprehensive architectural blueprint early in the EHR process will position project teams to effectively identify and select valid EHR solutions and supporting technical infrastructure that reduce the risk of solution misalignment. An EHR architectural blueprint should include the following key components:

- Shared health Data Resources
- Health Information and Semantics Model
- Messaging and Interoperability Framework
- Stakeholder Access Model
- Security and Privacy Framework
- Standards Framework
- Deployment Model

Given the evolution of the EHR marketplace and the complexity and immaturity of many solutions, it is critical that these core design and implementation constructs are defined up-front to ensure that the phased implementation of solutions operate within the overall EHR system and enable the functional and interoperability goals of the program.

Program and Project Management - EHR programs are typically large and complex, and involve a variety of stakeholders with different needs and expectations. Effective program leadership is critical to overall success. Within an EHR program, there are typically a number of projects that need to be well coordinated and managed. Excellence in project management is also a must. Experienced project managers need to employ best practice techniques to ensure projects are consistently delivered on-time and on-budget.

The Canadian Experience and Canada Health Infoway

A variety of reports commissioned in the 1990’s in Canada described the need to move towards the Electronic Health Record to support national health reform. These reports spelled out the requirement for cooperation between the many stakeholders in Canada’s health system to make the EHR a reality and also concluded that strong federal leadership was essential to develop the vision, strategy and blueprint and to ensure alignment of the stakeholders across all jurisdictions.

In September, 2000, the Federal Government announced the creation and funding of Canada Health Infoway (Infoway), an independent, not-for-profit organization. The mission of Infoway was to *accelerate the use of Electronic Health Records across the country. Infoway works with Canada’s health stakeholders as a strategic investor* – investing in jurisdictional and national EHR projects that align with over-arching architectural and standards guidelines.

Canada Health Infoway has estimated the total implementation costs of the Canadian EHR vision to be between \$10 billion and \$12 billion. Once the EHR is fully implemented, annual benefits to the healthcare system are estimated to be between \$6 and \$7 billion, yielding an investment ROI of 41%. The business case is compelling.

By March of 2008, Infoway had invested \$1.5 billion into 254 projects across Canada. These projects fell into the following domains:

- Registries (including Client Registries that accurately identify a patient across multiple systems)
- Diagnostic Imaging (including Picture Archiving and Communications Systems , or PACS)
- Drug Information Systems
- Lab Information Systems
- Telehealth
- Interoperable Electronic Health Records
- Public Health Surveillance and Innovation & Adoption.

Infoway's goals are aggressive – “By 2010, every province and territory and the populations they serve will benefit from new health information systems that will help transform their health care system. Further, by 2010, 50% of Canadians and by 2016, 100% of Canadians, will have their electronic health record available to their authorized professionals who provide their healthcare services”.²

Canadian Strategies for Overcoming EHR Obstacles

Funding - In Canada, although there were many pockets of activity with regards to EHR development prior to the formation of Canada Health Infoway, Infoway has clearly been the key “accelerator” of EHR investment across the country. Infoway co-funds most projects with Canada's jurisdictions – and plays an important role in ensuring that the programs and projects set and achieve reasonable objectives, follow national architectural and standards guidelines, meet privacy and security requirements and are effectively and efficiently managed. Typically, Infoway funding is “gated” – with payments flowing when project milestones, including clinical adoption, are achieved. The \$1.6 billion invested by Infoway has had a major impact on the speed at which Canada has moved towards its Electronic Health Record vision.

Clear definition of anticipated outcomes, goals and benefits - Each Infoway sponsored initiative must follow guidelines to ensure that intended benefits are realized. Early in each initiative, Statements of Work are prepared in which objectives, scope, approach, risks and anticipated benefits are clearly articulated and agreed to by all key stakeholders. In many cases, Infoway funding gates are triggered on the realization of program adoption goals ensuring EHR solutions are not just installed but that clinicians are realizing EHR benefits.

Governance - Canada and its jurisdictions have a wealth of experience in designing and implementing effective governance models for EHR programs. Two of the most critical elements of effective governance strategies have proven to be the definition of clear decision-making accountabilities and the inclusion of an adequate cross-section of stakeholders (particularly from the clinical community). Clinical and administrative leaders must work together to clear program obstacles and ensure success in these large and complex initiatives.

Standards - In 2006, Canada Health Infoway and the Canadian Institute for Health Information (CIHI) established a new Canada-wide “Standards Collaborative” designed to assist Canada's provinces and territories in accelerating the implementation of international standards and health information solutions. The Collaborative works to increase the level of awareness and understanding of pan-Canadian health information standards, engages a broad spectrum of stakeholders to ensure the ongoing relevance of standards, and encourages the uptake of pan-Canadian standards locally, regionally and nationally. This strong “national” leadership role is helping to coordinate the standards initiatives and thus speed progress in this complex and resource-intensive success factor.

