



CANADIAN

TWENTY-FIVE YEARS

# Healthcare Technology

CANADA'S MAGAZINE FOR MANAGERS AND USERS OF INFORMATION SYSTEMS IN HEALTHCARE | VOL. 25, NO. 4 | MAY 2020

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A CABHI innovation award was given to a company with an app that protects and maintains hearing. The app, called Audio-Cardio, may also protect against the onset of dementia.

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#### Advanced tele dermatology

Better remote diagnosis of suspicious moles and lesions is now possible through technological improvements made by a Canadian company called MedX Health.

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There are many therapies for COVID-19 patients being produced by innovators across Canada, but they need to be tested for efficacy and safety. A crowdsourcing site now connects coronavirus patients with researchers.

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PHOTO: KEVIN VAN PAASSEN, SUNNYBROOK HEALTH SCIENCES CENTRE

## App helps frontline workers find protective equipment

A group of companies in British Columbia have produced an app that allows frontline healthcare professionals to quickly locate the protective equipment they need, along with the human resources that are available to help treat patients with the coronavirus. Several dozen BC hospitals have already adopted the app, which will be made available to other sites across Canada. **SEE STORY ON PAGE 8.**

## New system rapidly screens and triages patients

BY JERRY ZEIDENBERG

**T**ORONTO — InputHealth, a Canadian healthcare software company known for its Collaborative Health Record (CHR) platform, has signed a contract to supply the Ontario Health West region with a newly devised solution for rapidly screening, triaging and treating patients according to the urgency of their care.

At a time when a wave of COVID-19 cases is crashing down on caregivers, the new solution, called the Population Health Navigator, enables a large volume of patients to access care.

It also allows doctors, nurses and other health professionals to manage patients and de-

liver health services in a safe and effective way, by combining the use of patient self-assessment, analytics and telehealth for virtual visits.

"This system is designed for the time when we have a large number of people all trying to

**The software is designed to prevent the healthcare system from being overwhelmed.**

access the healthcare system concurrently," said Dr. Puneet Seth, president of InputHealth and a practicing family physician.

He emphasized that as the numbers of coronavirus patients dramatically rises,

there will still be patients with heart issues, pneumonia and strokes, all of whom will need rapid attention.

The software is designed to prevent the healthcare system from being overwhelmed, and to ensure that all patients receive timely, appropriate care.

"Population Health Navigator is designed to flow people through the system as efficiently as possible," said Dr. Seth.

InputHealth worked closely with healthcare leadership in the London Middlesex area of Ontario, including Dr. Daniel Pepe, Dr. Cathy Faulds and Anna Foat, to rapidly deploy the solution. At the time of writing, over

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# Southwestern Ontario system rapidly screens and triages patients

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350 doctors in the region had signed on to start using the navigator for their practices.

Shortly after launch, family physician Dr. Daniel Pepe said the system has been making a “substantial impact”, ensuring that patients get the attention they need while taking physical pressure off health-care centres.

The application does this by allowing patients to first assess their own symptoms. If they are showing signs of needing further assistance, they are able to gain help from the online physicians.

If their own family doctor is not part of the network, 12 on-call practitioners are available to provide assessments and to direct patients to the right form of care.

Dr. Pepe, at the time of this interview, said 7,858 patients had gone to the website (covid19checkup.ca), of whom 93 were given a live, telephone assessment with a doctor or nurse practitioner. The plan was to add video visits and secure messaging by mid-April.

“The main advantage is that the solution provides rapid assessment remotely,

so that patients get the care they need and less pressure is put on in-person providers and our supplies of personal protective equipment (PPE).”

Dr. Pepe noted the system started with implementation in the London-Middlesex area and was just about to be expanded to the entire southwest region of Ontario.

Built on InputHealth’s flagship Collaborative Health Record technology, the new system has been optimized for managing patients in a pandemic like COVID-19. “This all happened at an unprecedented speed thanks to those who appreciated the need to act decisively,” said Dr. Seth. “It normally takes six months or more for the procurement process alone,” he commented.

“The urgency of the times requires rapid action, and we’re ideally positioned to respond given our existing CHR technology and history in this space,” he said. “The idea is to start with the basics of something meaningful on the ground as soon as possible, as phase one, and to build on this with more functionality as needs evolve.”

The strength of Population Health Navigator is that it allows a single point of access for patients to make an appointment,

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enter their symptoms and relevant health data, and even conduct appointments virtually, through the portal with caregivers – protecting the health of doctors, nurses and other healthcare professionals.

Population Health Navigator has its own “virtual visit” capabilities embedded into it, enabling clinicians and patients to

interact with each other virtually as needed, including real-time chat, messaging, and secure video conferencing.

The video portion was about to be released, after the first group of clinicians had time to adjust to the basics of the platform.

When used at the outset, the system can triage the patient and direct them to the appropriate type of care, whether it’s to self-isolation, to an occupational health department, or to emergency services.

Importantly, all patients are then tracked on a real-time dashboard, so that no one is left unaccounted for or falls through the cracks.

“It gives you a centralized view of the flow of care,” said Dr. Seth. “It’s dramatically different than using a screening tool or a video conferencing service alone. It’s an end-to-end pandemic management pathway.”

Using a geographical information system (GIS) map view, those looking at the bigger picture can see where the patient population with COVID-19 symptoms is growing or shrinking.

Dr. Seth noted the current contract applies to all of Ontario Health West, including Hamilton and all areas west of Hamilton. The company is in discussions to install it in other parts of Ontario, as well as in Saskatchewan, British Columbia and even in South Africa.

Meanwhile, Dr. Seth continues to practice part-time as a family physician in west Toronto, and also in occupational health at the Toronto Western Hospital. The CEO and co-founder of InputHealth, Dr. Damon Ramsey, works as a general practitioner in Vancouver.

Dr. Ramsey and Shawn Jung (CTO, co-founder) started the company in 2011, and have successfully deployed their CHR technology to healthcare organizations across Canada and around the world.



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Address all correspondence to Canadian Healthcare Technology, 1118 Centre Street, Suite 207, Thornhill ON L4J 7R9 Canada. Telephone: (905) 709-2330. Fax: (905) 709-2258. Internet: [www.canhealth.com](http://www.canhealth.com). E-mail: [info2@canhealth.com](mailto:info2@canhealth.com). Canadian Healthcare Technology will publish eight issues in 2020. Feature schedule and advertising kits available upon request. Canadian Healthcare Technology is sent free of charge to physicians and managers in hospitals, clinics and nursing homes. All others: \$67.80 per year (\$60 + \$7.80 HST). Registration number 899059430 RT. ©2020 by Canadian Healthcare Technology. The content of Canadian Healthcare Technology is subject to copyright. Reproduction in whole or in part without prior written permission is strictly prohibited.

