

Integrating Healthcare and e-Health in the Territories: The Tasks Ahead for Yukon, the Northwest Territories and Nunavut

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Introduction

In the government's Speech from the Throne opening the Third Session of Canada's 40th Parliament, delivered on March 3, 2010, the Right Honourable Michaëlle Jean, Governor General of Canada, asserted that the current government "established the Northern Strategy to realize the potential of Canada's North for northerners and all Canadians." Specifically, the government "will continue to give northerners a greater say over their own future and take further steps toward territorial devolution" (Government of Canada 2010).

In the last decade, the federal government's policy of promoting Canada's North for northerners has been echoed in the strategic initiatives, budgets and specific policies of the country's northern jurisdictions. Specifically in healthcare and social services, Yukon, the Northwest Territories and Nunavut have undertaken initiatives in the last year that reflect the distinctive healthcare needs and priorities of their northern jurisdictions. Examples of initiatives undertaken since 2004 follow:

- In February 2011, Yukon Health and Social Services announced that the Yukon government would continue

funding three local mental health programs that were previously funded under the federal government's Territorial Health Access Fund (federal funding expired on March 31, 2011) (Yukon Health and Social Services 2011).

- In January 2011, the federal Minister of Indian Affairs and Northern Development and Federal Interlocutor for Métis and Non-Status Indians, the Premier of the Northwest Territories and the Chair of the Inuvialuit Regional Corporation signed an agreement-in-principle for the devolution of the jurisdiction's lands and resources from Canada to the Government of the Northwest Territories (Government of the Northwest Territories 2011). Once a final devolution agreement is signed, authorizing the transfer of administration, control and management of land, water, mines, minerals, and oil and gas in the Northwest Territories from the federal Government of Canada, the Northwest Territories will access increased revenues. These revenues will allow expanded funding for development of enhanced health and social services, especially in the area of primary healthcare, which is necessary for sustaining the kinds of programs required to serve the specific healthcare and social service

needs of the jurisdiction's distinctive population mix.

- The increase in tuberculosis rates in Nunavut in 2010, which are approximately 62 times the national average, has sounded a nationwide alarm that this jurisdiction's healthcare problems require greater federal attention in terms of resources to improve hygiene, housing and nutrition to reduce the spread of the disease. Nunavut's Department of Health and Social Services is currently establishing an electronic database to track disease outbreaks (CBC News 2010).

Long-term strategic healthcare planning policy implementation is crucial to the future well-being of the northern jurisdictions in a way that differs decisively from the orientation of future healthcare demands on the southern provinces. As Stuart J. Whitley, deputy minister of Health and Social Services, Yukon government, pointed out in a recent article for *The Hill Times*, in the northern jurisdictions one in five residents are under the age of 15, unlike most southern jurisdictions, which have aging populations. The quality and quantity of health and social services available to the North's youthful populations in their formative years will have long-term effects on the social, psychological, economic and political fabric of the North for generations to come.

“We who are stewards of the healthcare system in the North must ... imagine a different future, or the costs of present arrangements will soon overwhelm us”
– S.J. Whiteley, DM Health and Social Services, Government of Yukon, 2011

These future consequences of current healthcare and social services delivery might seem of little consequence to the vastly more populated southern regions of Canada, save for the fact that increasingly Canada will depend on development of the resources of its northern regions to sustain a viable Canadian economy and social fabric. For this reason, Whitley argued that “We who are stewards of the healthcare system in the North must now more than ever be able to imagine a different future, or the costs of present arrangements will soon overwhelm us” (Whitley 2011).

Healthcare Priorities in the Current Budgets for Yukon, the Northwest Territories and Nunavut

The three northern jurisdictions, like the provinces, share a common commitment to expanding delivery of healthcare services for the sake of improving the healthcare status of their populations and adopting e-Health solutions enabling improvements in patient clinical and safety outcomes. Yet, the residents and providers of Yukon, the Northwest Territories and Nunavut are confronted by unique environmental, economic and social

challenges, which impose exceptional demands for delivery of medical services in ways not confronted by Canada's southern jurisdictions. Evidence of the northern commitment to tailoring healthcare services to meet the unique demands of northern medical practice, while keeping pace with the latest advances in healthcare delivery and e-Health unfolding in academic medical centres across the southern provinces, is found in the 2011-2012 budget allocations for healthcare services approved by the three jurisdictions.

Yukon's commitment to improving healthcare delivery is reflected in the 14% spending increase in the 2011-12 budget over the previous year for health and social services. Since 2002, expenditures for health and social services increased from \$143 million to \$261.2 million (Budget Highlights 2011). The mandates driving the increase were laid out in the recommendations of *The Yukon Health Care Review Final Report*, issued in September 2008. Major recommendations included changes in the Medical Travel Program, the Chronic Disease and Disability Benefits Program, the seniors' Pharmacare and Extended Health Program, the Children's Drug and Optical Program, and Continuing Care Services. The report also recommended continued investment in continuing care, collaborative primary care delivery models, expansion of locally available specialist services, and the transfer of services and facilities to the Yukon Hospital Corporation, including the new regional Watson Lake Cottage and Dawson Creek hospitals (Government of Yukon 2008.)

