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CANADIAN
Healthcare Technology

CANADA'S MAGAZINE FOR MANAGERS AND USERS OF INFORMATION SYSTEMS IN HEALTHCARE | VOL. 22, NO. 7 | OCTOBER 2017

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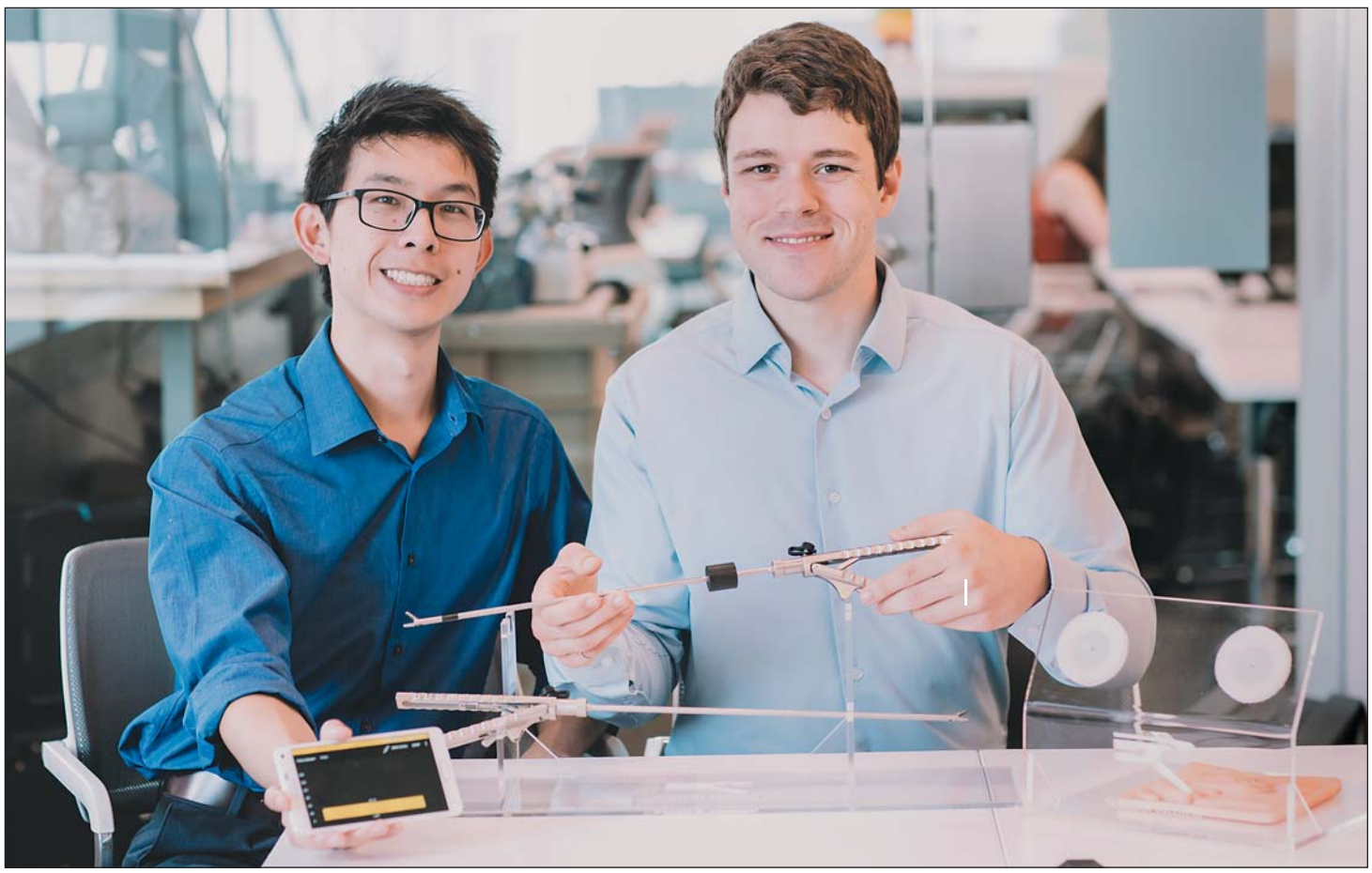

PHOTO: DYSON CANADA

Award-winning idea aims to improve surgeries

PhD students Justin Wee and Robert Brooks have devised a thin surgical add-on called ForceFilm, which accurately measures forces exerted on tissue during minimally invasive surgery. The wireless system is low-cost and re-usable, and stands to improve patient safety in keyhole surgeries by helping physicians determine how much pressure to use. The project won the Canadian leg of the James Dyson Award. **SEE STORY ON PAGE 4.**

Ontario devises cloud-based triage system for EDs

BY JERRY ZEIDENBERG

TORONTO – Cancer Care Ontario is in the process of rolling out a cloud-based system for Emergency Department triage to hospitals across the province. The computerized system uses algorithms that lead to more consistent assessments of patients who present in Emergency Rooms, resulting in higher quality triage and ultimately, increased patient safety.

"We're now live in six hospitals and by 2018, the system will be in 100 hospitals," said Steve Scott, Director of eCTAS, Analytics & Informatics at Cancer Care Ontario.

Scott added that over 100,000 patients have been triaged using the system, so far. Called eCTAS, short for the Electronic Canadian Triage and Acuity Scale, the system also provides real-time reporting of patient loads in Emergency Departments.

This data will be useful for the hospitals using the system, as well as planners in Local Health Information Networks (LHINs) and by the Ministry of Health.

The eCTAS solution also shows ER nurses if the patient presenting has been at other emergency departments, and provides the record of triage, but not the diagnostic record.

> **Nurses were key members of the team that developed and refined the standardized triage solution.**

The rollout comes after an intensive period of design and testing. A key factor in the design was the involvement of nurses, who worked closely with technologists and designers.

"We asked for nurses to volunteer [in the design stage] and expected eight to 10 to sign on," said Scott. "It turned out that we got 90 volunteers." Many nurses saw the creation of a shared eCTAS system as an important project and wanted to be involved, he said.

"The reaction and involvement was incredible."

By having the nurses working in design and education, CCO was able to produce a highly usable solution that meets the needs of frontline professionals, said Scott.

Moreover, the design process itself used an iterative model, meaning it was constantly tweaked, tested by users and then modified once more. Indeed, there were six waves of testing and modifications.

One of the major requirements, it turned out, was to have all the information needed by triage nurses on a single screen. That re-

CONTINUED ON PAGE 2

Cancer Care Ontario rolling out cloud-based system for ER triage

CONTINUED FROM PAGE 1

duces the number of clicks needed and cuts down on navigation.

Another important feature: while cloud-based (it makes use of Microsoft Azure), the system can be downloaded to run locally. This means if there is an outage of a connection to the Internet, for whatever reason, the solution can still be used in the ER.

"This is a real technological innovation," said Scott. "Even if access to the Internet is spotty, patients will still be coming in, and ED staff can continue working. High availability was critical."

"You don't want to experience any disruptions in service."

The system works on any platform – desktop, tablet or smartphone. Staff can be sitting at a workstation or walking around the unit and have access to the information they need.

Cancer Care Ontario was chosen for the task of leading the project as it is already heavily involved in data collection across the province. Moreover, it produced and manages the Ontario Wait Time Information System (WTIS) and already has links to all hospitals and Emergency Departments.

Giving the agency responsibility for deploying eCTAS made sense and was a natural fit.

Scott noted eCTAS is based on research from the University of Alberta and the algorithm was built in collaboration with the Canadian Association of Emergency Physicians. Cancer Care Ontario created a delivery system for it, ensuring that it is in a practical and easy-to-access format.

As part of the approach in building the solution, CCO also conducted a Privacy Impact Assessment to ensure any PHI data would be secure in the cloud.

Ross Memorial Hospital, In Lindsay, Ont., was the first to make use of the new, cloud-based eCTAS solution.

It is available to Ontario hospitals via the web, or they can integrate eCTAS into their own hospital information systems. So far, the majority of participating hospitals have opted to use the cloud-based version via the web.

"It's good to see healthcare organizations moving to leverage cloud to deliver and build for the future," commented Peter Jones, healthcare industry lead at Microsoft Canada. "Because of the broad use across the province, Azure is an ideal solution."

Earlier this year, the Ross Memorial Hospital in Lindsay, Ont., became the first to make use of the solution. Scott said that Ross Memorial has been a major supporter of the project and was of enormous help in the design and testing stages.

The solution has already helped Ross Memorial. "Before, triage was paper-based," said Jennifer Burns-West, ED unit manager. "With eCTAS, it's all on computer, and the system flags nurses about modifiers, so the scoring is more accurate."

She noted that when calculating a triage score, modifiers have to be taken into account. For example, for a patient who suffered a car crash, nurses must account for the speed of the car in the crash and the pain level of the patient.

"A lot more is automated, and our nurses love it," said Burns-West, noting the hospital has 70 ED nurses, with two triage stations in the department. The system makes triage faster, and because nurses are alerted about modifiers, the quality of triage has gone up.

"Honestly, it's so easy to navigate," said Burns-West. "This is going to help nurses across the province."

The implementation at Ross Memorial was soon followed by Cambridge Memorial, Mount Sinai, in Toronto; Southlake Regional Health Centre, in Newmarket; the Norfolk General Hospital, in Simcoe; and Lake-of-the-Woods District Hospital, in Kenora.

The impetus for eCTAS can be linked to a study done by Ontario's Auditor General, who examined three hospital EDs and determined that only 37 percent of patients were appropriately triaged.

The ministry then commissioned the creation of a computerized tool that would help ED staff produce more consistent and accurate assessments, and directed Cancer Care Ontario to develop the web-based delivery system.

Already it has been found that EDs using eCTAS are assessing patients much more consistently than before, when measured against the way an expert in triage determines a triage score.

> **A study by Ontario's Auditor General found that only 37 percent of ED patients were appropriately triaged.**

Initial results are showing that the number of patients who are under-triaged has dropped from 13 percent to just 3 percent in hospitals using eCTAS. "We've potentially improved patient safety for 10 percent of the ED patients, or one in 10," said Scott.

Speaking online in a web-video, Dr. Howard Ovens, provincial clinical lead for ER medicine, said: "Applying this project will give us an opportunity to make sure that every hospital is consistent and using best practices in making this initial assessment, which is such a key part of the patient journey."

Dr. Ovens is also the chief medical strategy officer for the Sinai Health System in Toronto.

Another useful feature of the system has been the inclusion of an infection control screen. Before patients are triaged, nurses see the screen and can determine whether patients may be infectious.

CANADIAN Healthcare Technology

CANADA'S MAGAZINE FOR MANAGERS AND USERS OF INFORMATION TECHNOLOGY IN HEALTHCARE

Volume 22, Number 7 October 2017

Address all correspondence to Canadian Healthcare Technology, 1118 Centre Street, Suite 207, Thornhill ON L4J 7R9 Canada. Telephone: (905) 709-2330. Fax: (905) 709-2258. Internet: www.canhealth.com. E-mail: info2@canhealth.com. Canadian Healthcare Technology will publish eight issues in 2017. Feature schedule and advertising kits available upon request. Canadian Healthcare Technology is sent free of charge to physicians and managers in hospitals, clinics and nursing homes. All others: $67.80 per year ($60 + $7.80 HST). Registration number 899059430 RT. **Publications Mail Agreement No. 40018238.** Return undeliverable Canadian addresses to Canadian Healthcare Technology, 1118 Centre Street, Suite 207, Thornhill ON L4J 7R9. E-mail: jerryz@canhealth.com. **ISSN 1486-7133**.

