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Health Care IT Advisor

A Strategic Approach to Telemedicine

Horizon Health Network—One Platform, Multiple Clinical Applications

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Abstract

Most telemedicine programs encompass only a few clinical applications within the organization or are one-off pilot programs to test viability. Few providers have truly incorporated telemedicine into their clinical care strategy. This case study examines how Horizon Health Network grew pervasive telemedicine capabilities throughout the organization to improve the quality of and access to care for the patients of New Brunswick, Canada.

Background

Horizon Health Network (HHN) serves as one of two regional health authorities for residents of New Brunswick. Within it is the Tertiary cardiac care program for the province which also serves patients from northern Nova Scotia, and Prince Edward Island in Canada. The network consists of 12 hospitals, and 100 medical facilities, clinics, and offices ranging from acute care to community-based health services. HHN was an early adopter of telemedicine capabilities in 1998 with their phone line-based post-cardiac surgery home monitoring program. Over time they have implemented multiple telemedicine initiatives, and today telemedicine is a strategic enabler across the provincial health authority. Currently, their telemedicine program spans multiple specialties and leverages various modalities via one major platform.

Province-Wide Telemedicine Initiatives

New Brunswick Heart Centre Post-Cardiac Surgery Telemedicine Program

One of the earliest clinical areas Horizon addressed with telemedicine was post-operative cardiac care. Administrators identified several inefficiencies in post-surgery care delivery for cardiac patients. Thirty-two percent of post-surgery patients presented to local emergency departments (EDs) shortly after discharge for one of three main reasons: congestive heart failure symptoms, wound infection, or atrial fibrillation. Frequently, the New Brunswick Heart Centre (NBHC) would not learn of the post-discharge problems until the patient returned for their six-week post-operative follow-up visit.

In 1998, internal organizational changes in the cardiac program provided the impetus to experiment with technology as a way to intervene and prevent some of these care inefficiencies. Horizon first developed a Seven-Day Home Monitoring Program to monitor patients more closely during the week immediately following discharge. Subsequently, they developed a Remote Six-Week Check-Up at the patient's local hospital, which relieves patients of the burden of traveling considerable distances to the NBHC in Saint John. HHN worked with vendors to develop their own solution to fit their needs, as nothing like it was on the market at the time. Originally, the programs utilized Plain Old Telephone System (POTS), but have since evolved to include DSL and IP, permitting the capture of a broader range of data types.

Seven-Day Home Monitoring Program

For the first program, upon hospital discharge the patient takes home a suitcase on wheels that contains monitoring equipment such a video camera and vital sign monitoring devices including electrocardiogram (ECG). Caregivers at NBHC contact the patient every day for seven days following his or her surgery discharge. Patients use the real-time interactive audio-video and photography equipment to show incision lines and graft sites to allow caregivers to closely monitor how the wounds heal. Patients also take

digital blood pressure, pulse, and oxygen saturation readings during the daily visits. A live three lead ECG is transmitted at the same time. If concerns arise, the patient is referred to their local emergency room or family doctor for immediate care, hopefully avoiding the need for readmission.

Remote Six-Week Check-Up

HHN employs a hub-and-spoke telemedicine model for their interprovincial six-week post-surgical check-up visits. Patients present at their local hospitals within New Brunswick and Prince Edward Island and connect via telemedicine to NBHC. Each hospital has telemedicine equipment and an electronic stethoscope. A nurse caregiver oversees the visit in person while the patient video chats with the physician located at NBHC. This initiative began in 2000 as a complement to the existing Seven-Day Home Monitoring Program.

New Brunswick Telestroke Program

Horizon subsequently developed a telestroke program that has evolved to provide province-wide coverage. New Brunswick has only 14 neurology specialists, all of whom live and practice in the southern part of the province, leaving the northern residents with limited access to emergency neurological care. In 2014, HHN implemented a telestroke program designed to provide better neurologist access for remote stroke patients.

Ten community hospitals across the province have computerized tomography (CT) scan capabilities. If a patient presents with stroke symptoms at one of these facilities, a general practitioner or ED physician can access the neurologist on call for a consult to determine if it is appropriate to administer TPA (tissue plasminogen activator). The neurologists are equipped with a telemedicine-enabled laptop virtual private network (VPN) connectivity. They can see the CT scan results, perform a real-time neurological consultation with the patient and the consulting physician in the ED, and open the telestroke portal to use the National Institutes of Health Stroke Scale for TPA eligibility assessment. Neurologists also have remote video camera control so the physician does not have to rely on a clinician in the ED to adjust the camera.

Some of the specific implementation components for the telestroke program include:

- Creation of an ambulance bypass system to get potential stroke patients to the nearest CT-capable hospital as quickly as possible
- Development of the Telestroke portal, which connects mobile clinical carts with video conference capabilities, includes training materials, provides access to CT scans in near real time, and facilitates real-time communication for provider-to-provider consultations
- Development of agreed-upon clinical protocols, training, support, and call schedules amongst neurologists using the Canadian Stroke Best Practices Recommendation as a guide
- Province-wide training and implementation, including visits to each local hospital and mock telestroke consultations
- Creation of the Telestroke Tracker to monitor program success against national benchmarks and collect patient-reported outcome comments

New Brunswick saw dramatic improvement in their TPA administration rates. Once one of the lowest provinces in Canada for TPA administration, New Brunswick quickly improved and saw better outcomes for stroke patients. Now, 90% of patients in the

province have access to a neurological consult within one hour at any time of day. The New Brunswick Telestroke program won Horizon's Quality Quest Award, modeled on the National 3M Health Care Quality Team Award.