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### Publisher & Editor

Jerry Zeidenberg  
[jerryz@canhealth.com](mailto:jerryz@canhealth.com)

### Office Manager

Neil Zeidenberg  
[neilz@canhealth.com](mailto:neilz@canhealth.com)

### Contributing Editors

Dr. Sunny Malhotra  
Twitter: @drsunnymalhotra  
Dianne Daniel  
[dianne.l.daniel@gmail.com](mailto:dianne.l.daniel@gmail.com)  
Dianne Craig  
[dcraigcreative@yahoo.ca](mailto:dcraigcreative@yahoo.ca)  
Dave Webb  
[dwebbmedia.ca@gmail.com](mailto:dwebbmedia.ca@gmail.com)

### Art Director

Walter Caniparoli  
[art@canhealth.com](mailto:art@canhealth.com)

### Art Assistant

Joanne Jubas  
[joanne@canhealth.com](mailto:joanne@canhealth.com)





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Thank you.

# App that may ward-off dementia wins What's Next Canada contest

BY NEIL ZEIDENBERG

**T**ORONTO – After nine months of planning, the second-ever What's Next Canada conference was set to begin – bringing together experts and thought leaders in aging and brain health to discuss new innovation in seniors care.

But with an outbreak of COVID-19 threatening to cancel it altogether, a team from CABHI (The Centre for Aging + Brain Health Innovation), powered by Baycrest, scrambled over a matter of days to ensure the conference happened. What's Next Canada became a virtual gathering of minds.

The conference featured a pitch competition consisting of seven innovative healthcare startups competing for the CABHI Innovation Award, and People's Choice Award.

A panel of seven investment gurus selected the winners based on criteria such as relevance to the present, meaningful impact, and how their solutions improve efficiency and reduce risk. Each participant had three minutes to impress the judges.

The pitch competition was officiated by MSNBC news anchor Richard Lui – a family caregiver to his ailing father with Alzheimer's. Lui also spoke about his soon-to-be released documentary – Sky Blossom. “It focuses on family caregivers, and what they go through. There are over 50 million family caregivers in North America, and about 10 million are under 18.”

In the end, the CABHI Innovation Award was presented to Audio-Cardio, a digital app designed to protect and maintain hearing health by using sound therapy. Hearing loss is associated with increased risk of dementia. Audio-Cardio helps by stimulating cells in the ear, inter-

preted as sound. Results from testing have shown a 10 decibel change in the first two weeks of use, representing a 10 to 12 percent improvement.

The People's Choice Award was presented to Rendevar, a company that helps seniors overcome social isolation and loneliness using virtual reality (VR) and shared experiences. Rendevar helps fulfill

• NeuroCatch, which uses a mesh cap embedded with EEG electrodes. When worn over a client's head, it captures and translates those signals into a clinical report. NeuroCatch can detect changes in an individual's cognitive health.

• OptoCeutics attempts to slow the progression of Alzheimer's by using non-invasive light therapy, targeting individuals al-

in the coming years. It's estimated the disease will affect over 13 million Canadians by 2050, at a cost of over \$1 trillion.

“There's been no new drug development for Alzheimer's since 2003,” said Mahnke. “All recent dementia drug trials have failed. So how do we promote a healthy brain?” The answer: diet, brain games and blood pressure.

“A healthy brain starts with a healthy diet,” he said, referring to the Mediterranean diet that helps lower cholesterol and blood pressure, leading to reduced risk of heart disease, cancer and Alzheimer's.

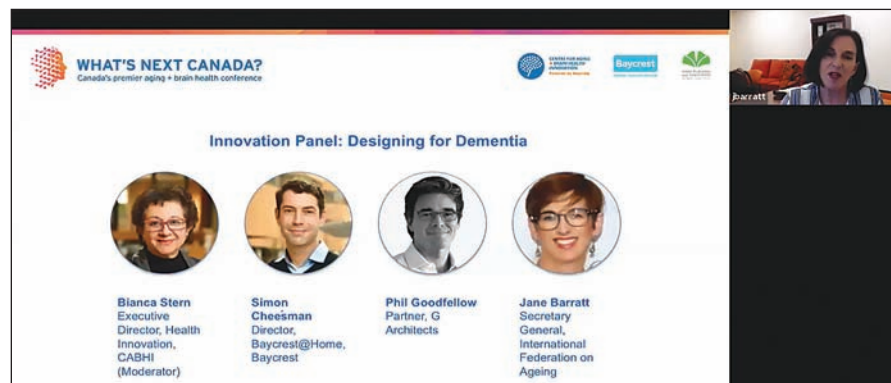
Stimulating activities can also slow the progression of cognitive decline in healthy adults by three years and lower the risk of Alzheimer's by almost 50 percent.

Maintaining normal blood pressure can help to improve a person's cognitive function, and lower the risk of dementia. Physical exercise and endurance training can also help to increase cognitive function.

During an innovation panel, participants discussed designing spaces for the treatment of dementia. Bianca Stern, executive director, Health Innovation at CABHI, suggested the creation of special places that connect us with others. “These spaces should foster health and wellbeing, be inclusive, safe, secure and supportive.”

Simon Cheesman, director, Baycrest@Home added, “What is the resident's home environment like. Does it have nursing carts in the hall way? A good design blends it into the environment or gets it out of the way completely.”

Jane Barratt, secretary general, International Federation on Aging, recommended creating a dementia-friendly environment that's resilient and full of colours. A place where residents and their families can enjoy being in.



bucket lists by enabling virtual travel to meaningful places.

The VR app can be networked together so multiple users can all experience riding in an air balloon, being on a Greek island or walking through the streets of their childhood communities. The technology can also measure before and after effects of the experience.

Other participants included:

• CUBIGO, an integrated cloud-based platform for seniors living that improves staff efficiency, and encourages resident engagement and family involvement. Features include digital signage, a 360-degree view of each resident and user-friendly kiosk creating an environment more like resident care, and less like long-term care.

ready showing signs of cognitive decline. In lab mice, results showed a significant reduction in the level of plaque, and Amyloid load (inflammation).

• Patient Pattern targets complex patients at risk of Alzheimer's and dementia by measuring their frailty risk. The percentage of frailty indicates a person's risk of cognitive decline.

• Toi Labs features an electronic toilet seat called True loo that monitors human waste to track a person's health. True loo uses an optical imaging modality, and image sensor to detect changes invisible to the eye.

