

# Optimizing the Effect of Electronic Health Records for Healthcare Professionals and Consumers

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## ABSTRACT

The traditional paper medical record used in physicians' offices, clinics, and hospitals no longer meets the needs of today's healthcare industry, and is therefore becoming extinct. The way healthcare professionals store, access, and use medical information, as well as the requirements for the management of health-related information are transforming. Electronic health records (EHRs) have the potential to become the core tool in healthcare delivery, integrating all pertinent patient information into a single record, which can then be accessed by authorized interdisciplinary professionals at any time. The purpose of this article is to help leverage the potential of EHRs by increasing familiarization and acceptance among healthcare professionals and consumers toward its implementation. Several studies support the use of electronic databases and indicate that EHRs are one of the key elements to improving the healthcare system; they help to improve continuity of care when clients move between different healthcare facilities, and they have the potential to reduce medical errors. EHRs affect the entire healthcare community, including hospitals, healthcare providers, consumers, pharmacies, researchers, and public health agencies; automate and streamline the clinicians' work flow; facilitate management of costs; and support all aspects of health industry. Nevertheless, healthcare providers need additional education to learn to skillfully use electronic databases and maintain their professionalism online. Having good system management to promote the growth and effective use of digital health, as well as to advance the design and evaluation of information technology needed, is all imperative in an increasingly complex environment.

**E**lectronic health records (EHRs) are a distributed documentation system that enhances the efficiency and effectiveness of a work flow. The powerful framework of the computer-based patient record optimizes the collection, presentation, and communication of client data, resulting in time and cost savings for anyone who participates in the healthcare delivery process, such as clients, physicians, hospitals, and insurers. The EHR system has the ability to generate a complete record of a clinical patient encounter, as well as support other care-related activities directly or indirectly via interface, including based decision support, quality management, and outcomes reporting.<sup>1</sup> The use of the EHR can also help one to analyze, document, and communicate basic care elements to improve uptake among healthcare providers.<sup>2</sup> Patients have the ability to access their medical history and medications, manage relevant health information, promote health maintenance, and add new information to their profile. These benefits should ultimately help patients with their treatments,<sup>3</sup> as the portability of information allows consumers to manage their own health—a very complicated process until now, with information inconveniently dispersed among multiple providers and related entities.<sup>4-6</sup>

For this paper, a literature review was conducted and several studies were critically analyzed to discuss some of the necessary guidelines to: successfully implement the new EHR system; assess its benefits and effectiveness; identify gaps, limitations, and solutions; formulate strategies to increase familiarization and acceptance among healthcare professionals and consumers; and discuss its current status and future directions.

### Guidelines for Success

In order to be successful with the implementation of EHRs among healthcare professionals and consumers, 4 components must be established to promote health, enhance disease management, provide evidence-based treatment, and prevent illness. These include:

*1. Patient medical record.* The patient medical record is a lifelong data management tool that documents the medical history and includes all information typically found in a patient chart (eg, patient demographics, progress notes, medications, vital signs, immunizations, laboratory data, radiology reports). The system allows for order entry management, which enables clinicians to enter orders related to care and medications and to facilitate data collection.<sup>7</sup> The value of its shared information will help to facilitate informed decision making.

*2. Decision support system.* The decision support system (DSS) provides a useful service to healthcare professionals to strengthen the selection of viable options by way of alerts, reminders, and best treatment recommendations based on current best practices. It can also extend to administration processes, such as scheduling, billing, and claim management that will directly impact care.<sup>8</sup> This type of system provides clinicians with specific information that is intelligently filtered to facilitate making the most informed decisions, which will ultimately enhance healthcare.<sup>1</sup> With this type of assistance, healthcare professionals are able to improve the diagnosis of a patient, including screening for correct drug selection and dosing; medication interactions; preventive health reminders in areas such as vaccinations, health risk screening and detection; and the creation of clinical guidelines for patient disease treatment that will prevent many errors and adverse events. Thus, DSS has the potential to directly and indirectly affect patient care and outcomes.<sup>9</sup>

*3. Drug prescription component.* The drug prescription component helps clinicians in calculating drug dosages; reducing the potential for mistakes; eliminating drug interactions; and enabling authorized healthcare professionals to access, manage, and safeguard the patient's medication history. It also expedites and ensures quality medical care and monitors the patient's compliance and progress.<sup>7,10</sup>

