



# How can Canada achieve enhanced use of electronic medical records?

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# How can Canada achieve enhanced use of electronic medical records?

## Executive summary

This paper will examine the value of enhanced use of electronic medical records (EMRs) and possible methods by which enhanced use of EMRs can be accelerated in Canada. These methods include, but are not restricted to, pay-for-performance mechanisms, such as those codified in the United States' "Meaningful Use" provisions. While some countries have tried to achieve enhanced use of EMRs through the implementation of pay-for-performance mechanisms, the concepts of enhanced use of EMRs and pay-for-performance are not inextricably linked.

This paper will refer to enhanced use of EMRs, as opposed to meaningful use, to distinguish between the concept of using an EMR in a particular way and the set of provisions and legislation in the United States known as Meaningful Use.

The clinical benefits of using an EMR have been clearly articulated.<sup>1</sup> However, a spectrum of additional clinical benefits will be achieved when EMRs are used to their fullest potential — when providers are using not only the core but also the advanced functionality of the EMR to transmit prescriptions to pharmacists and referrals to specialists, order laboratory tests, provide patients with access to their health record and inform public health measures, to name only a few examples.

This advanced functionality — the use of which will be referred to in this paper as enhanced use of EMRs — may be required to return the significant investments made in health information technology in general, and EMRs in particular.

## Conclusions

1. Importing the United States' approach to achieving enhanced use of EMRs without first adapting it for a Canadian context may not be effective.
2. The evidence of the effectiveness of pay-for-performance in general is neither conclusive nor authoritative. However, if pay-for-performance is applied to the enhanced use of EMRs at an appropriate level of compensation and governance, assumptions have been made that it can drive clinical behaviour.
3. The implementer of pay-for-performance to achieve enhanced use of EMRs should be aware of the following risks:
  - a. increased costs to the health care system(s);
  - b. the impact on other aspects of the health care system not covered by pay-for-performance provisions;
  - c. the impact on the morale of the overall care team, specifically those care providers not covered by pay-for-performance incentives;
  - d. the potential to create disparities in a health care system as funds flow to high performers.

## Recommendations for achieving enhanced use of EMRs

1. Develop or use existing quality indicators that measure the impact of the work on the quality of care provided; measure at a level of detail that reflects the scope of the work to be achieved; involve providers and patients in the design of these indicators.
2. Establish the level at which incentives will be implemented — provincially, regionally, organizationally or at the level of the individual — by assessing the capacity at each level to track adherence to quality indicators. Establish appropriate and transparent oversight at that level.
3. Before incentives are implemented, consultations should be undertaken with administrators, care providers and patients to determine:
  - a. the regional gaps in the enhanced EMR use that should be filled;
  - b. the level of EMR usability in each region, and whether providers will be able to achieve enhanced use of EMRs with the products available to them. Develop a Customized Common Industry Format Template for Electronic Health Record Usability

Testing, specifically tailored to enhanced use of EMRs and to which vendors must comply before users of their products are eligible for incentives;

- c. the milestones and quality indicators that will trigger incentives; and
  - d. the level of incentives and/or penalties that will drive provider behaviour.
4. In the absence of pay-for-performance measures, define the value proposition for clinicians through one or a combination of offering continuing medical education credits, providing personal and social reinforcement, driving consumer demand and/or modifying the vendor remuneration model to emphasize development of enhanced use functionality.
  5. Provide education and continuing professional development opportunities for providers to clarify their role and responsibilities when they are practising in an interconnected environment. Provide ongoing technical support. Advocate for the continuous update of medical education curricula to include competencies related to enhanced use of EMRs.

## Introduction

This paper will examine the value of enhanced use of electronic medical records (EMRs) and possible methods by which enhanced use of EMRs can be accelerated in Canada. These methods include, but are not restricted to, pay-for-performance mechanisms, such as those codified in the United States' "Meaningful Use" provisions. While some countries have tried to achieve enhanced use of EMRs through the implementation of pay-for-performance mechanisms, the concepts of enhanced use of EMRs and pay-for-performance are not inextricably linked.

This paper will refer to enhanced use of EMRs, as opposed to meaningful use, to distinguish between the concept of using an EMR in a particular way and the set of provisions and legislation in the United States known as Meaningful Use.

## The value of electronic medical records

According to 2013 National Physician Survey results, Canada has achieved a significant adoption of EMRs, and physicians perceive that EMRs improve the quality and efficiency of care:

- 63% of general practitioners (GPs) and 51.4% of specialists rate their access to EMRs as satisfactory or excellent
- 64.3% of GPs and 59.5% of specialists use an EMR to enter and retrieve clinical notes
- 74.2% of GPs and the same percentage of specialists have been using some form of EMR for over two years
- 45.3% of GPs and 39.3% of specialists report increased or greatly increased efficiency owing to the use of EMRs
- 62.8% of GPs and 50.4% of specialists report the quality of patient care they provide has become better or much better since they started using EMRs<sup>2</sup>

In a 2013 study of physician use of EMRs in the United States, nearly eight in 10 physicians using electronic health records (EHRs) reported that use of their EHR enhanced patient care (78%). The majority reported that EHR use helped them to access a patient's chart remotely (81%), alerted them to a potential medication error (65%) and alerted them to critical laboratory values (62%). For the remaining six measures of clinical benefits, between 30% and 46% of EHR adopters reported that EHR use provided clinical benefits.<sup>3</sup>

One review in the United States of 236 studies, including pre-post and time-series designs and clinical trials that related the use of health information technology — and specifically clinical decision support and computerized provider order entry — to quality, safety or efficiency found that 56% of the studies reported uniformly positive results and an additional 21% reported mixed-positive effects.<sup>4</sup>

A spectrum of clinical benefits will be unlocked when EMRs are used to their fullest potential — when providers are using not only the core but also the advanced functionality of the EMR to transmit prescriptions to pharmacists and referrals to specialists, order laboratory tests, provide patients with access to their health record and inform public health measures, to name only a few examples. Canada Health Infoway offers comprehensive evaluations of the clinical benefits of use of the various enhanced functions of EMRs.<sup>1</sup>

## Defining enhanced use of electronic medical records

One useful point of reference when discussing enhanced use of EMRs is the set of standards defined by the Centers for Medicare & Medicaid Services (CMS) Incentive Programs in the United States. These standards, referred to as Meaningful Use, govern the use of EMRs and allow eligible providers and hospitals to earn incentive payments for meeting specific criteria in EMR usage.

