HIMSS Analytics 2009 ICT Study: The State of E-Health in British Columbia

Patrick Powers

Introduction

In recent years, rhetorical and real support for e-health innovation has grown in Canada and elsewhere. Increasingly, healthcare stakeholders are impressed by positive healthcare outcomes from advanced clinical applications and new technologies, including hand-held devices. A growing body of evidence is confirming that information technology (IT) implementations in clinical care produce substantial returns on hefty financial and manpower investments, sooner rather than later. Not only does the continuity and efficiency of healthcare improve, but – more importantly – patient outcomes and patient safety increase.

However, harder realities underlying the current healthcare environment clash with the optimism of e-health rhetoric. Whether it will be feasible to sustain the momentum favouring ongoing IT improvements and investments in Canada and elsewhere depends on the consequences of powerful political, financial and cultural factors that are slowing down and even threatening to curtail more than a decade of favourable results for e-health.

The current climate for healthcare in British Columbia (BC) is a case study in the challenges facing healthcare stakeholders who are dedicated to employing information management (IM)/IT to improve patient healthcare. BC, Canada's third largest and second fastest-growing province in population, delivers a full continuum of healthcare through five regional health authorities (HAs) and specialized cancer, women's and children's care through a single consolidated Provincial Health Services Authority (PHSA).

There are some long-standing factors that bedevil BC's efforts to streamline province-wide healthcare delivery by implementing better technology:

- The HAs operate multiple clinical vendor solutions – Meditech (two HAs with differing versions), Cerner (three HAs) and a combination of Eclipsys, GE, McKesson and Meditech (one HA) – that must be interfaced to create a single clinical data repository (CDR) for a single provincial electronic health record (EHR) for all patient information.
- The province's ministry of health faces the long-term and daunting task of integrating all HAs with the following provincial e-health initiatives: a provincial patient registry, a common authentication and care provider identity management system, a provincial laboratory information system, PharmaNet and a provincial diagnostic imaging strategy, as well as various initiatives of the Physician Information Technology Office.
- There is an ongoing debate about whether six HAs is too many for efficient healthcare delivery in a fast-growing

province. Because Vancouver Coastal Health (VCH) and Fraser Health on the Lower Mainland increasingly provide joint services, some suggest that their patients would be better served by consolidation into a super-region with a $5 billion budget. Such a merger should reduce duplication and inefficiencies in areas such as healthcare IT systems and operations. Among other consequences, however, a merger might adversely affect the continuing maintenance of specialty programs at Providence Health Care's St. Paul's Hospital in VCH, which might be shifted to the eastern suburbs connecting to Fraser Health facilities.

- At the same time, there is a more radical proposal that BC would be well served to follow Alberta's example, sooner rather than later, of collapsing multiple HAs into a single province-wide health system and converting all HAs to the same clinical application suite and electronic medical record (EMR) or electronic patient record (EPR) in the Canadian context. Proponents argue that this may be the only way to achieve efficiencies and better outcomes in healthcare in the face of constantly escalating healthcare costs triggered by unending demands for advanced and complex healthcare services and facilities from a growing population.

Among the more recent issues challenging the strides made in e-health initiatives by the province's HAs, the most prominent is the BC government's projection of a $740 million deficit through fiscal year end 2011. The financial forecast for the province is largely negative: provincial debt will increase substantially by 2012; unemployment will rise to 6.2% in 2009; corporate profits and resulting taxes will decline more than 25% this year. Although the government has pledged not to cut, but actually to increase healthcare funding by $4.8 billion over the next three years (Hansen 2009), it has also mandated a 2% savings in operational expenses for all HAs that must be redirected to patient care. Compounding the dark financial news is the provincial election on May 12th, 2009, which will probably trigger a revised budget release in the fall after the new government is seated. Some observers suggest that, post-election, the new government will announce some sort of realignment, be it partial or radical, of the province's HA structure.

The impact of the province's financial picture on all HAs is exemplified by the challenges facing the Lower Mainland, especially VCH and Fraser Health, the largest and fastest-growing HAs in BC.