*4. Interface with an Internet-accessed patient portal.* A number of self-monitoring tools have been designed to give patients secured access to various health information, including their health records, services, such as appointment booking or requesting medication refills and interactive computer-based patient education. This will allow secure methods for bidirectional communication, information sharing, and enhancing quality of care.<sup>8,11,12</sup>

### Benefits of the EHR

The driving forces for the development of the EHR are clinical quality, patient safety, productivity, and the need to revamp the

healthcare delivery system. EHRs improve data integrity and quality of care, in addition to facilitating research. The benefits of this system can be best recognized when considering the needs of the diverse groups of users.<sup>1</sup>

#### *Benefits of EHRs for Healthcare Professionals*

The most common benefits of EHRs for healthcare professionals include increased delivery of guideline-based care, enhanced organization and accessibility, accuracy of patient documentation, capacity to perform surveillance and monitoring, and reduced medication errors.<sup>8,13</sup> For healthcare professionals, EHR systems offer substantial medical assistance through an extensive database of information, acting as indispensable virtual assistants that provide reminders and alerts for diagnosis and care, thereby improving quality and outcomes in chronic disease management.<sup>10,13</sup> Additionally, EHRs facilitate communication between healthcare providers and improved care coordination for interdisciplinary team work.<sup>13-15</sup> Healthcare providers can not only access the charts faster, resulting in reduced liability due to better decision making and documentation, but also track patients better, which allows for improved analysis and evaluation of the care delivered.<sup>15,16</sup> EHR use also improves the efficiency of billing and support for pay-for-performance bonuses.<sup>1</sup>

#### *Benefits of EHRs for Consumers*

The benefits of EHRs for consumers include a reduced wait time for treatment, enhanced access and control over health information, expanded use of best practices with inclusion of decision support to provide best medical treatment, greater responsibility for one's own care, alerts and reminders for upcoming appointments, higher satisfaction, greater cost savings, and a decline in the number of redundant procedures.<sup>1</sup>

### Legal, Professional, and Ethical Concerns, Barriers, and Solutions

Patient privacy and confidentiality are always paramount. Information security and confidentiality of personal information are major concerns in today's society among medical records and how they are being preserved electronically.<sup>17</sup> The right to privacy intersects with consent and confidentiality and raises questions like who would have access to an individual's information? How will the information be used? Who owns and controls the information? Are they safeguarding the privacy and confidentiality even though electronic records are susceptible to compromise? Are there potential risks associated with the widespread use of information technology?<sup>8</sup>

It is important for organizations to provide their users with the proper training to avoid known threats, but more importantly to be able to discern a possible new threat. The EHR system must be

configured to allow access only to those who have been identified as authorized users. The operating system should lock down after a specified period of inactivity and regular security training programs have proven to be extremely effective. The system must authenticate the user's identity with user IDs and a strong password that includes a combinations of letters, numbers, and special characters.<sup>1</sup> Data integrity can be compromised by incorrect entry, data tampering, and system failure that may include hardware and software impairments, so security mechanisms must use a combination of logical and physical restrictions to provide a greater level of protection to improve data integrity. These include measures such as audit trails, comprehensive procedures and policies, firewalls, the installation of antivirus and spyware detection software to eradicate viruses and other malicious programs—all of which should be reevaluated periodically to determine what modifications need to be made.<sup>1,8</sup>

In addition, initial and ongoing costs for developing and maintaining the electronic infrastructure have been found to be the greatest barrier to the creation of a fully functioning EHR; the development of the electronic links forming the infrastructure is costly and the allocation of fiscal responsibilities is challenging. Another obstacle to establishing an EHR system is resistance to implementation. Acceptance is frequently more difficult to obtain from healthcare providers, and barriers to adoption continue to exist as some healthcare professional are resistant to change unless they see obvious potential benefits.<sup>18</sup> Clinicians generally will not use a system if it is not user-friendly and easy to access, so to promote adoption, a change management plan must be developed in conjunction with the EHR implementation design.<sup>8,18</sup> People who will use the system and are involved early in the implementation process have been found to be a major determinant in a successful project that will result in high end-user satisfaction.<sup>18,19</sup>