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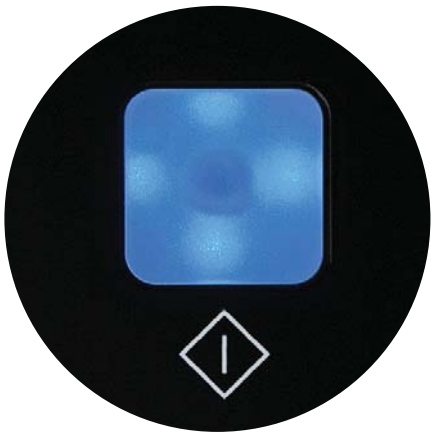

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Mackenzie Health jumps to EMRAM Level 6 using Epic-based EMR

BY JERRY ZEIDENBERG

L to R: Susan Kwolek, Altaf Stationwala, Richard Tam, Diane Salois-Swallow, Sharon MacSween, Dr. Steven Jackson.

RICHMOND HILL, ONT. – Only a few days after Mackenzie Health went live with its Epic electronic medical record (EMR) system on July 8th, its managers realized they had reached all of the requirements for Level 6 of the HIMSS Analytics' EMRAM scale.

The documentation showed the hospital's new closed-loop medication administration system, with bar-coding and integration with the CPOE system, was being used by over 80 per cent of clinicians – with nearly 90 percent compliance.

All in-patient, out-patient, ED and surgical departments were computerized and using full physician documentation.

"We contacted the HIMSS analytics leadership and described how we had met and exceeded the requirements, and within 10 minutes we were certified as Level 6," said Diane Salois-Swallow, chief information officer at Mackenzie Health. The hospital was previously at Level 3 of the scale.

The medical centre is now the first full-service Epic-EMR-based hospital in Canada to reach Level 6 of the eight-level EMRAM scale. (The ladder starts at 0 and peaks at Level 7.)

Moreover, it's one of just four community hospitals in Ontario that has achieved this distinction.

"We've got the system running across the hospital, in our inpatient and ambulatory services, emergency room and operating rooms," commented Richard Tam, executive VP and chief administrative officer. "We've done the whole shot."

"We used a big bang approach," said Tam. "We needed to get it done."

He explained that the pressure was on because the hospital's existing EMR supplier was going to sunset support for its system in early 2018. Moreover, Mackenzie Health is building a second hospital site, in nearby Vaughan, and wants its staff to be well-versed in the EMR technology before the new hospital opens in 2020.

Still, the effort to implement so quickly – in 15 months – required a well-thought-out and smoothly orchestrated planning process.

Indeed, the main driver in the minds of the administration was to make it a clinical transformation project, spearheaded by physicians and nurses. That has led to the high levels of adoption of the system, including CPOE, medication administration and everything else.

Tam and Salois-Swallow noted that CEO Altaf Stationwala's leadership has been instrumental to the success of the project; Stationwala has been an active driver in implementing the new electronic health record system.

But the CEO and the rest of the administration left it to clinicians to test and select the EMR they wanted.

"It was very important to let them choose the system that best meets their needs," said Tam. "And Epic was the one they preferred."

Moreover, Salois-Swallow described that in adapting Epic to the needs and workflow of Mackenzie Health, clinicians were leading the change, rather than clinical informatics analysts from the I.T. department.

Indeed, physicians were appointed as champions in different clinical areas, and many became 'physician-builders', meaning they were trained in the technology at Epic's headquarters in Wisconsin.

In this way, they could work alongside the Informatics staff to craft the system according to the needs of their departments.

This was so satisfying, and so appealing to physicians, that "they were literally knocking on our doors to be included and sent for training," said Tam. "But we could only send so many."

Physicians also served on every committee, and in many cases headed them up. Moreover, the chief of staff, Dr. Steven Jackson, was the executive sponsor of the Epic project, while Dr. Aviv Gladman and Dr. Victoria Chan had medical informatics leadership roles, too.

So did executive VP, chief operating officer and chief nursing executive Susan Kwolek.

With clinicians in charge, the Mackenzie Health EMR implementation avoided the problems that have beset projects like Vancouver Island's, where physicians have revolted against the new electronic health record system.

"We read the report that Island Health produced and took every recommendation they made seriously," said Salois-Swallow. "We give them a lot of credit for making this public. It is helping other hospitals across Canada."

Empowering clinicians and following their lead is one of the key points. In the culture of hospitals, physicians are venerated and obeyed; if they give their blessing to a system or way of doing things, everyone else will follow.

Not that Mackenzie Health didn't experience glitches and challenges of its own. For example, at the go-live, when the switch was turned on, it was found that some systems and processes weren't working the way they were supposed to.

However, Salois-Swallow noted the hospital, with help from Epic, planned for unexpected emergencies. It set up a command centre with two different help desks – one for technical issues, like passwords or getting information from one system to another, and the other for operational and workflow problems, such as an entire task taking too long.

The help desks were staffed 24/7. "We'd send someone right to the site to help," said Salois-Swallow. "Often, it was a case of people needing help to navigate through some

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Digital 'sense of touch' for keyhole surgery wins Dyson award in Canada

TORONTO – Minimally invasive surgery has revolutionized the practice of medicine in recent years, as it dramatically reduces the size of incisions needed during operations and decreases the need for blood transfusions. It also reduces infection rates and recovery times.

However, issues still remain, including minimal feedback for surgeons and interventional radiologists, who must work with a deprived sense of touch. This can lead to medical error during MIS – such as organs that are accidentally punctured or nicked.

A Canadian innovation may prove to significantly enhance the safety of these minimally invasive procedures.

This year's Canadian national winner of the James Dyson Award is ForceFilm – a thin surgical instrument add-on that accurately measures forces exerted on tissue from minimally invasive surgery.

Developed by two University of Toronto PhD students, Robert Brooks and Justin Wee, ForceFilm's patent-pending design can be retrofitted to work with any standard, rigid MIS instrument.

The forces detected by the film are wirelessly communicated to the surgeon, providing live force-feedback that allows the surgeon to determine exactly when dangerous levels of force are nearing.

Winning the national leg of the James Dyson Award will inject $3,400 into the project.

"Unlike most medical sensors, ForceFilm is uniquely economical and environmentally friendly because it can be steam sterilized and reused," said Robert Brooks, co-founder of ForceFilm. "We will be using the prize money to make ForceFilm last even longer.

"This will allow us to try different formulations and constructions of film and build test apparatuses to repetitively test them for abrasion and steam resistance, with the goal of having ForceFilm last a full year in surgical use."

Working on the technology over the course of two years, Brooks and Wee have had three major revisions of the prototype, with each revision involving modification on the circuit board. The first generation of the technology was used in an education study with 19 urologists at the Hospital for Sick Children in Toronto. The proof-of-concept study revealed a significant difference between the force application of novice, intermediate and expert surgeons.

ForceFilm accurately measures forces exerted on tissue during minimally invasive surgical procedures.

Brooks added: "Winning the national James Dyson Award means we can get the word out about our technology and how ForceFilm can have a life-saving impact on minimally invasive surgery."

ForceFilm is joined by four runners up who will move on to the next stage of the James Dyson Award, where a panel of Dyson engineers will select an international shortlist of 20 projects.

The James Dyson Award runs in 23 countries. The contest is open to university level students (and recent graduates) studying product design, industrial design and engineering.

The award encourages ideas that challenge convention, lean engineering – less is more, and design with the environment in mind. The best inventions are simple and practical yet provide a solution to a real-world problem. A national winner is selected for every country the award runs in, before going through to the final phase where the international winner is chosen by James Dyson.

The award is run by the James Dyson Foundation, a registered charity set up in 2002 which exists to inspire and support the next generation of engineers. The international prize is $50,000 for the student and $8,500 for the student's university department.

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Mohawk College's MEDIC helps small health tech companies scale up

HAMILTON, ONT. – The team behind the eHealth Ontario Innovation-Lab.ca, Apps for Health and the first functioning Infoway-compliant HIAL in Canada, have a new project in sight: creating a one-stop-shop to help smaller digital health companies with their technical needs.

The goal is to help them become bigger players in the healthcare system.

Mohawk College's mHealth and eHealth Development and Innovation Centre (MEDIC) just became a Technology Access Centre in Digital Health, thanks to government funding.

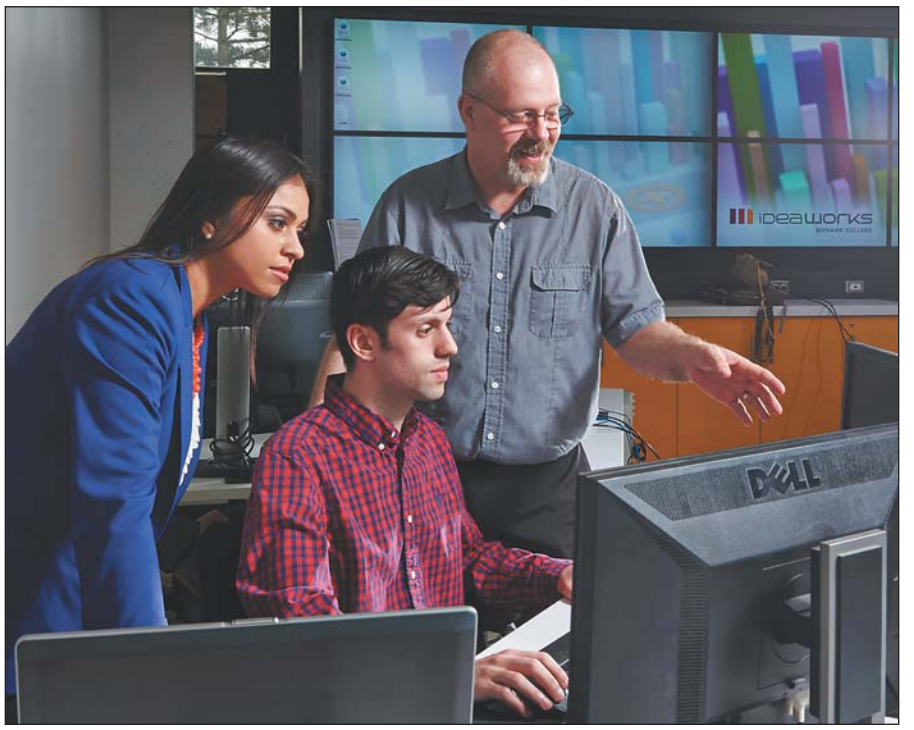
The centre, which is part of Mohawk's applied research area, IDEAWORKS, is the only Technology Access Centre in the country that focuses on digital health applied research projects.

The aim of these centres is simple: remove the barriers that prevent companies from starting, scaling up or expanding internationally.

"Smaller companies may have an idea but don't know how to connect to the infrastructure," said Duane Bender, who launched MEDIC 10 years ago in 2007 and is the lead faculty researcher on many of the centre's projects.

"We not only streamline that process, but we also help fill in gaps in expertise – either by the partner's team working side-by-side with our team or by providing training and referrals."

MEDIC is committed to making the applied research projects as accessible as possible, especially for companies that have never considered working with a community college on a research project before. The college doesn't retain any IP and often works with companies to secure additional government funding.



Mohawk College's MEDIC shows smaller companies how to improve their products and tackle new markets.