- The Lower Mainland faces an ongoing demand for expanded services, as reflected by the opening of Fraser Health's state-of-the-art Abbotsford Regional Hospital and Cancer Centre (ARHCC) in fall 2008, and plans for a new outpatient facility in 2011. Fraser Health's master plan projects 1,350 new acute care beds by 2020, the creation of facilities for long-term care, the replacement of substantial equipment with an average age of 12.8 years and ongoing facility upgrades (Nagel 2009).
- Personnel costs are rising at Fraser Health because of salary increases that are locked into existing long-term collective bargaining agreements (Nagel 2009).
- VCH has not succeeded in eliminating its deficit. This currently stands at around $100 million, even though the annual deficit declined from $44 million to approximately $25–30 million over the last three years (Fayerman 2009).
- Although operating expenses constantly increase, provincial funding, even with annual increases, has been inadequate to cover the budget for VCH and only covers the budget for Fraser Health, the province's fastest growing region, through supplemental funding.

The Clinical IT Solutions at British Columbia's Health Authorities

In January, Healthcare Information and Management Systems Society (HIMSS) Analytics inaugurated its 2009 Canada Information and Communications Technology (ICT) Study, starting with BC and followed by Manitoba, Saskatchewan and Nova Scotia, and thereafter the other provinces. As the 2009–2010 Canadian healthcare fiscal year gets underway, a major finding for BC from the HIMSS Analytics ICT Study is that the current provincial financial crunch outlined above will have a chilling effect on capital spending for IT by the HAs in the foreseeable future. Not surprisingly, most HAs do not anticipate being able to make aggressive capital investments in IT clinical upgrades over the next few years. Faced with a growing gap between a laundry list of critical facilities and services required to meet patient demand on the one hand and decreasing or, at best, steady-state resources on the other, most HAs are focusing on consolidating recent e-health clinical gains. Based on the 2009 HIMSS Analytics ICT Study, the following account summarizes the current state of electronic clinical implementations in each of BC's five regional HAs and the PHSA.

Fraser Health

In September 2008, Fraser Health opened ARHCC, a public–private partnership healthcare project that was designed and implemented as a single facility integrating acute and cancer care in alliance with the BC Cancer Agency.[1] This is the first Fraser Health facility in more than a decade to implement nursing documentation, and it employs Meditech's Client/Server version

[1] Information and data on Fraser Health clinical software applications is based on the HIMSS Analytics 2009 ICT Study and follow-up communications.

of the Patient Care System. The previous effort at nursing documentation, using Meditech's Magic Nursing application, stalled because Fraser Health was unsuccessful in persuading nurses to use the software to track events by entering observations, decisions, actions and the outcomes of those actions for patients. Even now, ARHCC has limited nursing documentation through the Patient Care System to assessment and has no imminent plans to rollout its full functionality. The next effort at expanding online nursing documentation is unlikely to occur before 2010 at Surrey Memorial Hospital and a yet-to-be constructed outpatient facility.

The current focus at Fraser Health is not on expanding online clinical solutions, but on aligning the operating systems of two groups of hospitals that are currently using different versions of Meditech clinical applications (Magic and Client/Server). By the end of 2010, all facilities will be operating on Client/Server. For the first time, Fraser Health facilities will adhere to common standards for nomenclature and clinical processes, thus streamlining the workflow process for using order entry (OE), normalizing patient data in the CDR and accelerating the output of a uniform patient record at all facilities in the region. In 2012, Fraser Health expects to migrate to Meditech's 6.0+ (Focus) product, which will establish a common clinical solution for the region.