### Strategies to Increase Familiarization Among Healthcare Professionals

All members of a healthcare organization must feel a sense of ownership to avoid common pitfalls and to make implementation successful for themselves, their colleagues, and patients.<sup>8</sup> Healthcare professionals must receive sufficient training to identify ways to access information and provide on-site technical support, and they must be continuously encouraged to use EHRs in their organizations. Moreover, the scope of practice must be defined, and standardized guidelines and clinical support tools must be provided. It is imperative to allow users plenty of time to use the program before going live, while providing education on the benefits of utilizing the EHR, what it contains, and how will it improve patient care.<sup>20</sup> Organizations need to increase professional practice environments and create strategies to enhance adoption among providers that may

include clinical stories, peer-to-peer training, demonstration clinics, and mentorship programs to encourage others to use EHRs.<sup>21</sup> It is important to increase funding, which will speed up information liquidity to digitize healthcare delivery and allow for community-based physicians, clinics, and points of care to adapt and utilize EHRs in their practice.<sup>22</sup>

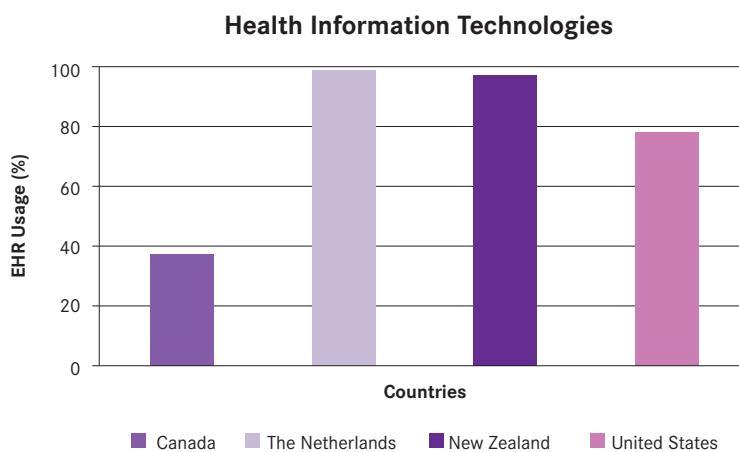
### Strategies to Increase Familiarization Among Consumers

There is a need to educate the clients and increase public awareness about the benefits of EHRs for care. Healthcare professionals need to hold free sessions for patients who are interested in more comprehensive information, which will help them in making an informed decision and provide them with a better understanding of technology by linking with EHRs. Consumers must be provided with well-identified information to learn how this new evolving technology can help to streamline work processes. This will reduce potential obstacles and disconnects between health consumers and this complex and challenging technology. Information literacy concerns need to be addressed and methods to assist consumers in overcoming their anxiety must be identified. Consumers should be encouraged to increase their knowledge to better cope with rapid technology changes by motivating and empowering the use of this type of computer software.<sup>8,23</sup>

### Strategies to Increase Acceptance Among Healthcare Professionals

It is essential to incorporate change agents into the program who will help implementers and users to effectively and meaningfully communicate with each other to address the gaps that may exist.<sup>18</sup> The change agents will provide education sessions for healthcare professionals to promote open-mindedness toward change and the acceptance of adapting systems to existing practices. Change management agents provide invaluable assistance to healthcare organizations to better manage their resources and improve productivity through supporting resources. They troubleshoot problems and provide their input for change, acting as a catalyst to encourage active involvement in setting up a new environment.

Timely and ongoing training would allow healthcare educators, providers, and agencies to explore and examine information trends and proactively react to changes; and increasing the quantity of hardware items in practices (eg, computers, phone lines, Internet connections) will improve access to EHRs. All of these factors will help to decrease the complexity of EHR systems and increase its ease of use. All organizational members will need to participate in the use of EHRs to ensure wide acceptance.<sup>8</sup> It is critical to provide support during the implementation phase to facilitate transition and communicate the accuracy and availability of the new electronic

**Table.** Status of EHR Usage

EHR indicates electronic health record.

system. There is a need to establish continuing education and develop a communication plan with useful tools, such as newsletters and posters to increase awareness by illustrating EHRs and acquainting healthcare professionals with current research in this dynamic field.

