Are Information and Communications Technologies Helping Canada to Achieve a Sustainable Healthcare System?

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Is Canada's healthcare system financially sustainable? On the spectrum from yes to no, some argue that sustainability is not the issue and that we should focus on quality (Hébert). Others (Chappell) argue that "to increase value for money, government should validate, as a priority, integrated systems of care delivery for older adults," while others such as Morneau Shepell argue that the healthcare system is on an unsustainable track. Falk argues that "a sustainable health care system is within reach if we recognize that health is increasingly a high technology service, that it can be delivered remotely (not just locally) and that for many parts of the healthcare system services have a declining cost curve."

Dodge and others have pointed out that the sustainability debate will no doubt intensify in the years ahead, as governments across Canada wrestle with budget deficits, uncertain economies, aging populations and demand for new medical technologies. Canada's provincial and territorial premiers discussed financial pressures on healthcare at their Council of the Federation meeting in Vancouver in July 2011 and have agreed to return to the city early in 2012 to work on an integrated approach to healthcare sustainability.

Many years ago, faced with looming sustainability concerns, federal and provincial governments turned to high-profile task forces and commissions to generate innovative solutions. These high-ranking studies uniformly argued that investments in province- or nationwide electronic health record systems were essential to reforming the healthcare system. For Roy Romanow back in 2002, new information and communications technologies would make it possible to create electronic health records (EHRs) for all Canadians, improving the care patients receive and enabling them to play a more active role in managing their health. Pan-Canadian EHRs, Michael Kirby argued, would allow governments to gather the information necessary to transition to evidence-based decision-making. Charles Castonguay in Quebec called new information technologies an "essential tool" that the healthcare system "cannot do without." More recent reports by TD Bank, the Canadian Medical Association and the Health Council of Canada have all echoed the belief that health information and communications technology (ICT) investments are essential.

All have argued that such investments will improve quality of care, access and patient satisfaction, and help reduce costs by improving administrative efficiencies and reducing demand for acute care services and the incidence of unnecessary and duplicate prescriptions, lab and imaging tests. For Michael Kirby, Don Mazankowski and the TD Bank, electronic records would also enable governments to begin restructuring their compensation schemes based on health outcome measures. That ICT has a role to play in improving productivity makes intuitive sense, given the central role ICT has come to play in society and industry. Yet historically the volume and quality of literature on the cost–benefits of health ICT interventions has been weak,

forcing healthcare planners and providers to rely on predictive analyses and second-hand industry reports. Is more effective use of ICT all that Canada needs to bend the healthcare cost curve?

The release of a number of major international studies offers a new opportunity to revisit the extent to which ICT interventions improve efficiencies and health outcomes and what the implications are to the sustainability debate in Canada. For the purposes of this essay (and a more robust paper in the making), sustainability is defined as the capacity of Canadian governments to meet the public's demand for universal, high-quality and timely healthcare services without sacrificing their capacity to invest in other areas, such as education and income support, which have been shown to have an equal if not greater impact on population health.

Three independent reports by Black, Greenlagh and Buntin advise that the impact of ICT investments is far more nuanced and context-specific than previously thought, particularly when it comes to the question of their cost-effectiveness. Black found evidence that certain medication and diagnostic imaging–related interventions improve efficiencies, but there is virtually no evidence to support the cost-effectiveness claims that are frequently made by policy makers when constructing business cases to raise funding for the large-scale ICT deployments now taking place in many parts of the world. This may simply be a result of the evidence base itself, which was described as very weak and of poor quality. As Lapointe noted, it is challenging to reach conclusions about the cost-effectiveness of ICT investments, given the range of solutions and financing models that exist.

The Greenlagh report exhaustively documents a number of unexpected challenges that emerged when the United Kingdom's Summary Care Record (SCR) was implemented. For example, many clinicians who accessed the SCR decided to err on the side of caution and order tests and referrals that may have been unnecessary. These findings raise questions about assumptions that EHRs alone will reduce the volume of unnecessary tests.