Because Fraser Health is not currently focused on expanding automated clinical solutions, and given existing provincial funding constraints, its e-health clinical capability will not develop rapidly, except where specifically provincially mandated. Currently, common electronic clinical applications include primarily laboratory, pharmacy and radiology information systems, as well as nursing OE, including order communications, and also a CDR. In addition to the near absence of online nursing documentation, Fraser Health facilities have not installed physician documentation, electronic medication administration records (eMARs) or computerized practitioner OE (CPOE). In addition, Fraser Health's clinical decision support (CDS) capability for integrating clinical data from diverse sources and generating alerts and treatment suggestions currently only functions for drug interactions. Bar-coding is in use for laboratory, radiology and pharmacy systems, but not for medication administration.

At the same time, ARHCC is Fraser Health's prototype for new technology and best practices, and the pilot site for advanced clinical IM systems (Hiller 2007). The hospital's complete wireless infrastructure allows cardiologists to view diagnostic cardiology examinations transmitted from patients' bedsides at multiple locations. State-of-the-art resources at ARHCC include an anesthesia delivery unit providing patient demographics and diagnostic information at the point of care, a patient monitoring system in the recovery room viewable on monitors in the operating room, access to patient laboratory data at the anesthesia workstation and continuous input and availability of all anesthesia and patient monitoring data in the electronic anesthesia record. Such advanced technology is intended to serve Fraser Health's primary IT/IM goal of eventually creating a fully operational EHR for patients across the continuum of care by integrating Fraser Health's clinical information system with the provincial patient registry (Fraser Health Authority ND).

Interior Health

In 2006, Interior Health completed the implementation of an advanced clinical system, relying on the Meditech Magic solution, at its 18-bed South Okanagan General Hospital (SOGH).[2] As a foundation for its clinical systems, SOGH has implemented pharmacy, laboratory and radiology information systems. These feed patient data to a fully operational CDR from Picis, providing physician access for retrieving and reviewing results. SOGH's CDS system enforces patient safety measures by providing drug-to-drug dosing interactions, as well as establishing best practices for clinical guidelines and pathways for nurses and physicians.

What sets SOGH apart from Interior Health's other 21 acute care facilities is its live and operational applications for nursing documentation, CPOE, eMAR and physician documentation. More than 75% of SOGH's medical records are electronic and more than 50% of physician notes are documented electronically using canned text and structure templates. SOGH has succeeded in providing medication administration at the point of care by using bedside medication verification with bar-coding, which ensures that patients are being protected by the five rights of medication administration. Interior Health has invested in transforming SOGH to an entirely paperless environment as the prototype for its IT strategy for how healthcare will eventually be delivered across the region.

In its other acute care facilities, Interior Health is well along the curve of implementing the same pharmacy, laboratory and radiology information systems. Interior Health's hospitals are already connected to a single CDR from Picis for entering and accessing clinical data from these systems at each of its facilities. Additionally, the CDR stores and makes available data from non-Interior Health organizations (e.g. electronic medical summaries from physician offices), which can be viewed through the EMR/EPR by Interior Health physicians, nurses and staff. During the next three years, Interior Health will focus on achieving e-health equity across all acute care facilities in the areas of OE

[2] Information and data on Interior Health clinical software applications is based on the HIMSS Analytics 2009 ICT Study and follow-up communications.

for nursing and transcription in health IM by implementing the same systems and the applicable data and information standards for their use. After 2012, Interior Health's objective is to rollout clinical documentation, then CPOE and finally eMAR. At some point in the next decade, Interior Health expects that the entire region will be operating in a paperless EMR/EPR environment, with all facilities having achieved parity with the current advanced clinical state of SOGH.

Equally important to Interior Health's e-health strategy is a two-year collaboration with Fraser Health, also a Meditech environment, to establish standards for nomenclature and basic clinical processes across the two regions. Until now, the existence of multiple clinical applications at Interior Health has obstructed standardization, thus complicating OE for laboratories and pharmacies because physicians, nurses and staff work at different Interior Health facilities. Finally, commencing in fall, 2010, Interior Health will begin transitioning its facilities to Meditech's 6.1 (Focus) product. For the first time, Interior Health will be able to operate a common platform across three time zones, 22 acute care facilities and myriad other facilities within the residential, community, mental health and public healthcare sectors.