Meaningful Use in the United States is enabled by key legislation. The Health Information Technology for Economic and Clinical Health (HITECH) Act, passed in 2009, provided the US Department of Health & Human Services (HHS) with the authority to establish programs to improve health care quality, safety and efficiency through the promotion of health information technology, including EMRs and private and secure electronic health information exchange. Under HITECH, eligible health care professionals and hospitals can qualify for Medicare and Medicaid incentive payments when they adopt certified EMR technology and use it to achieve specified objectives.

To date, four regulations have been released, two of which define the Meaningful Use objectives that providers must meet to qualify for the bonus payments and two of which identify the technical capabilities required for certified EMR technology.

- The Incentive Program for Electronic Health Records, issued by CMS, defines the minimum requirements that providers must meet through their use of certified EMR technology to qualify for the payments for stages 1 and 2 of Meaningful Use.
- The Standards and Certification Criteria for Electronic Health Records, issued by the Office of the National Coordinator for

Health Information Technology (ONC), identify the standards and certification criteria for the certification of EMR technology, so eligible professionals and hospitals may be assured that the systems they adopt are capable of performing the required functions.

To achieve Meaningful Use, eligible providers and hospitals must adopt certified EMR technology and use it to achieve specific objectives. These Meaningful Use objectives and measures are designed to evolve in three stages, originally slated to take place between 2011 and 2016, though these milestones have since been extended (Table 1).

**Table 1: Stages of Meaningful Use in the United States**

| <b>Stage 1 – Data capture and sharing<br/>2011–2012</b>                             | <b>Stage 2 – Advance clinical processes 2014<br/>(extended through 2016)</b>  | <b>Stage 3 – Improved outcomes 2016<br/>(extended through 2017)</b>           |
|---|---|---|
| Electronically capturing health information in a standardized format                | More rigorous health information exchange (HIE)                               | Improving quality, safety and efficiency, leading to improved health outcomes |
| Using that information to track key clinical conditions                             | Increased requirements for e-prescribing and incorporating laboratory results | Providing decision support for national high-priority conditions              |
| Communicating that information for care coordination processes                      | Electronic transmission of patient care summaries across multiple settings    | Providing patient access to self-management tools                             |
| Initiating the reporting of clinical quality measures and public health information | More patient-controlled data  | Providing access to comprehensive patient data through patient-centred HIE    |
| Using information to engage patients and their families in their care               |   | Improving population health   |

The initial stage of Meaningful Use in the United States was designed to encourage clinicians to adopt EMRs by providing funds to mitigate the onerous costs of implementation.<sup>5</sup> The second stage of Meaningful Use was intended to encourage enhanced use of the EMR, or use of the EMR's advanced functionality.

In addition to the core elements, the regulation creates a menu of 10 additional tasks, from which providers can choose any five to implement in 2011–2012. This gives providers latitude to pick their own path toward full EHR implementation.<sup>6</sup>

Canada Health Infoway has introduced a preliminary codification of enhanced use of EMRs in the form of clinical value levels and targets.<sup>7</sup>

For example, the proposed targets for clinical value level 1 include using the EMR to:

- enter patient demographics;
- record encounters, problem lists, allergies and immunizations;
- record and print prescriptions;
- generate alerts and reminders; and
- receive laboratory results.

Clinical value level 2 focuses on the clinician's use of an EMR that is interoperable with the drug information systems that have already been implemented in many provinces and territories. Also included is the clinician's use of electronic prescribing capability from an EMR.

While this preliminary codification of clinical value levels exists, there are few federal incentive programs or punitive measures in place for practising, or failing to practise, in a way that achieves these clinical value levels.

## **The state of enhanced use of electronic medical records in Canada**

Because of the manner in which enhanced use of EMRs has been pursued in the United Kingdom and United States, enhanced use is often associated with pay-for-performance. However, these two concepts are not inextricably linked. Enhanced use may be achieved

through other means, and pay-for-performance can be applied in other areas. As such, this paper asks how enhanced use of EMRs may be accelerated and examines whether the pay-for-performance mechanisms implemented elsewhere are appropriate for Canada.

In Canada, pay-for-performance can be viewed as an extension of the movement toward more performance-based information and greater accountability in health care. Ministries and departments of health across the country are demanding greater accountability for health care expenditures through quality councils, accountability agreements, hospital and regional report cards and performance measurement systems.<sup>8</sup> In Saskatchewan, executive officers and vice-presidents of regional health authorities and the Saskatchewan Cancer Agency are compensated through an executive pay-for-performance plan,<sup>9</sup> and a nominal sum is paid to physicians in that province each time they use the EMR to perform certain clinical tasks. In British Columbia, pay-for-performance, sometimes called "patient-focused funding," is used to tie hospital performance to dollars to create incentives to, among other things, conduct surgeries more efficiently.<sup>10</sup>

Canada Health Infoway has invested strategically to promote adoption of and interoperability between EMR components. However, it has not yet gone to the extent of paying for the use of EMRs in a particular fashion or to achieve quality milestones.

Table 2 outlines the status of incentive and support programs in Canada related to various EMR functions. It calls particular attention to the need for programs that will accelerate advanced functionality and interoperability, enhanced use of EMRs by medical specialists, and applied and population health research.

