

# CANADIAN Healthcare Technology

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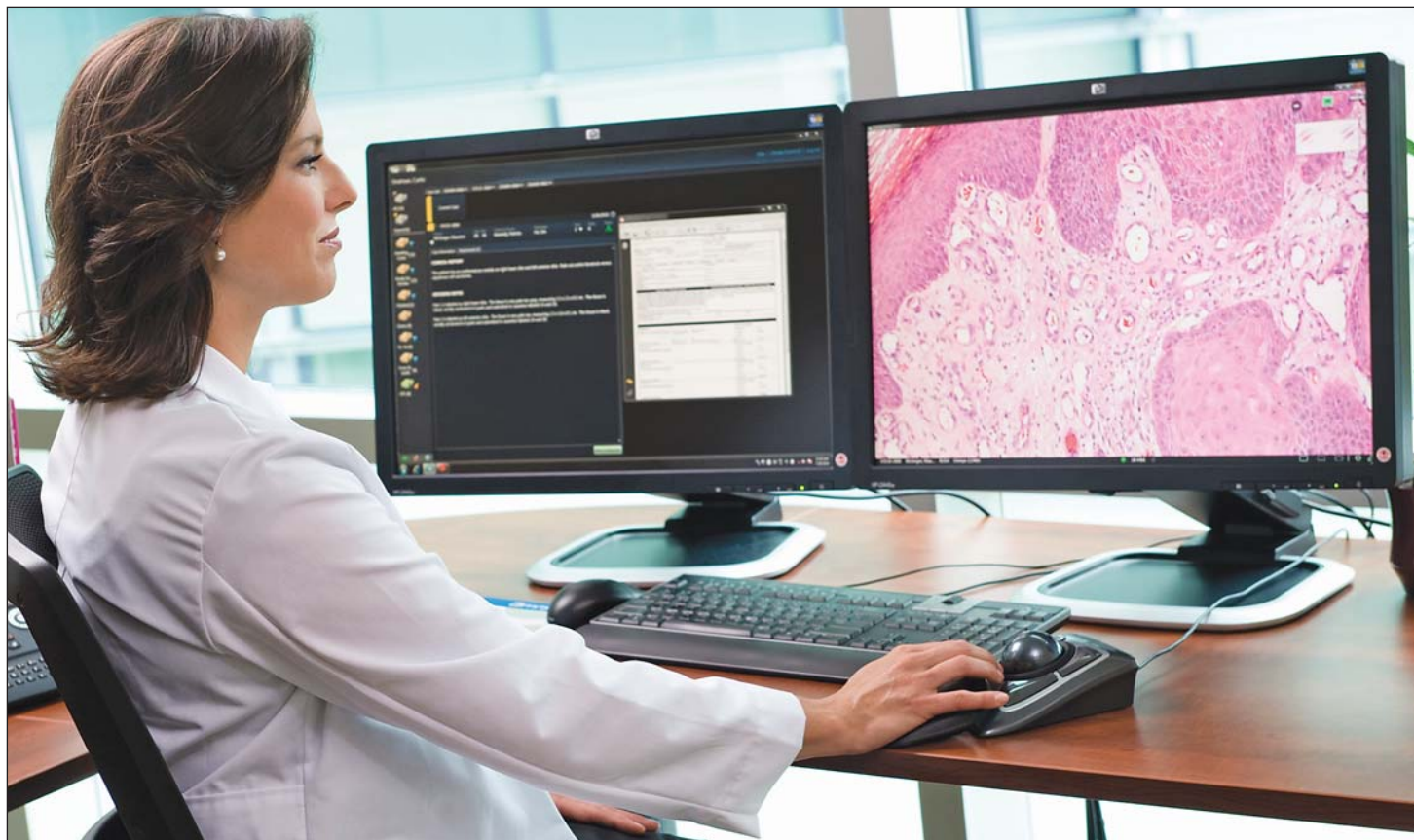


PHOTO: COURTESY OF GE HEALTHCARE

## Newfoundland launches provincial telepathology net

Newfoundland and Labrador, in partnership with GE Healthcare, are launching Canada's first province-wide telepathology system that's Health Canada approved. The solution modernizes the practice of pathology, enabling experts to quickly assess images and to confer with colleagues while examining digitized slides. The system is expected to provide faster, higher quality care for patients. **SEE STORY ON PAGE 4.**

## Protecting your organization from patent infringement

BY STEPHEN SELZNICK  
AND STEPHEN HENDERSON

An intellectual property infringement lawsuit in the United States, pitting one radiology service provider against another, may have important implications for hospitals, clinics and other healthcare providers across North America. When Virtual Radiologic (vRad), owner of Nighthawk Radiology Services, sued Tandem Radiology for alleged patent infringement, the company also named two users of

Tandem Radiology's services – Direct Radiology and Imaging Advantage.

The latter two are physician-owned radiology reading services. From a legal perspec-

**Healthcare providers should ensure that their suppliers are not infringing on patents.**

tive, this puts pressure on healthcare providers that acquire technological goods and services to ensure their suppliers are not

infringing on the patents of others – lest they be drawn into lawsuits themselves. As such, it's important to build protections from intellectual property disputes when entering into agreements that involve technological solutions.

This particular lawsuit was settled in September 2014 without admission of liability, with Tandem agreeing to wind down usage of the technology platform in question. The suit was originally filed about a year earlier, in September 2013, in an Arizona court.

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**PHILIPS**

# Lawsuit takes aim at two users of allegedly patent-infringing service

CONTINUED FROM PAGE 1

We are fortunate to live in an age marked by rapid technological innovation in the diagnosis and treatment of injury and disease. We have all come to expect that the healthcare system offer leading edge and cost effective diagnostic tools and solutions. This stokes a highly competitive marketplace for systems and equipment, the cost of which makes up a substantial portion of a hospital's or infrastructure service supplier's capital budget. Administrators in turn must ask their suppliers not only to tender top quality product, but that they do so at best available pricing.

Administrators are prudent to ask competing suppliers to bid for the privilege of supplying their product and systems offering. The expectation is that a modicum of comparative shopping will bring to light the best overall value.

This is a challenge when dealing with the purchase of advanced systems and equipment. Hospital and infrastructure administrators must be mindful to compare apples to apples, and in doing so minimize the risk of proprietary rights infringement.

It goes without saying that being drawn into a proprietary rights lawsuit will erode any price based cost savings. As well, since much of the funding for these systems and equipment purchases is sourced from government or patron donations, administrators must be sensitive to their moral and ethical obligations to respect the intellectual property rights of others.

The intellectual property rights of a solution provider comprise a bundle of rights including patent rights which we discuss in this article.

A patent is a statutory monopoly. In exchange for public disclosure of how to make and use the invention so that others can further innovate an even better technological solution, inventors are accorded a time limited monopoly (currently, in Canada, 20 years from the earliest priority date) to exploit their invention to the exclusion of others.

Unlike rights that arise at common law, patent rights only exist under statute if applied for and granted, and then only in those countries in which the patent is actually registered. For example, a U.S. patent does not grant a monopoly over the inven-

tion in Canada, where the invention may be free for all to use if a corresponding Canadian patent has not been issued.

Infringement occurs when someone interferes with the full enjoyment of those monopoly rights. Infringement, intentional or otherwise, may arise in a number of ways including constructing an inven-

**Under Canadian law, inventors are given 20 years to exploit their inventions to the exclusion of others.**

tion under patent, using it, selling it, importing it or even selling or using a product made via a patented process.

It is "use" which hospitals and infrastructure providers should be particularly concerned with. In addition, hospitals and infrastructure providers may expose themselves to claims for inducing patent infringement if suggesting specifications, or systems or equipment design in the tendering process. In some circumstances, this may also lead to a claim against the

hospital or infrastructure administrator in his or her own personal capacity.

Any person who infringes a patent is liable to the patent owner and its licensees for damages sustained after the patent is issued, as well as reasonable compensation for any infringement occurring before the patent issues but after publication of the patent application. In certain circumstances, patent infringement exposes the infringer to an order to deliver over and destroy the infringing product, an accounting for the value extracted from or profit made by the infringer, punitive or multiple damages, and the enforcement costs of the patent owner.

In an infringement lawsuit, a hospital or infrastructure service provider may also be ordered not to use the allegedly infringing product or system pending the outcome of the patent case which may take several years to resolve.

While such situations represent a worst case scenario, patent infringement should be a front-of-mind concern for hospital and infrastructure administrators. Here are nine important considerations to keep in mind when purchasing health care technology and systems to assist in limiting the risk of patent infringement:

- When drafting a request for proposal (RFP), set stringent parameters which allow bids to be evaluated properly against each other.

- An RFP should require vendors to identify the patents that they own or third party patents that they in-license for use or, alternatively, to confirm that their equipment and systems do not infringe on any existing patent and require no license from current patent holders.

- Prospective vendors should also be required to confirm that the patents they identify, and all related in-licenses, are in full force and in good standing in the territories in which the equipment or systems will be used, and for the intended purposes for which the equipment and systems will be used.

- Where an assessment is made that a particular in-licensed third party patent is critical, administrators need to consider requesting a cut-through or other non-disturbance acknowledgement from the licensor of that technology. This allows for the continued use of the licensed third party patent in the event that the vendor loses the right to do so directly.

- Prospective vendors should also disclose any adverse patent claims or allegations. If there are claims or allegations outstanding, the vendor should provide a legal opinion as to their likelihood of success (a non-infringement opinion).

- In big ticket purchases consider request-

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# Network for telepathology set to launch in Newfoundland and Labrador

BY JERRY ZEIDENBERG

**S**T. JOHN'S, N.L. — A province-wide network for telepathology, said to be the first in the country that's Health Canada-approved, is about to be launched by Newfoundland and Labrador. The \$2.5 million project will help improve the diagnosis of cancer and other diseases for patients throughout the province by electronically connecting hospitals to experts at Eastern Health, in St. John's, and ultimately, to other specialists in Toronto and Winnipeg.

Pathologists are in short supply in Newfoundland and across Canada, especially in rural areas. Often, hospitals must prepare slides and send them by courier for an interpretation by pathologists in larger centres, like St. John's. That can be a slow process.

However, by using the telepathology system, hospitals in Newfoundland and Labrador will be able to digitize the tissue samples and electronically send the images securely across the telehealth network for interpretation, a system that will provide faster results.

Not only are pathologists hard to come by, but sub-specialist pathologists are even more so. Generalists/community pathologists tend to consult with sub-specialists, especially on difficult cases, and rely on their expertise before reaching a diagnosis.

"We've got pathologists throughout the province, but often you need a sub-specialist," said Mike Barron, CEO of the Newfoundland and Labrador Centre for Health Information. "If there isn't the right sub-specialist available in a hospital,

they'll soon be able to connect with one in St. John's."

He added that the network, in this way, "will improve the quality of care and patient safety."

Barron noted the 2009 Cameron Inquiry recommended that alternative methods of providing pathology services be investigated in Newfoundland, after 383

a joint venture of GE Healthcare and the University of Pittsburgh Medical Center. Based in Pittsburgh, Penn., Omnyx has been pioneering the development of telepathology scanners, workstations, networks and workflow software.

In recent years GE and Omnyx partnered with the University Health Network (UHN) Laboratory Medicine Program, in

Regional Health Centre in Grand Falls-Windsor; Western Memorial Regional Hospital in Corner Brook; and the Charles S. Curtis Memorial Hospital in St. Anthony.