Northern Health

At first glance, Northern Health's clinical strategy would seem to be headed toward a comprehensive rollout of all software applications required for a region-wide paperless EMR/EPR environment.[3] BC's most northern HA has adopted a single vendor clinical solution, implementing a full suite of Cerner clinical products in four phases, scheduled to be completed in most acute care facilities by March 2016.

In the first phase, Northern Health's objective is to provide all hospitals and health centres with the same foundational clinical functionality necessary to develop a region-wide EMR/EPR for patient information that can be accessed from any site. This includes registration, laboratory, radiology and pharmacy information systems implementation, which is to be completed in all 18 acute care facilities no later than spring 2010. Registration, laboratory and radiology information systems are already live and operational for nine hospitals. Pharmacy information systems are live and operational at five of the eight hospitals with on-site pharmacies.

Northern Health is also currently implementing a CDR solution that will provide a more extensive EMR/EPR. When Cerner's PowerChart implementation is completed in 2010, physicians, nurses and staff at 24 acute care and ambulatory facilities across northern BC will be able to access the same patent information, regardless of the initial source of information. Other implementations in this phase include OE and a pilot of nursing documentation for a "frail elderly" initiative. Additionally, Crescendo's dictation and transcription functionalities will be live region-wide no later than spring 2010.

Future phases of the Cerner clinical rollout will allow Northern Health to implement those system-wide electronic clinical solutions that make crucial higher-level contributions to a complete EMR/EPR. Future implementations will include nursing documentation, patient scheduling, operating room scheduling, physician documentation, CPOE (achieved through a combination of Cerner products) and eMAR, as well as integration of its picture archiving and communication systems (PACS) and radiology information system modules. Currently, one hospital already has advanced connectivity for transmitting laboratory results to physician offices via Health Level 7 interfaces. When the basic Cerner clinical suite for EMR/EPR is implemented at the G.R. Baker Memorial Hospital in Quesnel, this functionality will be incorporated in the upgrade and subsequently rolled out to Northern Health's other facilities.

Even then, not all acute care facilities will be wired for all of these applications, and some modules of these applications might not become operational even at larger facilities. As a rural HA with few large urban centres, Northern Health sends its more complex patient cases to HAs in the Lower Mainland, allowing it to focus on providing a primary care delivery environment. Even with this focus, Northern Health is challenged to retain sufficient physician and nursing staff. As a result, Northern Health's e-health strategy stresses investment in those applications of an EMR/EPR that are appropriate to its restricted delivery of patient care in the acute care setting. For example, greater emphasis is being placed on a full complement of PACS systems to provide high-level diagnostic capability in a primary care setting via accessibility to physicians through an intranet or other secure network, rather than on compliance with CPOE, which is more essential in an advanced in-patient tertiary care setting. The preference of Northern Health's clinicians for an IT environment that stresses flexibility and the ability to customize electronic functionality to fit patient care in a rural setting accounts for its choice of Cerner's clinical suite.

Vancouver Coastal Health

Measured in terms of in-patient beds at acute care facilities, VCH is BC's largest HA with more than 2,400 beds at 11 acute care facilities. With 955 beds, Vancouver General Hospital is more than double the size of VIHA's Royal Jubilee Hospital (412 beds), BC's second largest facility. All of VCH's three Health Service Delivery Areas (HSDAs) are making steady progress toward an integrated regional EHR covering acute

[3] Information and data on Northern Health clinical software applications is based on the HIMSS Analytics 2009 ICT Study and follow-up communications.

care, community care, primary care and integration with BC's provincial e-health systems.[4]

VCH pursues a "best of breed" approach to clinical systems implementation, with many applications provided at a regional level and some at an HSDA level. Sunquest Laboratory, Agfa PACS and GE peri-operative systems operate region-wide, as does the Primary Access Regional Information System (PARIS) community system and the IntraHealth primary care EMR. Providence Health Care, a denominational healthcare system within the Vancouver HSDA, uses Eclipsys Sunrise Clinical Manager for its core acute clinical applications. Vancouver Acute (within the Vancouver HSDA) and the Richmond HSDA have adopted GE Carecast core acute clinical applications. In the Coastal HSDA, the North Shore and Sea-to-Sky sectors operate McKesson's STAR and Horizon products for ancillaries and clinical applications; the Powell River sector employs Meditech for ancillaries and clinical applications; and the Sunshine Coast sector uses CCD Health Systems (Santa Monica, CA) as its core clinical application.