**Table 2: Status of incentives for the use of electronic medical records in Canada**

| <b>1. To support significant adoption of electronic medical records (EMRs) by physicians in ambulatory care settings</b> |  | <b>Assessment</b>  |
|--|--|--|
|  | <b>Physician EMRs</b> to help the 20,500 physicians not covered by existing provincial programs to adopt an EMR (\$20,000 per physician in one-time costs).                                | <b>The federal government allocated \$200 M. This has led to almost all jurisdictions having an EMR program. As of 2014, about 70% of physicians have an EMR.</b>                            |
|  | <b>Transition support and change management</b> for those 20,500 physicians (\$15,000 per physician, based on existing programs/experience).   | <b>Five provinces have built transition support into their EMR programs, but not at a level sufficient to significantly accelerate enhanced use of EMRs.</b>                                 |
|  | <b>Functional requirements for specialists</b> that can be built into EMR products, the e-referral process, hospital interfaces, unique device integration and documentation requirements. | <b>Specialist requirements are not being adequately addressed.</b>   |
|  | <b>Data migration</b> to offset the physicians' burden of having to switch EMR systems as the marketplace matures.   | <b>Over half of physicians with EMRs already have or will soon migrate to other products. Little attention has been paid to supporting physicians who are switching between EMR systems.</b> |
| <b>2. To increase effective use of EMRs</b>  |  | <b>Assessment</b>  |
|  | <b>Applied research</b> on how best to integrate health information technology into clinical processes and translate this information into learning modules for clinicians.                | <b>A dedicated fund has not been set up to support applied research. Efforts to date have been <i>ad hoc</i> and unfocused.</b>  |
|  | <b>Consumer health</b> research agenda to explore how best to leverage patient portals and online health tools to involve patients and improve care.                                       | <b>Canada Health Infoway has funded some initiatives in this area, which are helping to identify best practices.</b>   |
|  | <b>Decision support tools</b> to support preventive care and medication management.  | <b>Additional effort is required to achieve this requirement.</b>  |
|  | <b>Natural language processing</b> to convert unstructured data to standardized formats.   | <b>Additional effort is required to achieve this requirement.</b>  |

|   |   |  |
|---|---|--|
|   | <b>Strategic use of advanced functionality of EMRs</b> such as electronic prescribing, performing medication reconciliation, reporting to public health or immunization registries or providing a summary of care record for each transition of care or referral. | <b>Additional effort is required to achieve this requirement.</b>  |
| <b>3. To accelerate health information exchange</b> |   | <b>Assessment</b>  |
|   | <b>Regional interoperability solutions</b> that will allow clinicians to share data at a local or regional level with colleagues, patients and regional management.   | <b>Focus continues to be placed on building province-wide solutions as opposed to local solutions built on consistent standards.</b>   |
|   | <b>Interoperability standard</b> (interim) for use in regional interoperability solutions.  | <b>The Standards Collaborative has developed standards in this area, but higher priority needs to be placed on ensuring that provinces apply them.</b>                                   |
|   | <b>Telehealth</b> to support the continued development of these networks across Canada.   | <b>This area has seen significant progress in recent years. Infoway funding has supplemented provincial programs, and there has been considerable growth in coverage and treatments.</b> |

### Should Canada use pay-for-performance to achieve enhanced use of electronic medical records?

Meaningful use in the United States relies on the principle of 'pay-for-performance, wherein a defined change in compensation occurs as a direct result of a change in one or more quality measures. Alternatively, a quality bonus can be awarded for achieving a specific quality target; a portion of compensation can be placed at risk, contingent upon achievement of quality targets; performance fee schedules can be instituted with rewards and/or penalties based on achievement of quality targets; and reimbursement rates can be increased for higher quality providers.<sup>8</sup>

Pay-for-performance can be distinguished from fee-for-service in that it does not necessarily compensate for volume of transactions but rather it compensates for meeting a minimum threshold associated with quality outcomes.

Should Canada adapt the United States' Meaningful Use to its context to drive enhanced use of EMRs? If so, the size of the task is not to be underestimated. Indeed, some have speculated that enhanced use of EMRs, coupled with large financial incentives, may signal the beginning of the end of health care as a cottage industry.<sup>11</sup> It is with this in mind that pay-for-performance as a path to enhanced use of EMRs must be carefully examined.

#### On the case *against* using pay-for-performance to achieve enhanced use of electronic medical records

Paying for performance to improve quality can be problematic. The evidence that tying pay or funding to quality will improve care is inconsistent and often weak, for the following reasons:

- There is no control group or comprehensive data-gathering in countries where pay-for-performance has been instituted.
- There is an inability, with existing data, to separate the effect of quality incentives at the level of the individual physician and the organizational level.
- Quality bonuses and tiered reimbursement schedules have not been thoroughly evaluated.
- There is little knowledge of how different markets, regions and populations influence the effectiveness of incentive programs.
- No longitudinal studies have been performed.<sup>12-14</sup>

There are a number of risks associated with integrating pay-for-performance provisions in any complex system, especially one using a wide variety of team and remuneration models. First, quality indicators may not have sufficiently high sensitivity and specificity to accurately identify safer care when used in report cards or reimbursement plans. Second, there may not be a sufficient number of validated measures to have a substantial enough impact on safety or on reimbursement itself. Third, it seems likely that pay-for-performance, like all other methods of reimbursement, will have its own unanticipated perverse incentives that might undermine its effectiveness, creating the conditions for "gaming" the system.<sup>8</sup>

In the United States, pay-for-performance may have already created unintended consequences and negatively affected clinicians' ability to deliver quality care. Instead of demanding product transparency or insisting that vendors of health information technology create more user-friendly technology, many large health care systems have rushed to adopt existing systems to qualify for time-limited

incentives. As a result, their clinicians must read thick user manuals, attend tedious classes and accept periodic tutoring from “change champions” to master the various steps required to enter and retrieve data.<sup>15</sup> In another example, where pay-for-performance was used to bolster chronic disease care, quality of care for some services that did not have incentive payments seems to have declined, and some patients may have been left off the chronic disease registers to make results look better. Staff morale was a problem too, because there can be tremendous pressure to meet targets, but rewards are not evenly distributed.<sup>12</sup> Finally, incentive programs have also been perceived to have undermined professionalism, autonomy and job satisfaction among physicians.<sup>16</sup>

Pay-for-performance also has the potential to create disparities in a health system. In many programs the rewards flow to groups that are already high achievers, and the groups most in need of resources to improve receive less compensation.<sup>17</sup> This can also raise overall system costs. Observers of the United Kingdom’s Quality and Outcomes Framework and its general practitioner bonus schemes suggest that costs have risen rapidly, at least in part, because performance bonuses are given to physicians who are not returning a sufficient benefit in terms of outcomes and efficiency.<sup>8,18</sup>

The case against pay-for-performance can be summarized as follows:

- There are increased costs to the health system.
- There is a general lack of high-quality evidence of pay-for-performance’s effectiveness.
- There is the potential to create gaps in the system where pay-for-performance is not in place, shifting an overall emphasis on quality to a selective distribution of effort.
- There is a possible negative impact on the morale of the overall care team.

