



# CANADIAN Healthcare Technology

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## INSIDE:

**FOCUS REPORT:**  
**VIRTUAL CARE**  
PAGE 10

### Deep learning

A tutorial-based website, called TeachingMedicine.com, enables physicians and trainees to learn and practice medical skills – especially diagnostic interpretation, including ECG and ultrasound.

Page 4

### The collaborative EMR

InputHealth, a Vancouver-based company started by doctors, has developed a collaborative EMR that highlights patient engage-



ment with their own records. The system also tracks the quality of patient outcomes.

Page 4

### The cannabis EMR

With the growing use of medical marijuana and the anticipated legalization of marijuana in Canada, some companies have devised a special electronic medical record that allows doctors and pharmacists to track usage.

Page 12

### Remote diagnoses

Dr. Ivar Mendez is spearheading the use of remote presence technologies that enable physicians to diagnose or monitor their patients,



even if they are thousands of miles away from each other. The tools include robots on wheels, with two-way video,

Page 6



## Saskatchewan deploys variety of advanced telehealth solutions

The University of Saskatchewan's Remote Presence Medicine Program has been using several leading-edge telehealth systems to deliver care to patients in distant and under-served communities. They include a tall robot that stands on wheels, with two-way video and communications, and the ability for physicians to remotely 'drive' the unit to where they need to go. Doctors can also equip nurses with a lunchbox-sized device, containing a video monitor and speaker, to deliver care in homes while still under the doctor's supervision. A third system involves surgical mentoring (as seen in photo), and allows a remote surgeon to teach other doctors or to monitor a remote surgery. A fourth solution consists of a telerobotic ultrasound system. **SEE STORY ON PAGE 6.**

## MedviewMD creates network of medical studios for e-visits

BY JERRY ZEIDENBERG

MedviewMD, a telehealth company based in Chatham, Ont., is working with provincial governments across Canada to build networks of doctors who can quickly examine patients through the use of e-visits. Patients are able to connect with physicians at MedviewMD studios, which are equipped with videoconferencing and medical equipment.

Since its launch in September 2015, the company has set up over a dozen of its specialized studios for e-visits in drug stores in Ontario, and another four of them in British Columbia. It is currently in discussions with government officials in Alberta to set up studios there, so that Albertans can walk into pharmacies and interact with an online physician.

Expansion plans are under way for Saskatchewan, Manitoba, Nova Scotia and

New Brunswick. By the end of 2016, MedviewMD expects to have 40 e-visit studios up and running across Canada.

Governments are pleased with the arrangement, said Dan Nead, CEO of MedviewMD, because the e-visits alleviate the problem of patients who are without a regular family

**The fast-expanding company has conducted over 12,000 video consults in the past year.**

physician and will often go to a hospital emergency room for treatment of minor problems.

According to Statistics Canada, 15 percent of Canadians, or about 4.5 million patients, were without a regular family physician in 2014. Services like MedviewMD can provide quick access to a GP.

"We've done 12,000 consults since last Sep-

tember," said Nead. "We're surprised at how fast this has taken hold."

Nead said that MedviewMD is improving the health of Canadians while simultaneously reducing costs for provincial health ministries. In turn, the ministries are compensating MedviewMD, based on the numbers of exams that are performed.

Physicians, for their part, bill their health ministries for the services they provide. In a breakthrough arrangement, Ontario physicians are able to conduct examinations of B.C. patients using the MedviewMD telehealth system; to be paid, the Ontario doctors continue to bill OHIP, the provincial health program, while the province in turn invoices British Columbia for remuneration.

While some onlookers have questioned whether MedviewMD and other online medical services can provide the continuity of care

CONTINUED ON PAGE 2



# MedviewMD working to build network of medical studios for e-visits

CONTINUED FROM PAGE 1

of a regular family physician, Nead points out that patients who visit its studios can request to see the same online physician when booking appointments.

The doctor may be in another city or province, but he or she will continue to manage the patient and will be familiar with the patient's history.

As a result, patients are more 'tethered' to an online physician than if they go to a walk-in clinic or emergency room, where they are likely to see a different doctor each time.

MedviewMD came up with the unique strategy of installing 'studios' in pharmacies, where a registered practical nurse assists the online doctor with the examination.

There is also a person booking appointments, although walk-ins can be accommodated, too.

At the Durham Drug Store, in Pickering, Ont., RPN Danielle Doering makes use of instruments such as an electronic stethoscope, otoscope, blood pressure cuffs and a vital signs monitor, along with a high-powered medical camera. "Using the exam camera, we can take detailed pictures and videos

of wounds or skin problems," said Doering. "We can take images of the inner ear, and show them onscreen to the patients as well as to the doctors."

The medical devices are supplied by AMD Global Telemedicine, of Chelmsford, Mass., a company that has a long history in telehealth in Canada and around the world. AMD also provides software that integrates images from the medical devices being used, and allows for easy sharing of the information among doctors and nurses.

All of the information and images are also loaded into a secure electronic medical record. MedviewMD is using the OSCAR EMR, an open system that has been tailored to its own requirements. Patients are able to gain access to their electronic records if they wish.

During the exam, the online physician guides the nurse and sees all of the patient images; the doctor and patient also see and talk to each other using standard video-conferencing.

With today's computerized systems and medical equipment, physicians are able to accomplish a great deal even when located at a remote location.



A nurse examines patient with a medical camera.

In many cases, the patient will be given a prescription to treat common problems such as rashes, infections, colds and coughs; he or she can walk out of the room and fill the prescription at the pharmacy counter.

That's the attraction for the pharmacy and reason why they're willing to install the e-visit studios – they increase traffic to the stores and result in more business.

At the Durham Drug Store, pharmacist and owner Zeinab Abdulaziz says patients are arriving every day; she expects the traffic will increase during the back-to-school

month of September, and in the flu season of November and December.

Awareness of e-visits at the pharmacy is growing through word of mouth and postings by Ms. Abdulaziz on the store's web site, as well as on Facebook.

At the same time, the pharmacies are acting as one-stop shopping outlets for medical problems. Patients can be diagnosed by an online physician; they can obtain their prescriptions and medical supplies at the same location. Pharmacists in Ontario can also give flu shots to patients.

The studio, with its computer and medical equipment, is offered to pharmacies at a cost of about \$80,000; it can be purchased outright or leased.

MedviewMD covers the salary of the registered practical nurse, who acts as the frontline medical professional and the assistant for the online physician.

When the problem the patient presents with is severe – such as chest pain or a severe wound – the doctor will advise the patient go right away to an emergency room, just as a family doctor would do during an in-person appointment.

MedviewMD is now adding specialists to its ranks. Nead said that mental health specialists, as well as dermatologists, internal medicine specialists and urologists are now available online. In this way, the company is expanding the range of services to patients – many of whom have great difficulty accessing a specialist close to home.

As with GPs, much of the work of a specialist can be done online.

And many GPs and specialist are happy to provide services online. "It's not as hard as you might think to recruit them," said Dr. Chad Burkhart, a medical lead with MedviewMD and a general practitioner who is based in Owen Sound, Ontario.

Indeed, there are many female physicians on maternity leave who still wish to work, and find they can provide online services from home. Other physicians prefer to work online part of the time, and many doctors find they can fill up empty schedules with online appointments.

## Correction

AN ARTICLE IN THE SEPTEMBER EDITION OF CANADIAN HEALTHCARE TECHNOLOGY that referenced Sunnybrook's MyChart service contained inaccuracies. MyChart is used by multiple hospitals, and patients with records at these hospitals can maintain a consolidated record in MyChart. Paper records can be uploaded in scanned formats by patients; the system also accesses and stores information from the electronic records in the member hospitals.

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# Facebook-like EMR acts like a ‘collaborative health record’ system

BY ROSIE LOMBARDI

Millennials are starting to re-design the EMR systems that doctors have used over the past decade, and they’re giving them a new twist. Vancouver-based InputHealth is a prime example of a fresh approach to collecting and sharing patient information.

InputHealth was founded in 2011 by the company’s CEO Dr. Damon Ramsey and CTO Shawn Jung, who were then in their early twenties and working out of Damon’s uncle’s basement. Dr. Puneet Seth, another millennial doctor, joined in 2013 as CMO to create a dream team that has moved rapidly to develop a modular patient engagement system that offers genuinely useful features and functions that go beyond the typical EMR system.

Many major medical organizations are using the company’s systems. The Mayo Clinic in Jacksonville, Fla., has adopted one of InputHealth’s modules, and many prominent organizations are following suit: the University of Texas at Austin, Sunnybrook Hospital, Jewish General Hospital, University of British Columbia’s Student Health Service, and more.

Dr. Ramsey and Dr. Seth are members of a much-needed group that is growing steadily: doctors with deep IT experience. Ramsey was a Microsoft Certified Systems Engineer at the tender age of nine, and Seth worked at Nortel Telecommunications before entering medical school.

“We built this company from the ground up to address a massive oversight in the existing paradigm of electronic medical records – that the patient does not exist in any meaningful way. From there came a fundamental shift in approach: every patient encounter becomes a data



Dr. Puneet Seth (left) and Dr. Damon Ramsey are physicians who also have deep experience with I.T.

capture opportunity where that data is generated by the patient themselves,” says Dr. Ramsey.

To that end, InputHealth initially developed a patient engagement platform that allowed people to convert paper questionnaires to digital, and to use mobile devices to collect data from patients remotely.

Over the years, the company has added module after module to tackle different areas, says Seth. “We started with our ihQnaire system, which is a questionnaire data capture engine, then we moved on to on-line appointment booking, to a kiosk system, to an electronic referral system, and to a more robust outcome tracking system which is what’s used at Mayo Clinic, UBC and McGill. The most recent module is an integrated tele-medicine engine that’s integrated into all of this. Our platform is constantly evolving that way.”

Clients were soon clamouring for a full-

blown EMR system from InputHealth instead of modular add-ons, says Dr. Seth. “Our clients said they loved the way our system worked and they didn’t want to go back to their EMRs. They asked: ‘Why can’t we do everything off your system?’ We decided to take a risk and develop a new EMR system from the ground up that was genuinely forward-looking.”

Dr. Seth says forward-looking means moving away from the ‘transactional medicine’ model our current healthcare system employs. “Today, EMRs track what happens when a patient is in front of me during a visit. I give them medication and they leave. Instead, the healthcare system is moving to more distributive models like community-based care, where you continue to provide healthcare even when the patient’s not in front of you.”

Traditional EMRs have no capacity at all to manage the workflow associated with

continuous, distributed healthcare, he says. The InputHealth team set out to develop a new type of EMR system best described as a ‘collaborative health record’ – a CHR. “Collaborative means that the patient and the clinician and the entire healthcare team work together to deliver care.”