An additional \$1.4 million is being invested by Canada Health Infoway. The first phase will see these centres connected to Eastern Health, in St. John's. A later phase will connect the hospitals with pathologists in Ontario and Manitoba — part of a pan-Canadian telepathology project that's being spearheaded by Infoway.

Barron observed that once the system is up and running, it could also be used for obtaining second opinions. "Pathology is not an exact science, and it helps to get second opinions for a diagnosis," he said.

GE Healthcare through Omnyx has devised scanners, display stations, software and transmission technologies that together produce a solution that could transform the delivery of pathology services, allowing pathologists to digitally view and rapidly share slide images with colleagues, regardless of locations.

To further enhance accuracy and speed of diagnosis for pathology, GE Healthcare and Omnyx have partnered with Real Time Medical, also of Mississauga, Ont. Real Time Medical has developed workflow software that allows pathologists to collaborate; it automatically alerts colleagues to new cases to review, tracks review progress and enables pathologists to report results through the network.

"It enables collaboration between specialists, allowing them to improve the quality of the diagnosis. It extends the reach of their skill sets," said Ian Maynard, CEO of Real Time Medical.

And when slide images are sent to pathologists for interpretations, if one is busy, the case is automatically rolled over to another pathologist. That ensures there is never a delay to have a case read.

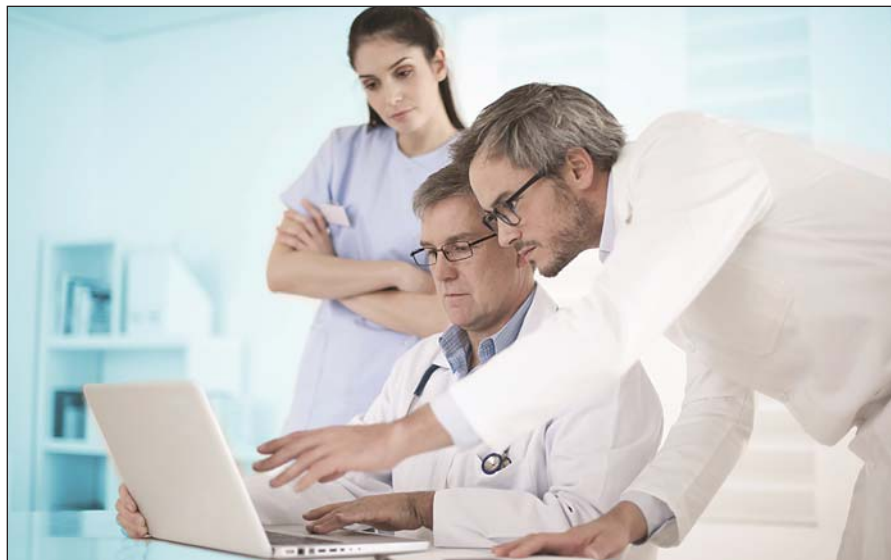
"The turnaround time for a diagnosis in remote regions can be days or even weeks when you're shipping slides by Fedex," commented Mike Clarke, General Manager of GE Healthcare IT Canada. "By eliminating need for shipping and transportation, we are making pathology slides immediately available for the consulting pathologist to read."

Clarke said, "Our workflow software is second to none, the scanner is easy to use, and the compression and streaming technology is one of our breakthroughs."

He observed that pathology files can be quite large, up to 10 times larger than radiology files, and compression and efficient streaming is needed for files to be moved across the network more efficiently. "Compression reduces network impact without compromising the pathologists' viewing experience," said Clarke.

What's more, he said, the solution is one of the few that's Health Canada approved.

Clarke noted that Newfoundland and Labrador is not only one of the first jurisdictions in Canada to create a telepathology network, it's also a North American ground-breaker in the transformation of pathology — a field that is ripe for technological modernization. "It's great to see Newfoundland leading the way."



women received incorrect diagnoses of breast cancer. Of these, 117 required a change to their treatment programs.

The new digital pathology network is, in part, an answer to this recommendation.

Several other Canadian provinces have experienced incidents of incorrect diagnoses of cancer, and are also taking steps to improve the quality of pathology services.

The platform was developed by Omnyx,

Toronto, to test and validate the Omnyx digital pathology system, in a project that linked UHN's pathologists with a hospital site in Northern Ontario.

Newfoundland and Labrador is investing \$1.1 million in the first phase of the new project, which will see equipment installed at four different sites: the James Paton Memorial Regional Health Centre in Gander; the Central Newfoundland

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# iCHIP system is a North American first for blood disorder patients

BY CECILIA LI

VANCOUVER—Patients with inherited bleeding and inherited red blood cell disorders such as hemophilia now have access to improved care and support, thanks to a newly launched tool.

The Inherited Coagulopathy and Hemoglobinopathy Information Portal (iCHIP) is the first web-based, secure application in North America which allows patients to directly enter his/her health information into the system. Inherited bleeding and inherited red blood cell disorders are rare, chronic and life-threatening conditions that are costly and complex to treat. Patients with genetic blood disorders are treated with blood products and may need frequent transfusions in both the hospital and home setting.

iCHIP is unique in that it empowers patients with inherited bleeding and red cell disorders to take ownership of their own care.

The mother of a B.C. hemophilia patient, Carmen Langdon, told reporters during a recent launch event of iCHIP at BC Children's Hospital that the technology also reduces some of the unnecessary burdens. "We live in a rural area and in the past, we had no idea when the products would arrive at our local hospital, so we were making multiple trips before we could pick up the products. Now, iCHIP sends me a notification and we know exactly when the products arrive – no more wasting time and back and forth on trips."

In the past, coagulopathy patients transfusing blood factor products at home would record their usage manually or through an older system that was cumbersome to use; their home infusions would then be assessed by their doctor at their next visit. Clinicians, in turn, would use many non-integrated data systems to record and monitor patient treatment and care, which made it difficult to track long term patient care and obtain an accurate understanding of product utilization.

iCHIP is comprised of two inter-connected modules – a Patient Home Module (PHM) and a Clinical Module. The PHM enables patients to directly enter their home infusion product usage and related treatment details into the system from home. A real-time link with the Clinical Module then enables clinicians to provide timely clinical care. An alert system is built in to notify program clinical staff if a patient enters a potentially serious bleed into the PHM. Messages will also be automatically sent if product use for the patient is outside the appropriate range.

The PHM offers other features to help simplify life for patients, such as the ability to generate and print various types of personal treatment protocols and reports which they can share with their primary care providers, or carry with them when traveling for emergency situations. Another handy feature for patients is the system notification function that informs patients when their product is ready for pickup.

iCHIP was developed by the BC Provincial Blood Coordinating Office (PBCO), a program of the Provincial Health Services Authority (PHSA), in collaboration with the BC Inherited Bleeding and Red Cell

Disorders (IBRCD) Program clinicians and patients.

"With the launch of iCHIP we are expecting a tremendous impact on patient care," said Dr John Wu, Pediatric Medical Director, IBRCD program "From a system-wide perspective, with patient care being

provided in a more timely manner, it will reduce the acute episodes or crises that patients may run into if some of their signs and symptoms are not captured earlier on."

The Inherited Bleeding and Red Cell Disorder Program was implemented in 2012 to help establish and maintain na-

tional standards of care, ensure patients have access to proper resources and ensure quality and accountability. The development of iCHIP was a key component of the IBRCD program, with a goal of providing IBRCD Program patients and clinicians a

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\* Gartner Magic Quadrant for Enterprise Content Management, 2014.  
\*\* IHS World Market for Medical Enterprise Data Storage – 2013

# Bruyère's Saint-Vincent innovation helps disabled patients communicate

ANDREA MACLEAN

**O**TTAWA – A team at Bruyère's Saint-Vincent Hospital is adapting conventional technology to help severely disabled patients communicate and maintain some independence.

By customizing a variety of technologies, Assistive Technologist Bocar Ndiaye and volunteer Yih Lerh Huang have found simple solutions to complex communication challenges. Today, approximately 50 of the 336 patients at Saint-Vincent Hospital, which operates the province's largest Complex Continuing Care program, are using open source software and hardware and everyday objects (such as headbands), to remain connected to family and friends.

"Unfortunately, many of our patients have lost the ability to use their hands and their voices in a traditional sense. We create the opportunity to communicate when nothing else is available," said Bocar Ndiaye. "By working closely with our patients and their families we can customize solutions for them."

Using mainstream technology and tools, Bocar and Yih Lerh are able to help bring the outside world in for patients who otherwise would be unable to communicate. Small and simple tasks such as changing the channel on the television or adjusting the volume on the radio allow patients to enjoy little pleasures and have a better quality of life.

"If the patient wants to control the TV or make a phone call, but physically isn't able to do it, we use different types of sensors – touch sensors or light sensors – that we customize for that patient who has lim-

ited hand or head movement," said Ndiaye.

The devices are attached to the patients using hair bands. Some of the wiring is also protected by cases for glasses. Ndiaye and Huang work on a shoestring budget, but have been able to custom-tailor devices for dozens of patients.

For seven years, Molly Knox has been a patient at Saint-Vincent Hospital. With Bocar's help and that of his team, she now just has to move her head to control her iPad, meaning now she can watch Netflix and Skype with her friends and family around the world. On her head – making this all possible – is a simple, everyday headband that has been customized to enable her to control the computer.

"It's made a big difference," she said. "I can go anywhere on Google. I can talk to friends."

"I am so proud of the passion and commitment of this small but mighty team of employees and volunteers," said president and CEO, Bernie Blais. "If there is something Bruyère can do to help our patients – we will."

Combining dedicated high-cost health-care devices with low cost hobbyist parts such as capacitive touch sensors, infra-red (IR) light sensors and gyroscopes, and working closely with a wheelchair technician, occupational therapists and speech language pathologists, Bruyère affords patients' life-changing projects on a shoestring budget.

"This team works hard and develops solutions that change lives," says Mr. Blais. "We picture a day when the team has phil-

anthropic support so even more lives will be transformed."

Saint-Vincent Hospital ALS patient, Howard Hunter, uses the Tobii eye-tracking software on his computer. This highly specialized and technical software responds to his eye movements and the click of a special button. Hunter is wheelchair bound and has limited mobility in his



Enabling patients to accomplish everyday tasks gives them great pleasure.

hands and arms. His daughter Annie said it's made all the difference in his life.

"Having the computer really allows him to be like everybody else, to use his computer," she said. "They get him up and all you need to do is set up the computer. You turn on one button and he's able to use the Internet as anybody else would. There's nothing he can't do on this computer with infra-red eye-tracking software. It's definitely amazing and he enjoys it a lot."

The future of this team's initiatives and

ideas is endless as technology advances. Ndiaye and Huang are currently researching ways to help patients who cannot move or communicate. There are undoubtedly opportunities to adapt Bruyère's simple solutions more widely to other patients. Ndiaye said they wanted to adapt a special game that allows a person to elevate or lower a ball using their minds.

"What we're trying to research is if there is any way we could interface it with a smartphone or tablet as well," he said.

The team recently received international recognition as they were asked to present their customized patient communication devices at the esteemed ISAAC International conference in Lisbon, Portugal this past July. This is a key conference for Augmentative and Alternative Communication, which brings together experts from around the world.