Henry Mahnke, CEO of Posit Science, a company specializing in community-based dementia prevention programs, discussed ways of curbing the impact of Alzheimer's

## Teams platform enhances communications among staff and clinicians

BY JERRY ZEIDENBERG

**O**TTAWA – In a matter of weeks, spurred by the COVID-19 crisis, The Ottawa Hospital has gone from 3,000 active users of the Teams platform to 5,000. Teams is enabling clinicians and staff throughout the multi-site hospital to work more closely, even when apart, through the use of the platform's secure instant texting, group communications, document sharing, and videoconferencing.

“Everyone who doesn't have to be at the hospital for patient care has been directed to work from home,” said Jean-Claude Lemonde, Director of IS Operations for The Ottawa Hospital.

Still, they've got to be in constant communication with staff at the medical centre, and with others working outside the hospital, to remain effective. That's where Teams has come in.

He noted that the organization has had Microsoft Teams in its toolbox for several years, but the current situation with COVID-19 has encouraged more staff to use it. When

people try it, they find that they like it.

In his own department, which has 85 persons reporting to him, Lemonde says that Teams has made the task of keeping the hospital's entire network and systems up and running more efficient.

Using a group chat function, problems in the network or systems – such as outages – can be reported instantly to team members, and the root cause of the problem can be found very quickly.

“We hear about the problems faster, and we can address them faster,” said Lemonde. “We've removed half an hour to one hour to resolve major incidents in this way.”

“It's important,” he continued, “as every minute counts in your Information Services operations.”

He said that Teams was also used recently in the creation of Ottawa's COVID-19 Assessment Centre, and helped to get the centre's Information Technology infrastructure up and running very quickly. The Ottawa Hospital collaborated with the City of Ottawa and the Children's Hospital of Eastern Ontario (CHEO) on the project, and each

organization used Teams to communicate.

“The centre went live in four days,” said Lemonde. “The biggest contributor to having the IT infrastructures ready in time was the use of Teams.”

Among other things, the City of Ottawa was responsible for implementing the Internet at the site, while The Ottawa Hospital took on the job of getting the

**The Ottawa Hospital has gone from 3,000 active Teams users to 5,000, in response to the COVID-19 crisis.**

network working, which required routers, Wi-Fi, computers and printers.

“As you can imagine, there was a lot of collaboration and coordination required,” said Lemonde. “We would not have achieved this velocity of implementation without Teams. Phone calls and regular e-mails are too slow and lack context. With Teams, we often had responses within seconds.”

Lemonde said there are many people

in the hospital – as there are in society in general – who resist change and some of them were reluctant to use Teams.

“Once they try it, they never want to go back,” he said. “It's like what happened with smartphones.”

But he said that it is worth continuing to convince staff to adopt modern platforms and better ways of communicating and collaborating, especially in times of crisis.

Not all communication is done in Teams. Within the hospital, when clinicians are working with patient information, they're instructed to use the secure messaging function that's embedded in the new Epic Electronic Health Record (EHR).

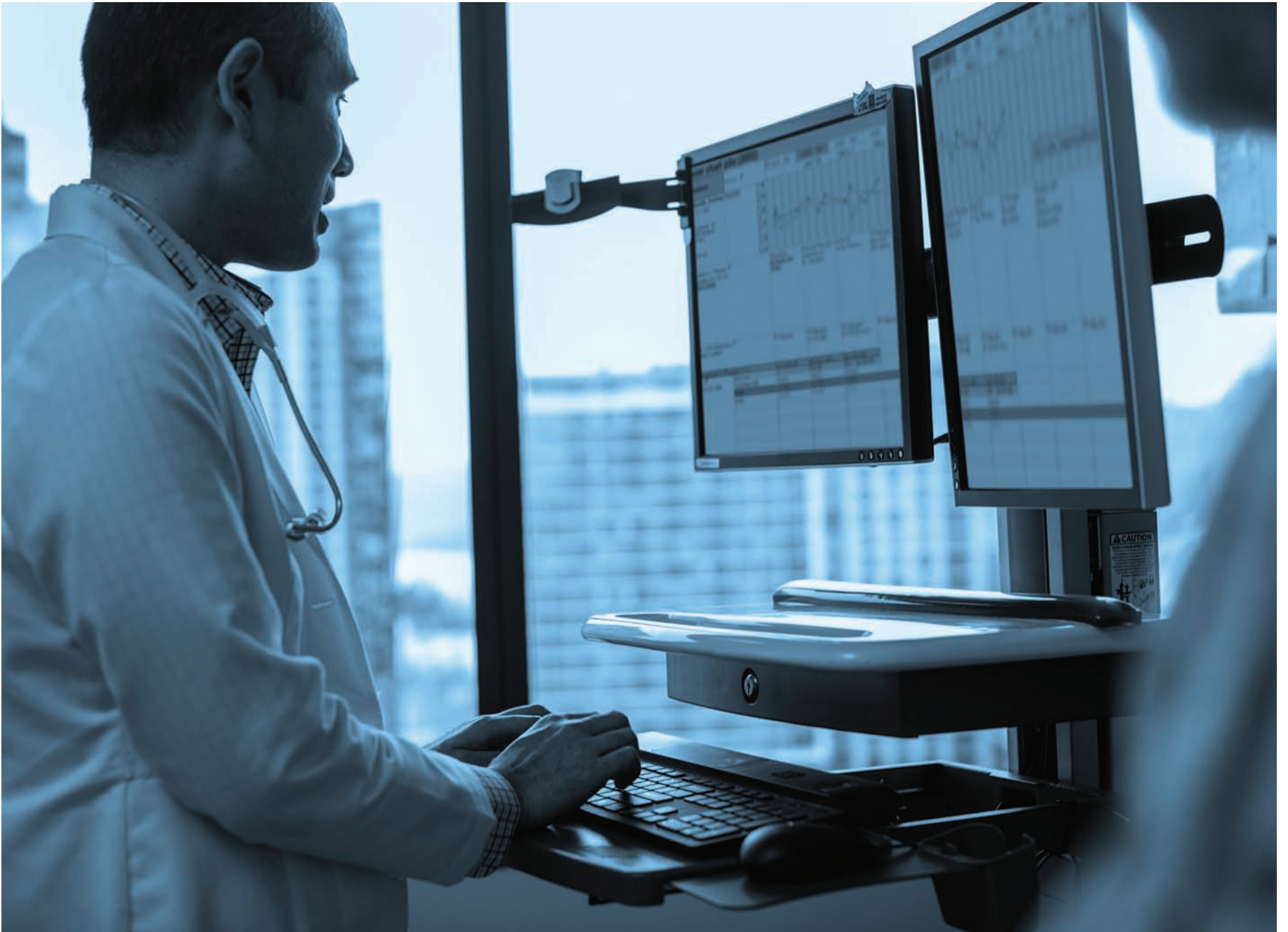
However, for administration, business, and discussions among staff and clinicians, people are now using Teams over emails more and more. According to Lemonde, if there's a discussion about hospital programs or operations, clinicians are using Teams.