### On the case for using pay-for-performance to achieve enhanced use of electronic medical records

Much of the criticism of pay-for-performance provisions assumes that they are attempting to drive complex systems to better quality outcomes and efficiency. However, the application of pay-for-performance in a scoped and strategic manner — such as in the areas where system performance requires the most improvement, and with appropriate implementation strategies (outlined later in this paper) — may result in the desired quality gains.<sup>19</sup> Even imperfect measures of quality might be effective if these measures were more broadly indicative of quality than what is currently in use.<sup>17</sup>

Specifically, applying pay-for-performance strategically to those areas most in need of improvement — both in terms of tasks where quality improvement and frequency should increase and in terms of regions where outcomes most need to be improved — may represent an effective quality improvement strategy. UK researchers discovered that the worst practices showed the quickest rates of improvement under pay-for-performance, and those practices tended to be in disadvantaged areas. As such, incentive payments for quality improvements have helped to address, in part, the United Kingdom’s long-standing and pervasive health inequities. By the third year of the Quality and Outcomes Framework, the variations between the worst-performing practices and the best had almost disappeared.<sup>17</sup> It is not difficult to imagine gaps in enhanced use of EMRs being closed in a similar manner.

There are other examples where it can be argued that pay-for-performance has helped to produce improvements. Programs built upon the Leapfrog Program and Bridges to Excellence in the United States are examples of the successful use of incentive payments to promote adoption of health information technology.<sup>17</sup> Some have claimed that pay-for-performance has played a “crucial” part in shortening waits for care.<sup>12</sup>

In the United States, quality improvements have emerged when physicians have been paid to adopt health information technology. Physicians with EMRs that met Meaningful Use criteria in the United States were 9.9 percentage points more likely than physicians with other EMRs to report enhanced patient care, and physicians with two years or more of EMR experience were 25.4 percentage points more likely to report this benefit.<sup>3</sup>

Policy-makers may also consider paying for enhanced use of EMRs as one provision within an overarching quality improvement agenda. Notably, in the United Kingdom, the pay-for-performance system anticipated the rollout of a uniform national information technology infrastructure to allow for automated collection of performance data.<sup>17</sup>

Finally, the enhanced use agenda represents an opportunity for Canada to demonstrate leadership to the international health policy community with regard to incentivizing quality practices. Canada has the opportunity to implement a system in such a way that it can be studied more comprehensively than has been possible in the United States and thus to contribute greatly to our knowledge base by implementing incentives in a phased-in manner that would provide the opening for both experimentation and evaluation.<sup>14,17</sup>

The case for pay-for-performance can be summarized as follows:

- Early physician reports indicate that EMRs that enable enhanced use can lead to enhanced patient care, and thus accelerating enhanced use of EMRs can improve patient care more quickly.

- Evidence suggests that pay-for-performance can have a positive effect if applied in the areas — both tasks and regions — most in need of improvement.
- The enhanced use agenda represents an opportunity for Canada to demonstrate health policy leadership.

## Alternatives to pay-for-performance

Enhanced use of EMRs has been connected to pay-for-performance provisions in the United States, the United Kingdom, Australia and elsewhere. However, the two concepts are not inextricably linked.

Providing incentives for services may be considered to be complementary to how payers traditionally reimburse physicians in Canada: through fee-for-service schemes. However, for the past decade, Canadian payers have been moving toward alternate forms of payment such as salary, capitation or models that blend alternative payments schemes with fee-for-service.<sup>12</sup> Indeed, the proportion of physicians receiving at least 90% of their professional earnings from fee-for-service dropped from 66% in 1996 to 38% in 2013. Fee-for-service remains most popular in Alberta, where 47% of doctors reported getting at least 90% of their income via such payments. It is least popular in Prince Edward Island (14%) and the territories (10%). Meanwhile, blended payments are most popular in Prince Edward Island (55%) and New Brunswick (49%).<sup>20</sup>

While evidence clearly demonstrates the value of enhanced use of EMRs, enhanced use can be incentivized in a number of manners beyond monetary remuneration, such as the following:

- **The value proposition of the EMR can be enhanced.**

The use of an EMR in a particular manner can be incentivized by creating systems that are easy to use and that provide health care providers with timely and appropriate information to facilitate decision-making. Funds might be better spent on improving the experience of using an EMR, for example, on standardizing and improving the EMR interface to complement and facilitate, rather than interfere with, clinical work flow. This might also be achieved through the natural maturation of products in the EMR marketplace.

- **Continuing medical education credits can be awarded.**

Continuing medical education credits can be awarded for successfully achieving enhanced use benchmarks. These credits represent tangible, valuable returns for a physician's investment of time and effort into enhanced use of EMRs, in the sense that the practitioner may avoid the costs associated with attending training courses or conferences or purchasing training material, and they also represent official recognition for the effort required to be an early adopter.

- **Personal and social reinforcement can be employed among care providers.**

Some change management theories suggest that monetary remuneration is less effective than personal and social reinforcement, or a combination of the two. These can include appealing to users' personal motivations and sense of professionalism; applying social pressure by placing users in groups with shared incentives for adoption; using synoptic reporting to compare one's individual practices with trends in practice in the aggregate; and co-location of those struggling to achieve enhanced use with those who have achieved crucial benchmarks.<sup>21</sup>

Indeed, when we consider alternatives to pay-for-performance, we are reminded that doctors are socialized to do well by their patients, and if they see evidence they're not doing well — which becomes clear when performance is measured — they strive to improve.<sup>12</sup>

- **Consumer demand for enhanced use of EMRs can be driven.**

Public relations campaigns to communicate the benefits of enhanced use of EMRs may result in increased pressure from patients for health care providers to adopt and use EMRs to their fullest potential. Through campaigns that appeal to consumers, patients may understand, and begin to expect, that elements of enhanced use of EMRs should be used in the course of their care.