The Hamilton-based centre is funded by an NSERC grant of $1.75 million and contributions from industry partners such as IBM, Interfaceware, eHealth Ontario, Canada Health Infoway, Hamilton Health Sciences and the city of Hamilton. It's also part of the Synapse Life Science Consortium, a regional cluster that provides access to a full spectrum of healthcare research.

The funding will enable digital health companies to collaboratively tackle their projects and problems, leveraging an applied research approach which puts current research and trends into practice.

It will provide easy access to MEDIC's expertise and technical solutions such as its Client Registry Reference Implementation. But it will also provide other business benefits to digital health companies, such as support to develop market entry and expansion strategies and even crash courses on the constantly evolving best practices in digital health.

Working with the private sector has always been a part of MEDIC's portfolio. Past partners have included YMS, Health QR, Swift Medical and mHealth Solutions, and the funding makes MEDIC's expertise even more accessible.

Now companies without the in-house staff resources or knowledge to fully realize the potential of their product or tackle the complex procurement process of the healthcare sector have a place to call for help.

Paul Brown, general manager of MEDIC, realized early on that scaling up products and ensuring interoperability with existing systems was a place where most companies needed some support.

"One of the best ways to spark an idea is to put a software developer and a clinician in the same room.

"You'll have a real problem to work from and a solution that directly responds to that need. It's a brilliant model for innovation," explains Brown. "But, what if your product is already on the market in a different format? What if your app could do so much more than just solve that one problem? That's where we help."

It's not uncommon for MEDIC to tackle that wide range of projects for its partners. But because the common business objective is the same – selling your product to buyers who are in the public sector – Brown and his team of development staff and co-op students always offer more.

"All digital health companies have different problems – sometimes it's building an interoperable app, sometimes it is testing if their software is rigorous enough to support over 13 million unique clients," says Brown. "So our partners may get the custom solution they are looking for at the end of the applied research project, but they are also going to leave with this baseline of digital health knowledge that they didn't have when they started."

"Being a Technology Access Centre for Digital Health allows us to function as a central hub for innovation," says Bender. "That's the brilliance of working on applied research projects – it's about both the development of the new products and the evolution of knowledge and talent."

App helps residents communicate safely, efficiently in hospitals

BY NEIL ZEIDENBERG

TORONTO – Some medical residents in Canada are still communicating with care teams by using outdated tools like pagers and even pen and paper for their daily processes – despite the fact most healthcare professionals own smartphones.

As an alternative, some are choosing non-compliant solutions like SMS and WhatsApp to communicate – improving efficiency somewhat, but at the same time risking patient privacy and potential loss of patient information to individuals outside the circle of care.

"Residents are using inadequate tools to get tasks done, and the solutions they're turning to aren't healthcare specific with built-in functionality – so they're not the best tools for the job," said Andrew Lawrence, COO of Hypercare (www.hypercare.com) – a new start-up company that aims to help residents collaborate more effectively and communicate securely within the care team.

"WhatsApp puts patient data at risk," said Lawrence. "Although it has data encryption, it doesn't have any privacy measures embedded, and there's no paper trail if you want to know what's going on."

The National Health Service in the U.K. prohibits the use of WhatsApp in hospitals because it uses an unsecure web-based platform, yet doctors still like using it because its eases communication and the exchange of clinical information.

"WhatsApp is a very popular communication tool, but it's designed for public consumer use – not for the workflows, privacy and security we expect and require in a complex healthcare setting," said Josh Liu, CEO of SeamlessMD, and medical advisor on the Hypercare team.

Dr. Matt Strickland, president of GestSure (www.gestsure.com), a surgical I.T. solutions provider, and medical advisor on the Hypercare team, brings up another disadvantage to using a third party application: the information may not be captured adequately as part of a medical record. "Pictures and clinical opinions exchanged via alternative platforms would ideally be included in a patient's record, but there are often inadequate ways to include this data."

Pagers – still endorsed by many academic hospitals in Canada – do little more than provide call back numbers with no context in terms of who, what, or the urgency of the page. "Clinicians may get over a 100 pages in a single shift, and it's hard for them to prioritize how they react to these pages," said Dr. Liu. "Moreover, much time is wasted playing phone tag with colleagues in response to these pages.

> **Some clinicians are using WhatsApp, but it doesn't provide the security or auditing that Hypercare does.**

"Hypercare allows doctors to send each other priority texts to attach to their messages. Clinicians can then gauge its importance and prioritize," said Dr. Liu.

In early 2016, Hypercare was formed by a team of computer scientists and medical professionals intent on helping healthcare professionals exchange patient information safely using a modern, HIPAA-compliant messaging platform. "In simplest terms, it's a mobile and web platform that lets residents collaborate securely, and privately around patient care," said Lawrence. "We're trying to improve the lives of residents and make them more productive."

Hypercare is a cloud-based solution hosted in Toronto and stored safely in the cloud. It's compatible with smartphones running Android, iOS or Web Clients and has built-in 128-bit SSL encryption.

Hypercare can improve how clinicians collaborate and deliver quality patient care by offering features like secure messaging; the ability to search the hospital directory to acquire detailed information about patients; task delegation within the care team and real-time updates so the entire team is on the same page. Furthermore, discussions can be associated with a specific patient so that this data could be imported into a formal medical record.

Microsoft

A digital transformation in healthcare:

Microsoft's role in the sector's digital revolution

Microsoft is best known for its key role in the computing revolution. Less well known is the role Microsoft plays today in the healthcare sector, but here a similar revolution is under way—and once again the company is at the centre. Dr. Simon Kos, chief medical officer for Microsoft, is responsible for helping customers and partners navigate that change.

As a critical care physician in Australia, Kos saw firsthand just how fragmented information in healthcare could be, and he recognized the risk that fragmentation posed to patient care. His interest in technology became a career as Kos first explored Electronic Medical Record (EMR) systems, then ran the health division for Microsoft Australia. His current, worldwide role is larger in scope and scale, but the industry challenges remain. "Digital transformation is all around us," he says, "and it will dramatically change how we deliver and receive health services."

Digital transformation. What does digital transformation look like in healthcare? Microsoft uses a model based on four aims:

- Engage patients and customers
- Empower care teams and employees
- Optimize clinical and operational effectiveness
- Transform health

Patient engagement. What does patient engagement look like? At the simplest level, it's technology that promotes the patient to an active, empowered position in the care relationship. That could be as simple as a patient view into the clinical care record, online meal ordering, or a kiosk check-in process. Many organizations have already replaced bedside entertainment systems with patient infotainment systems, allowing patients to access contextual, accurate and personalized health information, and even interact with the care team.

Where could it lead? "I see precision medicine, medical wearables, and the connected patient home as aspirational goals. The technology is not the limiting factor," says Kos. Patient engagement strategies are about more than simply adding a pleasant veneer to a healthcare encounter. "That wouldn't be transformation," explains Kos. He illustrates using an example from Children's Mercy Hospital in Kansas City. They changed how they monitor certain cardiac conditions at home, replacing the traditional three-ring binder with an online record shared in real-time with the care team.

The addition of video from a webcam has made a dramatic improvement, and they have decreased the mortality of hypoplastic left heart syndrome from 20% to almost zero. This model is currently being rolled out to other hospitals, and will redefine the prognosis for this condition. As a model of care however, it could just as readily be applied to any other condition that would benefit from remote monitoring—acute or chronic.

Dr. Simon Kos, Microsoft's Chief Medical Officer

Empowering care teams. "We have to move beyond the EMR. It's a poor proxy for communication," Kos asserts. While many organizations have invested heavily in their EMR systems, the spend has not boosted productivity or improved clinical workflow. A digital health record is important, but when coupled with a last-century pager system for communication, a disorganized intranet for policies and procedures, or a manual clinical education process, the potential value goes unrecognized.

Optimize outcomes and operations. Most systems do not store information in a way that makes analytics easy, and an enterprise-wide view across systems doesn't emerge organically. "For an industry that prides itself on being evidence-based, healthcare does a poor job of using the most recent and relevant evidence—their own!" Kos exclaims. He sees analytics as a continuum spanning retrospective reporting, real-time dashboarding, predictive analytics, and even proscriptive decision-making using cognitive services and machine learning. Even relatively basic initiatives, like patient journey boards and KPI dashboards, can have a huge impact on baselining performance, identifying bottlenecks and streamlining operations.

Transform the continuum. Some of the most exciting models of care leverage cloud computing. This is currently the primary focus for Microsoft. Once viewed with skepticism by the health industry due to perceived security or control limitations, the cloud is now being embraced by healthcare organizations around the world. Indeed, Gartner predicts that within this decade organizations will be going to the cloud precisely because it is more secure than the on-premises counterpart.

Part of this momentum is driven by cost efficiencies and outsourcing, but there is another motivator that is becoming increasingly apparent—some capabilities are only possible in the cloud. "The cloud is essentially a global supercomputer, that you can access on demand and pay only for what you use. You get all the benefits, yet the cost is spread across all the users. Kind of like timeshare," Kos reflects.

The future. The healthcare sector is not immune from digital disruption that has changed so many other industries. Moving beyond digitization into transformation is the new challenge, and healthcare organizations across the globe are trying to harness innovation. "This is ultimately why I continue with healthcare IT over clinical medicine. For me, the choice is between changing the world one patient at a time, or having impact on a global scale. I see Microsoft playing a key role in the digital transformation of healthcare," Kos concludes.

Infoway Partnership Conference to emphasize consumer solutions

Digital health advancement has been at the forefront of the annual Infoway Partnership Conference, which serves as a forum for knowledge exchange, debate and discussion.

In the past, the conference emphasized modernizing the healthcare system by moving from paper to digital as the medium to record and exchange patient information. Today, interoperable systems that securely store and may communicate data (lab test results, digital images, and medication history), among healthcare providers are widely in use.

Patients and caregivers can play a crucial role in improving patient outcomes themselves, and they are at the centre of the next wave of digital health innovation in Canada.

This year's Infoway Partnership Conference has been designed to align with the next wave of the digital health journey, with themes that include the ability for all Canadians to access and manage health records digitally, in addition to interoperability (the ability for systems to exchange information securely).

The conference, hosted by Canada Health Infoway, will be held November 14 and 15 in Calgary, Alberta, during Digital Health Week.

"Attendees at the 2017 Infoway Partnership Conference can look forward to learning from patients, as well as national and international healthcare leaders," said Lynne Zucker, vice-president at Infoway. "We expect a healthy amount of debate and discussion, as well as a close look at emerging digital health solutions that are transforming the healthcare experience for Canadians."

While Infoway has always collaborated with clinicians, patients, government and others, the organization continues to greatly value the participation of patients and caregivers for the unique perspective they bring to dialogue. Once again, the 2017 Infoway Partnership Conference is proudly Patients Included Certified.

To learn more about the program or register for the conference, visit www.Infoway-inforoute.ca, or follow us @Infoway #thinkdigitalhealth.

Conference highlights

Virtual mental health services: New Zealand recently converged several helplines into one multi-channel virtual mental health service for the country, and Andrew Slater, Chief Executive Officer, Homecare Medical New Zealand, will deliver what promises to be an insightful and compelling keynote address at the 2017 Infoway Partnership Conference. He will share with attendees their experience in rolling out this national service, which has connected with 20 percent of New Zealand's population in its first year-and-a-half in operation.