“On a smartphone, if you see a message come up on the Epic app, you know

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# Teledermatology comes of age via medical devices and secure iCloud

BY DR. BRUNO BATTISTINI  
AND DR. TREVOR CHAMPAGNE

**T**eledermatology is a subspecialty of dermatology that offers an effective way – at a distance from the patient – of addressing inflammatory skin conditions and life-threatening tumours of the skin. With COVID-19 restrictions and clinic closures, it becomes a necessity to transition to virtual care, eliminating the need for an in-person assessment.

However, consumer-facing apps assessing skin cancer risk are generally unproven and have poor performance. Most of them have not been adequately evaluated or regulated. Indeed, there are a number of new and existing platforms to transmit skin surface images taken by a cell-phone or digital camera to connect with specialists which are not PIPEDA compliant (<https://www.priv.gc.ca/en/privacy-topics/privacy-laws-in-canada/the-personal-information-protection-and-electronic-documents-act-pipeda/>) and put patients' privacy at risk.

To enable dermatologists to conduct a secure and qualifiable teledermatology consultation, particularly for lesions, you need high-quality imaging that is not affected by the light or angle of exposure and that can scan not only the surface of the skin, but deeper into the skin at various wavelengths to reveal pathological changes.

The compliant technology platform developed by MedX Health Corporation ([www.medxhealth.com](http://www.medxhealth.com)) is a two-part system that includes SIAscopy (Spectrophotometric Image Analysis), an advanced optical scanning technology, approved class II



Teledermatology is benefiting from new innovations, allowing lesions to be analyzed even more precisely.

medical device, here in Canada and in several other countries.

SIAscopy is a non-invasive scanning technique where a handheld device shines near infrared and visible spectra light through the skin (600-2000 nm). The image (surface to 2 mm deep) shows collagen and haemoglobin content of the papillary dermis, and melanin content of the epidermis and papillary dermis that can indicate pathological changes. The skin-contact surface view can be used for the analysis of many and various skin diseases (e.g., psoriasis, etc.).

The second part is cloud-based DermSecure. It is appropriate for widespread use and scalability, is hosted/served in Canada, and has been extensively audited by ISO and privacy certification committees.

It allows the patient's health information and images to be sent securely from an "ease of access" location to a trained dermatologist for assessment. The dermatologist receives an email notification that a new patient has been forwarded for assessment.

The dermatologist opens the patient's profile on his/her laptop and receives a high quality dermoscopic view of the patient's suspicious mole or lesion.

Ontario does have store-and-forward teledermatology platforms such as [www.otn.ca/providers/telederm/](http://www.otn.ca/providers/telederm/), a service of the Ontario eConsult Program, which is open, secure, with e-Consult fees for dermatologists. But it does not offer a solution for more in-depth assessment and documentation of skin lesions. Many other

Canadian provinces do not even have access to an appropriately vetted platform.

Don't expect "back to normal" after coronavirus. The pandemic has accelerated the transformation of healthcare, and there will be no "back to normal" when it is over. Responses will include adoption of a contemporary service mindset, technologies that allow remote work and monitoring, telehealth, predictive analytics, informational chatbots, and innovative care models.

Teledermatology is here to stay, and a safe and proper augmented tool like SIAscopy and DermSecure will contribute to a more rigorous and effective method of triage and first assessment network for dermatology referrals from family health teams considering wait-time referral to assess pigmented skin lesions, from emergency departments, and to aid the rapid discharge of patients with skin disease from hospital. Then, potential skin cancers, especially melanoma, will be dealt with at an early stage, more appropriately, discarding suspicious moles or lesions as benign (or vice-versa), freeing the remaining in-person resources for biopsy, excision, and ultimate management.

**Competing interests:** Both authors are members of MedX Medical Advisory Board and declare no financial gain. Provenance and peer review: Commissioned; not peer reviewed.

*Dr. Bruno Battistini is a Senior Consultant, Member of Scientific Advisory/Board of Directors, Chairperson and former National Co-Chair in Quebec and all of Canada. Dr. Trevor Champagne is an Assistant-Professor, Dermatology/Medicine, U of T and Toronto's Women's College Hospital, Clinician in Quality and Innovation, Division of Dermatology.*

## Canadian researchers apply AI to understand and control COVID-19

BY NORM TOLLINSKY

**A**rtificial intelligence, machine learning and natural language processing figure prominently in Canadian research efforts to understand and respond to the COVID-19 pandemic.

Among the 47 projects funded as part of a \$27 million investment by the federal government announced in March are initiatives to track the spread of the coronavirus around the world, determine the impact of the pandemic in less developed countries, and monitor people in home isolation.

Dr. Richard Lester, an infectious disease specialist and associate professor at the University of British Columbia, was funded to customize a digital virtual support tool for monitoring COVID-19 patients and contacts confined to their homes.

The WelTel Web app, a virtual care and patient engagement solution, was easily customized for COVID-19 and is available for use by public health authorities in Canada and around the world.

A proven technology trialed in Kenya

beginning in 2005 to monitor and support HIV patients, the WelTel app is currently being used by public health authorities in Rwanda to monitor COVID-19 patients and contacts in home isolation.

The system sends out a daily text message with the simple question, "How are you?"

"It's a powerful question because they can answer with anything that's meaningful to them. We use AI tools to interpret their responses," said Dr. Lester. "Another series of questions is triggered if they have a problem. The system triages them automatically and if their symptoms escalate, they are linked to care."

"It allows large numbers of people to be followed on home isolation. You simply register them and it automatically does the check-ins. Healthcare workers can monitor large numbers of patients from a dashboard. We estimate that as many as 100,000 patients can be tracked by just a few public health nurses."

Natural language processing is a key component of the solution.

"In the old days, we used to develop checklists and we would have to think ahead about what to ask to make it eas-

ier to sort the data, but today we have natural language processing that allows us to look at hundreds of thousands, even millions of conversations and draw out information from them."

Once deployed for the monitoring of COVID-19 patients, "we are going to learn a tremendous amount from doing

**WelTelWeb makes use of AI and natural language processing to monitor COVID patients in their own homes.**

some of the data science on the conversations collected.