² *Paving the Way to Collaborative Care, Canada Health Infoway Corporate Business Plan, 2008/09*

Privacy - Infoway-sponsored projects require the completion of privacy impact assessments and threat risk assessments to ensure the necessary analysis has taken place and appropriate decisions have been made to protect the privacy and security of health information. In each case, the EHR program must consider the impact of privacy concerns on the collection, use and disclosure of health information in the EHR system and how to mitigate them.

Clinical Will / Adoption - Detailed change management and clinical adoption plans are required for all Infoway-sponsored initiatives. These plans set out activities designed to assess the readiness of user groups for change, build support for the business or clinical changes that will take place, develop “champions” for change, and ensure excellence in communications with the key stakeholders.

Planning and Design for EHR Solutions - Health Infoway has developed a conceptual “Blueprint” that has provided the foundation for EHR architecture work in Canada and has also helped the solutions provider community prepare for the types of solutions that will fit within that architecture. “The Blueprint has the following characteristics:

- It is a flexible business and technical design framework that allows solutions, components and business rules to be reused by multiple applications in the health IT enterprise.
- It establishes clear technical standards and guidelines to ensure system-wide interoperability and achievement of desired functionality.
- It ensures that all EHR solutions can seamlessly and securely exchange patient health information between points of service across the continuum of care, across healthcare delivery organizations and across healthcare delivery jurisdictions.
- It addresses the business, conceptual and logical architecture, deployment models and potential applications in a health ecosystem.”³

The “Blueprint” has provided a roadmap for jurisdictions and vendors alike, has enabled the phased roll-out of individual EHR solutions, and the realization of benefits in each area a given solutions addresses, while still accomplishing the overarching process and technology improvement objectives of the program.

Project Management - Infoway-sponsored initiatives follow guidelines that help ensure implementation success. These guidelines have been refined and improved as experience has been gained. With over 250 projects completed and/or in progress, a vast amount of knowledge regarding implementation “best practices” has been gained for EHR initiatives in Canada. Lessons learned are shared through formal (e.g. knowledge data base) and informal channels and forums.

Summary of Benefits Realized by Canada

As stated earlier, \$10 to \$12 billion of initial investment is estimated to be required to fulfill Canada’s EHR vision – an investment that is expected to achieve annual benefits of \$6 to \$7 billion. To date, approximately \$1.5 billion has been invested by Infoway and assuming that same amount has been matched by the jurisdictions, Canada has made 25% to 30% of the necessary investment.

Although a comprehensive analysis of benefits achieved to date is not currently available, early indications are that intended benefits are being achieved. For example, Infoway recently sponsored an independent, third-party evaluation of its investment in Diagnostic Imaging systems (also known as PACS – Picture Archiving and Communications Systems) – one of the domains that has been implemented relatively quickly across the country. The results are promising:

³ *Healthcare Information and Management Systems Society (HIMSS), Electronic Health Records – A Global Perspective, August 2008*

“With better access to information, quicker turnaround time and reduced time searching for films, doctors can provide better care. Furthermore, productivity improvements for both radiologists and technologists are helping to mitigate health human resource shortages that delay access and threaten sustainability. As well, in rural and remote locations, patients can benefit from the expertise of radiologists in urban centres, and some unnecessary transfers can be avoided when PACS are in place. Once fully implemented across the country, it is estimated that PACS will generate between \$850 million and \$1 billion a year in health system efficiencies through increased clinical productivity and reduced patient transfers, duplicate exams and film costs.”⁴

The business case for continued EHR investment is strong, and Canada's progress is beginning to positively impact the provision of healthcare services from a quality and safety of care perspective. From coast to coast, successful implementations of EHR programs are enabling benefits to Canadian citizens such as:

- A consistent and accurate health history that is easily accessible and understandable by a range of authorized health care providers;
- Reduction in the need to repeat health history each time citizens encounter another healthcare provider;
- Reduction in duplication of diagnostic procedures;
- Increased confidence in the safety and reduction in medical errors due to the availability and visibility of information;
- Enablement of biosurveillance and evidence-based care;
- Better coordination of service across healthcare providers; and
- Improved information storage, management and file transfer processing.

Benefit Opportunity in the United States – Applicability of Canadian Lessons Learned

The United States has a population 10 times that of Canada and a healthcare system that may be the most complicated among all developed nations, so there is no question that the scope and scale of the challenges of moving to an Electronic Health Record are greater than those faced by Canada. It is also likely, however, that the patient care quality, safety and effectiveness benefits of an EHR-enabled health system would dwarf those anticipated in Canada.

The obstacles and challenges faced by both nations in moving towards an Electronic Health Record appear to be remarkably similar and therefore developing an understanding of Canada's EHR voyage may provide some valuable input into US EHR strategy development. Canada and the US have both been active participants in the development of EHR standards and technologies, but Canada has outpaced the US in the adoption of those technologies and the corresponding realization of EHR benefits. The Canadian system has distinguished itself by putting in place coordinated funding, management, and support bodies to facilitate EHR system implementation and usage. The gap in adoption of EHR in the United States is not born out of a lack of technology and ideas, it is born out of a lack of action in many cases and a need for coordinated programs to help fund and implement EHR initiatives.