Augmentative and Alternative Communication (AAC) describes the methods that make communication easier for people who find it hard to communicate

by speech. It includes many different methods, such as electronic talking aids, computers, books and boards with pictures or letters, and sign language. AAC can help people to understand what is said to them as well as to say and write what they want. Clients have mostly acquired conditions such as Multiple Sclerosis, Amyotrophic Lateral Sclerosis (ALS), Muscular Dystrophy, traumatic head injury, spinal cord injury, stroke and other neurologic disorders.

Andrea MacLean is Communications Manager with Bruyère Continuing Care, in Ottawa.

## iCHIP application for blood disorders

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data management tool that can be used to improve health outcomes through better and more timely patient care, as well as to facilitate optimal use of blood products.

To ensure iCHIP met the needs of patients and clinicians, stakeholders were engaged throughout the application development process. A Plan-Do-Study-Act approach was used to gather requirements and develop prototypes, which were then refined based on user feedback.

iCHIP is a three-tier web application built using the latest technologies including Java Server Faces, Ajax, and Web Services, with strict adherence to BC privacy laws and security requirements. iCHIP contains highly sensitive patient information, and as such, strong security controls are in place to protect against inappropriate and unauthorized access.

Cecilia Li, RN, BSN, EMBA (Health Care) is the Provincial Director, BC Provincial Blood Coordinating Office. For more information on iCHIP and the Provincial Blood Coordinating Office, visit [www.pbco.ca](http://www.pbco.ca).

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# Privacy breaches have implications for patients, staff and providers

BY JERRY ZEIDENBERG

Despite years of lecturing by privacy commissioners across the country, healthcare workers continue to lose portable computers or USB keys containing patient health records. Even more disturbing are the continuing reports of hospital employees who improperly access the records of patients.

What's strange about this latter phenomenon is that most of the employees caught 'snooping' in this way are found through regular or random audits. Employees know such audits are being conducted, yet they continue to peer into records they know they shouldn't be viewing.

One recent example: In October, Alberta Health Services notified the public that an employee of the Alberta Children's Hospital, in Calgary, improperly viewed the records of 247 patients. The person in question, who no longer works at the hospital, accessed the records over a 14 month period.

The audit showed that he or she – the identity of the person wasn't made public – may have looked at the patient histories, contacts, birth dates, and other information through two separate databases, Netcare and Clinibase. The breach was discovered through a regular audit of the electronic charts.

The matter is now being investigated by the province's Office of the Information and Privacy Commissioner. If charged, the employee faces a fine of up to \$50,000.

Vickie Kaminski, the president and CEO of Alberta Health Services, apologized for the breach and emphasized that AHS takes the privacy of patient information seriously. She also said the organization "will take appropriate action reduce the chance of this happening again," but didn't specify what steps will be taken.

Meanwhile, in Newfoundland, a former nurse was fined for inappropriately accessing the records of patients. In October, Colleen Stamp was fined \$1,000 by a provincial court for accessing personal health records – without an appropriate reason – 18 times over a 12-month period.

Stamp, previously known as Colleen Weeks, was a nurse working in the emergency department at Eastern Health, the province's largest healthcare organization. Her activity in the electronic record system was also discovered through an audit.

The province's Privacy Commissioner, Ed Ring, said the fine reinforces the message that health professionals shouldn't misuse their ability to view the records of patients. It should remind healthcare workers there are significant consequences for such actions.

And in September, Donna Colbourne, a former accounting clerk at Western Memorial Regional Hospital, in Corner Brook, was fined \$5,000 after improperly viewing personal health records on 75 different occasions.

It's not just patients and healthcare professionals who are implicated in breaches of health records. Naturally, the hospitals and clinics whose records are lost or snooped into suffer a hit when it comes to 'public image'. But they're also on the hook financially.

The theft of a laptop computer containing the health information of 620,000 Al-

bertans has spurred an \$11 million class action lawsuit against Medicentres, a chain of clinics that employed a consultant who lost the computer. Ironically, the consultant was a specialist in information technology – a person who might be expected to place a premium on data security.

In Ontario, an even larger class action has been filed against the Rouge Valley Health System, in Scarborough. The organization faces a \$412 million suit, an action launched after two hospital employees sold the personal information of 8,300 new mothers to a RESP company.

There are significant penalties involved in cases of health record breaches, along with the loss of public confidence. As such, hospitals and other organizations say they're stepping up their efforts to become more vigilant. Still, it will be important to take real steps to make improvements.



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# Niagara Health System integrates communications improving workflow and wait times

In March 2013, Niagara Health System's (NHS) St. Catharines Site opened its doors, marking a major milestone in Ontario's largest hospital integration. St. Catharines is the largest of six NHS sites, spanning nearly one million square feet.

Though integration and coordination had dramatically improved since the merger in 2000, opportunities to further streamline care, improve performance and patient satisfaction remained, including frustratingly long wait-times in the Emergency departments.

The hospital leadership had undergone a process to identify barriers to optimal performance, and they included communication breakdowns and poor processes. The different hospital sites, departments and functions operated as silos, and a focus on enhanced coordination was needed.

Over the course of 2013, leadership undertook a number of steps to improve patient flow and wait times. A cornerstone of this effort was to adopt one system to improve communications and workflow across the hospital sites.

In summer 2013, NHS selected Connexall as its integrated technology solution. Connexall enables nurses, physicians, porters, housekeeping, coordinators and other staff, and patients to stay continuously connected through simple wireless devices. The technology has been implemented in over 1,000 organizations globally, demonstrating a reliable track record.

Making the NHS adoption more ambitious was the fact that it was the first health system anywhere to deploy Connexall enterprise-wide – that is, using this

one solution to enable instant communications between multiple functions, departments and hospital sites in a region.

"We didn't just want to improve flow in one part of the hospital or in one location – our goal was to put tools in the hands of staff in all our sites in order to integrate care pathways across the region," says Angela Zangari, NHS Executive Vice President of Finance and Operations. "We felt confident moving forward with Connexall, and were inspired by the potential to improve our performance."

Since November 2013, the NHS and Connexall developer, GlobeStar Systems, have rolled out five integrated applications, specifically designed for NHS' unique clinical needs and physical spaces:

- A Patient Queuing solution in our central registration and ambulatory care areas which has sped up patient registration and eliminated the need for ill patients to stand in line.
- A Portering solution that automates porter requests, reducing the time nurses and others spend coordinating patient transfers, enabling staff to better manage their work, and making the patient journey within the hospital faster and smoother.
- A Housekeeping solution. Everyone on the team can see the bed status everywhere in the hospital at all times. Housekeeping staff are notified immediately to have the vacant room cleaned so we can get the next patient into a bed much more quickly.
- A Telemetry solution. Clinicians receive real-time alarms about medical events such as changes in vital signs through their handheld devices.
- The Nurse Call Notification solution allows patients to directly reach a nurse via a

handheld device. This enhances the nurse's mobility and allows the patient to receive assistance by way of direct interaction with the nurse.

The results in under a year have been striking.

By compressing the steps in the clinical flow, different sites have been able to move patients from the ER and through the hospital much faster. ER wait times for patients at the St. Catharines and Welland sites have gone down dramatically with Connexall. The 90th percentile

**Niagara Health System is the first healthcare organization anywhere to deploy Connexall enterprise-wide.**

wait time for high acuity patients at the St. Catharines site was reduced by 44% from September 2013 to August 2014.

In the past it could take nursing on average over 55 minutes for patients to be ready for imaging and transporting. We were able to get the average time down to below 25 minutes within four months of implementation.

Ms. Zangari says of the improvements, "once we were able to measure what was really going on, inter-professional relationships and job satisfaction improved. By making information transparent and giving staff greater control over their work, everyone is now able to plan ahead rather than playing catch up."

And we are seeing tangible improvements in the patient experience. For example, patients on crutches, women in

labour, and frail seniors used to have to stand in line to get registered for an appointment. Patients now get a ticket upon arrival and can take a seat until their number comes up.

"Patients find the experience much more satisfying and they get to their appointments on time," says Ms. Zangari. "Productivity has definitely gone up, as well. We have the same number of employees getting more accomplished in the same amount of time."

The methodical implementation of Connexall was as important a component to the success as the technology itself. From day one the cross-functional teams – including nurses, porters, housekeeping staff, registration, Diagnostic Imaging, Lab, Biomedical and ICT – had direct input into the design and implementation.

For example, it was critical that the EVS/Portering team and nurses led the development of the nursing solutions, as their teamwork is crucial to Patient Flow. ER and inpatient nurses now have the same information about where each patient is in the hospital and who is attending to them at any given time, which helps with care coordination.

Physicians have also observed that patient transfers between ER, diagnostic services and inpatient units are much more seamless with Connexall.

Super-users from different departments have a critical ongoing role, supporting new staff to use the system, and identifying adjustments that need to be made as needs change over time.

One of the workflow innovations that the NHS team is developing will be to perform tasks concurrently that used to be done sequentially. For example, bed/room cleaning will be concurrent with patient placement, movement and transfer of accountability.

Hospitals tend to only get the patient ready for transfer once a room has been cleaned. At NHS, viewing these activities simultaneously ensures that the patient arrives as the room clean process is completed, saving precious time.

Another critical success factor was having members of the Connexall team partnering with the NHS ICT team to work with internal stakeholders to understand business needs and develop a robust and sustainable system.

Having the technical experts from Connexall on the ground, working hands-on with hospital staff enabled us to design a solution that is tailor-made for our population, services, geography and facilities at each site.

Staff and managers are already thinking of ways to further harness this solution to improve how they do their work, such as using the queuing system in the ED.

Dr. Suzanne Johnston, NHS President, notes "being first in Canada with a comprehensive solution is impressive from a technology perspective, but even more so from the perspective of creating the best possible patient experience. The Connexall implementation is much more than an IM-IT project, it has promoted significant cross-functional operational teamwork. It is really part of a cultural change that's underway at NHS."

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# Stakeholders offer recommendations to mHealth at roundtable event

BY FRASER EDWARD

In June, the CATAAlliance Mobile Health Advisory Board published a summary report from its Mobile Health Roundtable event, which was held in Ottawa.

"The inaugural mobile health roundtable was a first step in building awareness of mobile health in Canada," said John Reid, President & CEO, CATAAlliance. "We are thrilled with the response and excited to have brought together some 70 stakeholders from government, hospitals, healthcare, industry, start-ups, academia, consultancies and the not-for-profit sector," Reid added.

At the event, six broad themes were identified as requirements to enable mHealth in Canada:

- Personal health information. Canadians want to be "enabled participants" in their own health and wellness. To achieve this, patients need greater access to their health information via provincial personal health records, patient portals, etc. Secondly, greater interoperability or a common data set is required to facilitate greater exchange of data. Thirdly, health professionals require systems to manage, share and respond to the anticipated volume of health data generated by mHealth solutions.

- Reimbursement models. To simulate adoption and integrate mHealth as part of standard care practices, mHealth needs to be supported within physician and institutional payment models. A combination of introducing mobile, virtual and remote care options into billing code nomenclature and a continued move towards an outcome based payment models is required.

- Gap between innovation and adoption. To close this gap, healthcare institutions need to drive a shift in emphasis from perpetual trials to mass adoption. While the yard stick must be on quantifiable results, flexibility in funding models and innovation in procurement processes would allow innovation to enter the healthcare system.

- Education and awareness. To achieve mass adoption, the value of mHealth innovation needs to be showcased across Canada. Canadians, administrators and medical practitioners need support materials to help them select and safely use mHealth solutions. Particular focus on privacy and security concerns should be emphasized.