InputHealth’s platform is able to collect data from different sources and make them meaningful with one another, he says. A patient with a mood disorder, for example, might complete questionnaires periodically, as will his spouse, to provide a second view of his condition. The system has the intelligence required to sort out the most significant elements of the two questionnaires’ responses.

“What the clinician will see is a paragraph summary of the person’s condition. The documentation is automatically generated, because the system was able to convert the patient’s responses to a clinical note. Almost 80 percent of a clinical note is actually subjective history-taking. The information can then be trended, visualized and manipulated in various ways.”

InputHealth has many features that go beyond the typical EMR offerings, says Dr. Matthew Chow, a psychiatrist who works at the Youth Wellness Associates clinic and St. Paul’s Hospital in downtown Vancouver.

It’s not just a system for sending out questionnaires to patients to pre-collect information, he says.

“The questionnaires are adaptive. Depending on how the patient answers, the system asks follow-up questions, something that intake forms can’t do. I spend my time during the actual appointment talking to patients about their concerns instead of collecting data because InputHealth has already done most of that job for me.”

The natural language output reports

CONTINUED ON PAGE 19

## Educational website helps physicians and trainees sharpen their skills

BY NEIL ZEIDENBERG

A tutorial-based website, called TeachingMedicine.com, provides physicians and trainees with the means to acquire and practice medical skills – especially their abilities in diagnostic interpretation, such as ECG, chest X-ray, echocardiography and ultrasound interpretation.

The participants then get valuable immediate feedback from a clinical expert.

And users can practice as often as necessary to acquire and retain the skills. The goal is to increase the competency level of trainees.

“TeachingMedicine.com started out in 2005 in a much different form. It was simply a place to store handouts – a pdf library if you will,” said Dr. Jason Waechter, an intensivist-anesthesiologist and clinical associate professor at the University of Calgary. Dr. Waechter has led the development of the website.

“In 2004, I was at UBC teaching ECG interpretation and created small group

ECG practice workshops. Students with an expert mentor had two hours to cover 12 different ECGs to interpret and provide diagnosis – one attempt at each.”

Results from the workshop confirmed that one attempt at ECG interpretation doesn’t provide the means to master the skill.

The solution was to create an online format that provides theory, practice and expert feedback on a student’s ECG interpretation.

“It requires many rounds of practice and feedback to learn a skill such as ECG interpretation and to gain an accuracy of 80 percent or better.

Without enough practice, not only will a person’s diagnosis skills be inaccurate, but so will their treatment,” said Dr. Waechter. “An incorrect diagnosis and treatment can cause serious harm to a patient, or at the very least delay proper treatment.”

The web site currently features modules for ECG, chest X-ray, echocardiography, ultrasound and CT. There are 7,000 registered users to the website and

there were 35,000 site visits in 2015, resulting in 400,000 minutes of learning. “The average site visit lasts approximately 16-minutes, so we know people are using it,” said Waechter.

For its part, medical school provides plenty of theory but often little or no structured practice. But TeachingMedicine.com offers unlimited access to

**It requires many rounds of practice and feedback to learn a skill such as ECG interpretation.**

practice a skill as often as necessary to retain the knowledge and provides immediate feedback.

“We offer tutorials followed by an opportunity for students to practice. We are constantly adding new content. We test it, get feedback, then make changes and revisions,” said Dr. Waechter.

Dr. Waechter has partnered with several Canadian medical schools (including

McGill, University of Calgary, UBC, University of Saskatchewan and University of Ottawa) to make use of the website part of the required curriculum.

He is also in discussions with multiple U.S. medical schools. Yale Medical School was the first American school to formally start using the online modules for their medical students, with the University of North Dakota and UCSD (San Diego) following.

TeachingMedicine.com provides doctors and trainees with an opportunity to practice and/or maintain their medical-related skills, ensuring competency throughout the various stages of their career.

Dr. Waechter said the idea is based on Competency By Design (CBD), an initiative by the Royal College of Physicians and Surgeons of Canada to improve physician training and lifelong learning.

Training is organized around desired outcomes and ensures physicians demonstrate the medical skills and behaviours necessary to meet their patient’s needs whether they’re in residency or nearing

CONTINUED ON PAGE 18

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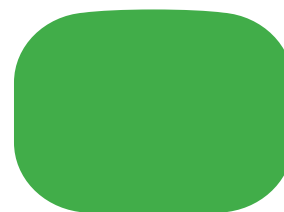


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# Remote presence healthcare technology: The Saskatchewan experience

BY DR. IVAR MENDEZ

As part of the Remote Presence Medicine Program at the University of Saskatchewan, we have been using a number of remote presence mobile devices to provide medical expertise to underserved communities in Saskatchewan.

We have worked with the communities, their leadership and local healthcare providers to identify areas of urgent, unmet need, such as access to pediatric acute critical care. We have also used remote devices for mentoring of senior surgical residents and for post-operative follow up visits in the patient's home.

Remote presence robotic technologies provide the sense that the user is "present", enabling physicians to provide real-time clinical services remotely.

The robotic device can be controlled for direct visualization, examination, and diagnosis of the patient, as well as communication with local healthcare professionals and family members.

These devices have multiple electronic ports for peripheral diagnostic devices such as stethoscopes, dermatoscopes, otoscopes and ultrasonography that facilitate the examination of the patient in real-time.

We have employed a number of remote presence platforms (from In Touch Health Inc., of Santa Barbara, Calif.) such as the RP-Vita remote presence robot (Figure 1), the portable RP-Xpress, for home visits (Figure 2) and RP-Vantage for surgical mentoring (cover photo, page 1).

These systems are designated by the US Food and Drug Administration



**Figure 1. Dr. Mendez and the remote presence robot RP-Vita. Remote presence robotic technology is used in Saskatchewan to provide medical attention in underserved communities.**

(FDA) as class II medical devices and meet the prerequisites for application in acute patient care.

We are also trialing a novel telerobotic ultrasound, the Melody system (Société AdEchoTech, of Naveil, France) consisting of a robotic arm that is capable of being controlled by a sonographer to scan a patient located in a remote location in real-time (Figure 4).

The experience so far with this system

indicates that telerobotic ultrasonography has the potential to answer a large unmet need of access to sonography in rural and remote communities.

The Saskatchewan experience: Over the past two years we have deployed 14 remote presence devices to a number of healthcare facilities, ranging from tertiary hospitals in Saskatoon and Regina to small nursing stations in remote First Nation's communities.

We have focused mainly on testing the feasibility of using remote presence robotic technology to answer urgent unmet needs in underserved communities and vulnerable populations, such as young

rows demonstrated that 63 percent of the acutely ill children who presented to the nursing station were able to be effectively managed locally by a pediatric intensivist located in Saskatoon with the help of the remote presence technology.

The triaging decision and interventions using this technology were sustained as none of the children treated needed to be transported up to the 14-day reassessment time.

Furthermore, 43 percent of the children that required specialized transport were safely triaged to a regional centre, thereby easing the overcapacity issues that often strain the pediatric intensive care unit in tertiary care centres.

The potential cost savings in transportation alone can be substantial as a specialized pediatric inter-facility transport by air costs approximately \$10,000 and the number of pediatric transports in the province of Saskatchewan is over 400 transports per year.

Our work with the telerobotic ultrasound system has shown considerable promise. We have completed a study comparing conventional direct abdominal sonography with telerobotic sonography using the Melody system.

There was no significant difference in the capacity of the systems to visualize the intra-abdominal organs as 92 percent of organs visualized on conventional examinations were also visualized on telerobotic examinations. Furthermore, there was no difference between the two modalities in measurements of the liver, spleen, and diameter of the proximal aorta.

Providing sonography access to under-

CONTINUED ON PAGE 18



**Figure 2. The portable RP-Xpress that is connected to regular available cell phone networks is being used by surgeons to conduct follow-up, postoperative home visits on surgical patients.**

children, pregnant women and the elderly.

A recently completed pilot study in providing pediatric specialized critical care access to acutely ill children in the Northern First Nation's community of Pelican Nar-

## SPE 3000 is changing the medical electrical devices landscape

BY SIMON KNIGHT

This past July, the landscape of the Canadian medical device industry underwent a significant change with the adoption of a new model code, SPE 3000. In order to address the needs of medical electrical equipment (MEE) and medical electrical systems (MES) sold in Canada in limited quantities; CSA SPE 3000-15 has been implemented as the model code for the field evaluation of medical electrical equipment and systems.

This model code specifies construction, marking, and testing requirements for MEE and MES with the aim of mitigating any risks for electric shock, fire and mechanical hazards associated with these types of products.

SPE 3000 would include products such as custom-built equipment for special applications; equipment sold on a non-repetitive basis; equipment not obtainable as "certified" under a regular certification program; or equipment purchased in quantities of not more than 500 on a national basis, per model, per year, per field evaluation body.

Though applicable to products such

as those mentioned above, SPE 3000 does have limitations in its scope and application. It cannot, for instance, be used to evaluate products such as X-ray equipment and systems, cosmetic and hygiene equipment, MRIs, CT scanners, and laser equipment.

Furthermore, it is not intended to apply to re-evaluating equipment that has been rejected due to the results of a previous evaluation conducted by a certification organization through any other existing certification service. Also worth noting is that hazards inherent in the intended physiological function of MEE and MES within the scope of SPE 3000 are not covered within the model code.

The testing requirements laid out in SPE 3000 involve a variety of procedures aimed at identifying and working to mitigate different risks associated with components of MEE and MES. These include dielectric voltage withstand testing to assess the insulation of devices, strain relief testing to analyze the strength and durability of the strain relief mechanism on equipment, and input rating testing to confirm that the measured input of MEE or MES at rated voltage does not exceed the marked rating by more than 10 percent.

The adoption of SPE 3000 will have sweeping implications for those in the medical community including doctors, dentists, hospitals, medical clinics, medical distributors and others. Through SPE 3000, inspection bodies may now conduct field approval, whereas previously they could only offer full certification. As of July 1, 2016, qualified inspection bodies accredited by the SCC are now able to conduct field inspections under the model code.



**Simon Knight**

To ensure compliance with the MEE and MES at your offices and hospitals, all involved should familiarize themselves with SPE 3000 and its requirements, to gain a greater understanding of the model code and how it will impact their medical electrical devices.

It is important to bear in mind that manufacturers of MEE and MES outside of Canada may not always take these regulations into consideration when develop-

ing their devices. As such, one shouldn't assume that all products imported into and sold in Canada automatically meet the applicable standards and regulations. It is up to you to ensure that your equipment complies with Canadian standards.

Taking a proactive approach to compliance with SPE 3000 will save time and money for your operation as your devices can be pre-inspected before getting red taped and deemed unsafe. Working with a field inspection body can help to ensure that your devices meet the requirements set out in SPE-3000 and will remain in service as they will not get shut down by authorities having jurisdiction.