⁴ *Canada Health Infoway – Diagnostic Imaging Benefits Evaluation Report – Executive Summary, December 2008*

There are three major principles that have contributed to Canada's success that can be applied to the upcoming effort to roll-out EHR in the United States:

- 1 **The federal government has played an important role in accelerating EHR implementation and adoption.** Canada's progress towards its EHR has clearly been accelerated through the strategic investment programs of Canada Health Infoway. Jurisdictions, facing serious financial constraints, were simply unable to move forward on EHR initiatives without significant funding assistance. Secondly, the development of Infoway's Blueprint and its significant leadership in the standards domain, has helped steer the evolution of the EHR in Canada – ensuring that all jurisdictions will, in the end, be able to seamlessly share pertinent health information.

To date, examination and adoption of EHR processes and technologies has primarily been a state-to-state proposition in the United States, with limited mandate and/or support provided at the US federal level. With the new administration taking office in the US in 2009 and early signals that health infrastructure and EHR will be a significant area of focus and investment going forward, it is anticipated that both mandates and support mechanisms will be introduced which will accelerate the migration to EHR systems at the federal, state and local level. Thus far, the movement towards making funds available, via the federal bail-out program or related federal infrastructure investment initiatives, has progressed at a faster pace than the development of corresponding, centralized implementation support and standard-setting bodies. Policy makers in the United States have advocated for the establishment of a Federal Health Board and it is generally anticipated that the gap between federal funding and more organized, public-sponsored tactical support will narrow, but in the interim period, two key trends are emerging:

- Private sector vendors have accelerated their efforts to establish standard-setting bodies and consortiums to provide guidance and framework-aligned solutions to both public and private health entities; and
- State and local health organizations have increased the collaboration between and amongst states to understand best practices, shorten implementation timeframes, and encourage cross-state interoperability.

The pace of EHR adoption in the United States will be dependent on a coordinated effort between public and private institutions, as well as the vendor communities that serves them. There is a key trend emerging in the United States where, as standards become solidified in certain areas of the EHR footprint, corresponding vendor certification programs are established to ensure that vendors conform to the new practices and guidelines.

Another noticeable trend is that, as state and local health organizations accelerate the pace of their EHR initiatives and work together to understand the best path forward, they are investing time to take a much closer look at the Canadian EHR experience, as is evidenced by their participation in Canadian Health sector conferences (eHealth, etc.) as well as their direct inquiries to Canadian health organizations, the provinces and the vendors that support them.

- 2 **Early establishment of implementable technology standards and a repeatable solution framework.** The establishment of Canada Health Infoway was a watershed moment in the history of EHR adoption in Canada. In addition to the Infoway budgetary mechanisms, the introduction of a clear technology blueprint provided the solution roadmap, support, and confidence required to motivate provincial and local health organizations to move forward with confidence. In addition to the establishment of Infoway at the national level, standard-setting and support organizations have been created to adapt to the unique design and roll-out requirements at each locale. An example of these “tier 2” support organizations includes the Western Health Information Collaborative (WHIC), a consortium that identifies, defines, and supports the implementation of strategic health initiatives across the western Canadian provinces and territories.

Thus far in the United States, the EHR frameworks that have originated out of public standard bodies (HL7, HIPAA, etc.) or private party consortiums (the Intel-sponsored Continua Health Alliance, for example) have been provided as guidelines to be optionally considered and potentially adopted by public and private health entities in the US. Furthermore, the evolution of the related solution frameworks is at an early stage. In the case of the Continua Health Alliance, only one technology device has been officially certified, though several more devices and systems are presently advancing through the certification process. As these individual standards evolve, and they are coordinated into a more coherent cross-jurisdiction framework by either a consortium of states and/or the introduction of a governing body at the federal level, the adoption of EHR processes and systems will accelerate in a correlated fashion.

- 3 **Excellence in program and project management.** EHR programs are large and complex and typically involve a series of inter-related projects. Standards adherence, privacy considerations, technical and solution complexity are examples of issues that permeate EHR initiatives. Experienced program and project managers are required to lead these initiatives and they must be fully equipped with appropriate methods, tools and support. Electronic Health Record initiatives are considered to be business transformation programs – with clear definition of anticipated outcomes and benefits. Electronic Health Record initiatives are successful when new business processes and information technology are combined to bring about positive outcomes for both clinical and administrative stakeholders. Adequate levels of clinical involvement in the planning, design and implementation of these programs is essential in achieving success.

We believe Canada and the United States share a similar vision with respect to the importance of an Electronic Health Record for all of our citizens. Though there are systematic and political differences that will affect the funding, decision-making and roll-out of EHR systems, many of the core management and design principles are highly transferrable from the Canadian experience to the upcoming effort in the United States. The ability to leverage the Canadian “lessons learned”, as well as the proximity of experienced EHR practitioners, represents an opportunity for the United States to realize benefits more rapidly and at a lower cost as it organizes and executes a coordinated and comprehensive EHR program across the country.