The vast majority of articles reviewed by Buntin reported clinical or administrative improvements. However, the authors point out that many of these interventions took place in the context of tightly integrated healthcare delivery networks. As others have noted, financial benefits may be correlated with high levels of healthcare information exchange and interoperability. This raises the question of whether there is more at play in the success stories from the United States, such as Veteran's Health Administration (VHA), Intermountain Healthcare and Kaiser Permanente (KP), all of which are tightly integrated networks. One of the key messages emanating from these organizations is that information (and the effective use of ICT) is a necessary but not sufficient condition for achieving integrated care and cost control.

Ultimately, the most effective way of lowering costs in a healthcare system is to ensure that fewer people are in need of expensive care – as stressed in the report from the Ontario Hospital Association and the Ontario Association of Community Care Access Centres. As Richards recently reported, on average, total annual healthcare spending for North Carolina patients served by community health centres was 62% less than for those patients with similar health status and demographic characteristics served in other ambulatory care settings. One of several factors that contribute to lower costs for health centre users is the salaried staff model for health centre physicians, which helps to avoid the perverse incentive for higher volume that results from a fee-for-service model.

In general, many reforms undertaken around the world have not had a dramatic impact on the rate of increase in healthcare costs. However, the Canadian estimate that once fully implemented across the country, picture archiving (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; the estimate is a step in the right direction. The same can be said for evidence that Telehealth solutions and drug information systems across Canada result in cost avoidance for the health system. As Falk points out, further savings could come in the thoughtful modernization of our regulation and payment systems – one example being "changing provider compensation models to remove their biases for physical presence."

Behner recently found that "All healthcare systems are facing challenges in terms of sustainability … incremental approaches in siloed national markets are unlikely to be enough to rebalance the cost equation." One major exception is the VHA, with its 1,400-plus facilities throughout the United States and Puerto Rico. In their major reform period of 1995–2000, the VHA implemented universal primary care, closed 55% of their acute care hospital beds, increased patients treated by 24%, had a 48% increase in ambulatory care visits and decreased staffing by 12%. By 2000, the VHA had 10,000 fewer employees than in 1995 and a 104% increase in patients treated since 1995, and had managed to maintain the same cost per patient-day, while all other facilities' costs had risen over 30% to 40% during the same time frame.

The Asch RAND study is one of many showing that the VHA outperformed all other sectors of American healthcare. Books by Longman and Brownlee suggest that the VHA clinical care model and its use of health information technology (HIT) provide potential solutions for resolving the healthcare crisis facing the United States. The December 2007 Congressional Budget Office interim report on the VHA model found that the key factors behind the VHA quality improvements included:

- Organizational restructuring designed to share decision-making authority between officials in the central office, regional managers and key personnel at dispersed medical facilities,

- Performance measurement targeted toward improving the quality of care, and
- Extensive use of HIT systems.

The VHA reforms had an even more significant impact through a dramatic improvement in quality and an increase in the value per dollar of health expenditure because of their effective use of ICT to help (a) clinicians to work in virtual teams to deliver patient care across care settings; (b) clinicians to deliver protocol-driven, population-based chronic care across care settings and disease conditions; (c) clinicians and managers to generate increasingly complex information to drive outcomes measurement and research; and (d) make the patient experience seamless across the care continuum. ICT played a key role in the transformation of a large health system from being the laughing stock of healthcare in the United States during the 1960s (as depicted in the Tom Cruise movie *Born on the Fourth of July*) to becoming the gold standard for high-quality, cost-effective care. One of the reasons for this higher quality is that the VHA tracks outcomes and the variations in their different medical centres.

KP on the other hand runs clinical peer reviews to assess and develop clinical protocols – which are embedded into the EHR systems (Liang). Typically, the clinician uses the EHR to document assessment findings and will select structured diagnostic term(s) in the patient's EHR. If the patient has a condition for which a clinical protocol has been deployed, a screen appears with the appropriate clinical protocol for the clinician to follow in terms of recommended tests, drugs and other actions. At that point, the clinician has a choice to either agree with the recommended protocol or override it and follow a different course of action.