For fiscal year 2011-12, the Northwest Territories will spend an estimated \$344.505 million, or 25%, of the jurisdiction's \$1.339 billion budget, which is 4% more than the estimated expenditures for education, culture and employment for 2011-12 (Northwest Territories Finance 2011.) The government's healthcare strategy is laid out in “A Foundation for Change,” a blueprint for healthcare action to be undertaken before 2012 to secure the following goals:

- Wellness: communities, families and individuals make healthy choices and are protected from disease
- Accessibility: people get the care they need, and know where and how to find it
- Sustainability: resources are used effectively and innovatively to ensure that the health and social services systems will be sustained for future generations

Since 2004, the Northwest Territories has employed a tripartite integrated service delivery model for health and social services. The model uses a primary community care approach, ensures all caregivers and their organizations are connected, and works together to describe and strengthen core services (Northwest Territories Health and Social Services 2009).

Despite a projected \$50 million deficit for fiscal year 2011-12, in the face of an expected 7% increase in revenues, the

Government of Nunavut will increase the budget for the Health and Social Services Department by \$32 million. The 2011–12 budget's estimate of healthcare expenditures at \$331.849 million will equal approximately 25% of the jurisdiction's entire budget for expenditures at \$1.316 billion (Department of Finance, Government of Nunavut 2011). Distinctive objectives of the healthcare budget are a major focus on preventive medicine, given the recurring outbreak of infectious diseases, and ongoing financial support for implementing MEDITECH'S advanced 6.0 clinical solution across all inpatient and ambulatory facilities, thereby positioning Nunavut among the leading Canadian jurisdictions closing in on implementing a truly jurisdiction-wide interoperable electronic health record (iEHR).

At the same time, though the three jurisdictions share a common set of healthcare challenges and financial commitments to improving the health status of their populations, by and large they do not share the same approach to healthcare delivery solutions. Just as Yukon, the Northwest Territories and Nunavut are distinguished from the 10 provinces by their legal status, in essential ways the three jurisdictions are also distinguished from the provinces and from each other in the way each jurisdiction's funding is allocated to administer and deliver healthcare. Yukon is a single healthcare jurisdiction, though with a special relation to the stand-alone corporation, Yukon Hospital Corporation, operating the jurisdiction's three hospitals. The Northwest Territories, despite its small population of just over 42,500 residents, has eight health and social service authorities that operate largely as independent from the central Department of Health and Social Services. Though Nunavut is also a single healthcare jurisdiction, unlike Yukon, it has three administrative regions. Understanding the organization of healthcare delivery and funding in the three northern jurisdictions is essential to understanding the challenges Yukon, the Northwest Territories and Nunavut face in implementing a jurisdiction-wide single e-Health strategy conducive to delivering timely and excellent healthcare for all residents.

Part One: Healthcare Delivery, Administration and Funding in Yukon

Primary healthcare, the heart of Yukon's healthcare strategy for its small and far-flung population of an estimated 33,246 residents (less than 1% of Canada's 34.01 million citizens as of 2010), is delivered at 12 primary care health centres. Additionally, secondary and some tertiary care is delivered at one regional acute care hospital, Whitehorse General Hospital (WGH) in Whitehorse, with 49 acute care beds. Two smaller regional hospitals are being constructed in Watson Lake (a replacement facility serving 1,555 residents), to the east of Whitehorse, and Dawson City (a new facility to open in 2012 serving 1,873 residents), to the north. Some specialty care and services are provided at WGH by visiting out-of-Yukon special-

ists, who rotate in and out on a weekly basis. Such out-of-Yukon care and additional specialist services – especially in cancer care, cardiology and other acute specialties – are mainly provided by regional health authorities in British Columbia (Vancouver Coastal Health and Provincial Health Services Authority in Vancouver) and Alberta (Alberta Health Services in Edmonton and Calgary). These services are paid for in accordance with established reciprocal billing arrangements. As well, some specialty services are contracted directly with local and out-of-Yukon provider groups (e.g., radiology interpretation services).

Since Yukon has no health authorities, healthcare funding, strategic oversight, service delivery and purchasing for the 12 health centres is managed directly by the Department of Health and Social Services (DHSS). Yukon Hospital Corporation (YHC) owns and manages Yukon's three acute care facilities in Whitehorse, Watson Lake and Dawson City. YHC/WGH receives an annual global budget from the DHSS for the provision of acute and non-acute hospital services, which amount is adjusted for inflation and projected growth. The DHSS provides 90% of YHC/WGH's budget, to which includes separate amounts for operations and maintenance, and capital spending. An additional source of capital for YHC/WGH is the non-profit Yukon Hospital Foundation, which raises funds for special projects such as a new CT scanner, and may raise monies for diagnostic imaging equipment. YHC/WGH also receives some third-party payments from individuals not insured in Canada. Funding assigned by the DHSS to YHC/WGH is allocated for various services by determination of YHC/WGH's Board in collaboration with the hospital's senior administrators.

Healthcare purchasing in the Yukon is divided between the DHSS and YHC/WGH. The DHSS handles all purchasing, including IT/IS, for the 12 health centres. YHC/WGH has complete purchasing authority for all hospital service expenditures at the three acute care sites, including IT/IS, within its budgetary control. Final authority for approving Yukon IT/IS projects rests with senior management at DHSS or YHC/WGH or both. Responsibility for managing these projects rests with the IT managers for the DHSS and YHC/WGH, as appropriate.