The Sequoia Project: The Sequoia Project is the leading interoperability organization in the United States, pioneering the nation's first public-private health data sharing network (eHealth Exchange) and a new national-level trust framework for exchange among networks (Carequality). Mariann Yeager, CEO, will share valuable insights from building nationwide health data sharing initiatives, which enable exchange across disparate geographies, vendors, technologies and networks. Discussion will include a history of the evolving market and government dynamics, privacy challenges, incentives to share data, and other lessons learned regarding barriers to exchange faced in the U.S. and Canada.

Data governance, privacy, and cybersecurity in health IT: A unique panel with Alberta's Information and Privacy Commissioner, Jill Clayton, global security strategist Kevin Magee and patient Deborah Prowse will discuss the challenges of protecting the privacy of Canadians at a time when data ranks among the most valuable asset globally. Expect to hear some of the leading questions and answers about privacy, data governance and cybersecurity in Canadian digital health.

PrescribeIT and Medication Safety Canada: With 39 per cent of Canadians, age 55+, taking four or more medications, and Canada ranking second in the consumption of opioid prescriptions globally, ensuring medication safety for Canadians has never been more important. An integral step toward safety includes the implementation of e-prescribing.

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Using ultrasound to deliver cancer therapies across the blood-brain barrier

OTTAWA – A new health technology is on the horizon that may open the door to new ways of treating glioblastoma – the most common type of primary brain cancer in adults.

Treating brain cancer is different from treating cancers in other parts of the body because it's so difficult to get the drugs into the brain. The "blood-brain barrier" helps to keep brains safe by protecting the central nervous system from toxic agents, bacteria and other pathogens.

This is a good thing – but the downside is that it often blocks certain drugs, like chemotherapy drugs, from getting through and reaching the brain, making treatment more challenging.

For many years, scientists have been working to find new ways of breaking through the blood-brain barrier. Recently CADTH, as part of its efforts to scan the horizon for promising emerging health technologies, took a closer look at the SonoCloud device, which uses ultrasound to deliver therapy across the barrier.

The SonoCloud is a small, MRI-compatible device that emits low-intensity pulsed ultrasound. It is implanted in the skull near the tumour, either as part of a scheduled surgery to decrease the size of a brain tumour, or in a 15-minute procedure performed under local anesthetic.

A microbubble contrast agent is injected into the blood and activated by ultrasound applied within the skull. These ultrasound waves cause the microbubbles to expand and contract, temporarily forming tiny openings in the blood-brain barrier.

Patients receive one ultrasound session each month, followed by intravenous chemotherapy. Follow up MRI imaging is used to measure the level of disruption of the blood-brain barrier.

An ongoing clinical trial of SonoCloud is using different ultrasound intensities to see which level offers the greatest and safest opening of the blood-brain barrier in patients with glioblastoma.

(The trial is not assessing patient outcomes, such as mortality or progression-free survival.)

Preliminary trial results with 15 patients were published in 2016. They found the blood-brain barrier opening was greatest, and seen in all 15 patients, only at the highest level of acoustic pressure. No serious device-related adverse events were reported.

Right now, the SonoCloud device is in clinical trials in France and not yet licensed for use in Canada, and we don't know what the anticipated cost will be. The manufacturer, CarThera, anticipates it may be commercially available in Europe and the United States by 2020.

To read the full CADTH article on this device, visit www.cadth.ca/health-technology-update-issue-18.

Other targeted approaches to treating brain disorders: Other developments are also under way to find more effective ways of treating glioblastoma, stroke, Alzheimer's and other brain disorders.

In Toronto, researchers at Sunnybrook Health Sciences Centre are investigating focused ultrasound under MRI guidance, combined with microbubbles of contrast agent, as a non-invasive way to temporarily open the blood-brain barrier in patients with Alzheimer's disease.

The Optune system, developed in the United States, is another innovation. It's a non-invasive, portable, battery-operated cap-like device that patients wear on their scalp. It delivers low-intensity electricity to the brain to disrupt growth of the brain tumour.

CADTH monitors a wide range of clinical areas and medical devices, drugs, diagnostic imaging, laboratory tests, surgical and dental procedures, and more.

If you would like to learn more about horizon scanning at CADTH, visit www.cadth.ca/horizonscanning, talk to our Liaison Officer in your area, and follow us on Twitter (@CADTH_ACMTS) and LinkedIn.

And we welcome suggestions – if you have an idea for a health technology we should cover, we'd love to hear from you.

Integrated communication improves productivity and patient safety

LONDON, ONT. – Dr. Tom Janzen wears many hats. Currently, he serves as physician and chief medical information officer (CMIO) for London Health Sciences Centre. His responsibilities range from treating patients to medical training and staff administration. He's also a sought-after speaker.

So, time is precious. Dr. Janzen was hard to reach and tired of losing long hours on national and international trips. He needed to be accessible to his medical staff to help ensure productivity, while also delivering medical courses and speeches remotely.

Improving collaboration and productivity was also a top priority for vice president of diagnostic services and CIO, Glen Kearns. "On measures like customer care, we sat in the healthcare sector's top quartile," he says. "Our goal now is to be even better."

The hospital seized the opportunity to reduce travel, streamline workflows, and improve communications between multidisciplinary healthcare specialists. "With Cisco, we look at the bigger picture and get there using an end-to-end approach, rather than siloed systems and point products," Kearns adds.

Cisco Services helped assess the network's readiness, and identified a long-term strategy for transforming campus IT. The foundation is a Cisco Digital Network Architecture-ready infrastructure. It helps multiple hospital campuses and remote sites act as a single entity sharing real-time data securely and reliably.

Patient data is no longer reliant on handwritten notes by multiple staff, but instead directly collected on mobile devices. Staff can digitally communicate to nurses, pharmacists, and other medical experts reliably, with everyone connected to the correct patient information.

"In two years, we've grown from 2,000 mobile devices to over 10,000," says Dave Schned, integrated director of IT infrastructure. "Cisco DNA helps insure device growth drives innovation, not extra administrative burdens."

The multi-campus London Health Sciences organization is connected by a city-wide optical ring over a Cisco ONS platform. Together with Cisco Catalyst switches, it provides seven hospitals and multiple remote clinics with fast, reliable connectivity. The network design has built-in dual redundancy. So, in the unlikely event that a link should go down, the network stays on.

To meet Ontario's strict compliance requirements for data privacy and security, the network is protected against malware threats by Cisco next-generation ASA firewalls.

"Our firewalls integrate easily with our Cisco infrastructure and future solutions, such as web filtering and intrusion protection, forming a wider cyber-security strategy," Schned says.

This comprehensive WAN and LAN infrastructure connects to more than 2,600 Cisco Aironet wireless access points and 40,000 active endpoints. There are three wireless security zones: one for core staff, one for external suppliers and contractors, and free guest Wi-Fi for patients and visitors. Everyone, regardless of role, is connected. This transforms the hospital experience for staff and patients.

"With pervasive wireless, no one has a frustrated look on their face as they try to find signal strength," says Schned. "Medical staff can work seamlessly, while patients are less stressed and can keep in touch with friends and family."

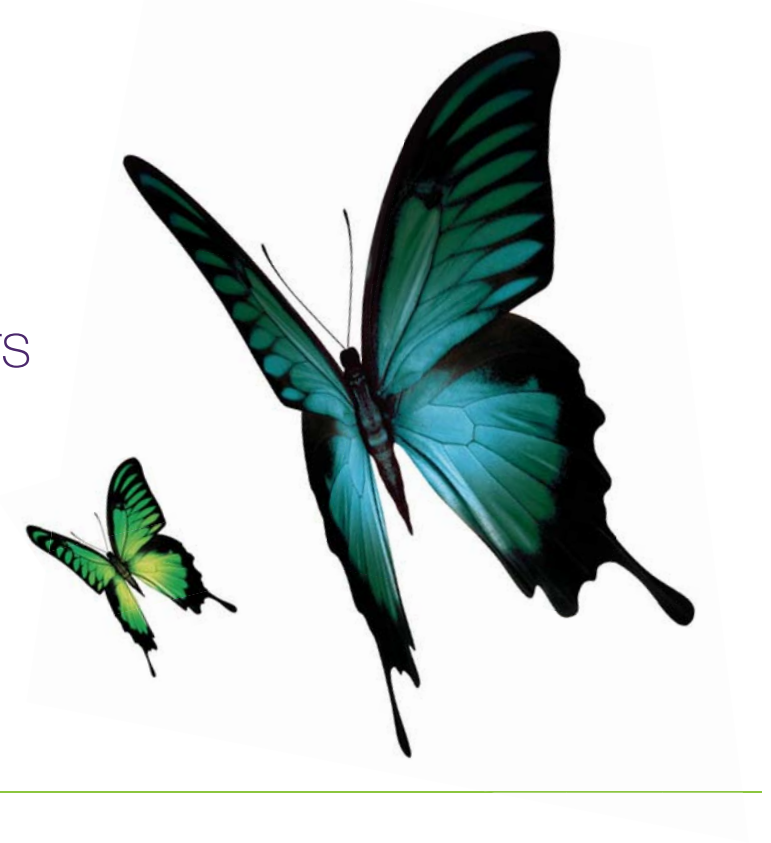
Medical teams always have secure access to electronic patient records, scan results, and clinical apps-whenever and wherever they need it. This translates into faster, more informed decision-making and improved patient care. Before, there were lots of repeat trips back and forth between nursing stations, drug cabinets, and the patient's bedside. Now, the Wi-Fi connects 2,000 wireless mobile workstations, so staff can work and administer care on the move.

"Using the mobile workstations, we're able to scan the medication, the patient, and the person administering at the bed-

CONTINUED ON PAGE 22

Taking care home

Health monitoring at home empowers patients and cuts costs



Shannon Malovec, TELUS Health
As Principal of Patient Engagement at TELUS Health, Shannon is a strategic health informatics leader for patient-facing products, applications, delivery and consulting. With executive experience at the provincial and international level, she is passionate about transforming healthcare through patient engagement.

Moving from acute to self-care can be tough. Home health monitoring (HHM) helps maintain the critical connection between patients and care teams during these transitions. In some B.C. pilots, heart failure patients with HHM in place used healthcare services 76% less than heart failure patients not using home monitoring.

When her patients' pedometer readings are low, Claire knows something's wrong.

"One of my COPD patients was down to only hundreds of steps a day," said Claire, a Victoria home health monitoring nurse. "When I called him, he said he wasn't getting outside for his daily rehab walk because his oxygen supply kept freezing up." Claire quickly connected her patient with a technician, who then fixed the problem.

And this happened without a single patient appointment or nurse visit.

Claire and her patient were part of a home health monitoring (HHM) pilot program, one of several in British Columbia and Yukon, where pedometers are one of the devices that patients with chronic conditions such as COPD and heart failure are using to manage their recovery.

Easing the transition from acute to home

"All patients, but especially chronic disease patients, need a safe and high quality transition from hospital to home," said Dr. Kendall Ho, Lead for University of British Columbia Digital Emergency Medicine and co-lead of Vancouver's TEC4Home HHM pilot program, together with Vancouver Coastal Health and Providence Health Care.

The statistics illuminate the critical need for better transitions.

In Canada, 18% of COPD patients are admitted to hospital once a year, while 14% are admitted twice. A full 40% of discharged heart failure patients are re-admitted to hospital within three months.[1]

Recurring hospital admissions are discouraging for patients, but also costly to the system. To combat these issues, HHM programs like the ones running in Yukon and several B.C. Health Authorities (Island, Interior, Vancouver Coastal and the Provincial Health Services Authority) extend patient monitoring beyond hospital walls.