- **Vendors can be incentivized to improve enhanced use functionality.**

Finally, progress toward achieving enhanced use of EMRs may be made by incentivizing vendors to invest in continuous quality improvement. Changing their remuneration to a transaction-based model targeting specific types of services, such as e-prescribing, may spur the refinement of enhanced use functionalities. This may also result in products becoming available that excel in

one particular aspect of enhanced use, driving innovation and availability of products in the marketplace.

To summarize, enhanced use of EMRs, as an evidence-based set of indicators of what will improve patient care, may not need to be linked to financial incentives. Steven Lewis asserts, "Pay individuals well and fund organizations fairly. Settle the money issues swiftly so all can focus on what the money is supposed to achieve. Do this well and we'll have pay for performance — not as cause-effect, but as a harmonious feature of a thriving culture."<sup>12</sup>

## Considerations for implementation of an enhanced use agenda

### The usability of electronic medical records

Health care providers cannot be expected to use EMRs in specific ways if the EMRs themselves do not provide them with the ability to do so. As such, implementation of incentives to achieve enhanced use of EMRs must follow a threshold of system functionality and interoperability.

Usability is defined as the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.<sup>22</sup> Without usable systems, doctors, medical technicians, nurses, administrative staff, consumers and other users cannot gain the potential benefits of features and functions of EMR systems.

User interfaces should be similar enough that a clinician working in one health system can intuitively discern how to use the interface in another system without extensive retraining. To offer a parallel: carmakers offer a wide variety of makes and models, but important controls are consistent enough that a customer can drive any vehicle off a rental lot without instruction. Health information technology should be no different.<sup>15</sup>

One extensive literature search concluded that there continue to be significant usability barriers to even the basic use of EMRs. These barriers can include a multiplicity of screens, options and navigational aids; a lack of customizability that leads physicians to conclude they cannot find a system that meets their needs; poor service and follow-up from vendors to address technical issues; and a general lack of training.<sup>23</sup>

To address the usability of EMR systems in the United States, the National Institute of Standards and Technology developed a Customized Common Industry Format Template for Electronic Health Record Usability Testing. The onus is placed squarely on vendors to demonstrate that products are available in a format that allows both independent evaluation of a single product and comparison across multiple products.<sup>24</sup>

This template relies on tactics such as summative usability testing, by which users are observed as they attempt to complete tasks using the product. The observer measures the amount of time to complete a task, the types of errors that occur while the user completes the task, and the user's level of satisfaction with the product. Summative usability testing produces a benchmark for the current usability of a product, which can then be used to inform the creation of a common industry format template.

Some work has been done in this area. Canada Health Infoway engaged Healthcare Human Factors to conduct an environmental scan and develop user interface guidelines surrounding the clinical coding of data using the Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT).<sup>25</sup> However, continuous improvement processes can also be put into place.

Finally, consideration should be given to health care providers with disabilities. Many software platforms place an increased emphasis on data entry, which can increase the usability barriers to providers with visual and mobility-related disabilities. These users may desire dictation software that works seamlessly with EMRs to complete order entry. Use of trainable dictation software, capable of recognizing medical terminology, is already in place for a number of medical specialists, such as radiologists.

### What specific tasks and features should enhanced use of electronic medical records emphasize?

There exists a wide degree of variability between provinces in Canada with regard to the components of EMRs in use and the degree of regional interoperability attained. As a result, incentives to achieve enhanced use of EMRs may wish to emphasize different tasks in different provinces to address gaps in EMR use.

Canada Health Infoway's "clinical value level 2" focuses on the clinician's use of an EMR that is interoperable with the drug information systems that have already been implemented in many provinces and territories. Also included is the clinician's use of electronic prescribing capability from an EMR.<sup>7</sup>

The United States' Meaningful Use scheme helpfully codifies tasks and features that can serve as a basis for comparison. Meaningful Use in the United States has moved from its initial phase, emphasizing adoption of EMRs, to stage 2, which emphasizes enhanced clinical functionality.

Tables 3 and 4 outline the tasks emphasized in stage 2 of Meaningful Use in the United States. Stage 2 is comprised of 17 core objectives and six menu objectives (of which eligible providers must choose at least three).

**Table 3: Meaningful Use stage 2 core objectives**

|     |   |
|-----|---|
| 1.  | Use computerized provider order entry (CPOE) for medication, laboratory and radiology orders                                    |
| 2.  | Generate and transmit permissible prescriptions electronically (eRx)  |
| 3.  | Record demographic information  |
| 4.  | Record and chart changes in vital signs   |
| 4.  | Record smoking status fo patients 13 years old or older   |
| 6.  | Use clinical decision support to improve performance on high-priority health conditions.  |
| 7.  | Provide patients the ability to view online, download and transmit their health information                                     |
| 8.  | Provide clinical summaries for patients for each office visit   |
| 9.  | Protect electronic health information created or maintained by Certified EHR Technology   |
| 10. | Incorporate clinical lab test results in Certified EHR Technology   |
| 11. | Generate lists of patients by specific conditions to use for quality improvement reduction of disarrities, research or outreach |
| 12. | Use clinically relevant information to identify patients who should receive reminders for preventive/follow-up care             |
| 13. | Use Certified EHR Technology to identify patient-specific education resources   |
| 14. | Perform medication reconciliation   |
| 15. | Provide summary of care record for each transition of care or referral  |
| 16. | Submit electronic data to immunization registries   |
| 17. | Use secure elecontric messaging to communicate with patients on relevant health information                                     |

**Table 4: Meaningful Use menu objectives**

|    |   |
|----|---|
| 1. | Submit electronic syndromic surveillance data to public health agencies |
| 2. | Record electronic notes in patient records                              |
| 3. | Imaging results accessible through CEHRT                                |
| 4. | Record patient family health history                                    |
| 4. | Report cancer cases to a public health central cancer registry          |
| 6. | Report specific cases to a specialized registry                         |