"We know that the key to bending the epidemiological curve is social isolation and social distancing, but we really need interventions to support that," said Dr. Lester.

Infectious disease specialists Dr. Isaac Bogoch and Dr. Kamran Khan of Toronto-based BlueDot Inc. have been funded to harness tools using AI-driven web-based surveillance coupled with real-time human mobility data to pre-

dict where COVID-19 will spread.

The BlueDot technology monitors "tens and tens of thousands of Web pages in more than 60 languages to look for sentinel words using machine learning and natural language processing," said Dr. Bogoch. The technology has been used in previous outbreaks to detect the occurrence and spread of Ebola, Zika Virus and lesser-known diseases such as Crimean-Congo Hemorrhagic Fever.

Data on airline volumes and destinations from the Montreal-based International Air Transport Association (IATA) and geo-referenced mobile device data are then used to predict the spread of the virus around the world.

"At the very beginning of this epidemic in January when there were only a handful of cases, we looked at all the flight patterns from Wuhan and used that to predict where this virus was going to go," said Dr. Bogoch. "The top locations were Thailand, Japan and Taiwan. And, lo and behold, a few days later, Japan reports a case, Taiwan reports a case and Thailand reports a case."

"Then we said let's look at a scenario

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# Social media prevents social isolation at Runnymede Healthcare Centre

BY MICHAEL ORESKOVICH

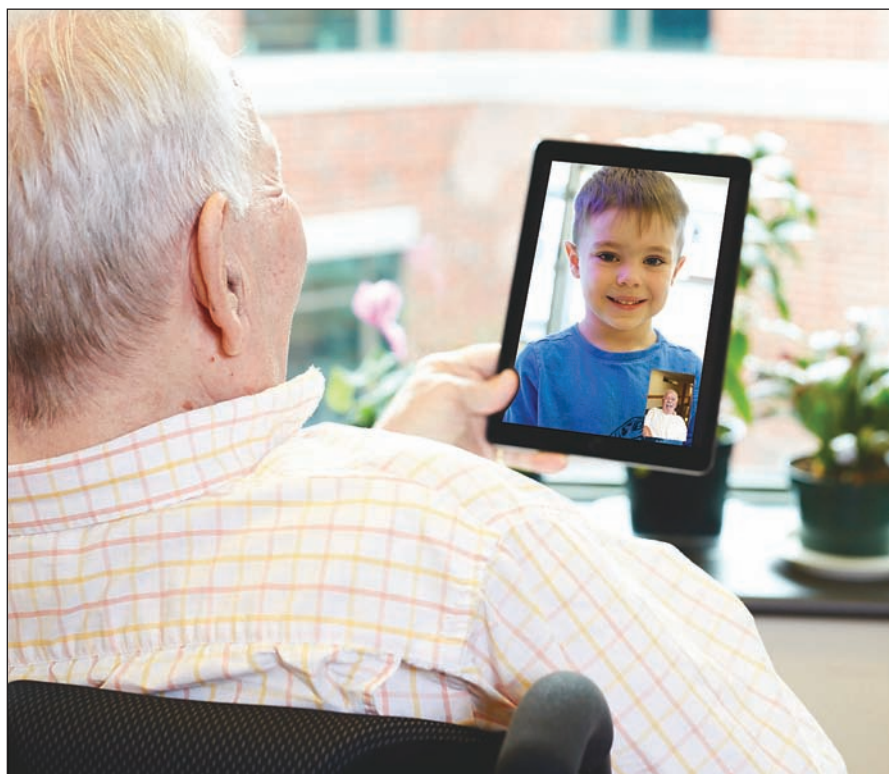
**T**ORONTO — Balancing patients' emotional needs and their safety has never been more challenging than during the COVID-19 crisis. Although social distancing is essential for preventing the spread of infection, it also has the potential to make patients feel alone and isolated at a vulnerable time.

By rethinking how it delivers programs and using technology in innovative ways, Runnymede Healthcare Centre, a 206-bed complex care and rehab facility, ensures patients are safe during their hospital stay, without sacrificing the patient experience.

Starting in February, measures were in place at the hospital to protect patients and staff from the spread of COVID-19, but these escalated dramatically when the pandemic was declared. All visiting was immediately suspended and large group activities were put to a stop. The measures were essential to take, but they removed key sources of support for patients.

"The limits on patients' social interactions are necessary, but they could also negatively impact their quality of life or even affect their therapy," said Sarah King, Runnymede's director of client relations and community engagement. "We recognized that action was needed to maintain patients' connections with others – it was a priority for us to ensure they weren't isolated in their rooms."

One way Runnymede's activation team responded was by making tablet devices available to patients, enabling face-to-face video chats with loved ones while visiting



restrictions are in effect. In addition to helping patients stay connected, they also alleviate anxieties felt by families and loved ones who desperately want to provide their support.

"The devices are in non-stop use for video chats," said King. "To meet the high demand, we had to double the number of tablets we have at the hospital ever since we suspended visiting."

There are currently eight tablets being shared, with more than 50 videoconferencing sessions held each day. Members of the activation therapy team help patients with the virtual visits, enabling patients to keep in touch with loved ones.

FaceTime, Skype and WhatsApp are the most popular applications.

Since the devices are handled by multiple patients over the course of a day, they

are cleaned between each use. The devices are kept in protective enclosures that are designed to withstand regular cleaning with disinfectants.

With safety modifications in place, the hospital continues to run its activation programs to the fullest extent possible. Sessions during the pandemic occur in smaller settings, with team members ensuring participants are kept a safe distance apart. Celebrations that normally would have been hospital-wide have been converted to floor-based events involving smaller groups.

"In some cases, we incorporate the tablet devices into our activation programming," said King. "For example, some patients are enjoying virtual tours in place of our regular out trips; others are taking advantage of streaming yoga classes; and those who usually attend our religious gatherings can continue to have their spiritual needs met with online church services."

Patient safety has never been in sharper focus at Runnymede than during the COVID-19 crisis, but the hospital is ensuring it upholds its commitment to an outstanding patient experience.

"At a time like this, helping patients connect with loved ones and others in the hospital is crucial for preventing them from feeling disengaged or slipping into depression," said King. "Through the actions we've taken, we're showing that social distancing doesn't mean social isolation."

*Michael Oreskovich is a communications specialist at Runnymede Healthcare Centre.*

## App helps hospitals find equipment and personnel in COVID-19 crisis

BY JERRY ZEIDENBERG

**V**ANCOUVER — Thrive Health has developed an app for tracking equipment, clinicians and staff in hospitals that's now being used in 39 of British Columbia's hospitals, across three health authorities. The COVID-19 Critical Care Resource Management app allows front-line personnel – from doctors and nurses to administrators – to rapidly locate gear such as gowns, gloves or ventilators on the spur of the moment.