Intertek, with its extensive expertise and experience in field inspection, as well as medical electrical testing and certification, is equipped and fully accredited to meet all of your needs for compliance with SPE 3000.

*Simon Knight, Products Manager, Canada, is based at Intertek's Vancouver facility. Simon is responsible for Intertek's Building & Construction and Electrical testing, inspection and field service businesses in Canada. 1.800.967.5352. [www.intertek.com/medical/spe-3000](http://www.intertek.com/medical/spe-3000).*

# Our healthcare system must adopt technologies created by Canadians

BY ZAYNA KHAYAT

Earlier this summer, Boston's Life Science Nation brought its Redefining Early Stage Investments (RESI) conference to the MaRS Centre in Toronto, drawing 220 North American investors to scope investment prospects among the city's fast-growing cluster of healthcare startups.

At least half the investors had traveled from outside Canada and were keen to learn about emerging Canadian health technologies.

Usually, RESI moves only between San Francisco, Houston and Boston. Its arrival in Toronto – the first time RESI has been held outside the U.S. – is a sign of the city's rapidly rising star as a hotspot for health innovation. In this respect, Toronto's reputation is catching up to reality. In the last decade, the elements required to create a

thriving innovation ecosystem have been assembled around a cluster of research hospitals and universities – including the renowned University of Toronto – located in the city's downtown core. The area attracts over \$1 billion annually in research funding.



Zayna Khayat

MaRS Innovation was created to commercialize the best discoveries coming out of 15 of these research institutes, including the University Health Network, the Ontario Institute for Cancer Research and SickKids.

To complete the discovery pipeline, MaRS Discovery District, the world's largest urban innovation hub, sits at the centre of this innovation cluster and provides the business expertise and connections to capital necessary to grow high-potential startups, including those formed by MaRS Innovation, into high-growth companies that can impact millions of lives.

Synaptive Medical, for instance, has been dubbed the "Google Maps of brain surgery," providing tools that help neurosurgeons digitally explore the complex web of nerve fibers in the human brain and plan surgeries. eSight, another startup, creates electronic glasses that help some people with vision loss to see again. Meanwhile Bresotec has created BresodX, a wearable device that uses sound and movement to detect the signs of sleep apnea and which is significantly more patient-friendly than existing diagnostic tests for this disease.

But – to paraphrase one speaker at RESI – what Canada has now is not a startup problem, it's a finishing up problem. We're innovating like crazy, but our healthcare system has not kept pace in adopting these new technologies.

After entrepreneurs have jumped the hurdles of clinical trials and regulatory approvals, they frequently complain that our health system is slow to adapt to the digital age and isn't set up to integrate innovations. Purchasing departments struggle to fully analyze the potential costs, benefits and implications of new technologies, resulting in risk-aversion when it comes to decision-making.

At MaRS, our EXCITE (Excellence in

Clinical Innovation and Technology Evaluation) program is working with high-potential companies like Bresotec to speed adoption through technology testing that goes beyond the clinical information required for regulatory approval, providing data on the value-for-money of the technology to the

healthcare system. This kind of robust evidence can help companies convince healthcare providers to invest in their technology.

But more needs to be done. The quality of healthcare innovation coming out of Toronto is world class. If Canadian patients are to truly benefit, we need to put as

much focus on getting these technologies into clinical practice as we do on getting them out of the lab and into the market.

*Zayna Khayat is Director, MaRS EXCITE and Senior Advisor, Health Systems Innovation at MaRS, in Toronto.*



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# Forcare finds growing demand for its expertise in Canada and the U.S.

BY JERRY ZEIDENBERG

TORONTO — After helping with province-wide integration projects in Ontario and Alberta, where it lent a hand connecting huge imaging databases, interoperability expert Forcare is now aiming to connect

the IT systems of Canadian hospitals and doctors.

Forcare offers a suite of interoperability tools based on Integrating the Healthcare Enterprise (IHE) standards. IHE standards and profiles are sometimes called the 'plumbing' that connects the

flow of information through healthcare systems, although this plumbing can be fairly complicated.

"The problem to solve now is that of patient-empowered, collaborative care," said Harm-Jan Wessels, CEO and co-founder of Forcare, which is headquar-

tered in the Netherlands. "Doctors need to work together, but increasingly, under the direction of their patients."

Forcare already supplies solutions to networks of doctors in the Netherlands, where the healthcare system is much like that of Canada's, says Wessels. "It is largely public owned, and in the Netherlands, consists of about 100 hospitals."

There, for example, Forcare has tied together the mammography screening system, which does about 1 million exams per year. "There's a lot of client data, but it's often from separate hospital infrastructures," says Wessels.

The Forcare system is used to link the images, reports, patient consent data and referrals for follow-ups.

"It's all connected," notes Wessels, who observes that it enables various caregivers to quickly obtain the information they need.

Patients can also access the data, if they wish, and they can also set up the consents, which determine who can look at the data and who can't.

"We're looking to bring this technology to Canada," comments Niles Geminiuc, Forcare's Regional VP for Canada.

Netherlands-based Forcare has opened an office in Toronto, where it has five employees, including developers who are adapting its software to the needs of the Canadian marketplace. Geminiuc notes the technology can be used in the cloud, which drives down costs.

Forcare is working with eHealth Ontario to connect the four large regional diagnostic imaging repositories (DIRs) in the province. This initiative is better known as the Diagnostic Imaging (DI) Common Service. The project is expected to be up and running by the end of this year, meaning that clinicians across Ontario will be able to access images and reports from any region.

In addition, the company is currently working on a project with eHealth Ontario that will connect the data of primary care physicians, making it easier for them to share the records of their patients. One of the leading-edge features of the Forcare system is the role-based access system that can be determined by the patient. As a result, the patient is in charge of his or her record.

For his part, Wessels is well-acquainted with Canada and the Canadian healthcare system. He lived in Mississauga, Ont., just outside Toronto, for two years when working for ISG Technologies, a leading-edge developer of medical imaging systems and surgical solutions now owned by IBM.

Wessels observes that in the drive to connectivity, standards are constantly evolving. In particular, the healthcare world is now moving towards the FHIR (Fast Healthcare Interoperability Resources) standard as a better way of sharing data. It is eclipsing HL7 v3.

"HL7 v3 tried to model the whole world, which is impossible," comments Wessels. "It went too far. It even tried to include semantic interoperability."



Harm-Jan Wessels

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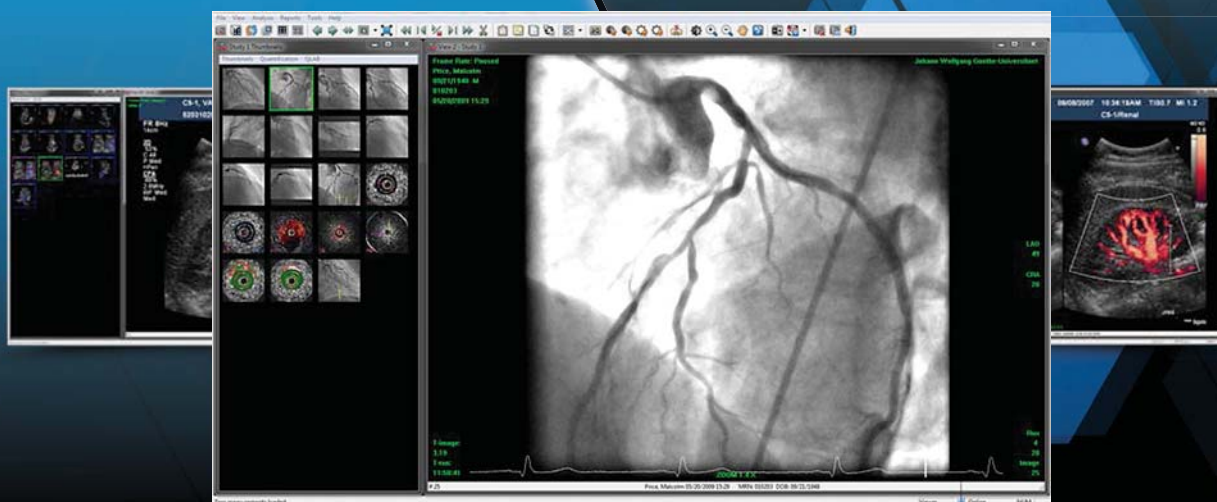
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# Decision-aid tool keeps blood flowing at Nova Scotia Health Authority

BY DIANNE DANIEL

The flow of blood at the Nova Scotia Health Authority (NSHA) has vastly improved following a recent ‘what if’ exercise and the introduction of a new analytical tool to aid in the decision-making regarding the ordering of blood products.

In the fall of 2014, the NSHA decided to rethink its red blood cell inventory practices when a routine review revealed a high variance in ordering methods among technologists, a rise in red blood cell wastage, and an overall need to simplify its blood ordering process.

At the same time, the health authority was due to update its inventory, a cumbersome process that requires a significant amount of time and effort related to manual data manipulation.

The goal, says hematopathologist Dr. Calvino Cheng, was to look at blood ordering through an “informatics lens,” to optimize procedures and reduce waste using statistical methods. If the in-house IT team could develop an algorithm to apply more rigour to decision-making, perhaps they could identify changes that would improve the overall ordering process.

“We realized we weren’t effectively managing our inventory. Inventory was going up, overall demand was going down, and we found that our O-Negative supply

make better decisions faster, with the ability to override the report’s recommendations when necessary. For example, if a patient is undergoing an emergency transfusion at the time of ordering, the ordering technologist can make the adjustment and order more than the report suggests.

“We made it a more standardized and thoughtful process,” says Dr. Cheng. “Technologists are spending less time ordering and less time thinking about how big their order has to be. We made it an intelligent decision rather than a decision based on outdated information or gut feel.”

Deployed in June, 2015, the new tool is now used at Halifax Infirmary and Victoria General (which together comprise the QEII), as well as at Dartmouth General and Hants Community Hospitals.

According to a recent survey of the trans-  
CONTINUED ON PAGE 18

Connect providers. Streamline workflow.  
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**The group devised an algorithm that blends historical data with future predictions to determine how much blood to order.**

was especially troublesome,” says Dr. Cheng. “We had all of these factors that were basically pointing us towards asking the question: How can we do this better?”

Prior to embarking on the project, technologists at the QEII Hospital were spending roughly 20 minutes, twice daily, to perform manual blood inventory calculations. Reports were run nearly three hours before morning orders were placed and one hour before afternoon orders, meaning data was not always reliable.

A significant effort was also required to account for blood inventories located in different areas of the lab, hospital and health system.

The NSHA Pathology Informatics Group used its in-house expertise with the Cerner Millennium database and Cerner Visual Developer to write a custom Cerner Command Language (CCL) program. (CCL is Cerner’s version of the SQL Structured Query Language.) The group devised an algorithm that blends historical data with future predictions to provide more precise data related to how much blood to order.