VCH's primary e-health initiative is CareConnect, which functions as the streamlined EHR for VCH, including Providence Health Care. CareConnect links applications and web services through an EHR portal and CDR. Since 2004, VCH has been implementing CareConnect as the EHR solution, collecting and providing access to patient information from the clinical environments of Providence Health Care (Eclipsys) and Vancouver Acute (GE Carecast) in the Vancouver, Richmond (GE Carecast) and Coastal (McKesson) HSDAs, as well as the regional community PARIS and external sources of information including private laboratory results via Excelleris and provincial medication profiles via PharmaNet. Practitioners in the three HSDAs use CareConnect to access patient care information for laboratory results, medication orders, diagnostic images, radiology reports, transcribed documents and reports, encounters, demographics and contacts, as well as identity and linkage sets from the provincial patient registry or enterprise master patient index.

CareConnect's role is now expanding into the provincial realm, having been adopted as the province's E-Health viewer. CareConnect's reach will be extended to all BC HAs to provide integrated access to provincial clinical content via the Canada Health Infoway-compliant Health Information Access Layer, including laboratory results, medication profiles and diagnostic reports and images.

Beyond CareConnect, VCH's strategy for moving to a paperless EMR/EPR environment in acute care has recently slowed somewhat as a result of reduced funding. In terms of higher-level clinical applications, VCH is not scheduled for substantial implementation of CDS, CPOE, nursing documentation, eMAR or physician documentation applications in the near future. Currently, only the Providence Health Care sector of the Vancouver HSDA is live and operational for CPOE; however, this application is not linked to CDS systems. Nursing documentation is live and operational in a few areas of the Vancouver Acute sector of the Vancouver and North Shore HSDAs. CDS systems and eMAR have not been implemented at any VCH facilities.

Within community care, however, the PARIS implementation, including full electronic clinical documentation, has been deployed with great success in the Vancouver and Richmond HSDAs. The regional implementation of PARIS is now being completed with its implementation in the Coastal HSDA.

A key area of E-Health for VCH is mitigating the impacts of chronic disease and an aging population on healthcare delivery costs, particularly in the acute sector. This is driving a focus on providing functional, integrated enablers for community care, primary care, outpatient settings and ultimately patients themselves. CareConnect will be an essential component of this strategy (by providing an integrated longitudinal view of a patient's care records), as will PARIS and IntraHealth.

Another key area of focus for VCH is to manage costs by achieving internal efficiencies through initiatives such as staff scheduling, bed management and improved organizational decision support. IM/IT costs will be contained through partnership with other HAs, particularly Fraser Health and the PHSA in the Lower Mainland, as well as by internal productivity improvements and cost management.

Vancouver Island Health Authority

In late 2008, VIHA announced that it had completed the implementation of a common clinical architecture for a seamless region-wide single instance of an EMR/EPR operating on the same platform at all facilities (Waldner 2008). The strategy of installing a single instance of Cerner's clinical applications began in 2002 at facilities on the South Island. It was implemented on the North Island in early 2008, and later the same year at all four acute care hospitals and two health centres on the Central Island. Going forward, all data for patients seen at any VIHA facility will be entered in a single integrated EMR/EPR, which can be viewed by physicians, nurses and staff at any hospital or health centre in the three areas (Waldner 2009).

Currently, common data available in the EMR/EPR for VIHA patients include laboratory and diagnostic imaging results, medication profiles and emergency department information, including patient demographics.[5] In addition to providing integrated patient data from all facilities, the single electronic

[4] Information and data on VCH clinical software applications is based on the HIMSS Analytics 2009 ICT Study and follow-up communications.