In the midst of the COVID-19 crisis, with situations quickly changing, the ability to locate and call on these resources can be lifesaving – especially when it comes to personal protective equipment (PPE).

And while many hospitals have traditional inventory systems and HR applications, they're usually "back-end" solutions that are operated away from the action. By contrast, the new COVID-19 Critical Care Resource Management platform is available and useful to those fighting the disease on the front lines, and who many need equipment or staff help immediately.

"We're giving people a quick and centralized view of what they have and where

it is," said David Helliwell. "It also lets them allocate it with the highest priority."

Helliwell said getting the information into the system for each hospital takes only a few days. It's then available to front-line care-givers and administrators on their phones and tablets, and works just like an app.

Not only can sources of supplies be updated quickly – including donations of PPE from local businesses. So can non-traditional sources of personnel, such as medical students, retired doctors and nurses, who are coming to the aid of hospitals.

Thrive previously created a COVID-19 app that is designed for the "consumer" market. It enables users to monitor and gauge their symptoms – such as temperature and coughing – showing whether they need further medical attention. As well, it provides information about the coronavirus and provides guidelines from the federal and provincial governments.

The consumer COVID-19 app was made available in March and quickly became the top medical app in the Apple iStore and on Google Play. Helliwell said it has been downloaded and used by 7 million people.

That app also ties into public health

agencies and is giving the Public Health Agency of Canada another way to monitor the progress of COVID-19 across the country.

To create the Critical Care Resource Management application, Thrive Health partnered with Traction on Demand, Salesforce and the government of British Columbia. Helliwell noted that Traction on Demand is a large, Vancouver software company with 1,000 employees and a great amount of expertise in Salesforce.

Together, the partners produced the app within a matter of weeks. As Helli-

**Thrive's app allows frontline healthcare professionals to find the equipment and human resources they need.**

well explains, Salesforce is a good choice for the platform because the company's software has strengths in inventory management and transactions.

It is also a cloud application, making it easy to use across organizations.

For its part, Salesforce is donating licences for several months, making the app cost-effective for the users. Thrive Health is doing this, too. "We really

wanted to get it out there," said Helliwell. "We're interested in saving lives."

The app also gives regions a view of how resources are being used in the hospitals. Fraser Health, the Provincial Health Services Authority and Vancouver Coastal Health are all using it in this way, to help keep tabs on equipment and resources in hospitals.

Helliwell observed that the Critical Care Resource Management app is geared towards emergencies and disasters. And while it is proving to be useful in the current COVID-19 crisis, he says it will be equally helpful in the future. "There are likely to be other disasters, from earthquakes to fires and floods, where it will be very useful."

While it is being quickly adopted by hospitals in BC, the app is also available to medical centres across Canada. What's more, Salesforce is about to start distributing it in the United States.

For its part, Thrive Health has experience in building apps for pre-surgical planning, to prepare patients for their procedures. It also creates apps for medical specialists. Helliwell said this background allowed it to design and turn out the COVID-19 consumer and hospital apps in short order. "For us, it didn't require a lot of re-tooling," he said.





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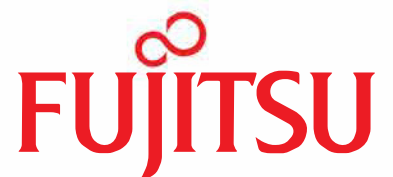


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# Organizations band together to step-up the production of ventilators

BY JERRY ZEIDENBERG

An incredible effort to increase the supply of ventilators has been unleashed by governments, private companies and academics across Canada. The machines are essential for saving the

lives of patients who are hardest-hit by COVID-19.

Automakers, in particular, have stepped into the fray, saying they're used to churning out parts with precision accuracy. They're especially glad to take on the work as their assembly lines have been idled by

the global recession. GM, Ford and Tesla have all announced initiatives to help produce ventilators.

So have auto parts suppliers, such as Canadian companies Linamar and Magna.

The government of Ontario, for example, placed an order for 10,000 ventilators

with a small company – O-Two Medical Technologies of Brampton, Ont. That's an extraordinary request, since there's an estimated 5,000 ventilators currently in use at hospitals across Canada. To ramp up, and hopefully reach those numbers within a few months, O-Two has partnered with auto parts giants Linamar, of Guelph, Ont., along with Magna International Inc., Martinrea International and ABC Technologies.

The company is now so busy that its website states it's not taking calls from the media. But Linamar CEO Linda Hasenfratz recently told the press that the company never envisioned itself getting so heavily into the medical device sector, although it recently made some investments in medical robotics. Nevertheless, she said the company is used to producing precision parts and organizing the assembly and shipping of components.

"We're used to highly precise manufacturing with very tight tolerances ... and very high standards in terms of cleanliness," she said.

Indeed, it's possible that each of the auto parts companies in the group will produce components and ship them to O-Two for final assembly and testing.

Of course, the work by O-Two and its partners is only the tip of iceberg when it comes to revved-up production of ventilators.

It's not just automakers who are entering the battle and producing ventilators. CAE, which makes sophisticated aviation flight simulators – and also medical simulators using high-tech manikins – announced that it is also going to produce 10,000 ventilators after a team of its engineers designed a prototype in just 11 days.

The company told the National Post newspaper that the new ventilator has 100 parts and will cost about \$5,000. CAE is scaling up its production line to start assembling them, and expects to turn out a ventilator every five hours.

Traditional medical device manufacturers have bumped up production, too. At the end of March, Medtronic announced that it is sharing the design specs and software codes for one of its ventilators, the Puritan Bennett 560 (PB 560). The move was made so that others can manufacture devices to increase the global supply of ventilators and combat fatalities from COVID-19.

In just two days, over 500 organizations in Canada downloaded the Open IP for the BP560, Medtronic said.

Medtronic is one of the world's biggest producers of ventilators and has dramatically stepped up production. But its managers realized that their redoubled efforts – along with those of its industry peers – may not result in enough machines to meet demand.

For that reason, Medtronic and other ventilator makers are reaching out to a host of industries, entrepreneurs and academics to help boost production. "Our efforts are collaborative," said Neil Fraser, president of Medtronic Canada. "We're working in a spirit of humanitarianism."