The report is an easy-to-read summary of what is to be ordered and why.

“What makes it novel is that it looks backwards and forward, and it uses the information to tell us how much blood is required,” says Dr. Cheng. “There is no other software platform out there that could do that for us.”

Technologists still place the actual order, but now have the information they need to

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# Virtual house calls provide patients with faster, more convenient care

BY GILLIAN WANSBROUGH

Yanekah suffered a serious car accident at age 18. After years of chronic pain, as well as depression and anxiety, the stress of pregnancy made life even harder to manage.

"I have days where I'm in tears," says Yanekah, who falls into the 15-20 percent of new mothers in Ontario who face depression and other mental health disorders, such as anxiety, during and after pregnancy.

"I have days where I question myself, and there are so many things that I want to

be able to do that I'm just not able to do any more and it causes a lot of anxiety. That can be incredibly depressing."

She began mental healthcare right away with a specialized perinatal therapist at Toronto's Mount Sinai Hospital, part of Sinai Health System. When attending in

person became too challenging because of her pain, she started receiving psychiatric care at home via telemedicine.

The hospital's perinatal mental health telemedicine program launched in early 2014 and now involves about six physicians who do 80 percent of their consultations virtually. It caters to women from pre-conception through pregnancy to the postpartum period.

Telemedicine eliminates the struggle of travelling while pregnant or later with an infant in tow, while coping with sleep deprivation, breastfeeding and other logistical challenges, according to Dr. Ariel Dalfen, Head of the Mount Sinai Hospital Perinatal Mental Health Telemedicine Program.

The program uses the Ontario Telemedicine Network's (OTN) private and secure eVisit videoconferencing technology. After a simple plugin installation, patients, nurses and psychiatrists click a secure video visit link and are instantly connected on screen.

"I would 100 percent recommend this tool to other practitioners in psychiatry and in mental health," says Dr. Dalfen, who notes that telemedicine enables the program to more widely share its specialized services.

"We all feel the tremendous advantage in terms of reaching out to patients who might not be able to have service otherwise and really in terms of offering patient-centred, patient-focused care where and when patients want it."

The desire to increase access and create capacity also drives the Trillium Health Partners/Halton Healthcare Telemental Health and Addictions Nursing Program, according to Telemedicine Coordinator Norma Rayner, RN.

Patients are referred via One-Link, a single point of access for referrals to 10 addiction and mental health service providers funded by the Mississauga Halton Local Health Integration Network.

Initiated in 2012, the program helps those who might typically go to the ER for support. It also alleviates wait times for mental health services, which can be two to four weeks for an initial assessment. Patients can access care from home or a number of community "hubs" using OTN services.

The program provides an initial assessment, up to 10 counselling sessions based on client goals and support needs, medication initiation or review, symptom management, self-referral information for community resources and health teaching for any other co-morbidities.

Dr. Ian Dawe, Program Chief and Medical Director of Mental Health at Trillium, has a "longstanding positive attitude toward telemedicine" – having himself carried out some 600 clinical telemedicine encounters over the past four years – not just to reach remote areas but as a "mainstream convenience delivery mechanism."

"There's a competitive advantage to being able to meet the needs of your clientele in the time and place of their choosing, especially in high-risk situations," he says. At Trillium he sees the greatest potential for telemedicine for urgent consultations and timely follow-up after discharge.

As well, he increasingly shares his psychiatric expertise using OTN's eConsult service to facilitate virtual "hallway conversations" with family practitioners.



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# Learn about the future of virtual care: attend OTN's event at HealthAchieve

BY DR. EDWARD BROWN

On November 7th, I will co-chair an event at HealthAchieve, at the Metro Convention Centre in Toronto. The session will look at the integration of virtual care into the home and its impact on overall health and well-being across the care continuum.

It's an exciting opportunity to look at innovation, but also an important chance to explore the value of virtual care and the ways we can integrate it seamlessly into our models of care to streamline and improve the care we deliver to our patients. Learn more at [www.healthachieve.com](http://www.healthachieve.com).

At the Ontario Telemedicine Network, we are excited to help lead the charge when it comes to useful and scalable innovation because we know firsthand that it makes a difference.

OTN is actively engaged in projects designed to evaluate mobile solutions in the areas of diabetes, mental health, chronic

kidney disease, palliative care, wound care and enhanced consumer access to primary care. Our goal is to help our partners spread the models of care that demonstrate success to all Ontarians.

As a long-time advocate for telemedicine as a tool to improve access to care, quality of care and the sustainability of healthcare systems, the fact that we now have the tools to effect this kind of change at our disposal is exciting to me. The technology of the future really is here, but it's just one piece of the puzzle.

We're in the middle of the journey to integrate technological solutions into a more patient-centred healthcare system in a way that supports better care. A critical part of that process is engaging patients and providers in virtual care. The key is to get everyone thinking about how to use virtual care to solve problems, and to embrace new ideas as opportunities to improve patient care.

But implementation requires change, and change is difficult because it's not just dependent upon the technology. In order to make headway people will be asked to do things differently and to take on different roles. They will work with different sets of people. Sometimes, it will empower some and disempower others, and unfortunately those aren't always easy adjustments to make.

OTN has a long history of helping to improve access to specialist care in rural areas. Over the past few years we've also been looking at the following big problems and working with partners to address them:

- Chronic disease: We need to engage patients in their own care, and we now have amazing solutions that support and track patient health.
- Access: We have the electronic means to support patient access to primary care anywhere.
- Continuity of care: When patients are

discharged home from the hospital, there's an abyss when it comes to information and collaboration. This often results in re-admissions.

- Complex care/palliative care: We have trouble navigating the system when it comes to complex care. Technology can bring

teams together and enhance outcomes.

- Mental health: There is a shortage of service providers and an access problem when it comes to mental health. Technological solutions can provide an online social network and access to mental health courses and supports.

To its credit, OTN's Telehomecare program has reduced hospitalizations and ER visits by 50%.

*Dr. Edward Brown, MD, is founder and Chief Executive Officer of the Ontario Telemedicine Network (OTN)*

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# Electronic solutions have emerged to track and monitor medical marijuana usage

Canadian companies are devising technologies to help patients benefit from medical and recreational cannabis.

BY DR. SUNNY MALHOTRA

**M**edical cannabis has received much attention in Canada and has been a topic of significant debate, due to expected changes in legislation. In the United States, the medical cannabis market has been flourishing with recent changes in regulations, and the option to consume medicinal and recreational marijuana in some states has made it easier to obtain.

Entrepreneurs have picked up on this and a burgeoning technology sector has been emerging around the ordering and delivery process.

In Canada, we are starting to see the nascent stages of this occurring under the new federal government, which is developing new legislation for medical and recreational marijuana.

Already, many startups and companies are providing medical cannabis through couriers and Canada Post – which has aroused some controversy. And due to the changing political climate, some entrepreneurs have felt emboldened to provide illegal services and storefront dispensaries.

On the technological front, online marijuana dispensaries have arisen in this evolving market.

Herbal Dispatch is an example of an online dispensary which accepts new members with a valid doctor's recommendation, MMAR or who have a terminal/late stage illness.

Bruce Linton from Canopy Growth Corporation is the CEO of a medical cannabis growing company in Ontario. CGC has 20,000 patients and has been adding 1,000 patients per month, says Linton. The use of cannabis for chronic pain includes those with cancer, as well as those with neuropathic pain from

diabetes, and people living with multiple sclerosis, Crohn's or post-traumatic stress disorder and other psychiatric conditions.

There are approximately 6,000 to 8,000 healthcare providers in Canada servicing this need. CGC foresees future opportunities to leverage technology in this market in EMR integration, e-verification, and plant inventory tracking.

Linton noted that companies hoping to participate in this market can target integration, distribu-

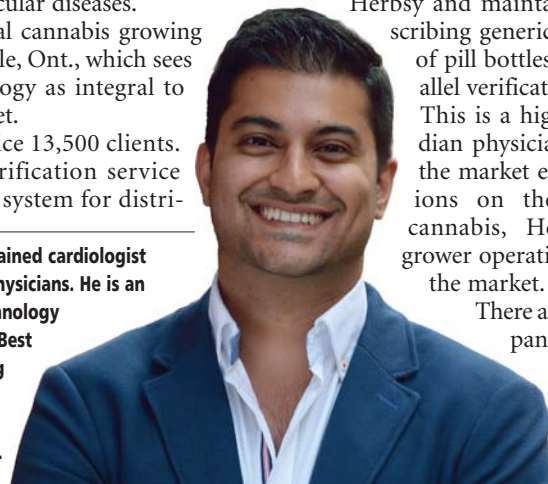
**Canopy Growth Corporation, a grower of medical marijuana, has 20,000 patients and has been adding 1,000 patients per month.**

tion, and identifying active plant ingredients and their efficacies for particular diseases.

Mettrum is a medical cannabis growing company in Bowmanville, Ont., which sees legislation and technology as integral to the growth of the market.

Currently, they service 13,500 clients. Mettrum uses an e-verification service and a primarily online system for distri-

**Dr. Sunny Malhotra is a US trained cardiologist working at AdvantageCare Physicians. He is an entrepreneur and health technology investor. He is the winner of Best in Healthcare - Notable Young Professional 2014 and the national Governor General's Caring Canadian Award 2015. Twitter: @drsunnymalhotra**



bution. It is using a proprietary platform called the Cannabis Electronic Medical Records (C-EMR) system.

C-EMR handles client and physician registration, renewal, product selection and real-time pharmacovigilance reporting and medical research.

This C-EMR concept has the potential to be a powerful tool to bridge the gap between physicians and patients while improving accessibility.

Companies such as Herbsy (disclosure: powered by PopRx) have teamed up with licensed Canadian producers and have provided technology to facilitate delivery through brick and mortar dispensaries, as well as via major pharmacy chains.

Herbsy leverages a mobile application to break down barriers and to improve accessibility, enabling medical cannabis producers, pharmacies and medical professionals to better serve patients.

Pharmacies and dispensaries can partner with Herbsy and maintain accepted methods of prescribing generic medications (taking pictures of pill bottles or e-renewals) to offer a parallel verification and delivery service.

This is a highly debated topic and Canadian physicians and patients are watching the market evolve. Regardless of our opinions on the consumption of medical cannabis, Health Canada has licensed grower operations in Canada to fill a void in the market.

There are both private and public companies looking to create distribution channels for consumers. It will be interesting to see how the demand is satisfied and how technology is leveraged to serve these patients.

## REBOOTING eHEALTH

### A bad boy's story: Don't try this in your hospital!

BY DOMINIC COVVEY

**I** was a really bad boy! I'll confess to you in a little while, but first I want to remind you briefly of some of the threats to privacy and security that everybody probably knows about, but need to be mentioned, at least for completeness.