The northern jurisdictions were early leaders in establishing shared service organizations for many governmental functions in order to realize economies of scale and administrative efficiencies. The Information and Communications Technology (ICT) Division of Yukon's Department of Highways and Public Works provides shared ICT services to all Government of Yukon departments, including the DHSS, and also to the Yukon public. The ICT Division has general responsibility for delivering application, development, network and telecom services, as well as corporate information management. In particular, the ICT Division oversees the Government of Yukon's IT network and all user accounts; maintains a large number of servers and government-wide corporate systems, including finance software

and some corporate databases for some software applications and the telecom servers; and provides records management and some software development (Based on research and interviews with Government of Yukon DHSS, 2009 and 2010).

Part Two: Healthcare Delivery, Administration and Funding in the Northwest Territories

The Northwest Territories delivers most healthcare regionally through seven Health and Social Services Authorities (HSSAs) and the Tlicho Community Services Agency (CSA), which serve a combined population of an estimated 43,529 residents (less than 1% of Canada’s citizens). The HSSAs and the CSA provide healthcare through a combined four acute care facilities, 22 health centres, six health stations and four primary care clinics, as well as other healthcare facilities. Some tertiary care is referred south to hospitals in Edmonton, Alberta. See Table 1 for Northwest Territories HSSAs and CSA.

Healthcare funding and strategic oversight for the eight HSSAs and one CSA is provided by the Northwest Territories’ Department of Health and Social Services (DHSS), located in Yellowknife. Each HSSA and CSA receives an annual global budget for healthcare, including IT/IS, which is adjusted for inflation and projected growth. Several HSSAs raise additional funds through community events and private sector donations. Working within an approved budget from the DHSS, an HSSA’s or CSA’s senior management allocates DHSS funding among its services, including IT/IS, based on the HSSA’s strategic priorities. An HSSA can fund requests for new IT capital expenses either by shaving dollars from non-IT/IS areas and reallocating the amount to IT and IS services, or by escalating the capital request up to the DHSS for supplemental territorial funding. These requests are reviewed by the Financial Management Board Secretariat (FMBS) of the Government of the Northwest Territories.

Each HSSA or CSA has centralized purchasing authority for all healthcare facilities in its region. While hospitals, health centres and clinics in an HSSA and CSA have on-site responsibility for day-to-day operating decisions about healthcare delivery, these facilities do not have independent authority over funding, budgeting, purchasing or strategic planning. Purchasing authority for IT/IS in the Northwest Territories is divided between the DHSS, HSSAs, CSA and the Technology Services Centre (TSC) – a shared services organization that reports to the Office of the Chief Information Officer (OCIO) under the FMBS (see below).

- For IS clinical applications, the DHSS, HSSAs and CSA purchase software solutions from their own budgets. In the future, new projects up for approval must go through a collaborative development process, as “stand-alone” application development is no longer acceptable.
- The DHSS, HSSAs and CSA do joint purchasing for juris-

Table 1. Northwest Territories HSSAs and CSA

Beaufort-Delta HSSA, serving an estimated 6,750 residents at Inuvik Regional Hospital and seven health centres
Dehcho HSSA, serving an estimated 3,420 resident at four health centres and three health stations
Fort Smith HSS, serving an estimated 2,396 residents at one health centre/hospital, Fort Smith Health Centre
Hay River HSSA, serving an estimated 3,777 residents at the regional H.H. Williams Memorial Hospital, one medical clinic and one health station
Sahtu HSS, serving an estimated 2,629 residents at four health centres and one health station
Stanton Territorial HA, serving an estimated 3,211 resident at Stanton Territorial Hospital and four clinics
Yellowknife HSSA, serving an estimated 19,817 residents at two health centres, four primary care clinics and one health station
Tlicho CS, serving an estimated 2,927 residents at three health centres and one health station

CS = community services; HA = health authority; HSS = health and social services; HSSA = health and social services authorities.

diction-wide e-Health IS initiatives, most importantly for the components of an interoperable electronic health record (iEHR), including an enterprise medical record, PACS/ diagnostic imaging and telehealth.

- The HSSAs and CSA, excepting Dehcho and Sathu HSSAs (see below), have responsibility for purchasing and supporting their clinical server infrastructure, desktop and office environment, and clinical software solutions other than iEHR (e.g., laboratory, operating room systems and scheduling), as well as financial and administrative software applications.

The point-person in each HSSA or CSA for initiating and spearheading plans for IT/IS purchases is normally the manager of information systems, information services or computer services. Final authority for all purchases is made by a committee of senior management, which may or may not include the manager of IT/IS.

The jurisdiction-wide TSC, under the Office of the Chief Information Officer, provides the IT infrastructure, including e-mail, core servers and desktop environment, for all governmental entities, including the DHSS. For all HSSAs and the CSA, the TSC supports e-mail and the digital communications network. For the Dehcho and Sathu HSSAs, the TSC also supports all IT services, including clinical software applications. The OCIO/TSC is currently implementing a government-wide

new financial system – known as the System for Accountability and Management, or SAM – which is using Peoplesoft Financials software (Based on research and interviews with Government of the Northwest Territories DHSS, 2009 and 2010).