- Mobile health app certification. With over 100,000 health apps available today, helping consumers and clinicians to identify solutions that are both safe and clinically effective is important. Attendees proposed an industry-led certification 'seal of approval' system to achieve this.

- mHealth champions. Physicians, pharmacists and other health professionals are required to build trust in mHealth solutions efficacy for Canadians. They will do this if armed with appropriate data and evidence of real outcomes. As always, definitive results are the most powerful enabler for adoption.

With significant announcements about Apple's Health Kit and Samsung's Simband, and an abundance of wearable devices and smart watches hitting the shelves, it is definitely time to enable mHealth to live up to its promise in Canada.

While this is not an easy journey, one thing is certain – we need to make room in our healthcare system to make mobile innovations part of the mainstream. I see no other way to achieve the one thing our system has always lacked – a truly engaged and enabled patient. That's the power of mHealth.

After all, mobile health (mHealth) innovations promise to have a measurable impact on health outcomes while at the same time facilitating new efficiencies in Canada's healthcare systems. Understanding the opportunities and challenges to find a way forward is an important task, one that

was taken up by the Canadian Advanced Technology Alliance (CATAAlliance) and its Mobile Health Advisory Board ([www.CATA.ca/communities/mhab/](http://www.CATA.ca/communities/mhab/)).

Modernizing healthcare in Canada is notoriously challenging and complex. Our

CONTINUED ON PAGE 11

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# Healthcare conference shows entrepreneurs how to find investors

**T**ORONTO – As an entrepreneur with a start-up company, you're confident you've got a great technology and the potential to become the next Facebook. All you need is cash, so you approach venture capitalists.

Often, the meeting doesn't go well, despite your world-beating technology. Why does your pitch fall on deaf ears, and what does it take to attract an investment from a vencap company?

"I'm amazed at how many people do presentations to us and haven't researched what we're invested in," said Scott Requadt, a partner with Clarus Ventures, of Cambridge, Mass. "They have a far better chance of getting money if we have a partner who has worked in a related area. A lot depends on finding the right person."

Requadt was a panellist at the annual Bloom Burton Healthcare Investor Conference, held in Toronto in June. The two-day event attracts healthcare entrepreneurs and fast-growing companies in need of investment, as well as venture capitalists, angel investors, lawyers and business consultants.

It is hosted by Brian Bloom, president, and Jolyon Burton, CEO. For its part, Bloom Burton offers an array of financial and consulting services to start-up and expanding healthcare technology companies, including direct investments and raising capital and financing with partners.

On the topic of what it takes to draw an investment from a vencap company, Requadt added that entrepreneurs must be persistent and persuasive. "You need the ability to turn one from a skeptic into an advocate," he said. "We're data driven, and we don't want generalities."

As well, he cautioned entrepreneurs: "Don't bluff about what you don't know, because we'll figure it out. Be honest."

Another panellist, Scott Weiner, a partner with Pappas Ventures of Durham, N.C., noted the importance of honesty and integrity in gaining an investment. It's not just your technology and the know-how of your management team that the vencap company is evaluating. They're also assess-

ing you and your colleagues on a personal basis. "We get to know companies for over a year before we invest in them," said Weiner. "It's like a marriage."

To much merriment, he added that, "A marriage in the U.S. lasts seven years – that's about the time we hold a company."

Weiner gave an example of the importance that personality plays in an investment. "A vaccines company pitched us last week, and at one point, their CEO dismissed our questions as simplistic and unimportant. 'Well, forget it, there's no way we're going to invest in that company.'"

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## Stakeholders offer recommendations

CONTINUED FROM PAGE 9

healthcare sector is one that has evolved over time, with little system-wide design. As a result it contains many barriers – physician reimbursement models, regulatory framework, budgetary constraints, procurement processes, information silos and privacy concerns, to name a few.

All of these factors add up to preserving the status quo and hinder necessary change.

Every week, I read about an exciting mHealth application, device or accessory that is brimming with promise. At face value they each present undeniable possibilities for improvement.

They all have a clear use-case, compelling patient benefits and a quantifiable return on investment. So, with all this innovation, where is the mHealth momentum? The fact is, unless we have structural change in our system, this innovation, although interesting, will remain irrelevant.

*Fraser Edward is a Director at Telus Health, based in Guelph, Ont. He is also a member of CATAAlliance Mobile Health Advisory Board. He can be reached on Twitter @FraserEdward*

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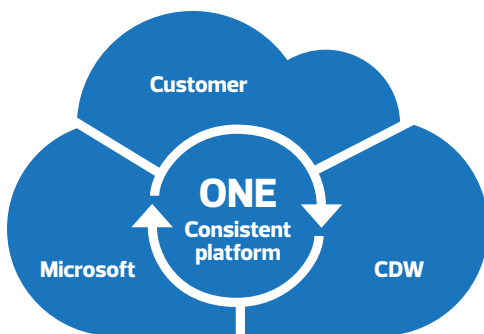
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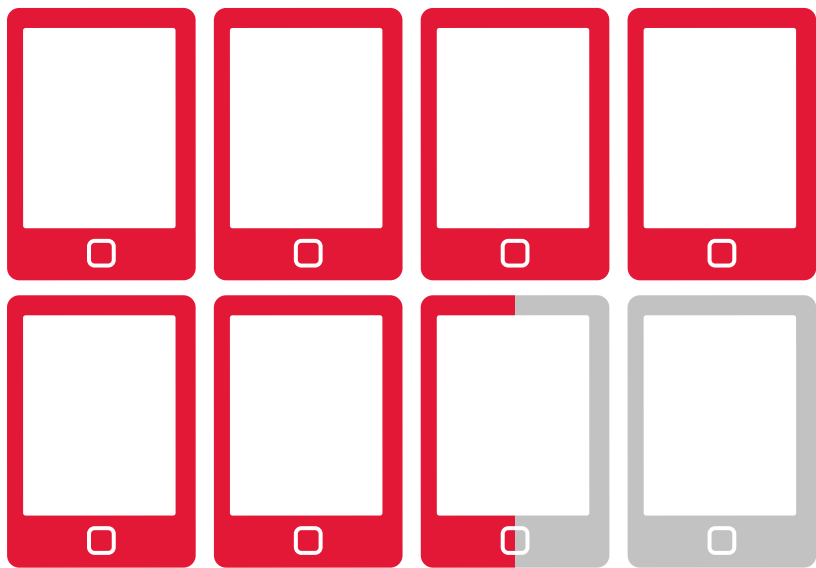
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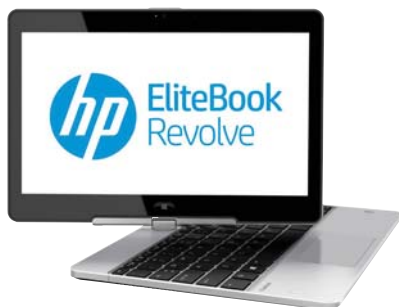
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# Trailblazers use tomosynthesis to improve the diagnosis of breast cancer

BY JERRY ZEIDENBERG

**T**ORONTO – An advanced form of mammography at the Joint Department of Medical Imaging is enabling radiologists to spot breast lesions with more accuracy than ever before. That's giving women a better chance to fight breast cancer at an early stage, when the success rates are much higher. It has also strengthened the Joint Department's position as one of Canada's leaders in the field of mammography.

"We're here to bring innovation to our patients so that we can improve their lives," said Dr. Lawrence White, Radiologist in Chief of the JDMI, which is made up of the multi-site University Health Network, Mount Sinai Hospital, and Women's College Hospital.

In particular, the organization has implemented three Selenia Dimensions tomosynthesis imaging suites, from Hologic, which take X-ray pictures of the breast and quickly reconstruct the images in three-dimensions. (Hologic is distributed in Canada by Christie InnoMed Inc.)

3D imaging gives the organization's 10 breast imaging radiologists a better look at the breast tissue than standard digital X-ray images – just as three-dimensional CT images can provide a better view of certain body structures than traditional, two-dimensional X-rays.

But just to make sure they've got all the bases covered, UHN added new "C-View" software in May that enables the tomosynthesis machines to produce two-dimensional scans at the same time as the 3D images are being taken.

That means the radiologists can scour both the 2D and 3D images for tell-tale signs of cancer, without subjecting patients

to two sets of exams and the additional X-rays they would require.

"We're reducing the radiation dose by 50 percent, and at the same time, catching significantly more tumours," said Dr. Pavel Crystal, Divisional Head, Breast Imaging, at the Joint Department of Medical Imaging.

The combined 2D/3D breast imaging technology is the first implementation of its kind in Canada.

The Hologic Selenia Dimensions imaging suites were originally installed a few years ago. One of the machines was recently upgraded with the C-View solution, a change that involved both software and hardware. The investment was well worth it.

"We've had cases where we saw cancer, when we wouldn't have with standard mammography," commented Dr. Rachel Fleming, a breast radiologist with the JDMI.

"There have been dozens of these cases," added Dr. Crystal.

There are proven benefits to tomosynthesis, Dr. Crystal said, referring to studies showing the technology enables radiologists to catch 33 percent more tumours than by using standard film screen or digital X-ray mammography.

That's tremendously important, as the earlier you can identify a tumour, the better the chances of treating it and keeping the patient alive. So when it comes to tomosynthesis, the JDMI physicians agree the technology is the way of the future.

Indeed, radiologists and hospital managers from across Canada and around the world visit the UHN to find out more about how tomosynthesis is implemented in clinical practice and how to use this technology to increase their cancer detec-

tion rate. One such example is an education course on tomosynthesis taught by Dr. Supriya Kulkarni, Radiologist, JDMI, at the University of Toronto's Advanced Imaging and Education Centre. This is the only course of its kind in Canada.

Dr. Fleming also pointed out that tomosynthesis reduces the call-back rate – the numbers of women who must return for another X-ray exam because something wasn't clear on the original image. Typically, 5-10 percent of women are

called back after undergoing a standard mammogram. "It takes double the time, and maybe a little more," she said.

Nevertheless, the additional time and effort translates into identifying approximately 33 percent more tumours than ever before, sooner rather than later. "It's well worth the investment," said Dr. Fleming.

The JDMI has 10 mammography machines across its sites and aims to install tomosynthesis upgrades on their mammography units at Women's College and Mount Sinai Hospitals in the near future; currently, the three Hologic tomosynthesis suites are all located at the Princess Margaret Cancer Centre.

The JDMI conducted a total of 58,785 mammography exams in 2013/2014, of which 17,484 were performed at the Princess Margaret hospital.

The department's 10 breast imaging radiologists are all skilled in interpreting both 2D and 3D images. In addition to these highly specialized physicians, the organization also employs 20 technologists in mammography.

While the JDMI has surged to the forefront of mammography in Canada through the use of tomosynthesis, it has a long history of leadership in this area. "We went digital long ago," commented Catherine Wang, executive director of the JDMI.

"We had the first DR breast implementation in all of North America, and we were the first organization in Canada to be completely digital for mammography."

That leadership continues, said Dr. White, as the department has committed itself to pioneering personalized medicine – the application of genetic information, specific to an individual, to the treatment of cancer and other diseases.



Breast radiologists and technologists at the JDMI, downtown Toronto.

called back after undergoing a standard mammogram. "Tomosynthesis reduces this recall rate by 15 percent," she said.