In my last article, I mentioned plain, old curiosity as a very common driver, particularly related to unauthorized access to medical records. This can be the curiosity of an individual or of a corporation. For example, an insurance company might want to assure itself that you or I have no previous medical conditions affecting a pending policy.

In the case of identity theft, the objective is to get a spectrum of information about an individual. That information would enable a fraudster to act as a proxy and get access

to the individual's good reputation and possibly other resources, not the least of which is money.

Similarly, one would steal a password as a key to one's identity information or to directly access items of value or just screw around with the individual's psyche by mass de-friending on Facebook.

Crashing systems is a bit different from these actions, in that the objective is to do direct damage to an online system and, perhaps, what the system controls.

There is great fear that our power grid is susceptible to an attack that could have effects like great inconvenience or even the loss of life. The attack on systems becomes an acute threat particularly related to the emerging Internet of Things.

There are myriad possibilities of gaining access to systems that control life-support systems, pacemak-

ers, implanted defibrillators, nuclear reactors and many other devices. I think a lot of us believe that we are not, as usual, ready for this advancement in the face of our very vulnera-



Dominic Covvey

ble technology. So, the curiosity threat I previously identified perhaps dims in the glare of these more devastating attacks. However, it seems to be a relatively common threat to which our healthcare system seems particularly vulnerable.

Given that detecting the curiosity threat currently requires human awareness, attention and manual detection, as well as responsive adminis-

trative action, we are very dependent on the clarity of our policies, the quality of our staff and the visibility of our punishment for infractions.

However, there is another threat that turns out to be a real and present danger and that brings us back to the Bad Boy story.

In the 1970s, the Krever Commission undertook investigations regarding the vulnerability of medical records – which at that time were virtually entirely on paper – and the reality of violations of patient confidentiality.

During the time I worked with the Commission, I had the chance to review evidence that had been garnered under sworn testimony. That was pretty easy. Towards the end of the Commission's investigatory phase, Justice Krever, Commission counsel and a few others were invited

CONTINUED ON PAGE 18



# Your health organization wants to 'do telemedicine': What's involved?

As healthcare organizations see the benefits of telemedicine, usage is surging to an all-time high. Your hospital or clinic may also want to invest in a program, but you're unsettled by the superabundant supply of telemedicine technology and equipment options available. No worries, here are six key elements for you to consider when researching your telemedicine equipment options:

- **Medical devices for specialties.** The specific medical devices you need may vary depending on the specialties you plan to service with telemedicine. The good news is you don't need to have all the answers right away, because many equipment providers have scalable and modular telemedicine systems. This means you can purchase just what you need to get started and then add additional devices later on as your program expands into additional specialties.

- **Communication platform and video conferencing needs.** How you plan to manage the patient-to-remote encounter is a key factor. Since you are communicating a patient's critical diagnostic data, the optimal choice is to do it securely and in real-time. After all, the beauty of telemedicine is the functionality to have a live interaction between a patient and a remote specialist.

Using a web-based encounter management portal to communicate and share live medical images from the patient side with the remote provider is truly the best way to offer telemedicine services. This makes it as close to an in-person visit as possible.

For video conferencing, first evaluate any technology investments your organization might have already made to see if these can be leveraged for your current application. Many times they integrate seamlessly with encounter management platforms. If no initial investments have been made for video conferencing and might want to consider software-based video conferencing for a small initial investment.

- **Packaging design and mobility.** Telemedicine carts, cases, wall mounts and other equipment are all just various ways to package the telemedicine hardware and software. Although there is a difference in how aesthetically pleasing they are (or are not), the main thing to keep in mind is whether this packaging will fulfill your intended use, not just now but also in the future.

Ideally you want a telemedicine cart or case that is modular and can be easily configured for additional medical specialties so it can evolve with your program.

- **Bandwidth and Internet connection recommendations.** You may not need to invest in a significant infrastructure overhaul to make telemedicine a reality for your clinic. Of course your specific needs will vary depending on factors such as location and size of your organization, but the most important consideration is not how much bandwidth you need, but rather how reliable and consistent your bandwidth is.

If possible, purchase a business-grade service so you experience a more consistent bandwidth capability to ensure your real-time data is not interrupted or compromised in any way.

- **Training.** The next step is to provide your doctors, nurses and technologists with the skills they need to best make use of your new telemedicine technology in daily operations.

Fortunately, clinical telemedicine equipment training isn't a complicated need to meet, especially if your staff has any familiarity with basic medical devices and modern communication technology.

- **Support.** Finally, the increased reliance on network connectivity and Internet

technology at your office means that you'll need to ensure that you have adequate IT staff support. This is likely more of a concern for smaller practices that may not have an in-house IT department. Find out if your vendor provides installation services, as well as what technical support op-

tions are available if you don't have an IT staff of your own. For additional information on how to move forward with your clinical telemedicine program, download the ebook *How to Ensure Sustainability for Your Telemedicine Program* at [amdtelemedicine.com/cht-ebook.html](http://amdtelemedicine.com/cht-ebook.html).




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# Advances in remote monitoring technology make it easier to help patients at home

Better sensors, more powerful networks and easy-to-use gadgets help, but organizations make it work.

BY DIANNE DANIEL

There's no place like home, but when you're heading there after major surgery, living independently or dealing with a chronic illness or disability, it can sometimes be a bit frightening. Wouldn't it be a relief to know some of the healthcare services you trust were right there beside you?

That's the goal of new developments in remote patient monitoring. From seniors aging in place to cardiac patients recovering at home to those suffering with sleep apnea, the number of patient groups benefitting from remote monitoring is growing in Canada. Fueled in part by advances in signal processing, cloud-based computing and the emergence of low-cost, wearable devices that incorporate discreet sensors, researchers are applying technology to quickly and accurately assess our health in ways that were unattainable just a decade ago.

"We're using technology that's ubiquitous, cost-effective, totally reliable and very simple ... all of the things that really need to happen for uptake," says Rheta Fanizza, chief business officer and senior vice president of innovation at Saint Elizabeth, a national healthcare provider. Whereas early remote monitoring pilot projects relied on expensive equipment that was complicated to operate and often required a home visit by a caregiver to set up, says Fanizza, today's applications are simple to use, leveraging off-the-shelf devices and cloud technology.

Saint Elizabeth's remote patient monitoring solution is based on a game-changing product it originally discovered in Denmark and now resells in North America as TelePowerShift. Combining a web portal and tablet-based app, the platform operates as Software-as-a-Service and can be tailored to support disease-specific clinical workflows as well as national or local clinical guidelines.

At one end is the patient, armed with a tablet and Bluetooth peripheral devices. At the other is a team of clinicians, monitoring information such as weight, lung function, blood pressure, pulse or blood glucose level. The TelePowerShift PatientApp sits in the middle, customized according to condition-specific and patient-specific healthcare plans, and alerting clinicians when specific triggers are met.

Recently, Saint Elizabeth allied with Trillium Health Partners (THP) in Mississauga, Ont., to help coordinate services around the needs of cardiac patients who are recovering at home. The resulting program, called Putting Patients At The Heart (PPATH), focuses on providing continuity of care and maintaining connection between patients and their healthcare teams.

Initially, PPATH established a 24-hour phone line for patients to use, so they could get answers to their questions without visiting the emergency department. Saint Elizabeth nurses can also consult with the THP cardiac team while visiting recovering patients at home, using secure phones and

tablets to communicate and viewing information on a shared dashboard.

"Patients are getting out of hospital sooner and they're being supported in the community with a combination of care and technology," explains Fanizza. "The whole service model is being redesigned and innovated on."

Launched in February 2016, PPATH is already receiving positive feedback and showing a significant reduction in post-discharge emergency room visits. Moving forward, the program is adding remote monitoring capabilities.

Instead of being discharged with paper-based or verbal instructions only, patients also receive a kit containing a tablet and peripheral devices.

The tablet is pre-populated with an app customized with the best practices for a specific condition and designed to solicit useful information, such as blood pressure and other vital signs. In addition, patients are prompted to answer key questions like: 'How much pain are you in?' or 'Did you sleep well?'

All responses are monitored at the backend by staff at the Saint Elizabeth virtual clini-

cal call centre who can intervene when specific triggers are met.

the system were reported, says Fanizza, who calls the technology "disruptively simple."

"Sometimes they're supported by caregivers, but generally, people find it pretty intuitive and straightforward," says Fanizza. "What we're most excited about is that it really helps shift the power to the patient ... It engages patients and caregivers in new and different ways that really puts the power back in their hands to understand how to take care of themselves," she says.

At the Toronto Rehabilitation Institute, which was integrated with University Health Network in 2011 and is considered one of North America's leading rehabilitation sciences centres, researchers are working to solve common problems experienced by people coping with injuries, illness, age-related health conditions and other disabilities. When it comes to remote monitoring solutions, their goal is "zero effort," says Dr. Geoff Fernie, institute director, research.

"As a caregiver, you're already at your wit's end ... the last thing you need is to spend a lot of time setting up bits of equipment," says Dr. Fernie. "A system has to customize itself; it has to learn the needs of the person it's caring for and do better over time."

One team of researchers, led by Toronto Rehabilitation Institute scientist Frank Rudzicz, PhD., founder and chief science officer at Winterlight Labs Inc., is working to monitor mental and cognitive health remotely using machine learning. Marketed by Winterlight Labs, the technology can quickly and accurately detect signs of cognitive impairment by analysing a short, one- to five-minute speech sample.

Spontaneous speech is recorded through a variety of means, transcripts are obtained using speech recognition technology, and acoustic, lexical, syntactic and semantic measures are then extracted and input into a machine learning model. The result is a rich and detailed

analysis of an individual's cognitive performance and researchers say the technology can also be applied to help monitor depression, assess aphasia in stroke victims and assist with early detection of language symptoms related to developmental disorders like autism.

The legwork was the intensive part, says Dr. Rudzicz. Using dozens of hours of recorded speech from hundreds of people, combined with years of academic, peer-reviewed research, the team developed complex computer models that help paint a picture of someone's cognitive state. The software measures some 400 variables, including how many words are used, how long the speaker pauses before certain words are spoken, how they use pronouns and the simplicity of their word choices.