Part Three: Healthcare Delivery, Administration and Funding in Nunavut

Nunavut delivers healthcare for an estimated 32,900 residents (less than 1% of Canada's residents) through a primary care system involving 31 local health centres, as well as one 19-bed acute care facility, the Qikiqtani General Hospital (formerly Baffin Regional Hospital), located in Qikiqtaaluk/Iqaluit (formerly Baffin), and one additional facility with acute care services in Rankin Inlet – Kivalliq Health Facility. In addition to jurisdiction-wide healthcare services administered centrally by the Government of Nunavut through three local administrative centres (Qikiqtaaluk/Iqaluit, Kivalliq and Kitikmeot), First Nations and Inuit residents receive primary, emergency and supplementary healthcare services directly from the federal department of health, Health Canada.

In Nunavut, healthcare funding, strategic oversight and purchasing for clinical services at all healthcare facilities are centrally administered through the DHSS. While there is some local discretionary authority over allocation of funding for local services, generally, all allocation is also centrally determined.

Purchasing for all Nunavut hospital clinical services, including IT/IS, is carried out predominantly by the DHSS. Some purchasing is carried out locally by regional administrative offices of Qikiqtaaluk at Iqaluit, Kivalliq at Rankin Inlet, Kitikmeot at Cambridge Bay and by the Materials Management Office at Qikiqtani General Hospital in Iqaluit.

Nunavut's IT Shared Services organization, Community and Government Services – Information and Technology Division, funds, purchases and supports administrative (human resources, etc.) and financial (accounts payable, etc.) software applications, core hardware servers, telecommunications and databases for all government departments, including healthcare facilities (Based on research and interviews with Government of Nunavut DHSS, 2009 and 2010).

E-Health Initiatives in the Northern Jurisdictions – TeleHealth

Given the limited resources of the northern jurisdictions, Canada Health Infoway has played a major role in funding the development of e-Health solutions focused on improving the healthcare in Yukon, the Northwest Territories and Nunavut. Consistent with the southern provinces, these northern jurisdictions have developed common diagnostic imaging system solutions across their acute and non-acute healthcare sites, as well as participated in the pan-Canada iEHR initiative.

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Not surprisingly, given their geographic expanse and small and largely isolated populations, Yukon, the Northwest Territories and Nunavut have focused on implementing widespread use of telehealth solutions. As in the southern provinces, telemedicine offers a viable alternative to travelling medical specialists. It can help avoid costly and stressful patient transfers, can enable planning for necessary transfers, and can help optimize patient treatment in a timely manner and arrange for follow-up care (Canada Health Infoway n.d.b).

At present, telemedicine services are available in the three jurisdictions as follows:

- In Yukon, through access to the Yukon Telehealth Network, 14 communities have telehealth capability for medical care, continuing care, alcohol and drug counselling, and social and mental health services, as well as follow-up care via video conferencing. Yukon's telehealth sites also participate in the Central BC and Yukon Telemedicine Initiative, consisting of 10 British Columbia hospitals and clinics and the Whitehorse General Hospital in Whitehorse, which was completed in 2005.
- In the Northwest Territories, telehealth services were initiated in 1998 with the WestNet Telehealth Pilot. Currently, there are approximately 27 sites spread throughout eight HSS authorities. Specifically, 23 communities have access to telespeech video conferencing technology that provides speech language pathology services in patients' home communities without the presence of the provider.
- In Nunavut, the IIU Network Nunavut Telehealth Project, which has been live and operational since 2003 through Canada Health Infoway support, connects 33 healthcare sites.

As the caseload of patients in remote areas requiring more home care has increased throughout the northern jurisdictions, so has access to electronic technology that facilitates more locally-based patient care. In Yukon, a project has been under way since 2009 to equip all homecare staff with tablet computers that allow home care providers to quickly download patient information before or during the home visit, as well as immediately upload information at the close of a home care visit (Canada Health Infoway n.d.a).

One of the challenges facing the expansion of telehealth medical practice, not only in the northern regions but across

Canada, is the fact that legal regulation of telehealth is not well-defined and thus not provider-friendly. By definition, the provision of telehealth services is indifferent to jurisdictional boundaries. Yet, with regard to licensing of telehealth practitioners, a “provincial/territorial patchwork system of telemedicine by-laws, guidelines, policies and practices continues to exist in Canada.” (Licensure and Telemedicine: National Review of Policies: 26) While the Canadian Society of Telehealth supports a national telehealth regulatory framework, the Federation of Medical Regulatory Authorities of Canada has not yet achieved a national consensus on telehealth licensure. Only four provincial regulatory Colleges have adopted telemedicine licensure regulations. Yukon, the Northwest Territories and Nunavut are among the Canadian jurisdictions without such regulations. In fact, in 2007, the Northwest Territories declined to issue licenses for telemedicine until “... a clear trend develops; noting that registration of telehealth providers is a complex area which is still evolving” (Licensure and Telemedicine: National Review of Policies: 25).