"Patients are healthier at home, where they're at ease, with family, and in familiar surroundings," said Gayle Anton, Director of Chronic Disease Management and Home Health at B.C. Interior Health. "With our HHM programs, we're bridging the gap by providing specialty care in patients' homes that allows for intervention as needed."

In the HHM pilots, heart failure and COPD patients are set up at home with devices that measure their heart rate, weight, blood pressure, oxygen saturation and activity level. Every day or more often, they send these vitals to an HHM nurse and answer an online questionnaire on how they feel, physically and mentally.

"With minimal training and support, most patients find the devices easy to use and the protocol simple to follow," said Lisa Saffarek, Senior Specialist, Virtual Care & Telehealth at Vancouver Island Health Authority.

HHM pilots return astounding results

Some B.C. health authorities, such as Interior Health, have been successfully using some form of HHM for over a decade. Recent results from chronic disease pilots in both Interior and Vancouver Island Health Authorities confirm why.

Pilot participants loved the programs: 100% of COPD patients said they would recommend it to others. And 86% of healthcare professionals reported satisfaction with their ability to deliver care.

But most remarkably, the need for healthcare service was dramatically reduced. For example, patients in Interior and Island Health's heart failure pilots used care 76% less than the average heart failure patient.

While this shows overwhelming promise for cost savings, the bottom line is that HHM keeps patients healthier—and happier. What contributes to this striking improvement in health? Put simply, three factors: HHM encourages engagement, strengthens care team connections and permits earlier interventions.

Engaged patients

Technology is at the heart of HHM. But it's how patients engage with the technology and their provider team that makes HHM successful.

"It's really a patient-practitioner partnership to track and speed recovery," said UBC's Dr. Kendall Ho, who is co-leading a new HHM pilot program in Vancouver.

For the teams at Interior and Island Health, it was critically important that the reporting interface that patients accessed daily set an engaging and positive tone. With the help of patient partners, they worked and reworked the health questionnaire and tips to be encouraging and helpful. This partnership between patients and providers really paid off.

"The protocol questions encourage a client to follow their action plan and reflect on how they're feeling every day," said Island Health's Lisa Saffarek. "This helps engage them to be proactive with their condition."

Subsequent pilots followed the protocols set by Island and Interior Health.

The questionnaire's daily hints are also leading to better self-care. "Many COPD patients and their home helpers didn't know that flare-ups cause longer term lung damage," said Anne Aram, Project Manager for Yukon's Territorial Health Investment Fund, Chronic Disease Management. "Learning this motivates them to do everything they can to avoid a flare-up."

Pedometers have also proven key to engaging patients in their recovery by boosting daily activity levels. Lori, a B.C. nurse, saw this engagement in action with her elderly neighbour.

"When he came home from the hospital, he honestly looked like he had one foot in the grave," she says.

But day after day, she saw him out walking. Slowly at first, then with more vigour. Finally, she asked him how he was improving so quickly. He told her he was a part of an HHM program, and his new pedometer had inspired him to walk a bit farther every day.

As a result of these learnings from patients, every B.C. HHM program for chronic disease will now include a pedometer.

Stronger connections with care teams

Both patients and care teams are noticing closer ties created by the daily HHM conduit.

"It's the relationships you build, facilitated by technology, that become important in patient care," said Yukon's Anne Aram.

Being connected into their circle of care every day gives patients peace of mind that they're getting better, since their care nurse is trained to spot any early sign of relapse.

"HHM gave me confidence in my recovery," said Maurice King, an HHM client. "I can call my nurse anytime I'm concerned about something, and she calls me at least once a week."

Clinicians feel they can track a patient's recovery more successfully than when patients simply went home and checked in from time to time. They feel they're making a bigger difference in the lives of their patients.

The program also helps family caregivers. "My family is feeling quite a bit more at ease since I've been on the program," said HHM client Elizabeth Brand.

Earlier interventions

Many stories coming out of these pilots are about faster responses to worsening conditions. When caught early, issues can often be solved by adjusting meds, revisiting the recovery plan, or other simple interventions.

For example, pedometers are not only inspiring patients to walk. They're also proving to be critical health indicators for nurses.

Said Island Health's Lisa Saffarek: "Dropping from 5,000 to 1,000 steps a day may indicate fatigue, which can be an early predictor of a flare-up, the primary reason for a COPD patient to visit emergency. When we know a flare-up is coming, we can ward it off and even treat it at home."

"HHM has the potential to decrease the burden on acute care," added Gayle Anton from Interior Health in B.C. "But more importantly, it lets us catch problems early and provide needed interventions, or support patients as they self-manage."

Home health monitoring to reach further

So convincing are the HHM pilot results that both B.C. and Yukon are expanding the pilots to more regions.

BRINGING CARE TO RURAL AND REMOTE AREAS

In B.C., the Island and Interior Health Authorities each serve the health needs of some three quarters of a million people in smaller cities and rural areas scattered over vast distances. Yukon is challenged to bring care to 38,000 people spread over half a million square kilometers—often in hard-to-reach places. In these areas, HHM really benefits patients discharged from regional hospitals who must return to remote communities far from health services.

Said Yukon's Anne Aram. "Taking healthcare to people in their own homes, especially in remote communities where access can be difficult, may increase self-management, result in better outcomes and reduce the stress of having to travel for care."

"Rigorous study will help us know the very best way to offer HHM so that it benefits patients as much as possible," said Dr. Kendall Ho of the Vancouver TEC4Home partnership.

"What are the critical services? What are nice-to-haves? What doesn't work? Then we'll know when we expand these programs across the province—maybe even across the country—that we're helping Canadians be as healthy as possible."

"HHM is only in its infancy," said Heather Harps, HHM Initiative Director at TELUS Health. "The benefits of today's pilots speak for themselves. And their lessons are creating the rich store of insight that will benefit all future programs."

We look forward to seeing more HHM programs that support providers, ensure happy, healthy patients, and deliver more savings on an even larger scale.

[1] Canadian Institute for Health Information

VIEWPOINT

GoGoGrandparent reduces the isolation of the frail and elderly

By tapping into Uber on behalf of patients, GoGoGrandparent is boosting their physical and mental health.

BY DR. SUNNY MALHOTRA

AARP, the American Association of Retired Persons, estimates that 15.5 million Baby Boomers will soon be shedding their car keys and will be left without access to public transportation. This number is expected to double in the next twenty years.

Getting older drivers where they need to go is essential to helping this segment live out their lives healthy and happily.

For many Canadians, affordable private transit solutions such as Uber and Lyft can provide mobility and a better quality of life. Unfortunately, three reasons keep these services at bay for older adults.

• **Accessing services with a smartphone.** PEW Research reports that over 70 percent of people over the age of 65 do not have a smartphone. Additionally, over half of the ones that do have never downloaded an app before.

App-based ordering has problems that extend beyond the app interface and keeps older consumers at bay. For many, the buttons and pop-ups that come second hand with smartphone operating systems are overwhelming and difficult to navigate.

• **Ride management.** The idea of connecting a driver with an older passenger in the endeavor of getting them from location A to location B sounds simple in theory. Unfortunately, many things can go wrong.

The driver's GPS can malfunction or lead them to the back of a residence, or the incorrect entrance of an office building.

The driver's car could be too big for the passenger to get into. The driver could be uncomfortable working with the elderly and their collection of ambulatory equipment.

Passengers could be lost, or not at the pickup location. Passengers can get confused. Drivers can cancel, requiring passengers to reorder rides. The list is overwhelming to an able bodied person.

Struggling to reduce cancellations and missed connections for a millennial audience is an active problem with on-demand transportation companies.

Combined with the reduced level of awareness and poor reaction time of an older adult, you can easily end up with someone standing on the street corner for thirty minutes wondering where their driver is.

For this reason, managing transportation is one of the Independent Activities of Daily Living that often falls upon the unpaid friend or family caregiver to arrange and oversee.

• **The number of unpaid friend and family caregivers in the United States is dropping.** AARP's 2016 Review on the State of Caregivers in the U.S. predicts a 50 percent reduction in available unpaid friends and family caregivers over the next couple decades.

> **The market is responding with innovative networks and platforms that provide solutions to problems like the social isolation of the elderly.**

Reasons for the reduction are that yesterday's families had less children and those children decided to live further away from their parents.

That gap is separating on-demand transportation services from people that could use them the most by requiring older adults to call in favours to get around.

That lack of independence and the embarrassment of causing a burden on a long-distance loved one leads to the same outcome as lack of mobility, namely: a reduction in trips to the doctor, restaurants and social functions with friends.

Fortunately, the market is responding to the void. Entrepreneurs from families just now experiencing these problems are creating services like GoGoGrandparent, which provide affordable access and oversight of the services rendered by on-demand transportation companies.

To order a ride older adults call 1 (855) 464-6872 and press 1 to order an Uber or Lyft to their home. They call and press 2 to order a car that'll pick them up where they were dropped off last.

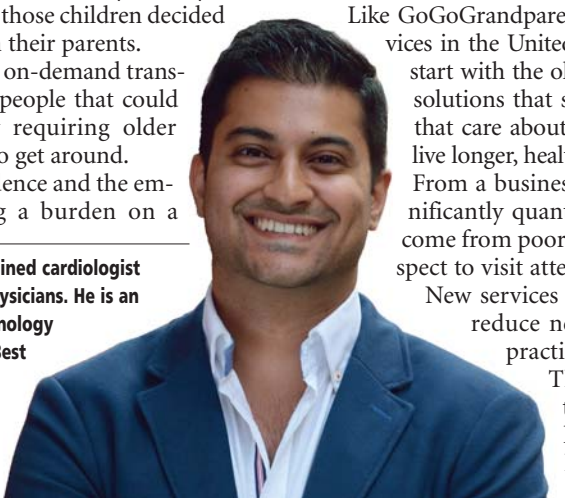
"Professional Grandchildren" oversee the entire ride by screening drivers to ensure they're comfortable working with older adults, and managing malfunctioning GPS's and driver cancellations amongst other problems.

On that last note, the company notifies families when their older adult is on the move, allowing long distance loved ones to participate in the care of their parents and grandparents. Interestingly, GoGoGrandparent is based in the San Francisco area, but provides service in Canada, too.

Like GoGoGrandparent, other senior-serving services in the United States and Canada need to start with the older adult in mind and build solutions that service them and the people that care about them, enabling everyone to live longer, healthier and happier lives.

From a business perspective, there is a significantly quantifiable loss of physician income from poor weather conditions with respect to visit attendance.

New services like GoGoGrandparent can reduce net losses from a physician's practice management perspective. They can also result in patients being discharged earlier and opening up beds for hospitals that are at full capacity.



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

REBOOTING eHEALTH

To improve procurement, we must maintain our objectivity

BY DOMINIC COVVEY

People seem to identify personally with pretty much anything they have created. In the eHealth domain, one experiences this especially when a developer lights up with a sense of profound pride while exhibiting or demonstrating a system or an application he or she has crafted.

From early in my career, I have been approached by people who had developed new software applications.

One good example involved someone I hardly knew, who insisted on my having a close-up look at his work. He told me that instead of writing a book, he had labored for years to develop a program that simulated drug action (I won't describe it further, lest I embarrass).

He contacted me several times and, eventually, I felt I had to give in.

Unfortunately, the program turned out to be very basic, ignoring some key aspects of how drugs behaved in the body. It was clear that, without a lot of further development, the application had minimal, if any, educational value. However, I could see that I had hurt him with my feedback, as gentle as I tried to be.