Paul Cornacchione, Clinical Director, JDMI, noted this not only reduces anxiety in the women, who are frightened when they have to return for another X-ray, but it also improves patient flow at the hospital. "It allows more throughput," said Cornacchione. "You don't need to take more views."

Dr. Fleming observed that tomosynthesis files are quite large, and reading a tomosynthesis exam takes longer than a stan-

## CT scanner at NYGH reduces wait times, improves outcomes

**M**edical imaging patients at North York General Hospital, a busy community academic hospital located in Toronto, is the first medical centre in Ontario to implement Siemens' SOMATOM Definition Flash CT scanner with Stellar Detector and Edge Technology.

Thanks to the system's innovations in CT technology, the hospital's medical imaging team is better able to satisfy its own high standards of imaging quality while caring for a large number of patients.

Each year the hospital sees more than 200,000 medical imaging patients and performs up to 30,000 CT scans. "We currently have one of the lowest wait times for procedures in the city, and with the addition of the new Siemens SOMATOM Definition Flash CT scanner, we expect to further reduce those times," said Dr. Enoch Lai, radiologist at North York General Hospital.

The new CT scanner uses flash speed to capture even the smallest anatomical details with up to 50 percent lower radiation and contrast dose using Siemens' unique Dual Source Dual Energy mode

to improve diagnosis and optimize treatment choices for patients.

The versatility of this CT scanner makes it ideal for disease screening and diagnosis in a range of clinical applications, including cardiology, neurology and oncology.

Another patient benefit is the reduced need for invasive diagnostic procedures for cardiac and stroke patients. Siemens' new scanner is capable of imaging the coronary arteries, motion-free, in less than one to two cardiac cycles.

The pulmonary and coronary arteries and the entire aorta can be imaged in just one scan. Now, instead of an invasive cardiac catheterization, patients can undergo a non-invasive diagnostic contrast CT scan to diagnose cardiac problems.

The trendsetting technology of this innovative SOMATOM Definition Flash can facilitate 256 slices with 0.5 mm thickness per rotation for high-resolution imaging, compared to the current CT standard of 64 images per rotation and a scan thickness of 0.625mm.

"This technology allows us to handle more complex exams, which means our

patients can book all of their scan appointments at North York General without having to travel to different hospitals," he said.

"The design of the scanner can also accommodate larger or very tall patients without compromising speed and diagnostic certainty. This enables the imag-



Dr. Enoch Lai, radiologist and CT Director at NYGH.

ing team to support the needs of all patients in our community."

The SOMATOM Definition Flash provides fast coverage – the patient can be scanned from chest to pelvis in as little as 1.5 seconds. Sharper images and reduced motion blur leads to clearer images and more accurate diagnoses.

"It also means our patients don't need

to hold their breath, as is necessary with older machines, which makes the whole experience much more comfortable and less intimidating. This is particularly ideal for claustrophobic or anxious patients," said Dr. Lai.

As a result, there is shorter prep time needed with the patient, and the need to repeat exams is reduced. In addition to agitated or anxious patients, the new system also helps in the case of critically ill patients, who have trouble holding their breath, and with children who may have difficulty limiting their motion during a scan.

These advances mean patients spend less time inside the scanners, giving them a better overall experience and allowing the medical imaging team to see more patients.

Jim Graziadei, Senior Vice President, Healthcare at Siemens Canada, shares Dr. Lai's enthusiasm: "Siemens' unique and innovative technology delivers an outstanding return on investment with superior image quality, the lowest dose and outstanding workflow. The system provides both exceptional patient care and improved outcomes."



# Don't be annoyed! There are solutions to alarm fatigue in hospitals

BY VICKI FORDE

We've all been to hospitals and heard the constant sounds of beeps and tones – which hospital nurses hear all day long. Ventilators, infusion pumps and blood pressure monitors are just some of the several hundred alarms per patient per day, which are causing alarm fatigue.

These are the beeps, rings and tones that come from different monitors and devices attached to patients. The alarms may be real or false, but these life critical alarms cannot be ignored.

Over time, hospital caregivers become desensitized and overwhelmed by the noises – a dangerous situation, as a patient's life could be at risk.

In the United States, The Joint Commission, which accredits U.S. hospitals and other healthcare organizations, has issued a sentinel event alert to hospitals about the need to reduce “alarm fatigue” related to alarms set off by monitoring devices. This term refers to situations in which clinicians ignore or turn off the alarms that they find irrelevant or annoying.

Factors that contribute to alarm-related sentinel events include:

- Alarm fatigue – the most common contributing factor
- Alarm settings that are not customized to the individual patient or patient population
- Inadequate staff training on the proper use and functioning of the equipment
- Inadequate staffing to support or respond to alarm signals
- Alarm conditions and settings that are not integrated with other medical devices
- Equipment malfunctions and failures

Since 2007, ECRI Institute has reported on the dangers related to alarm systems. In its annually published “Top 10 Health Technology Hazards” list, clinical alarm conditions consistently appear as the first or second most critical hazard, reflecting both the frequency and serious consequences of alarm-related problems.

In addition, the U.S. Food and Drug Administration's (FDA) Manufacturer and User Facility Device Experience (MAUDE) database reveals that 566 alarm-related patient deaths were reported between January 2005 and June 2010, a figure that is considered by industry experts to under-represent the actual number of incidents.

Alarm fatigue also occurs when a true life-threatening event is lost in a cacophony of noise because of the multitude of devices with competing alarm signals, all trying to capture someone's attention, without clarity around what that someone is supposed to do. It is compounded by inconsistent alarm system functions (alerting, providing information, suggesting action, directing action, or taking action) or inconsistent alarm system characteristics (information provided, integration, degree of processing, prioritization).

Patients also experience alarm fatigue, as they are unable to rest with the multitude of alarm tones going off within their room.

Direct messaging and calls to staff have practically eliminated the need for overhead paging and noise. Implementing a quiet, healing environment has proven to

result in healthier and happier patients.

Alarm fatigue is a system failure that results from technology driving processes rather than processes driving technology. Austco Communication Systems, a worldwide provider of IP Nurse Call Solutions, uses mobile communication to

eliminate the need for alarms to be broadcasted throughout the hospital floor or unit.

For example, when a patient presses the nurse call button for assistance, a notification is automatically sent to the assigned nurse/caregiver's mobile device. The noti-

fication includes the call location and type of call allowing staff to respond to the call quickly and efficiently.

*Vicki Forde is a Marketing and Communications Specialist for Austco Communications, North America. [www.austco.com](http://www.austco.com)*



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# The digital dilemma in Canadian healthcare

We should look more closely at the U.S. experience and follow their lead.

BY DR. JOSHUA LIU, BSC, MD

Most people who have worked in the Canadian healthcare system have undoubtedly shared the same 'eureka' moments on the impact digital health could have on improving patient care while reducing costs.

The transition from paper documents to Electronic Medical Records and Computerized Physician Order Entry (CPOE) were seen as significant milestones for many health care organizations, although even some of our "leading" organizations today still lag behind in this regard. Sometimes it feels as if our health care system is waiting for everyone to catch up before taking advantage of new digital health solutions.

All the while, three key trends in the past few years have created an unprecedented opportunity to radically improve healthcare delivery:

- The explosion of mobile, wireless and wearable technologies
- The transition from fee-for-service to value-based healthcare
- The decreased barrier to entry for startup companies and increasing private investments in healthcare innovation

From improved patient-self management using mobile health (mHealth) applications to remote patient monitoring using wireless technologies, there are a growing number of digital health solutions that can support high quality care at scale for our growing population.

While the U.S. has unique healthcare problems of its own, they are certainly ahead of Canada in devel-

oping, testing and adopting digital health innovations. When you compare the Canadian digital health landscape to the American one, it's almost as if Canada is in an entirely different universe.

So why is this concerning?

There is growing evidence that many of our costs and adverse outcomes are preventable. But the old way of requiring a healthcare professional

**When you compare the Canadian digital health landscape to the American one, it's almost as if Canada is in an entirely different universe.**

to do everything is simply not scalable, and we're missing an opportunity to deliver safer, more efficient care at scale.

Upon reflection, there are several factors contributing to the limited adoption of digital health solutions in Canadian healthcare.

**Fragmented system:** In Canada, the way in which hospitals are governed ranges from a single health authority in Alberta to multiple health authorities in Ontario, although it can be confusing as to

**Dr. Joshua Liu is co-founder and CEO of SeamlessMD, a Toronto-based company that has produced a computerized, wireless solution for tracking and supporting pre-op and post-op patients. For more information, see: [www.seamless.md](http://www.seamless.md)**



how much authority these organizations actually have. In contrast, most hospitals in the U.S. are part of a hospital system or network, often owned and operated by a central organization.

Fragmented system = low diffusion of innovation. With most Canadian hospitals operating independently, even if an innovation is proven and adopted at one hospital, there is no inherent framework or incentive structure for such an innovation to spread to other hospitals.

Conversely, the successful adoption of an innovation at one hospital in a large U.S. hospital system (which can be as large as 100 hospitals) is often used as a case study for the rest of the hospitals in the system to also adopt the innovation. This is because such systems are owned by a central body, which has the authority and incentive to scale successful innovations to its other hospitals.

**Fragmented policies on personal health data:** Related to Canada's fragmented system are our fragmented policies on how we collect, store and disclose personal health information. Not only can these laws vary from province to province, hospitals within a single province often have varying policies of their own.

Both within and across provinces, we need a more unified set of guidelines and methods of approval. Healthcare organizations and companies both waste time and money every time an innovation's privacy

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## REBOOTING eHEALTH

### How to reward excellence among healthcare professionals?

BY DOMINIC COVVEY

Excellence. We say we strive for excellence, that we focus our students on excellence or that we expect excellence. But what does excellence mean in the field of eHealth?

What is excellence?

The dictionary tells us that excellence is the quality of being outstanding or extremely good. Excellence is a state of extreme merit, a state of superiority where one has excelled.

I guess one question is: can we recognize excellence when we see it? I think that seeing excellence requires a 'lens' and a filter. The lens amplifies what is classed as extremely good and the filter attenuates or eliminates the dross or unimportant details.

In order to recognize excellence, we need unambiguous criteria. Each

of us must learn and internalize these criteria to tune our perception to recognize true excellence in ourselves and others.

How do we recognize excellence?

As a society, we feel the need to recognize good work. There are a variety of awards that purportedly identify individuals and their work as being good. Some fields have awards that are widely accepted as indicative of one's achievement of the pinnacle of performance. The Nobel Prize serves this purpose. Everyone recognizes a Nobel Prize winner as having achieved the state of excellence. In mathematics, the Fields Medal does the same thing. Computer Science has the Turing Award and some other disciplines have prestigious indicators. All of these sing out the greatness of their recipients.

Excellence is not only recognized in matters of intellect, but also in matters of action. The Congressional

Medal of Honor in the U.S. recognizes that a soldier has distinguished him/herself conspicuously by gallantry and intrepidity at the risk of his/her life, above and beyond the call of duty. The key words in this



Dominic Covvey

case are the concepts of the risk taken and the idea of being above and beyond duty.

This award is often bestowed posthumously, consequently. So we have some definitions of excellence both for intellect and for action.

What are the criteria for excellence? Awards like these set a very high bar. Are there other levels of excellence?

A while ago, a friend and I discussed writing an article on excellence in eHealth. The article in hand is intended to be a start on that. We weren't thinking of excellence at the Nobel and Medal of Honor levels, but rather of a more day-to-day level of excellence, yet one that would be remarkable and worthy of celebration. What would that level of excellence look like in our field?