Other Telemedicine Programs

HHN has made an effort to spread the use of telemedicine across multiple specialties.

Extra-Mural Program: Patients discharged from acute facilities and ambulatory clinics can conduct follow-up visits through Horizon's Extra-Mural Program, which provides a broad range of health care services in patient homes and communities. Patients have remote access to dieticians, speech language pathologists, and wound management specialists, among others.

Dialysis: HHN operates four remote satellite dialysis clinics. A nephrologist located at Saint John Hospital can monitor, connect with, and round on dialysis patients through telemedicine capabilities while on-site nurses perform the dialysis.

Mental Health and Addiction: HHN was the first health authority in Canada to provide ED-to-ED remote mental health consultations. These consultations help to prevent unnecessary patient transfers among facilities. This program has been particularly helpful for patients residing on islands and other remote locations that lack psychiatry coverage.

Telecorrections: Inmate surgical care typically necessitates time- and resource-intensive care due to the need to guard the patients closely. In New Brunswick, inmates are typically cared for in the intensive care unit (ICU) for the entire one- to two-week post-operative period, compared to three to five days for non-incarcerated patients. HHN used their telemedicine capabilities from their Home Monitoring Program described above to better care for post-surgical inmates in the corrections facility, greatly reducing their length of hospitalization and expensive out-of-corrections care and security. Additionally, Horizon has expanded their telecorrections program to include otolaryngology, gastroenterology, plastic surgery, infectious disease and urology remote care.

Other areas that leverage telemedicine include: oncology, urology, plastic surgery, neurosurgery, diabetes education, sleep lab, speech language pathology assessments, occupational stress injury assessments, physiotherapy, diabetes high risk foot clinics, rheumatology and physiatry.

Technology and a Strategic Approach

One key decision has allowed HHN to proliferate telemedicine throughout the organization: use one platform for all telemedicine efforts. One platform allows for easier scalability and multiple clinical applications. HHN utilizes Cisco's telemedicine platform along with peripheral devices from multiple vendors. With HHN's hub-and-spoke model six-week remote visit for post-cardiac surgery patients, other specialties are able to take advantage of the telemedicine suite on days when not in use by the cardiologists.

Initial funding for the Home Monitoring Program came from the Atlantic Canada Opportunities Agency (ACOA), hospital foundation contributions, and in-kind support from vendors. HHN uses one platform for all telemedicine programs. Cisco endpoints are paired with a variety of peripheral attachments (such as electronic stethoscopes and dermatology or examination cameras).

Outcomes and Determinants of Success

The two main sources of value for Horizon Health Network's telemedicine programs are geographical reach and financial savings. HHN's telemedicine programs expand their reach and allow them to provide care to residents in remote parts of the province. Efficient care and savings from avoided ED visits, hospitalizations, and transfers contribute toward the success of the programs. Telemedicine also reduces travel for clinicians to remote clinics.

Challenges

HHN's telemedicine journey was not without difficulty. Their efforts suffered setbacks in two main areas:

- In some cases they encountered **physician resistance**, but administrators adopted the outlook that "the clinical needs drive the technology" and focused on how to address providers' concerns with new care models, employing workflow modifications, education, frequent communications, and other change management techniques. To address physicians' concerns about lack of reimbursement, Horizon pays some clinicians a stipend for their telemedicine work. Administrators rely heavily on physician champions to tout the benefits of telemedicine programs. Perseverance, persistence, and patience were all required to overcome physician resistance to non-traditional care delivery methods. Once programs began to become effective, interest subsequently spread by word of mouth and drove demand for broader extension of existing programs as well as new programs.
- **The location of the telemedicine-enabled exam room** caused unforeseen problems. For one clinic, the exam room for remote visits was located nearly a quarter of a kilometer away from the providers across a busy tertiary hospital. Providers found it difficult to access the suite as they were constantly being pulled aside for hallway consults as they made the long trek to and from the telehealth suite. The suite was relocated to a more convenient position within the ambulatory clinic area.

Lessons Learned

Several lessons can be learned from HHN's telemedicine efforts:

- Community-wide leadership involvement and physician/clinical champions are critical to development and sustainability of broad telemedicine networks.
- Standardization on a single technical platform eases scalability and interoperability efforts and can help spread telemedicine across multiple clinical uses.
- If implementing a hub-and-spoke model, think carefully about where you locate the telemedicine suite. It needs to be easily accessible to clinicians so as not to interrupt the workflow in their clinics.

- Maximize return on investment (ROI) of telemedicine investments in remote hospitals by ensuring they are in continual use across multiple specialties.

Action Items

- Approach telemedicine as a strategic enabler for your organization's mission and goals to improve your geographic footprint, provide better care, and realize financial savings.
- Focus telemedicine efforts on care transitions, such as post-surgery discharge, to prevent higher acuity-care interactions in the event of complications.
- Search for ways to apply established telemedicine technologies and program infrastructure to different clinical specialties and administrative uses to improve ROI from your technical and programmatic investments.
- Employ a single technical platform for multiple telemedicine programs as it can ease start-up implementation, technical integration, on-going maintenance, and user-training issues across the organization. A single platform also provides scalability.
- Use physician champions to promote the adoption of telemedicine within your organization; word-of-mouth campaigning can be very powerful.
- Follow existing process flows as closely as possible so as to streamline and not establish barriers for using telemedicine by making it "different." Ideally, a physician working in the ambulatory clinic area should not know whether they are seeing the patient in person or via telemedicine until the they have entered the room.

Advisors to Our Work

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