Another experience was with a department-head-turned-developer in Eastern Canada who had created a microcomputer program. He was doggedly promoting that creation versus hospital leadership's desire to purchase a commercial package.

Dominic Covvey

Again, I'll minimize the details. I was asked to visit and assess this masterpiece and eventually agreed to do it. Now, this was in the early days of computerization, probably around 1985.

Software development based on microcomputers, at that time, was still impaired when it came to producing actual usable systems to support a hospital department. This person had stood against his institution because he thought that what he had done was wonderful.

During my visit, I asked him to retrieve a patient's registration information. He typed in a name and then began talking to me. It was certainly at least a minute or two before the system responded with a registration number on the screen.

I asked, "Why did that take so long?" He explained that it wasn't

CONTINUED ON PAGE 22

Ontario's privacy commissioner orders patient to destroy records

BY KATE DEWHIRST

The Information and Privacy Commissioner of Ontario recently released two decisions all healthcare providers in Ontario should read. Decision 49 is monumental. For the first time, the IPC has ordered a patient to destroy records using the 'recipient' rules under the health privacy legislation.

After a clinical appointment, a patient took a photograph of a physician's computer screen. The image captured the health information of 71 other patients.

The patient was upset that the physician had left the computer unlocked with his and other people's information on the screen. He wanted to pursue a legal claim against the physician and was threatening to make the image public or share the image with his lawyer in order to file a lawsuit against the physician or both.

Once notified of the photograph, the physician asked the patient to securely destroy it because he was not authorized to have the other patients' information. The patient refused. The physician then notified the 71 patients of the privacy breach. The IPC will review the physician's practices separately.

Kate Dewhirst

IPC concluded that the photograph was a record of personal health information and that the physician had disclosed personal health information to the patient by not protecting the information on the computer screen. The disclosure was not authorized by PHIPA.

IPC found that the patient was a "recipient" of personal health information under PHIPA. As such, the IPC had the authority to and ordered the patient to destroy the image and all copies because the patient had or intended to contravene PHIPA.

Because the patient had not yet initiated legal action against the physician many months later, the IPC refrained from deciding whether the patient would have been entitled to use the image for the purposes of litigation. The hospital undertook to maintain a copy of the image in case of future litigation.

Bottom Line: Decision 49 is a bit of a game changer.

First, it is essential that healthcare providers take care not to allow patients or visitors to collect information from computer screens or other sources. Even if done inadvertently, allowing patients to view other patients' information constitutes a privacy breach.

Second, this is the first time we have seen a recipient ordered to destroy health information. When there has been a breach, one of the first obligations is to contain the breach.

It is rare to have a recipient refuse to comply with this request. This decision now demonstrates the IPC's power to compel the destruction of copies of health records in the hands of those who should not have the information.

Also worth commenting on is Decision 48. In this case, a hospital received a request for access to records. The hospital provided the complainant with a full copy of his health records, but the complainant believed there should be additional records. The complainant had copies of the letters a social worker had written and wanted confirmation that the hospital had those letters in its records. The hospital searched for those records, but could not find them. The IPC required the hospital to provide affidavits explaining the searches performed and steps taken to locate responsive records. The IPC concluded that the hospital had completed a "reasonable search" and was convinced the hospital did not have copies of the social worker letters. The IPC dismissed the complaint.

Kate Dewhirst is the founder of Kate Dewhirst Health Law. For more information, please see: http://katedewhirst.com/

Smart sensors are being used to enhance the lives of patients living at home

Robots, natural language processing and AI are supplying information and enabling better care.

BY DIANNE DANIEL

Caring for seniors at home is about to get a whole lot smarter. With recent census data indicating one-person households surpass all other types of living situations in Canada, in part due to longer life expectancy, the need to help aging Canadians maintain independence and quality of life is stronger than ever.

The result, says Alex Mihailidis, scientific director at AGE-WELL NCE Inc., is a "grass roots" movement to adopt – and adapt – smart technology.

"It started to emerge over the last few years and is really starting to take hold now," said Mihailidis, noting that consumers are gravitating to off-the-shelf control devices such as smart thermostats, lighting, security systems, watches, cameras and wearable fitness trackers as a means to keep seniors healthy and safe at home.

"It's not the companies themselves that are pushing to be in this market, it's caregivers, families and seniors themselves making use of these tools for their own purposes," he said.

The driving force behind adoption is the ongoing evolution and maturity of the Internet of Things (IoT), the interconnection of embedded computing devices (sensors) in everyday objects so that they can send and receive information. For researchers at AGE-WELL, a federally funded Networks of Centres of Excellence (NCE) program hosted by the University Health Network in Toronto, the opportunity stretches far beyond consumer products.

Launched in 2015, the pan-Canadian network brings together researchers, non-profits, industry, government, care providers, older adults and caregivers to find innovative ways to support independent living and enhance wellness among seniors. Many of their projects are examining how digital sensors can be used to collect and monitor health data, with a focus on finding non-invasive ways to install sensors in a home.

One example is a joint research effort led by Dr. Frank Knoefel, physician and clinical scientist at Ottawa's Bruyère Research Institute and Rafik Goubran, professor and dean, Faculty of Engineering and Design, at Carleton University in Ottawa. As a specialist in geriatric rehabilitation, Dr. Knoefel was initially interested in applying smart technology to function as a type of early warning system for senior patients following hip surgery.

The goal was to embed a sensor between a patient's mattress and box spring so clinicians could remotely monitor patient movements getting in and out of bed.

"If we could do that, it would give us a level of confidence that if they got out of bed alright, there's a good chance they'd make it through the rest of the day alright; whereas if that first transfer in the morning was already wobbly, then we'd be more concerned," explained Dr. Knoefel.

The resulting 'smart mat' is a pressure sensitive foam pad that uses fibre optic light to measure pressure. As patients manoeuver in and out of bed, pressure sensors collect information related to their movements, enabling researchers to use that data to remotely monitor things like how long it takes them and how many times they stand up and then sit back down again. The technology has since been refined to also measure breathing rates and most recently, to measure fluid retention, an early indicator of trouble in patients with chronic heart failure.

"It's really incredible that the technology can do this," said Dr. Knoefel. "It makes us think completely differently about what we could be able to do in peoples' homes."

At first, the research team focused on modifying an existing pressure sensitive mat, commonly used in car seats to engage seatbelt indicators. Moving forward, they are developing a custom solution and are currently working to obtain a patent for their technology. Dr. Knoefel says it's not a question of will the technology be commercially viable, but how and when.

"It becomes a question of who do we partner with," he said, adding that one possibility would be home-care providers who could use the mat as a form of smart triage. "If they had a case load of 40 frail people, it would be useful if first thing in the morning they could turn on their computer and see three people who didn't get up at their usual time or got up really wobbly, or here's someone who just gained a kilogram over two days … they're about to go into heart failure," he explained.

ILLUSTRATION: LINDA WEISS

Saint Elizabeth, a national social enterprise providing home care, health solutions and education is investing in remote sensing research as it moves forward with its IntelligentCare framework, a care delivery model designed for a digital age.

All patient encounters, including virtual visits, direct visits and remote patient monitoring, will be tracked and maintained in a single longitudinal health record.

The framework is divided into four components: Self Care, an online service for patients looking to do self-guided symptom assessment or to access community resources; Tele Care, a clinical patient support centre that provides care navigation and clinical triage services on demand; Tele Health, a service that leverages remote patient monitoring devices and two-way communication channels to monitor patients at home; and Smart Home, a service that will provide remote sensing and other smart home health technologies to enable seniors and medically fragile patients to live independently.

Over the next 12 years, Saint Elizabeth will invest $12 million in research with much of it focused on remote sensing, says Barry Billings, IntelligentCare Architect, Saint Elizabeth. "We're thinking of it as a patient support program," he said, noting that the focus is on healthcare first, technology second.

"Somebody might say that (remote) technology should fall in the telehealth bucket. Yes, it's telehealth software, but what we deliver is far more than telehealth. It's telehealth with care pathways that are co-developed with our partners."

The goal of the Smart Home program, still under development, is to use motion sensors and other "unobtrusive, passive sensing" technologies, he says, to monitor the activity and normal behaviour patterns of those living independently. The data collected is sent to a smart cloud and predictive analytics are applied to identify variations in behaviour so that clinicians, or even other smart technologies, can intervene.

"If someone gets up in the middle of the night and we know from the last 48 days that their next step is the kitchen to get a glass of water, why don't we turn on a light in the kitchen?" suggested Billings. "If we can prevent a fall one out of 1,000 times, we've done a really good job."

Another area of research is focused on developing a digital health assistant, similar to the way Amazon Alexa or Google Home function.

Using natural language technology, the device becomes the interface to connect patients, family members, caregivers and the wider healthcare team. In addition to being used for passive monitoring, it collects self-reported symptoms and can even be used to manage appointments.

"If Dad wants to get a haircut, he can ask it to put haircut on his calendar. The message goes out to two or three family members and somebody goes to their smartphone and says I can take Dad Friday morning," he described.

Saint Elizabeth is also exploring how Tess, an artificial intelligence (AI) chatbot created by X2AI Inc., can be used to support patients and family caregivers at home. Tess works by holding conversations with patients and, with the oversight of a therapist, provides coping mechanisms and other self-care supports. One idea is to use the technology as a virtual emotional coach to calm people who are palliative and have questions about death and dying.

According to analysis from Frost & Sullivan, the real role of AI systems is to augment the expertise of trained clinicians. The capacity for AI technologies to extract information from various sources, includ-

ing remote sensors, and turn it into actionable data is allowing researchers to tackle challenges that "previously had no other means of recourse," the company stated.

"By 2025, AI systems could be involved in everything from population health management to digital avatars capable of answering specific patient queries," noted Frost & Sullivan Transformational Health Industry Analyst Harpreet Singh Buttar. "On a global scale … AI is expected to play a significant role in democratization of information and mitigating resource burdens."

An AGE-WELL research team at the University of Western Ontario in London is applying advanced telerobotics to design a system that will make it easier to deliver individualized therapy at home for older stroke survivors and seniors with age-related movement disorders.

Co-led by Rajni Patel, professor and Canada research chair in advanced robots and control, and Dr. Mandar Jog, a movement disorders neurologist, the team is aiming to bring stroke therapy to a wider catchment of patients. Their remote rehabilitation platform combines haptic or force-enabled robotic technology, virtual reality and Internet communication and is similar to a virtual gaming experience.

In one of the exercises, patients use a haptic robotic arm to move a ball on a computer screen, according to prompts. As they make the movements, they feel resistance from the ball; a therapist – who can be sitting next to them or in an office far away – uses a similar robotic arm to control a second ball on the screen. The therapist can create a sense of lag so that the patient feels more resistance and hence has to work harder.

"In a situation where a person has gone through therapy in the clinic and goes home, we'd like to continue the therapy as much as possible," said Patel. "Ultimately what we're trying to do with post-stroke rehabilitation is rebuild some of the neuro connections in the brain … the more actions you do, the stronger the connections get."

The innovative system is ready for patient evaluation and the team expects to have a commercial partner by the end of the year.

In addition to passive remote sensors and AI technologies, wearable devices are also emerging as a viable means to monitor seniors at home. However, rather than using prompts and alerts to engage users, similar to the Fitbit approach, researchers are targeting more passive applications.