Typically, clinicians or speech language pathologists will examine as many as two dozen measures independently to arrive at a cognitive score. By applying modern machine learning, the technology

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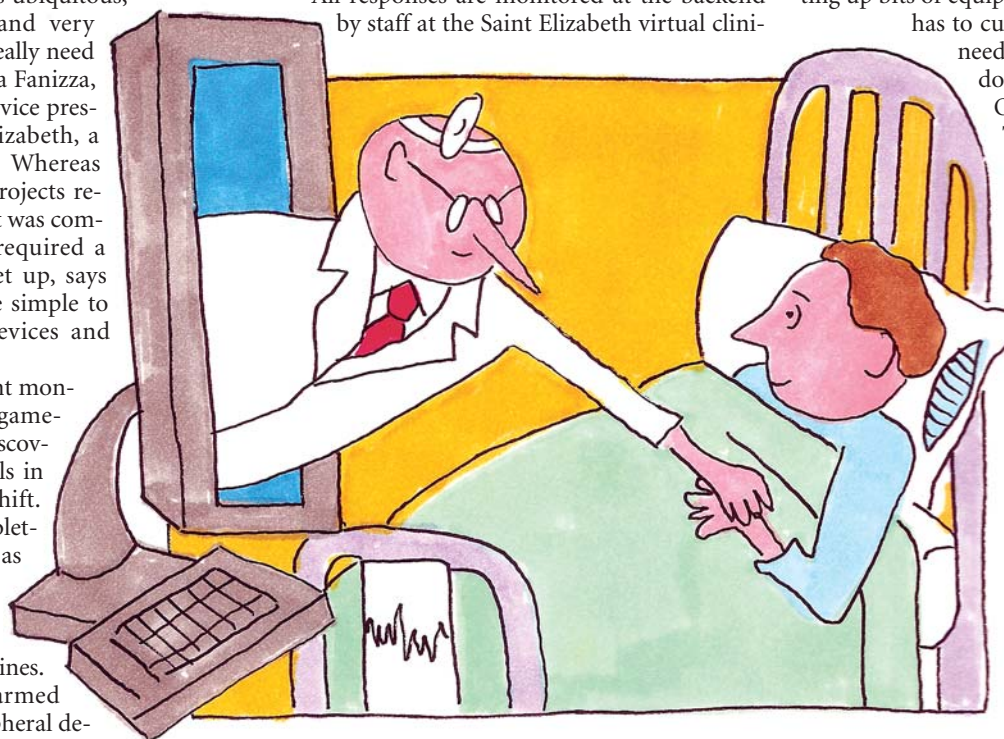


ILLUSTRATION: LINDA WEISS



# Medtronic evaluates expanding remote patient monitoring in Canada

Hospitals, post-acute care providers and provincial health ministries are all driving demand for post-discharge monitoring and chronic disease management. They are seeking to monitor complex, chronic-care populations, and this requires both standardized approaches as well as an ability to tailor services to each patient's unique condition.

According to Ontario's Ministry of Health and Long-Term Care, 5 percent of the patients in the province have complex, chronic conditions, and they account for roughly 66 percent of the ministry's health-care spending. A similar situation can be found in provinces across the country.

Better monitoring of these patients can improve their health. Improved care coordination can also keep them out of hospital emergency departments and reduce in-patient readmissions.

For its part, Medtronic has years of expertise in patient monitoring. Its remote patient monitoring services range from in-home monitoring of patients discharged from hospital with chronic diseases or after certain medical procedures, to monitoring of patients with implantable and wearable medical devices.

Such devices include insertable cardiac monitors, pacemakers, insulin pumps and continuous glucose monitors.

A few examples of implantable and wearable device monitoring:

- **Diabetes:** Medtronic has collected 125 million patient days of anonymous data, with consent, from insulin pumps and glucose monitors. Medtronic is working with other companies to combine analytics and cognitive computing with diabetes devices and health data to develop new insights. The information can be anonymously combined with other sources of data such as electronic medical records, health insurance claims and population health data to uncover patterns and predict health risks using advanced analytics models.

- **Heart:** Medtronic also has pacemakers, ICDs, and insertable cardiac monitors that can be remotely monitored using the company's CareLink Network. At the moment, there are over 1 million patients on the CareLink Network worldwide.

Information collected by the implantable devices is automatically routed through Medtronic's secure network to the patient's clinic, which instructs patients when to send their transmissions. They can also sign up to receive notifications of successfully received transmissions via email or on the MyCareLink Connect Website.

Although Medtronic has historically been known as a medical device company, it also offers in-home patient monitoring.

Medtronic Care Management Services (MCMS), which was formerly known as Cardiocom and acquired in 2013, "is a leader in post-acute patient monitoring," said Genevieve Lavertu, Senior Director, Medtronic Care Management Services, Canada, at Medtronic of Canada Ltd.

"After having deployed MCMS in the United States for more than 15 years and accumulated over 4 million patient months of experience monitoring patients, MCMS is actively evaluating expansion into other countries – including Canada."

MCMS offers over 20 different moni-

toring programs focused on specific diseases and comorbidities, including chronic diseases such as heart failure, hypertension, diabetes, weight management, and COPD, which can be combined together to help monitor the more complex, co-morbid patient.

These programs are designed to enable clinicians to identify problems and intervene upon signs of patient risk, as well as help patients manage their own self-care. There are currently over 95,000 patients being monitored through Medtronic Care Management Services in the United States.

Patient support staff, with over 15 years average clinical experience, are available to support patients as they engage with the service. Staff members gain contextual information from the patient, and they speak with the clinical care providers who are making clinical care decisions.



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# Canadian geriatricians ready and willing to adopt telehealth systems

BY OSMAN HAFEEZ

Canada's growing population of seniors presents several issues relating to accessibility and requires a paradigm shift in the current healthcare system.

A 2014 survey conducted by the World Health Organization found that 23 percent of geriatric patients faced issues accessing healthcare within a reasonable time period. I wanted to combine my MBA training and passion for healthcare to identify innovation gaps in healthcare.

In collaboration with Dr. Raza Naqvi, an Ontario-based geriatrician, I conducted a survey of Geriatric Medicine specialists in Ontario to better understand general perceptions towards telehealth of among this group.

I also had an opportunity to present key findings at the 2016 Annual Scientific Meeting organized by the Canadian Geriatrics Society. Literature indicates that telehealth is growing at a rapid pace and we wanted to conduct a live survey to corroborate these findings.

The research revealed some interesting trends that are worth highlighting. Out of the 24 respondents, 44 percent offered consultations via telehealth.

More interestingly, 78 percent of those not offering telehealth expressed

willingness to offer such services in the future.

In reference to the target patient group, 18 percent of the respondents highlighted 60-75 year olds to be the primary users of telehealth at their practice. While 82 percent of the respondents mentioned 76-90 year-olds as primary telehealth users in their respective practices. These findings highlight the demand for innovation in healthcare that needs to be met and recent research confirms this demand.

A recent survey conducted by the Canadian Health Informatics Association found a 45.7 percent aggregate growth rate in the volume of clinical telehealth sessions between 2012 and 2014. The survey further found a 120 percent increase in Health Facility Endpoints since 2010, with most common services related to Psychiatry, Neurology and Pediatrics.

Jurisdictionally, Ontario and Quebec observed the biggest growth rates with 78 percent increase in patients seeking telehealth services from previous reported figures.

When asked what have been some of the challenges adopting telehealth, 27 percent of the respondents said that finding the right technology has been challenging. Right now Ontario Telemedicine Network (OTN) provides the technology that is most extensively used by geriatricians. This was consistent with survey responses as well.

However, there is still a need for better technology with better scheduling and communication tools. Other challenges highlighted by respondents were, lack of understanding of what are the accounting or, more specifically, billing and legal issues related to offering telehealth.

A few respondents mentioned that scheduling for telehealth sessions has been challenging at their practice when telehealth sessions are cancelled or need to be moved. Lastly, communicating virtually with patients who have difficulty understanding English was highlighted as a difficult process.



Osman Hafeez

Some of the specific comments made by practitioners provide insights into general perceptions towards telehealth.

One respondent stated, "I don't always feel I am able to do a complete assessment without a physical exam, but patients, and more so their families, like the convenience."

Another commented on the importance of face-to-face clinical encounters that simply cannot be replaced by virtual technology. There were also comments

made on telehealth's great potential for use in remote and community-based practices. And so it seems that an ideal approach could involve an initial consult done at a health facility and later, telehealth can be leveraged when patients require follow up assessments.

Some of the limitations found within this research centres on the fact that there is still missing data on how telehealth has impacted some of the smaller communities in Canada.

It would also be interesting to factor in common perceptions of the wider healthcare community, including nurses. And so further research is needed to understand the complexities noted in this research.

Technology-based solutions much like telehealth, will serve as a complementary model rather than a silo to our current healthcare systems. This research reiterates the need to develop a model that complements the universality of the Canadian healthcare system while ensuring healthcare equity across the spectrum.

Given that accessibility and health education are some of the most fundamental aspects to healthy aging, policy-makers continue to evaluate the economic viability and feasibility of telehealth. The goal, of course, is to establish a path to a healthcare system that is truly universal.

## Advances in remote monitoring make it easier to help patients at home

CONTINUED FROM PAGE 14

measures multiple changes in speech simultaneously, arriving at a cognitive score within minutes. And instead of exerting the effort and strain to travel to an appointment and wait anxiously for a test to be administered, patients conveniently provide their speech sample from home.

The team is currently investigating three possible delivery mechanisms. The first is a tablet that caregivers could hand to patients, asking them to describe images that appear on the screen. Their responses would be automatically recorded for later analysis.

The second is an artificially intelligent robot named Ludwig, developed by a research team at the University of Toronto with the support of Mitacs, a national non-profit organization. Currently under trial at One Kanton Place in Toronto, the robot stands two feet tall and is made to look and act like a young boy. The intent is that Ludwig will draw seniors into conversation while he monitors for subtle indicators of Alzheimer's disease or dementia in the background.

The third, and perhaps the most promising for immediate real-world application says Rudzicz, is the phone method whereby a patient supplies a speech sample by responding to automated questions over a mobile or landline. Though most of the research is centred on testing for dementia or aphasia, the system can also track and monitor anxiety and depression.

"What the modern machine learning allows is the combination of these various cognitive scores in non-linear ways," explains Dr. Rudzicz. "It's not just that they're taking longer to remember words, but the words they use are simple and when they do say those words, there's a particular pattern in their voice. It's really how these things combine that allows us to be so accurate."

An added benefit of the technology is that it eases the assessment burden. Patients can very casually provide multiple speech samples over the period of a few months from the comfort of home, "providing a much better picture of how they usually operate," says Dr. Rudzicz, who believes at-home assessment tools will be increasingly important to help manage Canada's growing aging population.

Another development coming from the Toronto Rehabilitation Institute is wearable technology to help diagnose sleep apnea. Rather than enduring a night in a specially designed sleep lab, hooked up to electrodes, patients are equipped with a cordless, battery-operated device they use at home, in their own bed. Marketed by start-up Bresotec Inc., the Bresodx uses proprietary acoustic and movement recording technology to help make a diagnosis.

To use the Bresodx, patients simply pull a tab and press the start button. A blue light flashes for five minutes to indicate recording has started and the device – which includes adjustable head straps – is fitted snugly so that it sits

just under their nose. In the morning, the device automatically turns off, users remove the SD card and mail it back to the company in a prepaid envelope provided.