Consider some of the following possibilities as potential indicators of a performance that would be widely acclaimed as being excellent:

- Achieving a degree, diploma, certificate or other formal credential "with distinction". This means that one achieves all of the endpoints expected, but goes that extra kilometer to differentiate oneself from the crowd.

- Developing and or implementing a system that goes beyond user satisfaction

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# How to maximize the effectiveness of a community care organization

As healthcare systems continue to demand simultaneous improvements in both client outcomes and organizational productivity, the use of technology to deliver and manage client care has become a fundamental business element.

In the community care setting, the shift to electronic point-of-care solutions is particularly evident as providers increasingly place mobile devices in the hands of clinicians and aides to facilitate effective care and quickly create required documentation of services. Recently, the quality of community care services has been further advanced by mobile technology solutions. Mobile solutions have advanced to not only collect data, but to instantaneously use the data to improve operational and client outcomes.

Michael Wons, President & CEO of CellTrak Technologies, a leading mobile solution innovator in healthcare, was asked to explain how mobile solutions can improve outcomes for client and operations.

"In an environment where patient care and improvement is front and centre, and where provider agencies are going paperless, CellTrak has worked with the industry to develop easy to use new features. Alert driven management, care coordination and outcome management are the three major components in a successful mobile implementation."

**Alert Driven Management:** Alert Driven Management sends targeted, actionable alerts via email and text to agency offices, providing real-time insight into the important details of any visit. Operational, clinical and system alerts deliver intelligence from the field which the agency can immediately act upon to ensure optimal care delivery and resource management.

Types of alerts include: employee underperformance details, workforce scheduling challenges, travel time and mileage reduction opportunities, staff safety issues, and device and data security.

**Care Coordination:** Care Coordination solutions enable home care providers to dispatch the right person at the right time for needed care. By leveraging the integrated GPS features of the solution, an agency can more efficiently match each client's care requirements with the skill sets of available staff. When care management teams are able to rapidly deploy the nearest field staff members with needed skills to deliver vital care, when and where it is needed, clients and payers alike will benefit from improved outcomes.

**Outcome Management:** The third feature of mobile platforms is the Outcome Management solution. This feature enables agencies to better manage client care through access to real-time data. Information gathered in a uniform manner and shared among the members of a multi-disciplinary care team provides a comprehensive and continuously updated view of each client's condition and supports decisions to adjust care plans and/or escalate interventions.

Real-time data contributes to better care coordination, improved planning for future care and reduction of unnecessary hospital admissions. By focusing staff resources on the interventions that will

yield the greatest results, Outcome Management improves client wellbeing, improves operating results and elevates payer satisfaction.

Sharon S. Harder, President of C3 Advisors, LLC, a company which specializes in providing operational, financial and hu-

man resources assistance to post-acute and community care providers throughout the United States and Canada, was asked how to optimize a technology investment.

"Addressing a business's pain points and opportunities for productivity improvement through the introduction of new

technology requires a careful review of processes and procedures to ensure they are aligned with the new system's functionality.

"Neglecting this important step in the implementation process almost certainly guarantees that old problems will simply be replaced by new ones."

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# Hospitals are seeking to improve their EMRAM scores with new clinical systems

While Canadian hospitals currently score low, they may fare better with an upcoming HIMSS model.

**2015** could be a breakthrough year in Canada as a handful of hospitals prepare to be the first in the country to reach Stage 7 on the Electronic Medical Record Adoption Model (EMRAM), a benchmarking scale developed by HIMSS Analytics, a subsidiary of the U.S.-based Healthcare Information and Management Systems Society (HIMSS).

Others anticipate a quantum leap from Stage 3 to 6 following successful implementation of computerized physician order entry (CPOE), often considered one of the major stumbling blocks to obtaining higher EMRAM scores.

In fact, improving scores is now high on the hospital IT agenda across the country, says Jim Shave, president, Cerner Canada, a supplier of healthcare information technology systems.

"I can think of several instances over the last year where we have been asked to sit down with clients and help them map out what it takes to reach HIMSS 6 or 7, and where they stand today," says Shave. "There's a recognition that you're doing good things as you climb up this adoption scale."

The EMRAM is an eight-step process designed to help acute-care healthcare organizations track their progress as they move forward with electronic medical record adoption strategies. Each stage depicts a certain level of functionality and deployment, and organizations cannot move up a step until all criteria in the stage are met.

Compare American scores to Canadian scores and one of the first notable findings is that the largest portion of U.S. hospitals are at Stages 3 to 5, whereas most Canadian hospitals fall somewhere between 1 and 3. Canada is also still awaiting its first Stage 7 result, while roughly 3 percent of U.S. hospitals are already there, with another 15 percent close behind. And, the number of U.S. hospitals meeting criteria for Stages 5, 6 and 7 has been steadily rising since 2011 while Canada's growth remains relatively flat.

At first glance it appears Canada is lagging behind. But what do EMRAM scores actually say about the ongoing journey towards the digital hospital of the future?

John Hoyt, executive vice-president, HIMSS Analytics, would argue there's room for Canadian governments – provincial or federal – to take a more active role in pushing things along using incentives. He attributes the recent spurt in U.S. achievement to the American Recovery and Reinvestment Act (ARRA) program, which outlines a set of "meaningful use" criteria which organizations must meet in order to receive government funds.

"Our argument is we think the stimulus program has worked," he says.

But in Canada, the push towards automation has less to do with incentives, competition and scoring and more to do with measuring outcomes and sharing. That often makes it difficult to apply the U.S.-developed EMRAM as a benchmark to gauge overall progress, comments Don Newsham, CEO of COACH, Canada's Health Informatics Association.

"Here in Canada, we need a broader and more Canadian-focused set of adoption and maturity models to really understand how we're making progress,"

says Newsham. "We're very supportive of hospitals moving in the direction of higher EMRAM scores ... but the importance is the linkage, integration and connectivity to all other components in healthcare."

In February 2013, COACH published a white paper entitled Canadian EMR Adoption and Maturity Model: A Multi-Jurisdiction Collaborative and Common EMR Adoption & Maturity Model. The report gathered input from B.C., Ontario, Manitoba and Alberta to propose a uniquely Canadian maturity model that divides measurements into three areas: functionality, breadth and outcomes. It also examines integrated care and population impact, two priorities as Canada moves towards "personalized, patient-led, participatory healthcare," says Newsham.

"It's not about getting to a certain level, it's about using technology to the greatest ability and opportunity you have available to you," says Newsham. "EM-

on our e-Care project in 2007 to improve the quality and safety of patient care; the EMRAM was not a specific goal."

Fast forward to today and NYGH now anticipates achieving Stage 7 during its 2014-2018 eHealth strategic planning period. The biggest difference is that Stage 1-6 functionality only needs to be demonstrated in one clinical unit, whereas Stage 7 functionality must be demonstrated hospital-wide, with data exchange taking place outside of the four walls of the hospital, as well.

Stage 7 functionality also encompasses a longitudinal electronic medication administration record (eMAR), so that all medications are discretely documented in the eMAR, including those given by an anesthesiologist during surgery. In addition, it entails use of business intelligence systems that actively extract and analyze data to inform decisions and improve systems.

Though the spirit of HIMSS 7 is a 'paperless' hospital, Dr. Theal prefers to keep the focus on patient outcomes versus degree of automation. He's also a firm believer that strong system design based on clinician input, workflow analysis, evidence-based principles and well-structured data is the real differentiator, regardless of the EMRAM stage.

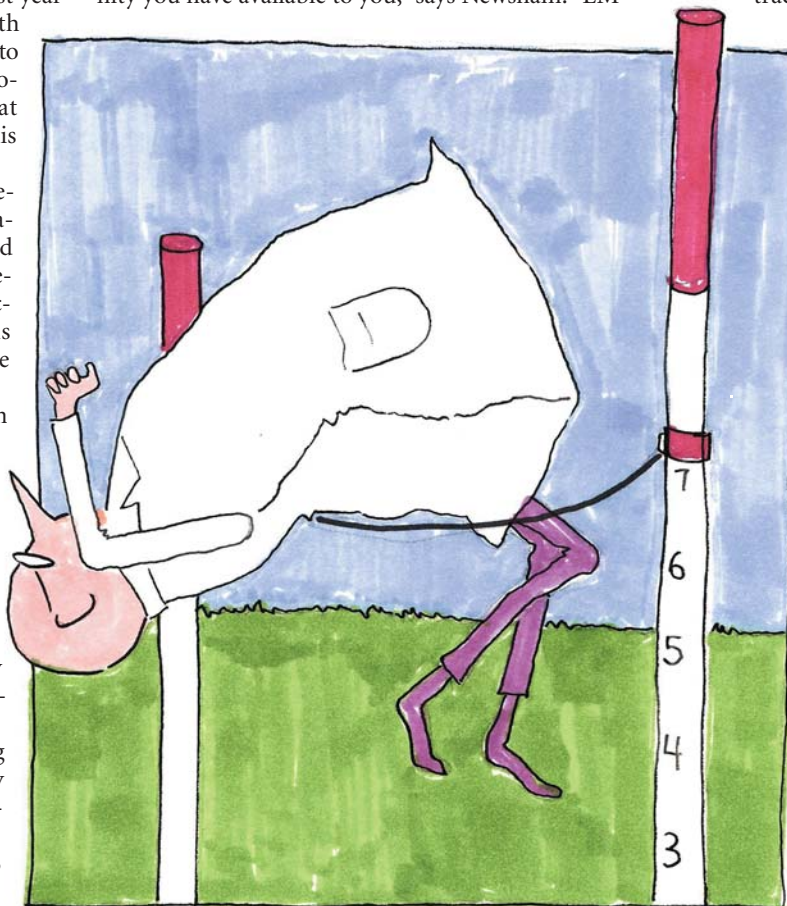
"I try to shift the conversation away from words like automation and paperless and switch it more to decisions and outcomes, because I think that's where the real value is," he says, noting that the emphasis at NYGH is always placed on quality and safety first. "Although we are happy to be at Stage 6, there are some limitations in the model because it doesn't really focus on patient outcomes, which is where we prefer to evaluate and improve on our performance."

University Health Network in Toronto is also building its EMR adoption strategy around patient outcomes. In 2011, senior Vice-President and CIO Lydia Lee outlined the hospital's goal of achieving Stage 6 on the EMRAM scorecard. After more than two years of planning and due diligence, UHN is ready to move forward with a transformation project to replace a myriad of best of breed systems with one enterprise-wide system. The primary driver behind the hospital's ambitious plan is better documenting and tracking of outcomes, and that relies on better tools for discrete data capture.

"For us, the Holy Grail is being able to have information captured about our patients and the way we treat our patients, and then tie that to good outcome information so we can always understand what we need to do to continuously improve," explains Lee.

UHN currently scores near 4.75 on the EMRAM benchmark. Although there are pockets of technology in use throughout the hospital that match the functionality laid out for higher EMRAM stages, it's not yet pervasive or comprehensive enough to achieve a Stage 6 or 7 score, and won't be until the transformation project takes place, she adds.

"One of the challenges is that the project to rip



RAM simply provides a measuring stick to help demonstrate where you are on that journey, but the importance is the journey. Does a hospital say, 'I'm Stage 7; I'm done'? Absolutely not. Because the use of digital solutions and the opportunities to use technology to the benefit of patient and provider are ever-changing."