An AGE-WELL team at University of Toronto (UofT), for example, is developing WearCOPD, a wearable application to monitor chronic obstructive pulmonary disease (COPD) patients at home. The goal is to monitor their condition and detect early exacerbations – such as shortness of breath, worsening cough or a decrease in activity level – so that a timely intervention can occur before a trip to the emergency room is necessary.

Right now the team is using a standard Android smartwatch to monitor heart rate, activity level and collect audio (to detect coughing). Approximately 30 COPD patients from Toronto General and Sunnybrook Hospitals wore the watch for three months, generating well over 1,000 hours of patient data which is being analyzed. Coughing analysis is complete and now the team is working to ensure the device provides an accurate measure of heart rate.

"One of the next steps is validating how good the consumer smartwatches are," said project lead Dr. Robert Wu, associate professor in the Faculty of Medicine at U of T. "The other part is asking participants what they would like to see and what they would use … it's about providing the appropriate technology to patients in the form they want, that can actually help them."

At Saint Elizabeth, Billings refers to growing smart technology trend as "augmented intelligence." Machines and devices may be capable of collecting and processing more data in more ways than ever, but human intervention is still required, he says.

"We believe in having all of that sensor data processed and sent to somebody who's clinically trained to say 97 times out of 100 that is the right diagnosis, treatment or intervention," said Billings.

"But the one time that it's not, or the time the sensors malfunction, or there's missing data, it needs to function as a healthcare assistant for the healthcare worker."

Teleradiology is advancing: can you afford to give up its benefits?

The concept of teleradiology has been around for over 50 years – at that time, diagnostic images were transmitted within hospitals on closed-circuit television systems. However, this early form of the service was limited, due to a lack of widespread and reliable technologies. The advancement of teleradiology is directly tied to progress in more recent technologies, including telecommunications, the internet, and PACS.

According to the "PACS for Canadians – Canadian Association of Radiologists PACS Position Paper", in 2003 approximately 20-25 percent of all diagnostic imaging exams in Canada were managed with PACS. By 2015, The Canadian Medical Imaging Inventory survey found that almost all sites with the majority of modalities stored and accessed images on PACS. It was riding on this wave of PACS adoption in Canada that teleradiology was able to grow.

In 2008, Real Time Medical – then called CanadaRAD – was the first company to announce a nation-wide, radiology collaboration service. To enable the company's vision, RTM developed its own proprietary radiology workflow management and quality assurance software platform, called DiaShare.

Broken barriers: During the rise of teleradiology in Canada there was no shortage of concerns about adoption. One of the early criticisms by traditionalists was the use of unlicensed radiologists, which would affect radiology quality. However, over time, this proved to be a largely unfounded worry, as seen today by the growing number of Canadian licensed radiologists that are participating in teleradiology.

In a 2015 Diagnostic Imaging journal article, Dr. David Levin of Thomas Jefferson University Hospital brought up teleradiology as a threat. He mentioned that some companies "are trying to oust on-site radiology groups from their hospital contracts."

While some Canadian radiologists may continue to hold similar concerns, the prevailing trend is that hospitals are adopting a mixed service model that should ultimately benefit Canadian patients.

The original vision for Real Time Medical was for Canadian licensed radiologists to assist their on-site colleagues in a way that would compliment services provided to patients and physicians. This is why Real Time has always worked with the express consent or at the request of the Chief of Radiology for the site.

Demand for productivity: A growing trend: According to a recent Health Quality Ontario report, overall visits to emergency departments have increased by 13.4 percent, more than double the rate of the province's population growth.

This phenomenon is, however, not limited to the province of Ontario but appears to be part of a larger trend. In 2015, the Wall Street Journal reported U.S. emergency department visits keep climbing. As increasing pressure on global health systems increase, ER radiology workload increases, which creates a greater risk of backlog.

Radiology workload backlog is already a reality in countries such as the UK and some experts believe that these clinical backlog challenges will also put pressure on American and Canadian healthcare systems.

Using a service delivery approach and the right diagnostic sharing software platform provides for considerable radiology productivity and quality improvement. When teleradiology becomes part of the diagnostic service mix it ensures that no exam goes unread for any significant period of time.

For example, Real Time Medical non-urgent cases are typically reported in two to four hours for hospitals or under two days for clinics.

These unavoidable demographic realities require a service approach and technology solution that maximizes use of available resources nationally. Teleradiology provides the technical and organizational infrastructure to allow Canadian radiologists nationwide to cooperatively share their services for mutual benefit.

Wireless video and messaging on tablet computers keep patients connected

BY MOLLY DAVIDSON

On July 27th, 2016, Rick O'Neil woke up in a bed at Arnprior Hospital. He had no idea what he was doing there. When he noticed two red marks on his chest, the doctor had to explain that they'd been caused by the defibrillator paddles used to revive him. Rick had been brought back from the brink of death.

He had collapsed after a cyst ruptured in his leg. Not only did he have no memory of this event, he hadn't even known about the cyst, which had silently grown to the size of an apple. Somebody called an ambulance, though he would never find out who.

Rick had dealt with health issues in the past. He'd been living with diabetes, and there had been complications. He'd had a knee replacement a few years earlier. Still, nothing had prepared him for the ordeal he was about to face.

For many patients, there are major bumps on the road to recovery. This has certainly been true for Rick O'Neil.

After he awoke, Rick quickly learned that his ruptured cyst had caused septic shock, resulting in kidney failure. He was transferred to The Ottawa General Hospital, where he received round-the-clock care. But new health problems continued to arise.

A month into his hospitalization, Rick's care team discovered an ulcer. The damage it had caused was extensive. "Basically, my stomach was gone," says Rick. There was also a vascular problem – four clotted arteries in one leg.

By the time he was discharged, almost six months had passed. Rick had endured multiple surgeries and blood transfusions. He had stents in his leg, and was receiving a continuous dose of intravenous antibiotics.

Health Links – an Ontario initiative that provides better-coordinated care for the province's most complex patients – was there to help. First, Rick was assigned a care coordinator: Laurie.

Laurie listened to Rick. She learned his recovery goals and care preferences, and she did everything in her power to ensure he received the medical and social support he needed.

But things were far from perfect. At home, Rick grappled with feelings of depression.

Two years earlier, he'd been living in Toronto with his wife and two children. He'd been working in communications, under the employ of some of Canada's most high-profile organizations – including CBC and Bell Canada.

Since then, Rick and his wife had separated. His career and financial situation had changed. He moved back to Arnprior, the town outside of Ottawa where he'd grown up. It was during this transition period that his spate of recent health issues began.

The challenges in Rick's life began to compound one another. Many of his problems stemmed from the fact that he now had limited resources, which meant no phone, no internet, and no car insurance.

How would Rick get to his doctor's appointments? Given his situation, how could he make the lifestyle changes necessary for recovery?

Laurie had made a huge difference in Rick's life. But there had been limitations to what Health Links was able do. Due to logistics, it wasn't always possible to provide patients like Rick with instant, continuous access to all of the care providers they needed to see.

Luckily, that was changing. The Arnprior Health Link had recently launched a pilot program that used technology to connect patients to those involved in their care – face to face, and in real time. That technology is from a company called Aetonix.

Rick was a good candidate for the pilot, so Health Links decision makers chose to include him. His life before and after this decision has been, in his own words, like "night and day".

Equipped with the Aetonix digital tablet, patients can connect to anyone within their care networks, including med-

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Community care benefits from AcuteNet's 'sharing economy' software

BY DIANNE CRAIG

The Victorian Order of Nurses (VON) – which pioneered the support model for home healthcare back in the 1800s – is still an early adopter of new ways to help people in their homes. One simple innovation, a move to a Software-as-a-Service (SaaS) cloud platform from AcuteNet to fulfill Local Health Information Network (LHIN) requirements for an Automated Provider Report, has helped VON realize new time and cost efficiencies.

"It has allowed us to increase speed and productivity, and to have more timely flow of information," says Brian Lyons, VON's VP, information technology and services. He adds that AcuteNet has also helped improve accuracy on forms by reducing keying errors and eliminating issues involving legibility that occurred when everything was handwritten.

AcuteNet's SaaS offering is integrated within VON's corporate IT infrastructure through webservices. That lets them take full advantage of the AcuteNet's form digitization framework to improve productivity of VON's frontline healthcare workers.

VON, which operates predominantly in Ontario and Nova Scotia, faced challenges before automating referrals of information that would flow to their suppliers. "People used to fax services offers and referrals up to 42 pages to provider agencies. If there was any change, all 42 pages would be resent," recalls Lyons.

"AcuteNet brought the two-way integration interface, which gave us the ability to send the two-way provider reports back to the LHINs." It enables a "full electronic transmission from point of care through to the funding agencies," he adds.

Recognized by CIO Review as one of the 50 most promising healthcare solutions providers in 2016, AcuteNet supplies a series of Form Digitization and Workflow Automation solutions for home care organizations, but charges only on a per-user basis.

Customers create as many clinical assessments as needed on the AcuteNet cloud-based platform, and pay a service fee that starts at $5 per patient but with greater usage can result in just a one-cent per patient.

AcuteNet founder and CEO Fariba Anderson calls AcuteNet a "sharing economy framework" for healthcare and likens it to businesses like Airbnb and Uber.

It's designed to be a cost-effective way for organizations of all sizes to meet technology requirements of clinical assessments, care plans and outcomes, and to deliver the right care to the right patient, according to Anderson. It also enables these organizations to take advantage of the company's open source technology, which lets them create as many clinical assessments as they need, and simply pay a service fee based on number of patients.

"There's nothing like this in the industry," says Anderson. "There's not a lot of money in the healthcare industry, and people are very busy – they don't have time for technologies that take a lot of time to learn and use."

AcuteNet's digitized forms free nurses to focus on their patients, notes Anderson. "Nurses know best. They don't need an IT system to tell them how to do this job," she adds.

To date, the Toronto-based company has helped its customers perform close to 7.5 million assessments, on 2.4 million patients, by 11,219 frontline healthcare workers, in 53 locations across the U.S., Canada, and Asia.

"I created this infrastructure for the Ontario government," says Anderson. It's for use with everyone who has received care outside of a hospital, in their home, through palliative care, etc., she explains.

AcuteNet's subscription Software-as-a-Service (SaaS) licensing model enables clients to pay month to month, with unlimited access, with the option to opt out at any time.

"It's a very economical model per patient," says Anderson. For example, it costs $5 per patient for up to 100 patients; $1 per patient at 1,000 patients; 50 cents per patient at 10,000 patients … and the model goes up from there to just one cent per patient per month.

The cost to most organizations, on average, if they get the solution, is between $10,000 and $30,000," reports Anderson.

To help organizations determine costs, they are asked each year what they expect their utilization will be over the next 12 months. "It's a trust system," she says. "We come up with a pricing model that works for them. Everyone can come in and use it – like Uber, it puts something in their hands without spending a lot."

Dorota Milaszewski, manager, information and decision support at non-profit agency LOFT, says she likes the way the subscription-based service allows them to plan ahead. "We see how many clients we served in the past two fiscal years and estimate how many we'll serve in the next fiscal years," she says.

LOFT provides housing, case management, and outreach services to people with mental health issues. It serves 4,000 people in Toronto and in the LHIN representing York Region.

The agency uses AcuteNet's InterRAI-based form digitization and workflow management to assess the needs of its client base. Asked whether they had to adapt to work with the AcuteNet forms, Milaszewski said, "No, not really. The tool beautifully sits in our workflow. We do a RAI assessment on intake, and every six months after that."