E-Health Initiatives in the Northern Jurisdictions – Interoperable Electronic Health Record

All three northern jurisdictions are working with Canada Health Infoway to develop respective jurisdictional-wide electronic health records (EHRs) connecting acute, ambulatory and physician facilities and services, which will eventually be integrated in the projected pan-Canada iEHR. In keeping with the distinctive approaches of most dimensions of healthcare administration and delivery being carried out by the three northern jurisdictions, Yukon, the Northwest Territories and Nunavut are also engaged in developing of a jurisdiction-wide EHR in distinctive ways (based on research and interviews in the three jurisdictions):

- As outlined above, Yukon prioritized telehealth as a foundational element of its long-term e-Health strategy. This strategy was inaugurated in 2005 when the Connect Yukon project enabled high-speed Internet access for 95% of Yukoners. E-Health initiatives that have become live and operational since 2005 through Connect Yukon include telehealth, video conferencing, telehomecare and teleradiology.
- Likewise, Yukon’s DHSS, in conjunction with YHC/WGH, is currently focusing on diagnostic imaging (DI) and laboratory result initiatives that will contribute to developing WGH as Yukon’s hub for access and storage of radiology images and lab results for all healthcare sites, while improving access by practitioners.
- Another e-Health project in which the Yukon DHSS is engaged is the Public Health Information Project in collaboration with British Columbia’s Ministry of Health. Specifically, Yukon and BC are collaborating on implementa-

tion of Panorama, the pan-Canadian public health information system solution for managing communicable diseases and immunization.

- In January 2010, the Northwest Territories’ DHHS began implementing the NWT HealthNet Viewer, a web-based integrated hospital information and health information exchange system. The HealthNet Viewer, the first step in establishing a jurisdiction-wide iEHR, is being implemented in phases across seven HSSAs and one CSA and will provide Northwest Territories’ healthcare professionals with remote view-only access to integrated demographic and medical information for all patients. Clinical information from four acute care and other non-acute sites – including information drawn from Lawson Healthvision’s MediPatient clinical data repository (CDR), GE Healthcare’s laboratory information system (LIS) and Agfa’s radiology information system (RIS) and picture archiving communications system (PACS) (as well as some clinical reports, discharge summaries and patient lists), will be fed via interfaces to a provincial CDR. The provincial CDR is integrated with the province’s client registry or enterprise master person index. Currently, the preponderance of Northwest Territories’ clinicians can access the HealthNet Viewer.
- Nunavut’s DHSS is pursuing a strategy of implementing the clinical solutions of the MEDITECH Client Server 6.0 product in a phased approach over the next two years at 33 territorial healthcare sites, including 31 primary care clinics and two acute care sites at Qikiqtani General Hospital and Kivalliq Health Facility – Rankin Inlet. The MEDITECH 6.0 implementation is the foundation of Nunavut’s strategy to build a jurisdiction-wide electronic health record by 2012 (see below for more details).

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E-Health Initiatives in the Northern Jurisdictions – Primary Care and Physician Office EMRs

In the northern jurisdictions, perhaps more so than elsewhere in Canada, it is obvious that primary healthcare delivery is the front line of providing most non-critical healthcare for the majority of northern residents. Most residents do not have easy access on a daily, weekly or even monthly basis to the services of an acute care inpatient setting, such as those at hospitals in Whitehorse, Yellowknife or Iqaluit. Central to effective primary care delivery

in the northern regions is the use of primary healthcare teams that bring together physicians, nurses, pharmacists, physiotherapists and nutritionists, working collaboratively to deliver comprehensive healthcare to residents in their rural communities. In this context, the combined nine acute care hospitals and health centres in the three jurisdictions truly serve as regional hubs for secondary and some tertiary healthcare delivery, rather than as the source of all healthcare for the region. Seen in this light, the mix of inpatient and outpatient healthcare delivery systems that has emerged in Yukon, the Northwest Territories and Nunavut through two decades of experience and planning provides exemplars of the integrated “continuum of care model” that is regularly advocated but not easily implemented in the southern provinces.

Not surprisingly, although the northern jurisdictions may be at the forefront of developing appropriate and viable Canadian models of primary care-centred healthcare delivery, Nunavut, the Northwest Territories and to some extent Yukon suffer inordinately from Canada’s shortage of physicians and nurses. Without these resources, the primary care delivery model cannot be effectively implemented. Currently, the physician-to-patient-ratio in Nunavut is one medic for every 3,000 residents. Only Yukon benefits from a low, one to 268 doctor-patient ratio (Hernandez 2011). As of early January 2011, statistics indicated that 115 physicians reside in Yukon and 75 in the Northwest Territories, but only 15 in Nunavut (Nunatsiak Online 2011). Likewise, Nunavut suffers inordinately from the lack of nurses or nurse practitioners, as the jurisdiction currently has only 46 serving a population of approximately 30,000. To address the problem of insufficient healthcare providers serving a population afflicted with chronic diseases such as tuberculosis and diabetes, Nunavut has enacted the Nunavut Nursing Recruitment and Retention Strategy 2007–2012. The strategy includes a four-year bachelor of science in nursing degree at the Nunavut Arctic College in Iqaluit, with plans to expand the program to Cambridge Bay and Rankin Inlet. By contrast, the Northwest Territories’ Aurora College Nursing Program is graduating nurses who are joining the 400 nurses already working in the jurisdiction. These include licensed practical nurses, registered nurses and nurse practitioners (Government of the Northwest Territories 2010).