According to HIMSS Analytics data, the five hospitals in Canada successfully demonstrating Stage 6 functionality are: South Okanagan Hospital in B.C., and North York General Hospital, Markham Stouffville Hospital, St. Michael's Hospital and Ontario Shores Centre for Mental Health Sciences in Ontario.

When North York General Hospital (NYGH) learned it had achieved Stage 6 back in 2011, the news was "a pleasant surprise," says Chief Medical Information Officer Dr. Jeremy Theal. "Our focus was never the HIMSS Analytics scale. We embarked



out and replace your system is very expensive,” says Lee, noting that it’s much harder for Canadian hospitals to make a financial case. “I don’t have that stimulus funding out there for me to grab. I have to make my case truly on clinical outcomes and what’s in it for the hospital in terms of improving efficiencies.”

There is literature to suggest a correlation between better outcomes and progression up the HIMSS scale. What’s interesting to note, says Hoyt, is that the “big payoff” comes at Stage 7 when all of the criteria are met. There are small, incremental improvements from Stages 1-5, but the more notable improvements start at Stage 6 and increase exponentially at 7.

“So the message is, it takes the whole kit and caboodle to begin to drive quality, safety and efficiency improvements,” he says.

But that doesn’t mean Canada is underperforming or under-achieving simply because the majority of its hospitals are scoring in Stages 1-3. Many Canadian hospitals already have CPOE and Closed Loop Medication Management systems in place; yet, they can’t score higher on the EMRAM scale because they haven’t tackled nursing or clinical documentation. As soon as they do, they will jump from Stage 2 to 6.

“Our advice is this is the typical manner in which a hospital progresses up these stages, but it’s not everybody,” says Hoyt.

Stage 4 in particular stands out as a major stumbling block in Canada. According to Cerner’s Shave, the major hurdle is throughput. Implementing CPOE introduces workflow changes that have a tendency to slow things down and it often takes as long as six months before improvements can be measured. “Despite better quality, better safety and better outcomes, at the end of the day they’re not getting the throughput they’re accustomed to,” he notes.

When UHN adopted CPOE nearly a decade ago, it changed the entire practice dynamic, says Lee. Prior to CPOE, doctors issued verbal orders, nurses took note, placed the order at pharmacy and then administered it. Now, physicians place electronic orders that go directly to pharmacy for verification.

**H**IMSS Analytics recently introduced a Continuity of Care Maturity Model, now in pilot stages and slated for launch early next year. Intended as a roadmap to help hospitals reach the goal of a “true interconnected healthcare delivery model,” it’s expected to be the guideline for what comes next, after EMRAM Stage 7.

Beyond EMR adoption, the Continuity of Care model examines interoperability, information exchange, care co-ordination, patient engagement and analytics – all of which are top priorities in Canada – and Canadian hospitals are poised to score better than their U.S. counterparts, says Hoyt. “We’re too competitive (in the U.S.) and we’re paying a price for it,” he says.

Once published, Hoyt expects Canada to score well on the Continuity of Care model, particularly in those provinces that have established regional health authorities and laid the ground work for integrating regional care, primary care, home care and community care.

One example of collaboration is the ConnectingGTA project in Ontario, an ef-

fort between the Ministry of Health and Long-Term Care, eHealth Ontario, Canada Health Infoway, UHN and the five Local Health Integration Networks in the Greater Toronto Area. The project will enable 700 service providers to securely share patient health information so that patients receive more co-ordinated care.

Another is Island Health’s One Record, One Patient, One Plan for Health and Care

strategy in B.C., based on an integrated electronic health record strategy and an enterprise system from Cerner. As part of its alliance with Cerner, the health authority is looking to integrate lab results, prescription history, information from community care clinics, medical images, notations and other relevant health information into a shared digital file.

“When you want to address maturity of

use and how well you are using the digital health solutions that are in place today, it takes a broader perspective of maturity models to do that kind of measurement,” notes COACH’s Newsham. “I’ve always said we will really have arrived at the level of strong adoption and use when patient demand is the driving factor for the use of digital solutions. I believe we are right at the cusp of that.”

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# Innovation for the developing world leads to cost-effective solutions

BY DR. MARK ANSERMINO

**V**ANCOUVER – We're on the verge of a wave of new solutions in global healthcare that will be the result of innovations in three key areas: technical, social, and business innovation.

These segments overlap, but the most influential innovation is likely to be in business. We need business models that will ensure healthcare can be affordable for everyone, everywhere. Innovation at scale will bring about the democratization of healthcare, enabling all people to access the care they need.

**Predictive healthcare:** Innovative models of delivery are required for healthcare to be affordable and accessible – even in developed countries such as Canada. By supporting and embracing new models that are being pioneered in the developing world, such as mobile health (mHealth), we can ensure a sustainable healthcare system for our children.

Technology innovation will enable us to build affordable mHealth applications that will deliver the power of predictive healthcare. The key is to provide lifesaving interventions before a patient's condition becomes critical.

Technology solutions can overcome the current barriers to accessing healthcare services that include diagnosis, triage, transportation and treatment. In many remote and low-resource areas, mHealth apps and sensors will enable community health workers with limited training to make sophisticated lifesaving decisions.

**Mobile impact:** Virtually everyone, everywhere has a mobile device that could

be used to deliver mHealth solutions. We are already seeing a major impact on the delivery of global health services and program support with text messages and electronic educational materials. This needs to be extended and enhanced to include diagnosis and treatment of a wide range of clinical conditions. This can be done with widespread use of mobile medical sensors.

A medical sensor is an electronic medical device that is able to measure one or multiple specific physical properties of your body. This could include temperature, blood pressure, blood oxygen level (oxygen saturation), activity level, sleep quality and duration and airway flow, for example.

These sensors are routinely used during anesthesia and critical care in hospitals in high-income countries. Mobile health devices equipped with smart sensors can be used to bridge the gap in the availability of clinical experts, ensuring that patients who live hours, or even days, away from healthcare can receive timely lifesaving interventions.

**Global health:** As an anesthesiologist, I have seen that innovative sensor technology – such as pulse oximetry – has supported improvements in the safety of children in my hospital. This technology could also have a tremendous impact on a global scale.

In low-resource areas, many clinics – even hospitals – don't have pulse oximeters. If they were available in every operating theatre and every emergency room, thousands of lives would be saved. Millions more could be saved if pulse oximeters were provided to frontline healthcare

workers around the world. The problem is that they're too expensive.

In the developing world, detecting risk can be a lifesaver: it provides precious time to ensure the required intervention can be given. For example, we have pioneered the use of oxygen saturation as a tool for identifying women and children at risk of life-



The use of innovative medical sensors can save lives around the world.

threatening complications of diseases such as pre-eclampsia (high blood pressure in pregnancy) and pneumonia.

In recent research, we have clearly demonstrated that the measurement of oxygen saturation will identify 20 percent more women at risk of developing the complications of pre-eclampsia when used in addition to other clinical signs and symptoms. We are currently testing this intervention in a rigorous randomized trial with over 20,000 women in four low- to middle-income countries supported through the Bill & Melinda Gates Foundation and the Sensor Project. (See [www.the-sensorproject.org](http://www.the-sensorproject.org))

The pulse oximeter sensor is easy to use: a SpO2 reading of less than 90 percent means the person is sick enough to require medical attention. That means community health workers, with minimal training, will be able to administer medications and refer women and children to clinics or hospitals.

**Healthcare at home:** For people in Canada, a pulse oximeter could alert them to the need to call their doctor or go to the ER. This would work well for everyone, especially people in rural or remote areas. In these instances, it could provide critical medical data to physicians in clinics or hospitals that are thousands of kilometres away. In the near future, I believe that every Canadian household will have a blood pressure cuff, a pulse oximeter and a thermometer – perhaps even an ECG or other vital signs monitors – in their medicine cabinet. All of these sophisticated medical devices

will be inexpensive sensors that plug into a smartphone or other mobile device, and are powered by apps.

The potential for these app-devices is tremendous. It is the foundation for individual predictive healthcare, which is the healthcare model of the future.

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## Virtual patient visits, via video and telehealth 2.0, provide benefits

BY MICHAEL SMIT

**C**anada has seen significant efforts in telehealth, most notably perhaps with OTN and BC Telehealth. These, and other solutions across the country and around the world, might be deemed "telehealth 1.0". The characteristics of these solutions include expensive hardware, fixed endpoint solutions (telehealth locations), fat client software architecture, and more often than not, costs that far exceed returns.

Our Canadian catalyst for innovation might be the charge to "Telehealth 2.0", where we seek solutions that do not carry these characteristics or limitations. Another consideration is the ubiquity of personal and mobile computing.

We have an aging population, without a doubt. What we also have is a learning population. Canadians of all ages are exceptionally well connected and adept with technology that permeates their lives.

With that connectedness and level of savvy, Canadians are seeking support for their health online, without expert guidance as to what is appropriate or not. More so than any other sector, it is absolutely necessary for the human factor to be a part of virtual healthcare.

One to one care from a practitioner is imperative to be able to properly interpret the signs of the human body, mind, and spirit. So the catalyst for connected healthcare might be to ensure we are meeting Canadians with the solution they require to fit their lives.

Access to care, and the lack thereof, is and will continue to be a catalyst. As the breadth of specialization continues to expand, smaller communities, the elderly, infirm, and young families will continue to find it harder to gain access to the full circle of care that is available to the flexible, mobile, urban population.

Virtual practitioner visits can go a long way to solving this issue. We have heard of significant gains in health management from elderly communities on Vancouver Island who now have greater access to their nephrologists and gastroenterologists, allowing for more timely and meaningful follow-ups and checkups.

And this is where online doctors' visits start to introduce a world of potential. What we've observed is that an episodic, single visit online between a patient and doctor has benefits mostly limited to that specific consult. But, as we have observed, when patients and doctors continue to maintain parts of

their relationship through Medeo's software, the value of each resulting interaction becomes that much stronger.

The continuous record of any notes, activities and care plans related to the consultation are securely stored on the patient's file. These notes and details become accessible to any other practitioners that are introduced to work on this patient's chief complaint. Any updates to

**Leaders in telemedicine suggest that 20 to 50 percent of patients could benefit from online doctor visits.**

the file become instantly available to the entire circle of care working on the case.

Consider that every secure medical visit conducted virtually can be automatically codified and attached to the patient record, and even to an aggregate view of other criteria such as disease state. The potential for a greater understanding of clinical pathways and outcome measurement is tremendous. Unfortunately a deeper dive into that potential would exhaust this article's word count.

Perhaps most interesting, is that when

the tool of care is creating the record of care, the patient always has immediate and secure access to his or her care plan, through any connected device including the smartphone in their pocket.

Adherence instructions in a digital world are never subject to being misplaced or thrown out, as is often the case with paper notes. And practitioners can seamlessly and quickly create new virtual appointments with their rostered patients once they observe any milestones or progress indicators in the patient's online file.

Certainly, not all types of care can be handled or managed through a secure online visit. Thought leaders in telemedicine suggest the figure to be between 20 percent and 50 percent of today's primary care. Anecdotally, at Medeo we have been told of a ten-year dermatological issue being referred from a GP to a specialist and resolved within four hours through secure video consults, as opposed to many months of waiting for that referral where geography and clinic wait times are constraints.