[5] Information and data on VIHA clinical software applications is based on the HIMSS Analytics 2009 ICT Study and follow-up communications.

clinical record allows more accurate communication among physicians and nurses, and should reduce information redundancy and diagnostic testing duplication.

VIHA's implementation of a single EMR/EPR across all facilities for core clinical application will be expanded in future phases to include higher levels of electronic clinical connectivity. Currently, all facilities employ the same Cerner modules for laboratory, pharmacy, radiology and emergency department information systems. In addition, all hospitals are live and operational for a single instance of the same software application for transcription, chart deficiency, chart tracking and locator, ADT/registration, OE, patient scheduling and nurse staffing/scheduling. VIHA supports a single CDR for the in-patient and ambulatory environments. Physicians at VIHA's clinics are connected through Wolf Medical Systems' EMR for the physician office environment. While VIHA has implemented the eMAR application at all facilities, CPOE and physician and nursing documentation are not yet live and operational. Some CDS functionality is available through Cerner. Images from VIHA's PACS, provided through multiple vendor solutions, can be viewed in departments outside radiology. Bar-coding is used in pharmacies, but not yet in radiology departments.

VIHA's *Health Service Plan 2008/09 to 2010/11* outlines six key IM/IT initiatives for 2008 and 2009 (Vancouver Island Health Authority 2009). Among these is a project to redesign medication management processes to support safe dispensing and administration by introducing CPOE, which will provide physicians and other clinicians with CDS functionality for medication, laboratory, and diagnostic ordering processes. VIHA will also invest in telehealth, and will implement a new clinical documentation application to enhance interdisciplinary communication and effective discharge planning. Not surprisingly, now that VIHA has implemented a single instance of basic clinical applications across the region, the next goal is to develop a robust EHR to link personal health information to organizations both within and outside VIHA in order to strengthen clinical decision-making for the region's patients.

Provincial Health Services Authority

The first organization of its kind in Canada, the PHSA works with BC's five regional HAs to meet local and provincial needs. The PHSA provides a strategic and organizational framework to ensure effective and high-quality delivery of specialized services and selected province-wide programs. The PHSA manages the following provincial agencies: BC Cancer Agency (BCCA), BC Centre for Disease Control, BC Children's Hospital and Sunny Hill Health Centre for Children (BCCH), BC Mental Health and Addiction Services (BCMHAS), BC Renal Agency, BC Transplant, BC Women's Hospital & Health Centre (BCWH) and Cardiac Services BC. By planning, coordinating and evaluating specialized health services, the PHSA is working with the other HAs across BC to provide equitable and cost-effective healthcare for people who need provincial services such as cancer treatment, management of a complex mental health problem or cardiac care.

The PHSA is in the early stages of design and implementation of a comprehensive integrated PHSA-wide (all sites and services) clinical information solution, leveraging a shared instance of Cerner's clinical suite that has already been implemented at Vancouver Island Health Authority (VIHA). Over the next few years, to 2012 /2013, the PHSA will be focused on delivering, across all patient care sites at BCCH, BCWH, BCMHAS and BCCA, the foundational components of integrated diagnostic imaging, laboratory and pharmacy solutions. It will also be developing a robust CDR as well as beginning to provide an electronic view through Cerner PowerChart.

Currently, these patient care sites have operational stand-alone pharmacy information systems. The PHSA operates a comprehensive suite of laboratory subsystems, with Sunquest Laboratory providing the main information system for the clinical pathology and microbiology laboratories.[6] The PHSA laboratory provides laboratory services within the PHSA and is a reference laboratory for the province of BC. BCCH has a radiology information system for both radiology and cardiology. PACS systems are in place in most areas, utilizing technology from Phillips, Siemens, McKesson and Fuji. The PHSA shares diagnostic images province-wide, both to and from regional cancer centres and facilities at other HAs via transfer grid technology.