"Increasingly, we're doing more work where we listen to the body," notes Dr. Fernie, pointing out that it's really no different than a physician using a stethoscope to make assumptions about health.

Another research project at the institute is looking at the possibility of placing sensors in the head of a bed or on a nearby piece of furniture in order to

**Ludwig, a robot, can continuously monitor the speech of the elderly at home to diagnose dementia.**

analyse sleep patterns. "We're doing a lot more analysis by listening to people's sounds, either by attaching microphones directly to their body or placing them in various places close to their body," he says.

At a high level, Toronto Rehabilitation Institute researchers are investigating three approaches to remote patient monitoring. One is to embed intelligent sensors into the "fabric of the home," including walls, ceilings and floor tiles. Such systems can be configured to provide automated reminders for daily tasks, detect falls using ceiling-mounted

vision sensors, or, in the case of the floor tile, apply ballistocardiography to remotely measure weight, heart rate and blood pressure. Researchers are also investigating how unobtrusive sensing technologies like infrared motion detectors and contact sensors can be used to monitor the at-home activity of seniors aging in place.

The second approach is to design wearable devices. Researchers are considering innovative uses for "little micro-processors you can wear discreetly, that are light and don't have batteries," says Fernie. "They can monitor things in terms of what you're doing, how you're feeling and how your body is functioning. There are new opportunities for us there." For example, wearable devices have been developed to measure electrocardiography, electromyography (electrical activity of muscle tissue), galvanic skin response (measures emotional stress), respiration rate, blood pressure and body temperature.

The third area incorporates robots, like Ludwig. Following the pilot project, Rudzicz's team aims to roll out similar robots at other Canadian organizations.

"What this means is you don't have to endlessly take your relatives to the hospital for clinical assessment, which is really quite burdensome, especially as they get dementia," says Fernie. "It takes a lot of work to take someone out and get them assessed. This sits in the background, monitors for cognitive status and warns of changes."



# British Columbia is seen as Canada's trail-blazer for online, 'virtual care'

BY NANCY GABOR

**E**arly in August the Vancouver Sun's personal health reporter, Erin Ellis, described BC's online eHealth environment as 'freewheeling'. The article highlighted a handful of new, private telehealth services, most offering on-line medical consultation to patients who don't have a doctor or don't want to come to a doctor's office.

The article showcased both the convenience of this new type of care, as well as concerns about its impact on care continuity. I left the article thinking "If I was a reader who didn't work in telehealth, would I run towards or away from this type of care?"

Since I work in telehealth in BC, people often ask me what's going on out here. BC is often viewed as the harbinger for virtual care, as it was the first Canadian province to allow primary care doctors to bill for web-based clinical services delivered to patients, regardless of the location of either party.

BC has stated its support for telehealth as a means to improve the health of priority populations in primary and community settings, surgical services and remote and rural care in its 2014 policy paper 'Setting Priorities for BC Health Care System' and in the supporting policy discussion papers released in 2015.

Indeed, dozens of new virtual care projects and programs are under way in BC, in addition to the bevy of speciality services available to British Columbians through Health Authority managed clinical video-conferencing.

Provincial projects have been developed by provincial agencies or health authorities, such as online interactive care services like GetCheckedOnline.com, SmartSexResource.com, MindHealthBC, and Mindcheck.ca.

Other pilots and projects are driven by healthcare providers themselves, often with the support of the Doctors of BC Clinical Committees or other provincial agencies.

For example, the Healthlink BC Physician Triage Pilot Project is demonstrating that integrating a physician into the 8-1-1 Nurse Services triage algorithm can decrease caller referrals to the emergency department (ED).

The ConsultDermBC Teledermatology Initiative is another successful project leveraging Alberta's Telederm platform to improve primary care access to specialist dermatology consultation.

While these innovations have been well-received by patients and providers in the province, the rapid emergence of direct-to-consumer virtual medical clinics have triggered skepticism from some healthcare providers and administrators.

Clearly, on-line medical services offer real patient-centered care. They are convenient, bring service choices for patients who may not have had options in the past, and offer hope for primary care attachment for patients in rural and remote communities.

On the other hand, one-off virtual care transactions can result in service duplication, care disruption and increased health system costs by circumventing regular care relationships.

Medeo, an early entrant in the direct-

to-patient primary care service model, shook the market by launching a web-based medical service in 2013. They advertised directly to patients in Vancouver EDs and carried a strong social media presence including Facebook feeds.

It was evident that patients liked the service. A recently released Canada Health Infoway study from 2015 reported that 399 BC patient users of Medeo said their online visit replaced a visit to a walk-in clinic (48%), a visit to their regular doctor (20%), a visit to the ED (11%) or that they otherwise would have not sought care (13%).

Meanwhile, with 735% growth in taxpayer-funded primary care telehealth billings in the first year alone, Terry Lake, BC's Minister of Health, ordered a review of telemedical care in BC. The results of the review are expected to inform the yet-to-be released provincial Virtual Care Strategic Plan.

Medeo was quickly followed by a small number of virtual clinics, each applying a slightly different service model; all offering medical services from BC-based physicians. Livecare, a Vancouver-based on-line clinic, has contracts with remote First Nations communities to provide medical services.

Quebec-based Equinox LifeCare uses the Medeo platform to deliver its EQ Virtual Clinic. They offer direct-to-consumer, corporate extended-care services and support community-based medical programs such as the Positive Access Link, which provides mental health services for marginalized patients on the downtown east side.

MedviewMD, a new entrant to the BC market from Ontario, has opened four pharmacy-based clinics in Kamloops, Kelowna, Chilliwack and Langley this year,

with plans to open another in Victoria in the near future.

MedviewMD clinics are staffed by nurses who operate peripheral diagnostic devices like digital stethoscopes and otoscopes on behalf of a remote doctor. Patients can pick up their prescriptions before leaving the pharmacy. MedviewMD operates other pharmacy-based telehealth walk-in clinics in Ontario with plans to build more across Canada.

Realizing the challenges facing virtual walk-in clinics in BC, Medeo changed its business model significantly. They stopped selling medical services and started licensing their software to any doctor or clinic wishing to use it in their regular practice.

At the end of 2014 QHR Technologies, the Kelowna-based developer of Accuro, Canada's largest electronic medical record (EMR), purchased Medeo with an eye to integrating the platform into their EMR.

In spring 2016 Telus Health and QHR announced their intention to collaborate in the development of a national, open and secure, standards-based, communication solution that will make it possible to share referrals, prescriptions and asynchronous consultations between providers. Plans to expand the solution to interprofessionals and privately funded healthcare services mean patients will be able to coordinate their care and connect their care team members.



Nancy Gabor

Through the partnership Telus Health customers will have access to the Medeo web portal and mobile app for online booking, messaging and video conferencing between healthcare providers and patients.

And this summer, Loblaw, the owner of Shoppers Drug Mart, announced its intent to purchase QHR, along with its Medeo technology.

It looks like virtual care is here to stay. Are we ready? Certainly there is a strong demand for virtual care, both on the patient and provider side. BC has a strong, established room-based telehealth service integrated to mainstream specialties like oncology, mental health and cardiology.

We have most of the specialist billing codes we need, and specialists can charge for email consultations with other clinicians. We have many practice standards and policy statements supporting the use of telemedicine, but we don't yet have a single, stand-alone legislation governing the sharing of personal health information.

We don't have consistent texting policies or even the ability to bill for text-based care. We don't have any sanctioned clinical collaboration tools to practice with and we don't even have directories to know who offers telemedicine or how to access those services.

Clearly, there is more work to be done on the legislative and policy side. Meanwhile, the market is speeding ahead, creating new forms of healthcare delivery with both benefits and challenges.

*Nancy Gabor is a Telehealth Strategist, within the IMIT Services group at BC's Provincial Health Services Authority.*



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# Remote presence healthcare technology: Saskatchewan's experience

CONTINUED FROM PAGE 6

served communities remotely is potentially transformative. We envision a network of telerobotic ultrasound systems located in remote or low-volume centres to be serviced by sonographers at central telerobotic sonography facilities.

Such clinics could provide routine examinations for patients in low-volume or underserved communities, as well as facilitate after-hours imaging for emergent cases, possibly avoiding transport to a

## Educational website helps sharpen skills

CONTINUED FROM PAGE 4

retirement. "Everyone needs to maintain their skills – even established physicians. There are modules on the website that would be too advanced for a student, but with CME (continuing medical education) on the site, established doctors can maintain their echo skills.

And they can practice up to 50 different "focused TTE" cases over and over until their accuracy of diagnosis is high enough."

Doctors of all ages practice medical skills at times that are convenient for them, and receive meaningful feedback from clinical mentors.

ECG and chest X-ray interpretation are skills needed by most practicing physicians.

They can practice multiple cases of ECG, chest X-ray or ultrasound interpretation, as often as required until they reach a high level of competency.

"I'm very passionate about teaching, and the positive feedback I receive from users makes my entire week," said Dr. Waechter. "It's a great feeling to have a hand in helping someone learn, acquire and maintain their skills."

## Dominic Covvey

CONTINUED FROM PAGE 12

to visit the Government Data Centre.

We were invited because evidence had been presented that brought the security of the Data Centre into question. The Director of the Centre wanted to prove to the Commission that its new capabilities, including IBM's RACE, effectively made their systems impenetrable. I thought inviting our crowd into the Centre was itself a security foible and inadvisable, but they really wanted us there!

Well, it was pretty easy, with our small group being led by only two Data Centre staff (no 'caboose!'), for me to drop back and look at people's desks to see if anyone had left behind a computer room pass card instead of wearing it, as mandated.

Sure enough, there lay one on a desk and I took it. Later in the tour, we were shown the access system to the computer room and how difficult it was just to get in. Of course, the person admitting us seldom went into the room and therefore entered the numeric code on the keyboard quite slowly so I could

larger centre for imaging. In small to mid-sized centres, telerobotic sonography may also allow access to subspecialized sonography which would otherwise be unavailable.

Potential barriers and the future: Potential barriers for the implementation of remote presence robotic technology would not likely be technological. Rapid advances in telecommunications, robotics, and mobile device development are providing a solid technological platform for the future.

The barriers are likely to be related to issues pertaining to medical liability, jurisdictional legal considerations, provider remuneration, perceived costs of capital equipment, data and patient confidentiality, competing health priorities, and lack of regional and national strategies and standards for implementation of telemedicine applications.

Issues related to the disparity in access to telecommunication infrastructure may also be a factor in remote communities or developing countries.

Public expectations and pressure for cost-effective and decentralized healthcare provision may play a significant role in removing cultural barriers and streamlining of regulatory and remuneration issues.

The rising costs of transportation and the unsustainable strain on tertiary care centres of a system that encourages the concentration of services in a few large hospitals may open the way for the implementation of a cost-effective remote presence healthcare strategy.