A successful primary healthcare strategy for improving patient clinical outcomes depends on developing a comprehensive patient information record that is accessible to all caregivers in a timely manner. For rural environments such as the northern jurisdictions, a complete patient record can realistically only be developed through use of an electronic medical record (EMR) by the patient’s providers, who input and view patient information from locations at distances from one another and often without the benefit of a immediate or direct access to the patients. Additionally, access to a viable physician EMR solution that is

integrated electronically with the jurisdiction’s healthcare facilities and patient records is a major incentive for attracting physicians to practise and reside in Yukon, the Northwest Territories and Nunavut. Currently, the status of physician EMR initiatives in the northern jurisdictions is as follows:

- Although Yukon has not yet undertaken a jurisdiction-wide initiative to implement a physician office EMR solution, approximately 70% of the jurisdiction’s physicians already use either the QHR-owned CliniCare EMR or Plexia Electronic Medical Records physician office EMR solutions. In 2009, WGH received federal wait-time funding to implement an electronic system for distribution of clinical results to staff physicians. Clinical information to be accessed by physicians, employing CliniCare and Plexia EMRs, will include MEDITECH laboratory, microbiology and blood bank tests results, as well as diagnostic imaging and other reports.
- In 2007, the Northwest Territories’ DHSSs initially signed an agreement with Nightingale Informatix Corporation to roll out physician EMR and practice management solutions over several years that was intended to support more than 150 physicians and community-based healthcare workers throughout the jurisdiction. Instead, the physician EMR solution of Wolf Medical Systems was eventually installed at two primary care clinics in the Yellowknife HSSA. Currently, approximately 30 staff physicians, five rotating visiting physicians and five nurse practitioners access the Wolf EMR solution at the Yellowknife Primary Care Centre and Frame Lake Community Health Clinic.
- Starting in 2011, as part of Nunavut’s region-wide implementation of MEDITECH 6.0 across all facilities in a staged rollout, the jurisdiction will provide all physicians with access

Since 2007, HIMSS Analytics has conducted an annual survey of ICT systems at acute care hospitals in Canada. Currently, HIMSS Analytics publishes quarterly EMRAM scores for Canadian hospitals, based on the most recent data collection for the acute care environment across the ten provinces, Yukon, the Northwest Territories and Nunavut. The status of Canada’s progress at implementing a comprehensive e-Health strategy for acute care facilities in 10 provinces and three northern jurisdictions is documented quarterly in the HIMSS Analytics Canada EMR Adoption Model SM scores. Figure 1 shows the 2010 Q3–2010 Q4 (Final) scores for Canada, which are based on the comprehensive results of the 2010 Canada ICT Study for acute care hospitals. In 2010, Yukon, the Northwest Territories and Nunavut participated in the 2010 acute care study on behalf of their combined eight acute care hospitals.

to a Physician Desktop viewer, the foundation of an interactive EMR system, which will allow them to view patient records at provincial healthcare facilities.

HIMSS Analytics' EMRAM Scores for Hospitals and Ambulatory Settings

Over the last few years, the northern jurisdictions of Yukon, the Northwest Territories and Nunavut have embraced electronic healthcare solutions as an essential component of any serious strategy aimed at providing excellent healthcare for their rural populations who live at great removes from major urban centres of academic medicine such as Vancouver, Edmonton or Winnipeg. But even more importantly, these jurisdictions have begun implementing viable policies and practices that will soon realize the benefits of electronically enabled healthcare for their residents over the next decade. The time is approaching when the northern jurisdictions would benefit from folding into their e-Health strategies the component of measuring their progress at implementing a paperless healthcare delivery solution in both the acute and ambulatory environments and correlating their EHR progress with advances in clinical outcomes and patient safety. For this reason, since 2007, Canadian providers, including the Northern jurisdictions, have participated in the HIMSS Analytics Canada Information and Communications Technology (ICT) Study, which measures levels of a paperless clinical environment at acute and ambulatory facilities, in order to access the HIMSS Analytics Electronic Medical Record Adoption Model (EMRAM) score and collateral benchmarking reports.

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What is the HIMSS Analytics EMRAM score? The acute care EMRAM score measures levels of acute care EMR/EPR (electronic patient record) capabilities ranging from limited ancillary department systems to a fully electronic environment on a continuum of eight stages from zero to seven.¹ Stage 7 allows clinical information to be readily shared via electronic transactions or exchange of electronic records within a health information exchange, including other healthcare organizations, government entities and patients in Canada or the US. It is important to note that in American terms, EMR refers equally to an inpatient hospital or outpatient ambulatory environment.

Table 2: Ambulatory EMRAM – Stage 5 Indicators

Proactive and automated outreach to patients for preventive care and chronic disease management
Proactive searching for patients with particular conditions and medications as new clinical evidence (including recalls) develops
Interconnected regional community of physicians and healthcare organizations to easily share and exchange information, and collaborate, for improved patient care
Ability to mine data for clinical research

In Canadian terms, EMR refers most often to the ambulatory environment of physician offices, health centres or outpatient clinics, while EPR refers to the inpatient hospital environment.

Why is the HIMSS Analytics EMRAM score a valuable tool for Canadian healthcare delivery organizations to use in measuring their clinical e-Health progress? The methodology and algorithms of the hospital EMRAM score are currently used to automatically score more than 5,000 hospitals in the US database and 639 Canadian acute care facilities that participated in the 2010 Canada ICT Study. In particular, the annual survey targets detailed information about an acute care facility's EMR/EPR environment. Of the 76 benchmarking reports that HIMSS Analytics makes available to participating regional healthcare organizations and their hospitals, 33 compare their EMRAM scores to factors such as IS Department Operating Budget, Nurse FTEs, IS Department FTEs and other hospitals' EMRAM scores.