Both the VHA and Kaiser EHRs accumulate a large and growing number of detailed patient records in separate data warehouses, enabling the organizations to identify which clinicians have accepted the clinical protocols and which have elected to override them and to see how patient outcomes differ between these groups. Both have reported that the more clinical data that is available in data warehouses, both in terms of the complexity of clinical detail for each patient and the total volume of patient records, the more overall data that accumulates and the greater their clinicians' and managers' appetite for analysis and gaining insight into how they perform clinically, operationally and financially (Kwo and Irani). Integrated care not only requires integrated "transaction" systems, but also data warehouse systems and business analytics tools that provide the ability to retrospectively analyze data at various levels of the organization, including the group, hospital, clinic, clinician and patient levels.

It is noteworthy that these success stories share a number of organizational characteristics unrelated to ICT. The organizations are very large, allowing them to make very significant investments in IT without devoting an undue proportion of their operating budgets to technology. They have fully integrated primary and tertiary care, which allows them to shift resources to prevent acute hospitalizations. They are also physician-led or have physicians playing a prominent role in line management, making fundamental clinical process changes easier to achieve. One of the reasons that KP and VHA are successful is that they have a process to harvest technology gains instead of simply seeing them vanish into provider incomes. Do these characteristics have to be present in order to get full value from ICT initiatives?

It appears that there has to be a force in addition to ICT that drives continuous change and improvement. Leadership has to ensure that appropriate incentives (positive and negative) are in place. Providers and provider teams need to be held accountable for improvements to result. A key characteristic shared by KP and the VHA is the incentive to improve outcomes that result from being "at risk," in contrast to most fee-for-service reimbursement models that incent higher treatment volumes. The leaders set goals (and associated incentives) for improved quality/outcomes and hold leaders and clinicians accountable for achieving those goals. None of these measures are possible in the absence of advanced HIT.

Information technology–driven transformation in other industries has been accompanied by significant restructuring. This restructuring includes the arrival of disruptive new entrants into the market, major changes in industry dynamics (i.e., workflow), consolidation of the industry to a smaller number of larger market players, tight vertical integration (either through consolidation or supply chain relationships), consumer self-service on a large scale and globalization of markets. Do some or all of these need to be present in healthcare to derive financial benefits from ICT investments?

It is well known that there are significant barriers to transformation in healthcare, namely, heavy government regulation and control, major barriers to innovative delivery models, inhibitions to cross-border service delivery, strong union influences, a heavily intermediated relationship between patient and provider (i.e., payment is controlled by third parties and minimally related to patient choice), and generally weak consumer influence (Demetriades). Are these factors favouring the status quo, thereby limiting our ability to get value from ICT? Information technology adds value by creating new capabilities. Perhaps the absence of significant restructuring of the health system to take advantage of these new capabilities negates the potential benefits of ICT.

Returning to the international reports, Buntin also recommended that public and private payers begin using their clinical information systems to test innovative new payment strategies (e.g., new incentives that favour outcome, not quantity/volume of interventions). This echoes proposals by Kirby and the TD Bank that clinical systems be used to transition to evidence-based compensation models. Do these ideas have to become an integral part of our strategies for health ICT investments in Canada?

Romanow, Kirby, Mazankowki and Castonguay specifically recommended investments in province- or nation wide EHRs, with the implicit assumption that the costs associated with integrating health information would be more than offset by improvements in clinical outcomes and efficiencies. But are investments in EHRs enough? Does the evidence from the VHA and others suggest that a more radical integrated care reform model is required to realize efficiencies and outcome improvements? Do we need to shift the payment (and therefore incentives) of healthcare providers from "pay for volume" to "pay for outcomes," as Cherian and others have been suggesting?

Perhaps ICT must be part of a larger package of reforms before the sustainability question is successfully addressed. If so, the EHR in the absence of major health system restructuring will have very limited impact. The recent Accenture study reported that in the United States, "community-based physicians – those previously in private groups – are increasingly selling their practices or seeking employment directly with healthcare systems." Are we hesitant to pursue VHA-like reforms because of the implications they would have for compensation and governance models in Canada? EH

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