## Decision-aid tool keeps the blood flowing in Nova Scotia

CONTINUED FROM PAGE 9

fusion service, technologists are welcoming the simplicity of the printout and appreciating the time savings since they no longer need to perform complex manual calculations.

Daily ordering times are down from as high as 45 minutes to 10 minutes on aver-

memorize it and write it down.

After he did that, I asked to take a look at his card, giving me the opportunity, if I had wished, to switch cards with him.

After the tour, on the way out, I showed the card to the other Commission members. At first they didn't believe it, but finally broke up laughing.

I then tried to give the card to the receptionist, who initially refused, because

**Security starts with people, depends on people, and (unfortunately), also ends with people.**

she was not authorized to even touch those cards. I left it on the desk and we left the facility. The Director hated me for years – I guess I am an equal opportunity offender.

So here's the message. Another important security threat is individual ego, inability to resist proving one is right, and simply having the bloody-mindedness to prove the other person wrong.



**Figure 4. The Melody telerobotic sonography system can be used to perform an ultrasound study on a patient in a remote location. The photo shows a nurse holding the ultrasound probe frame over the patient but the system is controlled by an expert sonographer performing the exam in real-time from a distant location.**

It is clear that the healthcare industry is lagging behind the banking and airline industries in the implementation of decentralized consumer-centre solutions that remove barriers of time and distance.

Remote presence robotic technology and other telehealth solutions are rapidly expanding. The provision of point-of-care diagnosis and treatment will transform the current paradigm of centralized healthcare delivery.

Our experience in Saskatchewan leads us to believe that this technology can also help to narrow the gap of inequality in healthcare access to the most vulnerable and underservice populations in the Province.

*Dr. Ivar Mendez is the Fred H. Wigmore Professor and Chairman of Surgery at the University of Saskatchewan and the Unified Head of Surgery for the Province of Saskatchewan.*

age, with some technologists completing their orders in seconds.

The tool also introduces new functionality, such as the ability to take anemic patients into account and to order enough blood supply to cover a weekend, removing the need to place weekend orders.

In addition to greatly reducing excess

blood inventory, the tool is significantly reducing the amount of red blood cell units discarded due to expiry.

Prior to deploying the new report, outdate rates hovered between 1% and 2.5%. Following implementation, the health institution sustained an outdate rate of less than 0.5% for several months in a row – a first, he says.

"Each unit we save from wastage is about \$450 and that comes off the bottom line of our provincial budget," says Dr. Cheng.

The project reflects a true team effort that brought together software expertise at the back end with business know-how at the front end. While creating and validating their mathematical models – designed to assess the probability of transfusion – database analysts collaborated closely with management and supervisors from the Blood Transfusion Services department. Business input was required to ensure the algorithm's feasibility, including what features to include and the risks to address.

One reason the new tool is trusted is that the algorithm is positively biased, meaning it recommends ordering slightly more blood than is required. The informatics team has also included safeguards to prevent inventory from getting too low.

"We have a variable that allows you to peek into the future and that variable has become a very trusted one," says Dr. Cheng, noting that analysts were able to take a 'what if' situation and make it real. "Our philosophy, moving forward, is that our lab information system, Cerner Pathnet, is a very powerful tool that can be used for more than single patient encounters. It's up to us to unlock that potential," he says.



## Facebook-like EMR

CONTINUED FROM PAGE 4

the system generates are particularly helpful in the mental health field, where reports are very narrative.

"Instead of looking like a survey – yes/no, 3 out of 5 – it actually creates nice sentences, as if I had taken the information and dictated the report myself: 'The patient reported that he had these symptoms for a week and it affected his life in this way.'"

However, Dr. Chow believes the system would be equally useful in more data-driven medical fields such as cardiology, for example, because it can also collect vital signs remotely in advance of a visit and generate meaningful clinical notes based on hard data.

"Cardiologists need to collect all manner of information – height, weight, medications, and so on. InputHealth can collect all of those things ahead of time and spit them out in a readable format. It can detect trends and display them in graphical format. It can also track vital signs over time. The patient can punch in their blood pressure results every day. And you can set up alerts in InputHealth to notify the doctor if there's more than, say, a 10 mmHg change in the systolic pressure."

On the administrative front, Dr. Chow says there are fewer no-shows for his appointments using InputHealth, and he can use questionnaire completion – or lack thereof – to predict no-shows and other patient behaviour.

"In the past, about 20 to 30 percent of patients don't show up for appointments, but this is not uncommon in the mental health field. Now my no-show rate is about 1 to 2 percent. And I can see if someone's filled out their questionnaire or not at my end."

"If they haven't, I know they probably won't show up. I can now reliably predict who's engaged and who's not. So I have a shorter wait list now and I waste less time on admin. Patients clearly feel invested because when they fill out the questionnaire, they want to show up."

For all its complexity, it's very easy to learn how to use InputHealth, he adds. "It feels like using Facebook instead of Excel. You just learn how to use it intuitively. Even my less technologically inclined staff can pick it up within a few days, unlike other EMRs that require weeks of training."

InputHealth's customer service team is extremely responsive when he's asked for help or reported a bug. "If there's something I don't understand or a feature I don't like, I usually get a response within five or 10 minutes. Their people are always in touch because they do a new release of the system every few weeks. And I always get little pop-up messages when I log into InputHealth to notify me about new features."

Overall, the system has a modern, 21st century look-and-feel that works intuitively like iPhones, iPads and other technology that everyone's accustomed to using in everyday life, says Chow. "The feeling I get from other EMRs is that they're essentially mainframes with a user interface slapped on top, whereas InputHealth was created from the ground up to be usable. InputHealth is a lot like Apple in the sense that I really feel that the user experience is top-of-mind, not a second or third consideration."

At present, InputHealth is the solution of choice for niche practices such as mental health clinics, community care centers, chronic pain clinics, and perioperative

clinics, says Dr. Seth. "It's useful for any type of practice that sees one or two different types of clinical conditions and requires routine data collection. The market for our system right now is enterprise organizations such as hospital networks and academic institutions – healthcare organizations that need to know how a patient population is doing in a specific region."

However, the company is laying the groundwork to expand its reach by pursuing certification in Ontario and other provinces as a full-fledged EMR system

that any medical practice, big and small, can use. "We're doing the development work needed to create a robust product that can replace existing EMRs altogether. We believe we'll be able to replace traditional EMR systems over time."

The company is working to fulfill the regulatory and other requirements needed to launch InputHealth as an EMR across Canada. All the provinces have different rules governing EMR system certification, and provincial laboratory and other systems are at different stages of develop-

ment and integration, explains Dr. Seth.

"In British Columbia, for example, InputHealth can replace all the functions of an EMR. Our collaborative health record is a full-blown system that a clinic can use in its entirety, because we've integrated it with B.C.'s provincial billing and lab systems. In Ontario, we're working toward that and we're actively collaborating with Ontario MD. If you're using Practice Solutions or Accuro in Ontario, depending on your practice type, very soon we're going to be able to say we're ready to take you on."



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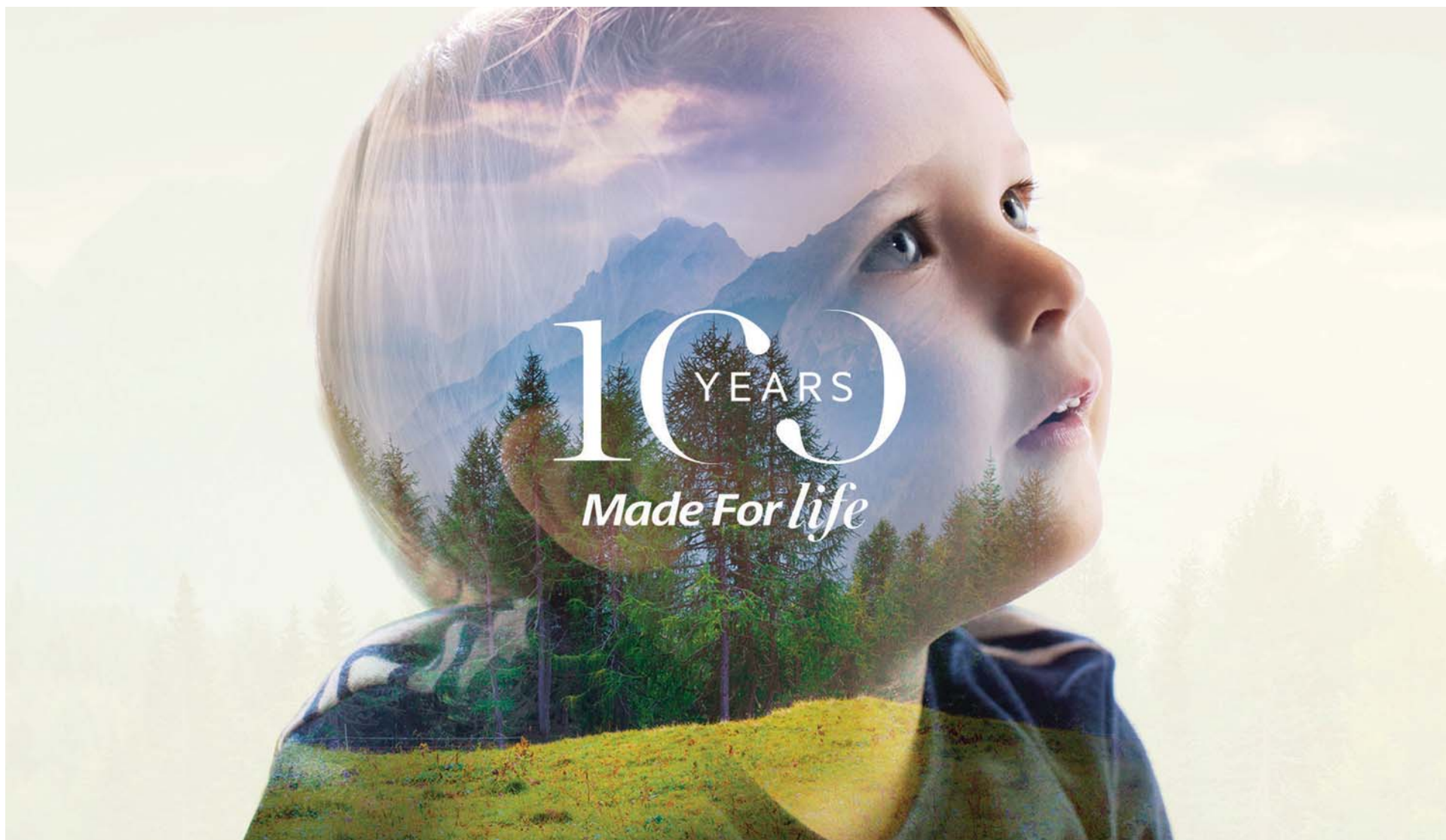
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