To be certified for stage 2 of Meaningful Use, EMRs must be able to exchange data with EMRs developed by other vendors, incorporate laboratory results into the EMR as structured data, and provide patients with the ability to view, download and transmit their health information.<sup>3</sup>

The argument has been made that the bar should be set high for enhanced use of EMRs. Concerned by data showing that simply adopting EMRs was inadequate to substantially improve care, policy-makers in the United States focused on a range of enhanced functionality: electronic prescribing, coupled with decision support, to improve quality, along with widespread sharing of clinical data. In addition, the US Congress required automated reporting of quality performance to augment existing efforts to increase transparency. Congress was prescriptive about defining enhanced use. Other requirements include electronically recording key parts of a patient's history (detailed demographics, vital signs, active medication and problem lists, smoking status), creating care-summary documents and implementing at least one clinical decision support tool.<sup>11</sup>

When selecting functions to emphasize, one may begin by looking at existing usage patterns and work flows, which represent

habits of using electronic systems as a simple replacement for paper-based processes. If electronic systems are being used in this way, such patterns may need to be disrupted to help providers benefit from EMRs. Examples would be using structured data to capture information or implementing clinical decision-support rules. One may also choose to analyze the volumes of services provided and emphasize those tasks that will drive provision where it is unacceptably low.<sup>5</sup>

One may also choose to identify those functions most desired by patients. Online services linked to the EMR are most used by patients with serious chronic health care needs, including those with depression, HIV and diabetes. Most patient engagement with the EMR is not focused on viewing an archive of past care but rather on actively using a constellation of services that support day-to-day care needs and patient-provider relationships.<sup>26</sup> Additionally, studies have shown that providers' level of secure messaging services heavily influenced whether patients used the online messaging and other online services of the EMR.<sup>26</sup>

## Indicators and measurement

The change management and quality improvement literature strongly suggests establishing concrete metrics to define what enhanced use looks like and the benchmarks through which progress will be achieved. Indicators are standardized measures that can be used to measure health status, health system performance and characteristics across different populations, between jurisdictions and over time.<sup>27</sup>

Some form of quality indicators have been put in place in health systems where pay-for-performance provisions have been implemented — though the types and ranges differ greatly. Metrics in existing pay-for-performance systems in the United States, the United Kingdom and Australia measure clinical quality in terms of both process and outcome, patient satisfaction or perceptions of the quality of care, cost-effectiveness, access, use of information technology, their ability to solve clinical challenges, and organizational/administrative quality priorities. The number of indicators also varies substantially, ranging from a low of 10 to a high of 156.<sup>8</sup> Applying metrics to the enhanced use of EMRs can apply one, some, or all of these lenses.

Evidence suggests that due consideration should be given to:

- using metrics that measure the impact of the work on the quality of care provided;
- measuring at a level of detail that reflects the scope of the work to be achieved;
- involving providers and patients — whose performance and satisfaction with health services will be assessed — in the design of the metrics; and
- providing appropriate oversight in the development and use of these metrics.

Indicators are often implemented as part of broad, system-level quality-improvement initiatives and thus can emphasize overall impact of practices on system efficiency. This level of indicator may not be appropriate in the context of enhanced use of EMRs in Canada, though they should be sensitive to the effects of enhanced use of EMRs on related components of the health care system.

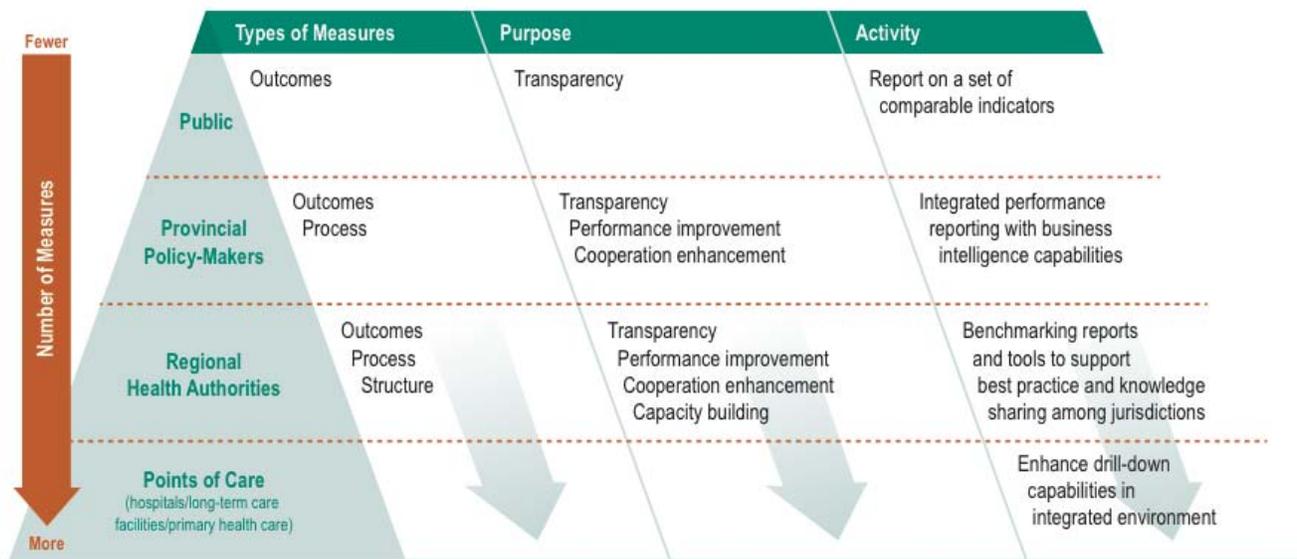
As Figure 1 (see page 12) demonstrates, quality indicators, when used at the different levels, have different purposes, occur in variable numbers, rely on relative activities and may produce different outcomes.