*Michael Smit is the COO of Medeo, Canada's leading direct to patient virtual care solution provider.*



# The wearables revolution is coming: Are you ready to try it on for size?

BY AHMAD ZBIB, MD

Oct 11, 2020. It's 5:45 am. My alarm goes off and I wish it didn't. It has been harder to wake up despite my going to bed earlier than usual. I reach out for my phone to upload the data from my Air-SyncPillow 3000, which I purchased two weeks ago as recommended by Dr. Johns.

Today is the day I send my two-week log file to Dr. Johns to help him make his final diagnosis. Alas, I look at my sleep pattern data and it confirms how I feel – it indicates restless sleep activity. I'm really not looking forward to being diagnosed with sleep apnea, but at least I know there is something I can do about it. I put my feet down and that recognizable voice on my phone asks, 'Would you like me to turn on your coffee machine?' How can I say no this question?

I put my slippers on and walk to the shower as I hear the coffee maker grind the beans and start perking away. At about the same time, my shower radio turns on, playing oldies from the last decade.

Technology is finding its way into our lives. The smarter our phones and their accessories get, the more indispensable they become. And if you are like me, technology becomes an indispensable extension of your body.

Nowadays, there seems to be quite the interest in 'wearables'. Wearables are miniature electronic devices that are worn under, with or on top of clothing, usually for the purpose of capturing objective measures such as steps taken, body temperature, heart rate and much more.

Most recently, a new category has emerged: the 'ingestibles', miniature electronic devices and as the name indicates, they are ingested. Once inside the body, they can capture information and relay it back to external devices. Such devices include Proteus Digital Health's pill-embedded sensors, which track medication adherence.

Be it wearables, ingestibles or a new category that will likely emerge by the time you are reading this, these technological advances are already shaping the way healthcare is being delivered. Although the impact is more visible amongst the early adopters of both patient and healthcare provider groups, it is only a matter of time before the rest follow suit.

These gadgets will also have an impact on the way we train our future medical/clinical professionals. Earlier this year, UC Irvine School of Medicine announced that they will be implementing Google Glass as part of their curriculum and that is just the beginning. Google is currently projecting to sell over 21 million units of Google Glass in 2018 and healthcare is expected to get a fair share of the pie. Also, virtual reality accessories such as the Oculus Rift are already being used to train surgeons and to practice before sensitive procedures.

A digital health geek like me can go on and on talking about the different kinds of devices in the market, but let's get serious. The multi-billion dollar question here is: why should we care?

If you are an executive at any healthcare organization and this is not on your radar, I've got advice for you: it should!

Consumers and patients are adopting wearables – including watches and other devices – that are giving them a tremendous amount of information. Combined with the information they can find on the web, they will have more challenging questions for your doctors, nurses and

other clinicians. What's more, other organizations will start to incorporate the data from wearables into electronic health records – if you're not aware of what others are doing, you risk becoming obsolete!

We often hear of doctors and nurses

building apps by leveraging the help of entrepreneurs and business incubators, and many of their offerings are actually quite useful. It's important to stay on top of new developments, so that your services remain relevant.

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“The magic of a system like this is seeing how at every level of the organization nurses are using the health outcomes data to shape care at the client, organizational and system level. Nurses can see, in real-time, health outcomes data to make informed clinical decisions for care planning and care delivery and can reflect on data to inform nursing practice change.”

**Cheryl Reid-Haughian,**

RN, MHSN, and Director, Professional Practice, Knowledge and Innovation, ParaMed

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# Lawsuit takes aim

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ing a freedom to operate opinion (FTO). An FTO provides independent legal confirmation that the intellectual property rights encompassed by the supplier's product are valid, and as to the scope of acceptable use that will not expose the hospital or service provider to an unacceptable risk of patent infringement.

- Consider your insurance options. Does your organization's insurance coverage include coverage for errors and omissions and potential liability for intellectual property rights infringement. If it does, what are the parameters of that coverage and what back-up support do you need from

your prospective suppliers. Also, is your coverage enough, taking into consideration that you might expose your organization's budget to infringement claims and have to replace the offending equipment or system?

- Prospective vendors should provide a minimum threshold of errors and omissions and intellectual property right infringement insurance, and your organization be identified as a named insured on that policy. Remember that the cost of defending a patent infringement lawsuit will very quickly eat into the overall insurance policy coverage available to you.

- A fulsome indemnity obligation from the prospective vendor should also be a baseline RFP requirement. However, recognize the limitations of indemnities. While they are a

good adjunct to other protective measures, they are not a panacea. Indemnification clauses are merely contractual so the scope of protection they provide is dependent on their drafting and the financial status of the indemnifier at the time the indemnity is

**Will your insurance cover your costs if you need to replace equipment, pending the outcome of an IP lawsuit?**

called upon. Recent history has shown us that even blue chip corporations can be rendered insolvent in challenging economic times, leaving other companies in their supply chain to shoulder burdens previously the

subject of indemnification clauses. In appropriate circumstances, consider supporting indemnity obligations from third party vendors with performance bonds or third party guarantees (including guarantees of performance from parent companies).

Recognize that being drawn into a patent infringement lawsuit is an expensive and time consuming endeavour. Any award of costs you might receive will likely not fully compensate you for the cost in time, money and disruption in operations that you will have incurred, and you will have lost the opportunity to use the equipment or systems while the lawsuit is pending. As well, litigation imposes discovery obligations upon you that will result in your having to catalogue and produce all your electronic communications and records that may be relevant to the action. This is an expensive process in time and money.

Your staff will be taken away from their regular duties for long periods of time and numerous considerations will have to be assessed, including how this discovery process will impact your privacy obligations to patients or customers. It is not uncommon to find yourself in expensive and time consuming interlocutory proceedings just to settle these matters.

*Stephen Selznick and Stephen Henderson are lawyers with the firm of Cassels, Brock & Blackwell LLP, in Toronto.*

## The wearables revolution is coming: Are you ready for it?

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My advice is simple:

- Stay up to date: Reading this publication is a great start. That being said, this is not enough. Start by devoting time daily to catch up on the latest and greatest from the world of digital health, mHealth and wearables. The simplest way is to follow key influencers on social media outlets such as Twitter and LinkedIn. On Twitter, start by searching the following hashtags: #digital-health, #mhealth, #wearables and #hcs-mca. On LinkedIn, join relevant groups such as Paul Sonnier's Digital Health Group. Another way to stay up to date is by attending meet-ups and conferences – there are many to be found in all major cities around the year.

- Experiment (fail, early and fast): the best way to learn something is to get involved. If you happen to be in town when the Hacking Health group is hosting an event, join a

group and I promise, you won't regret it. Another way to learn is to engage with a group of early adopters. Learn from their observations, as this is often an indication of what the general population will be interested in three to five years later.

- Think ecosystem. Gone are the days of locked-down systems. Almost every wearable device on the market place has an API (Application Program Interface). Leverage

some of these APIs to provide connectivity to your own systems – where it makes sense, of course. Do not ignore privacy and security requirements, but at the same time, do not let privacy and security be the barriers to progress.

*Ahmad Zbib, MD, is Director, Digital Health and Innovation at the Heart and Stroke Foundation of Canada.*

## Dilemma in healthcare and the American experience

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and security standards need to be re-applied at a new organization.

What's acceptable in one hospital should be acceptable in every other hospital. And these requirements must be clear and publicly available.

- Work that improves our satisfaction with our jobs and our roles. Making our work life easier, introducing a degree of pleasure into it and removing disturbances seem like worthy effects. Arguably, this is achieved from time to time, but it's antithesis, systems that frustrate, irritate, interrupt, devalue and confuse people seem more common.

- Other valued effects. There probably also needs to be a category for a whole box of other effects. For example, solutions that reduce errors or risk, mini-

**Perhaps we should track 'personal best' performances in healthcare, as we do with athletes.**

mize forgetting, or enable teams to work as a unit, achieve something important, as well. Excellence can take many forms. What are your suggestions?

When NIH was considering awards for excellence, several other criteria were brought to bear, for example, that the work had international ramifications. For work like this we recognized Dr. Roger Côté for SNOMED. In the case of Dr. Brian Haynes, it was his and his group's remarkable work on developing evidence, particularly as to the efficiency

**Healthcare's tendency to build in-house:** Because internally developed technology takes longer to deploy and often stays within healthcare organizations, it is difficult for healthcare organizations to attract the most talented software developers and designers who want to build quickly and impact the global population. In con-

trast, health technology companies provide the most talented software developers the opportunity to build products that can impact patients and providers at a large scale.

Can there be day-to-day excellence? Not everyone can rise to that level, perhaps. Is there the possibility of defining "personal excellence" similar to "personal best" achieved by athletes? I would argue that this is a worthy goal for each of us. We may not rise to the level of the few percent who receive public accolades. However, personal excellence may have a formula. It might start with fully grasping, in all its complexity, depth, breadth, whatever the challenge is we face.

It would then expect us to become fully capable as individuals, to work with the proper tools, to define valued objectives, to develop comprehensive plans, to obtain needed approvals, to get adequate budgets, to work tirelessly to address the challenge, to evaluate what we create and to communicate with all those involved and affected. It would cap the application of fierce dedication, total commitment, and the pursuit of needed outcomes like they really matter!

Excellence involves risk and going beyond simple duty! Let's put our stake in excellence!

*Dominic Covvey is President, National Institutes of Health Informatics, and an Adjunct Professor at the University of Waterloo.*

trast, health technology companies provide the most talented software developers the opportunity to build products that can impact patients and providers at a large scale.

In most cases, healthcare organizations should not be building digital health solutions in-house. They should focus on what they do best – delivering high quality medical care. What they should do is partner with technology companies who have greater technical talent and experience, and work together to solve these problems.

**Passive approach to value-based health care:** No one changes unless they are forced, and we have created a limited sense of urgency in Canadian healthcare. Unfortunately, our current funding models are not quite conducive to digital health adoption. Although we are beginning to tie funding to quality, the vast majority of healthcare delivery is still funded based on volume, leaving little incentive for healthcare organizations to adopt digital health technologies that improve coordination of care and patient outcomes.

In contrast, the U.S. has been much more prolific in terms of investing in, testing and adopting new digital health solutions, mostly due to the more aggressive pay for performance guidelines in President Obama's Affordable Care Act – for example, readmission penalties – thereby forcing providers to deliver higher quality care at a lower cost.

True, some parts of the Affordable Care Act are controversial and may ultimately be flawed, but you don't know what policies will or won't work unless you try.

Personally, I'd rather be part of a system that's a leader in trying to make value-based care work, instead of waiting and reacting to what works in other countries. Instead, our current funding model in Canada is out of date, and it's killing our ability to innovate.

## Dominic Covvey

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faction and achieves "client delight". A system so efficient and easy to use that no one can afford not to use it. I know of a few examples of this, like the work of Dr. William Stead at Vanderbilt University on his ICU system. Products like this tend to generate user demand instead of requiring interventions to achieve user adoption.

- Delivering a capability or a concept that is paradigm-changing. Something like this doesn't just change the rules of the game; it changes the game itself. Think of the impact of VisiCalc in introducing the concept of spreadsheets, or of social media and the effect they have had on our society, or of the Internet itself and search engines. These have changed the game in how we live, conduct business or interact socially. Outcomes of this genre are rare, but we need to strive for that kind of impact in eHealth.

- Capabilities that change how we work. Moving to computerization and networking dramatically reduced the interminable time people spent making phone calls to the laboratory and the answering of the phone by the lab staff. Order entry and results reporting is a change at this level.



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