#### Strategies to Increase Acceptance Among Consumers

Integration of the EHR is an essential factor to the vision of an electronic health information environment and one that can lead to the empowerment of individual patients, consumers, and healthcare professionals. In order to increase acceptance of the EHR among consumers, some of the following are necessary: education to promote technology as a means of improving health information exchange and health literacy; accessibility of computers in common public spaces (eg, libraries, community centers); and standardization around data safety, privacy, and confidentiality policies.<sup>8</sup> Consumers need to be well informed on its effect to conveniently reduce travel time for multiple physicians' appointments. They also need reassurance that healthcare information can only be accessed by legitimate users, and that client privacy and confidentiality are being safeguarded.

#### Current Status of the EHR and Future Directions

To date, no country has implemented an operational national EHR. Historically, many systems were developed locally by the information technology department of a healthcare organization. While most hospitals have some level of automation, few have accomplished a fully operational electronic environment, and many physicians' offices, clinics, and long-term facilities still preserve manual processes.<sup>1</sup> Canada has made significant progress in recent years and EHR

standards have evolved; however, it is behind in use and spending on health information technologies. There is no unified legislation for all jurisdictions in Canada, and the setup of provincial storage databases remains slow.<sup>24</sup>

According to a survey in 2010, only 37% of Canadian physicians use electronic records compared to 99% of physicians in the Netherlands and 97% of those in New Zealand and Norway (**Table**). The report indicates the lack of trust and collaboration between Canadian health authorities, which contributes to Canada's slow progress in implementing the EHR. Additionally, a lack of government investment, inadequate involvement of physicians, and absence of flexibility and coordinated leadership all account for widespread variance in the EHR development across Canada. To promote EHRs more effectively, there should be an improvement in communication between jurisdictions and healthcare

organizations, and clinicians should have stronger engagement toward adoption.<sup>25</sup> Stronger leadership will accelerate the ehealth infrastructure and promote greater awareness of its benefits—subsequently, increasing scrutiny of additions to documentation, adequate resources, and an organizationwide commitment to information security are required.<sup>1</sup>

The United States is making substantial efforts in engagement for the promotion of EHR adoption. According to a study published by Furukawa et al,<sup>26</sup> almost 78% of office-based physicians reported using some type of EHR system. However, physicians' electronic health information exchange with other healthcare providers outside of their organization was limited to only 14%. Despite ample progress in EHR adoption, health information exchange and patient engagement require ongoing attention.<sup>26</sup>

The future holds tremendous potential for EHR capabilities and moves toward its implementation and adoption. From this point forward, information technology applications will become more commonplace, easier to use, and will highly extend the capabilities of healthcare providers through additional features offered. Technology will promote a safe environment for healthcare professionals by reducing negative exposure to risk and liability, and consumers will have increased accountability for the management of their own health, with tracking and benchmarking at their fingertips.<sup>1,8</sup>

#### CONCLUSIONS

EHRs offer numerous benefits to healthcare professionals and consumers. The creation and innovation of new practice models deliver effective healthcare at a lower cost while improving patient safety and collaborative processes; implementation of EHRs also drives

health system sustainability and productivity. The slow development of an electronic infrastructure and initial cost create hindrances to achieving full functionality of EHR systems across the country. The skilled use of continuously developing technology—which provides tools and opportunities for system automation—is an expectation of today's healthcare workforce that requires further training and education. Nevertheless, despite these limitations, the benefits outweigh the risks.

During technological evolution, it is vital to highlight the importance of strategies to increase familiarization and acceptance of the EHR among healthcare professionals and consumers. An important step toward developing an EHR is to adapt to the procurement challenges caused by information technology acquisition. Proper workplace security discipline and significant engagement strategies are crucial aspects. Organizations need to properly train employees and ensure that only authorized personnel have access to the electronic infrastructure. In order for EHRs to remain sustainable in the long-term and be accepted and utilized, it is vital that practitioners and policy makers direct their attention to the many unresolved issues surrounding consent, privacy, and legal implications to meet government and accreditation requirements. In addition, because of the rapid pace of technological change, ongoing assessments of quality standards in EHRs are critical. These barriers must be removed and more future research needs to be conducted in order to optimize their effect and have a future in which EHRs will remain central to shaping healthcare.

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