In Saskatchewan's Executive Pay-for-Performance Plan, performance goals and measures reflect the diversity of stakeholders, objectives and principles at play. For example, the CEO's performance metrics are comprised of a series of weighted goals established by, among others, the provincial ministry of health and the board of the regional health authority and are based on principles such as health of the individual, health of the population and sustainability. The patient experience is assessed using a provincially developed assessment tool. Behavioural performance is also taken into consideration, on the basis, in part, of employee feedback.<sup>9</sup>

Some have argued that involving providers, managers and patients may be more important to uptake than the actual selection of measures.<sup>8</sup> The wrong kind of measurement can easily erode trust and prompt widespread gaming of the system. In some cases, providers may reject performance measures over which they have no influence. Conversely, adequate consultation and involvement of the clinical community produces support for both indicators and pay-for-performance provisions. Researchers in Nova Scotia have found that because of the level of consultation in that province, providers and decision-makers agree that some quality indicators are acceptable as valid measures and also warrant incentive financial strategies.<sup>28</sup>

Patients should also be consulted closely in the design of indicators so that the indicators reflect the patient experience of EMRs, including whether care is timely, needs are met and communication with physicians is satisfactory. This may manifest as a measurement of patient satisfaction with providers' communication with patients outside of office visits.<sup>26</sup>

Finally, oversight of these metrics — both their development and their use — may be delegated to an intergovernmental agency, such as Canada Health Infoway, licensing bodies, other health care organizations or third parties independent of the payer or provider

**Figure 1: Levels at which quality indicators can be implemented**

CIHI, 2013.

communities. This reflects the notion of the “honest broker” — one who looks at the evidence and decides what’s right for patients, determines the priorities and decides when quality in an area has improved to the point where it is time to move on to new indicators. In the United Kingdom, an independent, transparent process for developing and reviewing indicators is led by the National Institute for Clinical Excellence.<sup>12</sup>

### Size, timing and target of incentives

Evidence suggests that if enhanced use of EMRs is to be driven by pay-for-performance provisions, a significant portion of income must be at stake, the scenarios in which incentives are triggered must apply to a broad enough population of patients, and incentives must risk-adjust to the amount of work required for each case.

In health systems where pay-for-performance provisions have been implemented, the nature of the compensation itself has been subject to variable approaches — from very large in the United Kingdom’s Quality and Outcomes Framework, in which 18%–50% of providers’ total compensation is based on performance, to very small in the United States’ Performance Measurement Program, in which only extremely modest financial incentives exist.<sup>8</sup> In contrast to the situation in the United Kingdom, physicians in the Highmark Blue Cross health maintenance organization in the United States earned a 1% bonus if they ranked in the top 50%–59% for standards of care for diabetes, cancer screening, cholesterol screening and beta blocker treatment, as well as for patient satisfaction, electronic connectivity and access. The bonuses went up by increments, to a maximum of 5% for those ranking in the 85th–100th percentiles.<sup>12</sup> In Saskatchewan’s Executive Pay-for-Performance Plan, CEOs and vice-presidents will only receive their full base salary if they have met approximately 10 different strategic performance targets; up to 10% of salary can be lost, or up to 10% above base salary can be gained.<sup>9</sup>

This may also imply that effective pay-for-performance is cost prohibitive. If the possibility that even 5% to 10% of income at risk is insufficient to produce a significant effect on behaviour, let alone the 1% to 2% typically on the table in such arrangements, pay-for-performance may simply create the conditions for a higher base pay among clinicians already performing at a high level.<sup>18</sup> Similarly, physicians are unlikely to respond well to incentive programs that apply to less than 15% or 20% of their patient population.<sup>16</sup>

Additionally, incentives, whether they be pay-for-performance or otherwise, must take into account the roles of the range of health care providers and organizations involved in patient care, including laboratories, pharmacies and hospitals. In emerging interprofessional team models, it might not be physicians but other team members, such as nurses, who are responsible for some aspects of enhanced use of EMRs.

The schedule for payments can also be a factor in the effectiveness of pay-for-performance provisions. Annual payments would be

the easiest to administer, and they can be timed with annual patient satisfaction surveys, public report cards, health status information published by the Canadian Institute for Health Information and other reports. Conversely, semi-annual or quarterly payments would keep quality targets front and centre, but these reports also require sophisticated reporting and data collection capabilities and administrative resources, and highly automated statistical analyses.<sup>8</sup>

Finally, payments should be risk adjusted for case mix and severity to provide a fair comparison across providers and to reduce the likelihood of providers selecting patients who they believe may improve their quality measures.<sup>8</sup>

## Education, continuing professional development and change management

Policy-makers should be aware that removing technical, financial and legal barriers may not, in itself, be sufficient to realize the promises of EMRs. Many practitioners, even newly educated ones, have been provided with only cursory training in interconnected practice environments, data stewardship, epidemiology and population-based health.<sup>29</sup>

Some physicians may have received their qualification to practise before EMRs were introduced. Also, EMR developers may underestimate the level of computer skills required from physicians. As a result, there may be gaps in provider competencies and knowledge relative to enhanced use of EMRs — for example, the role of the physician as a data steward, or the way public health data are collected and used.<sup>23</sup> The lack of technical skills among physicians, along with privacy or security concerns, was the third most referenced barrier out of 49 observed barriers to EMR use in one study. Only high start-up costs and high ongoing costs were cited more frequently as barriers to EMR use.<sup>23</sup>

Although many medical students are currently using EMRs, how effectively students are using them is largely unknown. Specifically, the readiness of medical students to capably accomplish tasks related to enhanced use of EMRs is undetermined. Most students underused specific EMR features, such as prompts for medication interactions and preventive services. Ninety-four per cent of 197 students accessing an EMR during a simulated challenge failed to retrieve critical information embedded within the EMR (i.e., history of a previous myocardial infarction and thrombocytopenia) related to the chief complaint.<sup>30</sup>

In fact, a substantial minority of students commit errors performing even basic, “low-hanging fruit” tasks, even though they have successfully completed online training tutorials. Many of these tasks are relatively straightforward, such as the effective use of pull-down menus or check boxes for data entry. Students should not only be taught but should also be assessed on their basic EMR competencies before they are expected to achieve enhanced use of EMRs.<sup>30</sup>