Canadian regional organizations and their hospitals which complete the annual HIMSS Analytics ICT Study, have easy web-based access to combined 76 benchmarking reports, including 47 at the hospital level and 29 at the regional level. Each of these reports allows them to compare their organization against 10 de-identified or blinded peers selected on the basis of 33 hospital or 13 regional factors including bed size, adjusted patient days, facility type, total operating expense, system installed, location, etc. Benchmarking comparisons include IS department operating statistics such as full-time equivalents, operating budget and salary expense, in addition to EMRAM score comparisons.

In late 2009, an annual survey of ICT systems at Canadian ambulatory health centres and outpatient clinics was initiated. After four quarters of 2010 data collection, results confirm widespread Canadian interest across the provinces in providing the data necessary to establish a robust evaluation of IT implementation in the ambulatory or outpatient environment. HIMSS Analytics is planning to debut an Ambulatory EMR Adoption Model SM score during 2011, based on the American and Canadian data collection for physician offices, health centres and outpatient clinics. The future Ambulatory EMRAM

Figure 1. Canada EMR Adoption ModelSM Q3 2010 – 2010 Final

		2010 Q3	2010 Final
Stage 7	Complete EMR; CCD transactions to share data; data warehousing; data continuity with ED, ambulatory, OP	0.0%	0.0%
Stage 6	Physician documentation (structured templates), full CDSS (variance and compliance), full R-PACS	0.2%	0.2%
Stage 5	Closed loop medication administration	0.0%	0.2%
Stage 4	CPOE, Clinical Decision Support (clinical protocols)	2.7%	2.2%
Stage 3	Nursing/clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology	32.7%	33.0%
Stage 2	CDR, Controlled Medical Vocabulary, CDS, may have document imaging; HIE capable	24.4%	23.5%
Stage 1	Ancillaries – Lab, Rad, Pharmacy – all installed	10.6%	12.1%
Stage 0	All three ancillaries not installed	29.4%	29.0%

Data from HIMSS Analytics™ Database.

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companies and patients, allowing easy sharing and exchange of information and collaboration for improved patient care and development of evidence-based medical protocols. Yukon and Nunavut participated in the 2010 ambulatory study on behalf of their combined 66 non-acute facilities providing ambulatory, sub-acute and home health services. The Northwest Territories is expected to participate in the ambulatory study in 2011 on behalf of the jurisdiction's combined 45 non-acute facilities in four health authorities with an acute care hospital (Beaufort-Delta, Fort Smith, Hay

River and Stanton Territorial Health Authorities)

Figure 2. Ambulatory EMR Adoption ModelSM

Stage 5	Preventive care, chronic disease management, HIE participation, clinical data analysis
Stage 4	Advanced CDSS, PHR provided, summary pt. data reports, links to pt. registries, interoperable orders
Stage 3	EMR becomes chart, all orders electronic, medication management & reconciliation, structured data capture
Stage 2	CDR, e-prescribing, problem list, hospital data access via the web, secure e-mail – patients and consults
Stage 1	Initial linkages for diagnostic results and web information access; initial digital information storage
Stage 0	Physician orders and notes handwritten; information exchange via fax and phone

Data from HIMSS Analytics™ Database.

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Measuring Yukon, the Northwest Territories and Nunavut's Acute Care Clinical Capabilities

A first step for Yukon, the Northwest Territories and Nunavut, as for the Canadian provincial authorities, at assessing correlations between levels of clinical IT and e-Health implementation with patient clinical and safety outcomes is to begin trending the northern jurisdictions progress toward achieving levels of advanced clinical IT based on employing the HIMSS Analytics EMRAM scoring system.

EMRAM results from HIMSS Analytics' ICT 2010 Complete Studies of Yukon, the Northwest Territories and Nunavut's combined eight acute care facilities (one facility is under construction) reflect only the current live and operational state of these jurisdictions' existing e-Health clinical capability. Their EMRAM scores do not measure

score will measure levels of an EMR environment at physician offices, health centres or outpatient clinics ranging from an entirely paper environment to a fully electronic environment on a continuum of six stages from 0 to 5 (Figure 2).²

The major indicator of Stage 5 is participation by a physician office in an interconnected regional community of physicians, hospitals, lab companies, the pharmaceutical industry, imaging

the extent to which installations of advanced clinical systems for the acute care environment that contribute to Yukon's, the Northwest Territories' or Nunavut's developing iEHR are already in process, or contracted but not yet installed in various hospitals, with projected dates for going live and operational in the next 12 to 24 months. Nor do their EMRAM scores reflect the extent to which Yukon, the Northwest Territories and Nunavut

are substantially prepared to implement more advanced e-Health functionality, as soon as fiscal and personnel resources permit.