Anderson says their customers "determine how clinical assessment standards and forms are to be digitized and how workflows are to be automated to meet their specific requirements."

"They (AcuteNet) are very responsive to any customization request, which is rare when it comes to vendors," confirms Milaszewski.

Asked why they chose AcuteNet, Milaszewski said, "It was love at first sight … When I saw the layout and how intuitive the tool was, and how easy to use it was, it was a no-brainer." She particularly liked "the flow of it. It all basically made sense. The layout was very user-friendly. You couldn't knock it, mess it up. So, it was less stress for the staff to use and a big time-saver. Not all our staff are tech-savvy."

AcuteNet increases speed and accuracy of information flow, and leaves more time for patient care.

Like VON, LOFT has experienced cost and time savings benefits. "The tool is not only amazing to use, it's very affordable," she says, adding that cost savings are key since non-profit organizations like LOFT have limited budgets.

It also saves time, as little trouble-shooting is needed and training is simple. The only times there are any issues, according to Milaszewski,"is when we go from one version to another version – but that goes with the territory."

For LOFT, AcuteNet helps assist their workers in supporting their circle of care. It is "not uncommon for two or more agencies to provide information for one client. It gets rid of duplication. There is more cooperation between agencies for sharing very fundamental information about the client, like for example, the probability of being hospitalized," notes Milaszewski.

While sharing of some key information with other agencies is valuable, security is critical. "Privacy and security issues are top priority. We've never had any breaches. Each user has his or her own login credentials," she says.

"We marry security and privacy and make them work together," says Anderson. "People think sharing means you're exposed. It actually means you're more protected."

In this 'sharing economy' framework, explains Anderson, "you have to have valid access to get to the data. The company's clients get the key, determine who can access it. "They start collecting data, or downloading it, into their 'container'. It becomes their environment – they own it. We can't access it. It's their data. Like a house, where outside we give them a key. We can only access it if they ask us to code or script to fix something in the house. By design, we banish ourselves," she says.

While some organizations using AcuteNet software need to share information with other community agencies, the Canadian Deafblind Association (CDBA), Ontario Chapter, does not. "We don't share information – we may not even put in last names, says Nicholas Miles, project manager, DCBO (Deafblind Coalition of Ontario).

The CDBA assists and conducts assessments of individuals with congenital or acquired deafblindness. Currently there are close to 400 deafblind people in Ontario. The Ministry of Community and Social Services wanted the CDBA to use the AcuteNet tools to provide assessments of deafblind people for determining funding needs.

They are using the InterRAI CHA (Community Health Assessment) to determine things like how much to commit for intervenor services (which assist with communication) for deafblind individuals.

Prior to using AcuteNet form digitization, the CDBA had a paper-based system for years but wanted to find an electronic InterRAI system. "AcuteNet had the best solution by far," says Miles. "We found we could do it a lot cheaper with AcuteNet. We've saved a lot of money for the government and our tax dollars," he says.

Miles also notes that since AcuteNet has a pretty intuitive interface, similar to the physical form, training is minimal. "The admin level requires a bit of work, but for the users, it's easy to understand," he says.

The interface is similar to what the InterRAI has, so for the people doing the assessments, notes Miles, they can see at-a-glance what's finished, and unfinished.

The affordability of the per-patient cost structure also gives the CDBA more flexibility. "We can grow it without breaking the bank, and we can grow with it," says Miles.

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CANADIAN Healthcare Technology

Integrated London

CONTINUED FROM PAGE 11

side," says Schned. "This has contributed to a 40 percent reduction in adverse medication events."

To protect network health, London Health Services chose Cisco Prime Infrastructure and the Smart Net Total Care service. The former provides proactive monitoring and simple, unified management for both wired and wireless domains. The latter helps ensure fast access to Cisco technical expertise, along with automated inventory and contract management. The combined result is quicker fault resolution, greater uptime, and better end-user experience.

"Our Cisco network brings it all together," says Kearns. "Having a solid platform for digital healthcare is vital. We're able to work more efficiently, flexibly, and securely, and deliver better outcomes and quality of care to our patients."

Collaborating for Patients, Students, and Peers: The healthcare provider has boosted productivity further still with Cisco Collaboration solutions. "I've got a Cisco phone on my desk and Jabber is open on my desktop," says Kearns.

The hospital previously had to bear the expense of supplying 6,000 staff with pagers. So far, 2,000 users have moved to Cisco Jabber technology, reducing costs and boosting productivity. For example, it makes it easy for clinicians to view the availability of colleagues and use IM chat to resolve issues on the spot.

The video connectivity of Cisco WebEx technology has had a huge impact.

"I can work from home and share my keynotes and courses online, and the quality is exactly like a face-to-face meeting,"

> **Using WebEx, Dr. Janzen can easily train others in diverse locations, ensuring doctors and nurses have up-to-date skills.**

says Dr. Janzen "It has totally transformed my working day."

Giving Time Back to Patients: Before, four meetings could take up his entire day, but now Dr. Janzen's time is used efficiently.

"With WebEx, I can virtually travel to Northern Ontario over my lunch hour," he says.

By air, that would be four hours each way, taking two days out of his work schedule. "I'm able to do two or three presentations on the same day, complete my clinical work, and be home with my family in the evening. That wouldn't have been possible before," he adds.

Beyond time efficiency, Cisco WebEx technology also helps Dr. Janzen train users in diverse locations over a single session. This helps insure doctors and nurses always have the most up-to-date skills, without unnecessarily diverting them from caring for patients. And, of course, travel costs have reduced significantly, too.

Canada has a minimum requirement for 50 hours of training per physician per year. Cisco Collaboration solutions are helping free-up around 100 hours of doctors' time per annum, the equivalent of up to 600 additional patient consultations.

Moving to digital healthcare is helping London Health Sciences obtain more detailed, consolidated information concerning patient care journeys. This creates opportunities to improve clinical workflows and continue to enhance in-patient care.

Wireless video and messaging keeping patients connected

CONTINUED FROM PAGE 19

ical practitioners, caregivers, and close family members. It's as easy as tapping an on-screen image.

Rick used his tablet to connect to Laurie, as well as other healthcare providers at the Arnprior and Ottawa General hospitals. With the touch of a screen, he could see their faces – and they could see his.

"You can't lie," says Rick. His care coordinator watches to make sure he takes his medication. His doctor looks at him and can tell right away whether he feels as well as he claims.

It also makes it possible to provide service in challenging situations. For Rick, travelling to see the physicians who treated him in Ottawa would be difficult and costly. Even walking to his care providers in Arnprior can be tricky – especially in bad weather. "Without the tablet, I wouldn't be able to have doctor's appointments," he says.

These days, Rick is quick to acknowledge that Aetonix has saved his life.

Lately, Rick has been thinking about what happened to him. "I have a second chance at life," he says. He wants to take the opportunity to help others. One of the best ways he sees of doing this is spreading the word about Aetonix.

He's stood up and described the solution in church. He's discussed it at length with people in the legion he sometimes visits to see live music. Wherever Rick sees a chronically ill patient struggling to get by at home, he'll step in to say there's a better way to receive support.

Mackenzie Health jumps to EMRAM Level 6 using Epic

CONTINUED FROM PAGE 4

of the new workflows. Some of the training took place just weeks prior to go live."

As well, the hospital hired university and college students to act as "at-the elbow" technical support in every department, and trained them ahead of time in the Epic system and the needs of various departments. They wore bright yellow aprons, and were available around the clock for several weeks after the go-live.

Overall, the system has been working well and staff are using it. "The over 80 percent adoption rate [for CPOE and medication management] shows the buy-in," said Tam.

That's an extremely high rate of adoption, with many of the non-users consisting of part-time staff members and clinicians on locums who were not yet trained or committed to using the system.

But the hospital plans to get them up to speed. "We're working on it," said Tam. "We have a philosophy of 'No one left behind'."

The Epic system has many leading-edge features. They include self-serve registration kiosks, where patients can quickly use their health cards to let the system know they have arrived.

The kiosks work in several languages, and they also produce bar-coded armbands for the patients – just as airport kiosks print out bar-coded boarding passes and baggage tags.

Patients who prefer to check in with a real person can still do this, although the self-check-in can be much faster.

The system comes with a rich set of online data– from every part of the hospital – this data is now giving managers excellent stats for monitoring performance in their departments. Real-time monitors show how many patients are waiting in the ED, the number of ALC patients on the floors, and many other metrics.

Dominic Covvey

CONTINUED FROM PAGE 14

that long, only a minute or two, and that was highly preferable to waiting hours or days for manual records to be retrieved. You can imagine my recommendations – when commercial systems had a response time of seconds!

Digitally Identifying Yourself with your own creations is somewhat expected. But I have also met many people who have purchased a system or an application and were so proud of what they did that they expected others to go out and buy the same thing.

And they promoted that to the hilt! When I was make-believing that I was a consultant, I was asked to review an institution's existing (legacy) system for a comparison with commercially available products.

The legacy system was quite long in the tooth and new commercial capabilities had evolved that it sorely lacked.

Furthermore, a company would support a commercial package, leaving the hospital to be a hospital.

However, people within the institution had diligently customized this legacy system to do exactly what they wanted. It did lack new capabilities; it did lack easy maintainability; but it was made in their image and likeness.

They had selected it and assisted in its development. Consequently, they did not want any commercial alternative. Not one of those was good enough! Eventually, a system was forced on them.

People seem to personify, or invest their personas in, applications they develop or systems they have acquired or assembled Lego-like from standard products.

These solutions become their children and the 'parents' want everyone to agree that the child is brilliant and drop-dead gorgeous.

I've experienced this myself! I have felt very disappointed when things I had developed or chosen were not immediately adopted by others.

It seems to be a human thing (though some might deny that applied to me) to be possessive, particularly about technology, and to identify it with oneself. When we put part of ourselves (like our intelligence or ingenuity) into our creations, they seem to become part of ourselves and we see ourselves in them. This can be a problematic issue in procurements, blocking the acquisition of good systems while demanding the perfect ones – the ones I built or I chose.

We have seen this syndrome before. We see it when someone raises a child. We see it when someone sculpts a bust or paints a picture or writes an article, like this one.

Anybody who doesn't immediately worship the child or adore the bust or lust for the painting, is a disappointment. Of course, writing should be treated differently with every word of the author preserved from the malevolent dissections of editors and readers (yeah, sure!).

> **The trick in system development is to put everything in, but to extract ourselves back out.**

It seems to me that any of us who engages in creative work, including the procurement of a new system, needs to acquire a certain amount of discipline. We need to have discipline not unlike that of a psychiatrist, and remain apart from our creative work, not fall in love with it and try to possess it forever.

So let's define a new discipline: Dispassionate Creativity. We need to be able to put ourselves into our work and its products figuratively, but we need to let them stand on their own. We need others to be able to accept or reject them or to go another direction, without feeling they are taking our things from us or rejecting us.

The next time any of us participates in a project – like developing software, making a movie or writing an article, or whatever – we need to invest all of our talents in it, but construct a separation between us and it.

That separation will allow us to survive when our work is critiqued, not bought into by everyone, or discarded. It will ameliorate the discomfort felt when experiencing criticism or editing or peer review or possibly even rejection. And it may be that this thinking even needs to be extended to our jobs!

The trick is to put everything in, but to extract ourselves back out. My thoughts anyway.

Dominic Covvey is President, National Institute of Health Informatics, and an Adjunct Professor at the University of Waterloo. He can be reached at: dcovvey@uwaterloo.ca

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