In one instance, automaker Tesla announced that it would partner with Medtronic to produce more ventilators. A

CONTINUED ON PAGE 12

## dapasoft

[www.dapasoft.com/covid-19-services](http://www.dapasoft.com/covid-19-services)

## VIRTUAL WALK-IN CLINIC APP FOR COVID-19 ASSESSMENT

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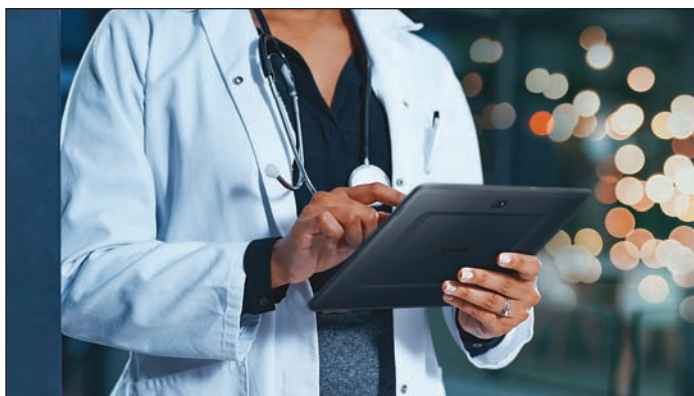


# Tough solutions to aid our tougher frontline healthcare workers

How the latest in rugged mobile solutions from Samsung help solve most common challenges for medical professionals.

**H**ealthcare professionals are always on the move. Whether it's at a busy hospital, clinic, or long-term care facility, doctors, nurses and allied professionals need solid, secure electronic devices they can rely on. Samsung understands the challenges these healthcare workers face, and as a result have designed truly rugged and more secure mobile devices that are optimized for use in healthcare's fast-paced and messy environment.

"At Samsung Canada, we understand how vital it can be to choose the right technology in the healthcare sector," says Jennifer Safruk, Vice President, Mobile Division, Samsung Canada. "Facing uncertainty on a daily basis, we appreciate how essential ruggedized devices can be to address the unique needs of medical professionals everywhere."



## Securing confidential data

As expected, healthcare professionals deal with extremely confidential medical data on a regular basis and need to ensure any transmission of data is kept safe and secure. All Galaxy rugged mobile solutions are equipped with built-in, defence-grade security, Samsung Knox Security. The Knox Platform offers multilayered security starting at the chip, offering added peace of mind to healthcare workers dealing with confidential

medical information.

An additional layer of security is embedded in both the Tab Active Pro and XCover Pro, with facial or fingerprint recognition to unlock a device. This is particularly handy with medical staff who may rely on face recognition to quickly unlock devices with one hand or when wearing gloves.

In the off-chance that a device is stolen or goes missing – always a concern in healthcare – Knox Manage<sup>5</sup> is an added solution to help further protect confidential data. This added cloud-based EMM solution comes with an affordable license fee that allows remote access to devices, allowing the user to both receive support or wipe the device remotely when lost.

The Galaxy Tab Active Pro and Galaxy XCover Pro are enterprise-level devices that are perfect for healthcare. They're powerful, ruggedized and more secure. Everything that busy healthcare teams need.

The Galaxy Tab Active Pro and XCover Pro are available at the Samsung Experience Stores, or online at [shop.samsung.com/ca/samsungsmb](http://shop.samsung.com/ca/samsungsmb). Corporate orders can be placed through distributor/reseller channels and the online SMB store. For more information and full product specifications, please visit the product pages:

[www.samsung.com/ca/business/](http://www.samsung.com/ca/business/)

**As technology continues to develop, medical professionals need to stay ahead and ensure they're equipped with the right devices to meet their unique needs.**

## Sanitation and durability above all else

Hospitals require sanitary environments at all times, for their patients and staff – devices are no exception. The Galaxy Tab Active Pro and Galaxy XCover Pro are the latest in rugged technology from Samsung and, unlike most mobile devices, are tested against typical sanitizing solutions.<sup>1</sup>

Both rugged devices hold an impressive IP68 rating<sup>2</sup> and have been tested against military specifications.<sup>3</sup> This means these truly durable mobile solutions are better protected from dirt, dust and wetness and accidents when potentially dropped during insanely busy, overcrowded shifts.

## Long days and longer nights

Another reality of frontline healthcare workers are the incredibly long, grueling shifts. In order to get through them successfully, medical staff require technology that lasts as long as they do (if not longer).

Both the Tab Active Pro and the XCover Pro are equipped with long-lasting, removable batteries that include POGO pins, letting users conveniently connect and charge the device and/or compatible third-party accessories. The Tab Active Pro offers up to 15 hours of video playback,<sup>4</sup> ensuring the device withstands a full shift – even when outlets are few and far between. With the XCover Pro, its replaceable battery offers faster charging, allowing healthcare staff to keep their day going without unnecessary interruption.

## Tools to evolve alongside ever-changing medicine

As technology continues to develop, medical professionals need to stay ahead and ensure they're equipped with the right devices to meet their unique needs. Pagers remain an essential tool for internal communications, while digital systems are required to review medical records and take notes electronically.

The XCover Pro offers incredible capabilities for more secure, instant communications, allowing clinicians to contact each other easily and with a higher degree of privacy. Using two programmable buttons, it supports features such as Push-to-Talk and Walkie Talkie integrations, elevating doctors and nurses' internal communications. The Tab Active Pro is equipped with the S Pen, allowing for easy note taking while monitoring electronic health records or forms while on the go.

1. Based on internal testing.
2. IP68 is based on test conditions for submersion in up to 1.5 meters of freshwater for up to 30 minutes. Not advised for beach or pool use. Water or dust damage not covered by warranty.
3. This device passed U.S. military specification (MIL-STD-810G) testing against a subset of 21 specific environmental conditions, including temperature, dust, shock/vibration, and low pressure/high altitude. Real world usage varies from the specific environmental conditions used in MIL-STD-810G testing. Samsung does not guarantee device performance in all extreme conditions. Please see the inbox Quick Sales Guide.
4. Based on average battery life under typical usage conditions. Average expected performance based on typical use. Actual battery life depends on factors such as network, features selected, frequency of calls, and voice, data, and other application-usage patterns. Results may vary.
5. Sold separately.

## Ventilator production

CONTINUED FROM PAGE 10

Tesla factory that was making solar panels in Buffalo, N.Y., may soon be turning out ventilators in collaboration with Medtronic.

In Canada, a 2009 survey led by Sunnybrook Health Sciences intensivist Dr. Robert Fowler concluded there were approximately

5,000 ventilators spread across 286 hospitals in Canada.

When patients are suffering from severe cases of COVID-19, the functioning of their lungs is impaired and they often need ventilation. A recent estimate by Globe and Mail writer André Picard suggested that 2 percent of COVID-19 patients need to be put on a ventilator. Other sources have said as many as 5 percent will need ventilation.