At BCCH and BCWH, Cerner's ADT registration, person management, bed management and scheduling information systems have been implemented in the shared instance, and also within BCCH's emergency department. Data from Cerner modules are extracted into a data warehouse, which is used for management reporting supported by business intelligence tools. Riverview Hospital and the Forensic Psychiatric Services Commission (FPSC) are currently running their own instance of Cerner ADT/registration, person management, and bed management systems. In addition, Riverview Hospital has implemented chart management, electronic view of results, transcribed documents and electronic laboratory orders through Cerner's PowerChart.

By year-end 2010, the PHSA will have implemented within the shared instance the following functionalities across four agencies (BCCH, BCWH, BCCA and BCMHAS-FPSC):

---

[6] Information and data on PHSA clinical software applications is based on the HIMSS Analytics 2009 ICT Study and follow-up communications.

Cerner's person management (patient ID, registration, ADT), Cerner Core (structured data requirements), a diagnostic imaging solution including the RadNet radiology information system and voice recognition technology, laboratory anatomical pathology for gynecological cytology and charts (Cerner's PowerChart) including results viewing for laboratory and diagnostic imaging, viewing of scanned documents, DICOM (Digital Imaging and Communications in Medicine) and non-DICOM clinical images and access to the provincial drug database. Expansion of the Philips PACS will include BCCA implementations as well as others, as appropriate after design. Design of a PHSA-wide pharmacy solution will be well underway and clinical order set redesign will have been initiated.

In 2011, the rollout of functionality will continue with PHSA agencies adding more comprehensive functionality for integrated transcription and electronic signatures and enterprise document management, until PHSA agencies are fully on board by 2013. Implementation of nursing documentation and CPOE across PHSA sites is not scheduled in the next 24 months. HQ

References

Hansen, C. 2009. "Budget 2009. Budget Speech." Retrieved May 5, 2009. <http://www.bcbudget.gov.bc.ca/2009/speech/2009_Budget_Speech.pdf>.

Hiller, W. 2007, "Abbotsford to Invest $8 Million in New Technologies", *Canadian Healthcare Technology*, September 2007, Retrieved April 21, 2009. <http://www.canhealth.com/sep07.html#07sepstory2 >.

Nagel, J. 2009, February 28. "Fraser Health Faces Budget Squeeze." *Abbotsford News.* Retrieved May 5, 2009. <http://www.bclocalnews.com/fraser_valley/abbynews/news/40441408.html>.

Fayerman, P. 2009, January 19. "Vancouver Coastal Health President Resigns to Take New Job." *Vancouver Sun.* Retrieved May 5, 2009. <http://www.vancouversun.com/news/Vancouver+Coast+Health+president+resigns+take/1194768/story.html>.

Waldner, H. 2009. "A System-wide EHR Enhances Healthcare in Canada." *The Cerner Quarterly*. Vol. 5, No. 1, 2009. Retrieved April 21, 2009. <http://www.cerner.ae/public/CernerQuarterly.asp?id=31402>.

Waldner, H. 2008. "VIHA's Fall 2008 CEO Update." Retrieved May 5, 2009. <http://newsletters.viha.ca/news>.

Vancouver Island Health Authority. 2009. "Health Service Plan 2008/2009 to 2010/2011." Retrieved May 5, 2009. <http://www.viha.ca/about_viha/news/publications>.

About the Author

Patrick Powers, PhD, is a senior research manager at HIMSS Analytics with oversight responsibility for the Canada ICT database and research, and an occasional visiting faculty member at several American colleges and universities in government and the humanities.

Longwoods journals are published in partnership with our readers, our editors, our advisory boards, our authors as well as healthcare organizations and their suppliers of solutions and services. We value this participation in and dedication to leadership and knowledge. They enable us to present new ideas, policies and best practices essential to healthcare management, practice, education, research and innovation. It is a measure of their support for learning. Nothing can be more fundamental to the progress of healthcare.