As of Q4 2010, the mean, minimum, maximum and median EMRAM scores for Yukon's two existing acute care hospitals (Whitehorse General Hospital and Watson Lake Hospital) are 2.5855, 2.0630, 3.1080 and 2.5855, respectively (HIMSS Analytics 2010a). The hospital with the highest EMRAM score is Whitehorse General Hospital, with a score of 3.1080. WGH's core clinical system operates on the MEDITECH Magic platform. Clinical applications that are live and operational at WGH include a laboratory information system, a pharmacy management system, radiology information system, clinical data repository, clinical decision support system, order entry, nursing documentation and electronic medication administration record. Six of ten core PACS modules are live and operational on Fujifilm Medical Systems USA, Inc. (Synapse). Bar coding is used in radiology, but not yet in laboratory, pharmacy or medication administration. Clinical applications are not yet live and operational for computerized provider order entry (CPOE) or physician documentation.

Yukon, Northwest Territories and Nunavut provide models of how to tackle these challenges in distinctive yet converging ways that just might enable other Canadian health care systems in the southern provinces to get healthcare right

As of Q4 2010, the mean, minimum, maximum and median EMRAM scores for the four acute care hospitals in the Northwest Territories are 0.1560, 0.1540, 0.1620 and 0.1540, respectively (HIMSS Analytics 2010b). The reason why EMRAM scores for the jurisdiction's acute care facilities remain below 1.000 is because no hospital has yet implemented an automatic pharmacy management system. Lacking one of the three foundational ancillary systems that feed a clinical data repository providing a unified patient information record, a facility's score does not rise beyond 1.000, regardless of the other clinical implementations. All four acute care facilities in the Northwest Territories operate, for the most part, the same limited set of clinical solutions. These include a CDR employing Lawson Healthvision's MediPatient as the vendor solution, GE Healthcare for a LIS and Agfa for nine out of ten PACS modules. A RIS is being installed that also uses an Agfa solution. Order entry at all four sites uses the MediSolution vendor product. At two sites (Inuvik Regional Hospital and H.H. Williams Memorial Hospital), MediSolution is also used for physician documentation. The other two acute care sites (Stanton Territorial Hospital and Fort Smith Health Centre)

have not implemented physician documentation. As mentioned above, no site has yet implemented a pharmacy management system, as well as nursing documentation, an eMAR or CPOE.

As of Q4 2010, the mean, minimum, maximum and median EMRAM scores for the two acute care hospitals in Nunavut are 0.5025, 0.0050, 1.0000 and 0.5025 (HIMSS Analytics 2010a). Nunavut's scores are depressed for technical reasons that do not reflect the level of progress the jurisdiction has made in implementing an electronic clinical solution across its acute and non-acute facilities. Nunavut's DHSS is pursuing a strategy of implementing the clinical solutions of MEDITECH's Client Server 6.0 product in a phased approach over the next two years at 33 healthcare sites, including 31 primary care clinics and two acute care sites at Qikiqtani General Hospital and Kivalliq Health Facility – Rankin Inlet. Initially, six MEDITECH modules are to be implemented starting in February 2011 at the following four acute and/or primary care facilities: Qikiqtani General Hospital Iqaluit – Iqaluit (acute/primary care), Kivalliq Health Facility – Rankin Inlet (acute/primary care), Kitkmeot Health Facility – Cambridge Bay (primary care) and Family Practice Clinic – Iqaluit (primary care). The MEDITECH 6.0 modules that will go live and operational are Admissions, Health Information Management (Registration), Community-Wide Scheduling, Laboratory Information System, Pharmacy Management System, Imaging and Therapeutic Services (Radiology Information System), Order Management and Enterprise Medical Record (Order Entry and Clinical Data Repository) and Physician Desktop. Some of these forthcoming MEDITECH installations will replace existing diverse software solutions.

Conclusion

The current strategies of Yukon, the Northwest Territories and Nunavut for promoting a promising future of viable e-Health enabled healthcare delivery in their jurisdictions and the challenges they face in attempting to implement those strategies in a timely fashion are very relevant to the healthcare delivery and funding challenges facing Canada's southern provinces. Everyone knows that the real benefits of an EHR are realized in the primary care setting, where healthcare begins and full patient information is needed for right treatment. Everyone knows that only vigilant and collaborative primary care provides early detection of the chronic diseases that drive up healthcare costs in the acute care setting. Everyone knows that excellent health and social programs applied to the youth will reduce the incidence of long-term illness in later years. Everyone knows that focusing on these obvious healthcare tactics with the assistance of e-Health contributes mightily to realizing long-term financial, medical and social returns on investment from costly electronic healthcare solutions. However, not everyone, and certainly not all jurisdictions, have a confident grip on which models of integrating electronic healthcare delivery will realize

these objectives, thereby enhancing their returns on investment of personnel and financial resources.

Observers and practitioners of Canadian healthcare delivery pondering viable e-Health solutions for healthcare delivery might do well to turn their attention to what is happening in primary-care centred healthcare delivery north of the 60th parallel. The northern jurisdictions of Yukon, the Northwest Territories and Nunavut provide models of how to tackle these challenges in distinctive yet converging ways that just might enable other Canadian health care systems in the southern provinces to get e-Health enabled healthcare right by delivering “the right services through the right providers in the right places.” **EH**

Endnotes

1. For a full description of the eight stages of the EMRAM score for hospitals, see HIMSS Analytics' EMR Adoption Model: <http://www.himssanalytics.org/c_providers/emr_adoption.asp>.
2. For a full description of the six Stages of the future Ambulatory EMRAM score, see HIMSS Analytics' EMR Adoption Model: <http://www.himssanalytics.org/hc_providers/emr_adoption.asp>.

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