In one study, 30.6% students had at least one error associated with enhanced use of EMRs and 13.5% had more than one (in a range of two to six). In this study, 69.2% of the errors were errors in structured data entry. Errors occurred in medication dosing and instructions (18%), drug-drug interaction identification (12%), documenting smoking status (15%) and documenting colonoscopy results (23%). Students with errors associated with enhanced use of EMRs demonstrated poorer performance on end-of-clerkship professionalism assessments and lower observed structured clinical examination history-taking skills and communication scores.<sup>30</sup>

The Association of Faculties of Medicine of Canada and Canada Health Infoway performed an environmental scan in 2012 to learn how e-health is represented and taught in the 17 Canadian faculties of medicine and made seven recommendations to “serve as a catalyst for a robust national strategy to improve the training of Canadian doctors, allowing them to thrive in the e-health environments of today and tomorrow.”<sup>31</sup> The essence of these recommendations is to move beyond the teaching of operator skills to a more comprehensive view that encompasses the cultural, social and business effects of an e-health-enabled health care environment.

These various barriers can be addressed, in part, through education and continuing professional development, which can be broadly organized between those processes taught as a part of the medical curriculum and those processes taught as part of integrated change management efforts. Regardless of the level of clinicians’ readiness, well-timed and carefully planned training can and does play a critical role in successful health information technology implementations.<sup>32</sup>

Appropriate professional curriculum and additional and ongoing training can include responsibilities related to data stewardship and population health management to provide context to physician tasks and clarify safeguards to patient privacy. This should also involve bridging theory into practice with longitudinal curriculum development, using such methodologies as narrative medicine and reflective practice, which cultivate habits of mind, behaviour and practical wisdom consistent with mindfulness.<sup>33</sup> This training should reflect emerging models of team-based care.

This training may incorporate participation from EMR vendors to educate physicians and roll out new features, or to facilitate the transfer of medical records between older and newer EMRs, for example. However, clinicians seem to prefer peer-led proficiency training. Respondents in one study named clinician peers/champions as a preference 78% of the time, followed by a local support desk

(38%), on-site non-clinical support staff (35%), a national help desk (31%), nurses and medical assistants (17%) and web-based help (2%).<sup>34</sup> One review of over 4500 articles found that a combination of classroom training, computer-based training and feedback is the most effective way to improve enhanced use of EMRs. In addition, the training should be tailored to the needs of the trainees and they should be able to practise in their own time.<sup>35</sup>

The Royal College of Physicians and Surgeons of Canada is seeking to address some of the gaps in physician skills by updated the CanMEDS framework of medical competencies. CanMEDS "is an educational framework identifying and describing seven roles that lead to optimal health and health care outcomes: medical expert (central role), communicator, collaborator, manager, health advocate, scholar and professional."<sup>36</sup> The Royal College is currently updating this framework to include e-health competencies as part of its CanMEDS 2015 initiative. There will be faculty development and resource tools to support these changes.

When introducing an EMR into an established practice, regardless of the level of medical education received by the user, it is also important to use a change management model (e.g., the Adkar change management model) to facilitate the introduction and support individuals to perform new tasks. This can include:

- articulating a business case and vision for change, thereby making change an organizational priority;
- assessing organizational risks and readiness;
- mobilizing and aligning change leaders and champions;
- building awareness of and commitment to the change effort with proactive communications;
- aligning the organization so that affected stakeholders can adopt the appropriate mindsets and behaviours to execute the desired processes; and
- tracking performance improvement and benefit realization.<sup>37,38</sup>

## Conclusions and recommendations

Given the clear value of the use of EMRs in the improvement of patient care, it is in the interests of provincial governments and health care organizations to accelerate the use of EMRs to their fullest potential.

Upon examination of the issue, the following can be said:

### Conclusions

1. Importing the United States' approach to achieving enhanced use of EMRs without first adapting it for a Canadian context may not be effective.
2. The evidence of the effectiveness of pay-for-performance in general is neither conclusive nor authoritative. However, if pay-for-performance is applied to the enhanced use of EMRs at an appropriate level of compensation and governance, assumptions have been made that it can drive clinical behaviour.
3. The implementer of pay-for-performance to achieve enhanced use of EMRs should be aware of the following risks:
  - a. increased costs to the health care system(s);
  - b. the impact on other aspects of the health care system not covered by pay-for-performance provisions;
  - c. the impact on the morale of the overall care team, specifically those care providers not covered by pay-for-performance incentives;
  - d. the potential to create disparities in a health care system as funds flow to high performers.

### Recommendations for achieving enhanced use of EMRs

1. Develop or use existing quality indicators that measure the impact of the work on the quality of care provided; measure at a level of detail that reflects the scope of the work to be achieved; involve providers and patients in the design of these indicators.
2. Establish the level at which incentives will be implemented — provincially, regionally, organizationally or at the level of the individual — by assessing the capacity at each level to track adherence to quality indicators. Establish appropriate and transparent oversight at that level.
3. Before incentives are implemented, consultations should be undertaken with administrators, care providers and patients to determine:
  - a. the regional gaps in the enhanced EMR use that should be filled;
  - b. the level of EMR usability in each region, and whether providers will be able to achieve enhanced use of EMRs with the products available to them. Develop a Customized Common Industry Format Template for Electronic Health Record Usability Testing, specifically tailored to enhanced use of EMRs and to which vendors *must* comply before users of their products are eligible for incentives;
  - c. the milestones and quality indicators that will trigger incentives; and
  - d. the level of incentives and/or penalties that will drive provider behaviour.
4. In the absence of pay-for-performance measures, define the value proposition for clinicians through one or a combination of offering continuing medical education credits, providing personal and social reinforcement, driving consumer demand and/or modifying the vendor remuneration model to emphasize development of enhanced use functionality.
5. Provide education and continuing professional development opportunities for providers to clarify their role and responsibilities when they are practising in an interconnected environment. Provide ongoing technical support. Advocate for the continuous update of medical education curricula to include competencies related to enhanced use of EMRs.

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