If the volume of cases explodes, as in Italy or New York State, the supply of ventilators could be easily outstripped by demand. Moreover, COVID-19 patients tend to stay on the ventilators for weeks rather than the mere days that are normal for surgical step-down patients and others.

"The way COVID-19 manifests itself in most critically ill patients is complex," said Patrick Nellis, marketing manager, Respira-

tory Interventions, at Medtronic. "They may need to be on a ventilator for a long time."

Already, there is a real shortage of ventilators in the United States and abroad, and companies like Medtronic have been rallying to produce more. Here are some recent efforts announced in Canada and internationally:

- Canada's advanced manufacturing super-cluster – called NGen and based in Hamilton, Ont. – has selected a ventilator created by Winnipeg's Cerebra Health Inc., as a device to be further developed for use combatting the COVID-19 epidemic in Canada. The Next Generation Manufacturing Super-cluster (NGen) is dedicating \$50 million to get companies up to speed on producing the medical equipment needed to fight COVID-19 in Canada, including virus screening kits, gloves and gowns, cleaning equipment and ventilators. Cerebra's Winnipeg Ventilator is now being re-designed for use in the COVID-19 pandemic, in alliance with companies across Canada. The design work is being led by Starfish Medical, a Victoria company that specializes in the design of medical equipment.

- GM/Ventronic. GM said it is working "day and night" to convert an auto parts plant in Kokomo, Indiana to the production of Ventec VOCSN critical care ventilators. Shipments were expected to start later in April.

- Ford Motor Co. plans to build simple medical ventilators at a components plant in Michigan and says it hopes to produce 50,000 of the devices over the next three months. Production was slated to start in late April at Ford's Rawsonville Components Plant in Ypsilanti. Output will ramp up over time, with the bulk of the 50,000 devices being built in June. Ford, working in collaboration with GE Healthcare, will be using an existing design from a small medical technology company called Airon. Ford is also, separately, working with GE Health to ramp up production of a more complex, fully featured ventilator.

- The Montreal General Hospital Foundation, in collaboration with the Research Institute of the McGill University Health Centre (RI-MUHC), launched a global innovation challenge called Code Life, backed by a prize of \$200,000. They are calling for teams to design a simple, low-cost, easy-to-manufacture and easy-to-maintain ventilator which could be deployed anywhere needed to save lives. An astonishing 2,639 participants from 94 countries around the world responded to the call. The top three designs will be available for free download to anyone who needs them, Code Life said, saving lives immediately.

- In one response to this challenge, engineers at the Queen's Faculty of Engineering and Applied Science Human Mobility Research centre and Ingenuity Labs have joined forces with Kingston Health Science's Centre (KHSC) to design a low-cost, and easy-to-manufacture ventilator that can be created and deployed anywhere around the world. The Queen's/KHSC team of 18 includes faculty members and students, as well as health professionals. The team is working on a design that uses Continuous Positive Airway Pressure (CPAP) technology in its design. These machines, which help healthy people with sleep apnea breathe more easily, have the potential to be modified to support or replace breathing for a coronavirus patient.



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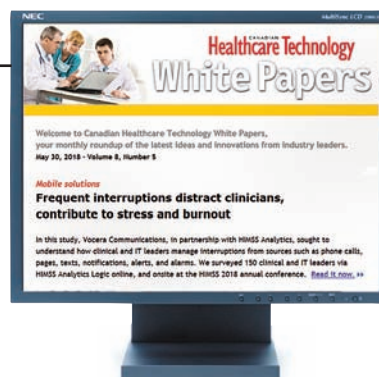
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# On the front lines: How healthcare IT helps fight COVID-19 in Canada

BY JOHN LEE-BARTLETT

**W**ith COVID-19 cases and related deaths increasing in Canada, Allscripts understands the pressures the pandemic is putting on healthcare organizations across the country. We remain a trusted partner to help navigate these challenges and keep Canadian patients healthy and safe as policy and guidance rolls out from Public Health agencies and governments around the globe.

We have processes in place to ensure support and services teams remain staffed to help address all our clients' needs during this time. Allscripts resources are equipped to work remotely and our teams are continuing to support customers here in Canada and worldwide.

Our global approach has enabled us to pivot our resources as needed to adapt to the evolving crisis. Here are just a few of the solutions launched to support healthcare providers in Canada and across the globe in fighting COVID-19, including updated workflows for non-COVID-19 patients.

- **Virtual Health.** During the pandemic, it's critical for organizations to have a virtual health strategy, both to strengthen and broaden their reach into the community, and to safeguard their patients and staff. Our clients can now turn any scheduled appointment into a virtual visit. In addition to virtual visits, Allscripts launched Allscripts Virtual Triage, which addresses immediate concerns surrounding the identification and fast treatment of high-risk patients in accordance with Public Health-defined screening measurements. Allscripts Virtual Triage provides a com-



prehensive digital “front door” to organizations focused on virtually identifying, managing and triaging high-risk patients as efficiently as possible. Developed to be implemented within a few days, this triage solution addresses immediate concerns surrounding the identification and quick treatment of specific diseases or conditions.

- **Hospitals on the front lines.** A new set of COVID-19 solutions for hospitals and health systems is one way, as Allscripts stands solidly behind clinicians on the front-lines. To respond to the worldwide pandemic, Allscripts established an internal COVID-19 task force of clinicians and technical experts who prioritized “need-to-have” solutions and services that can immediately help when and where health-

care organizations need them most right now. Hospitals and health systems worldwide face many new challenges now. Standard operating procedures are being quickly revised and new standards are being created to face the pandemic head-on.

- **Caregiver and patient safety.** Keeping hospital staff safe and patients well during the coronavirus disease pandemic is our top priority. Our team joins our clients in working hard to relieve the pressures the spread of COVID-19 is putting on healthcare organizations everywhere. Allscripts is providing a series of COVID-19 workflows that addresses disease-specific needs within the Sunrise EHR. These workflows include documentation for screening, Tracking Board Safety icons, Expert Rules and Patient Header updates for surveillance, and associ-

ated decision support for tracking patient condition. These updates offer workflow guidance for identifying and tracking patients with confirmed and suspected COVID-19. Additionally, Allscripts Analytics Clinical Performance Management generates real-time dashboards, patient identification and surveillance reporting to closely monitor COVID-19 patients. This helps clinicians leverage their organization's existing solution to broaden scope of research to include many different domains like order sets, alerting and documentation.

- **Connectivity and interoperability.** Clients leveraging Allscripts dbMotion Solution can connect clinical information from disparate systems and make it available to clinicians at the point-of-care. This saves time as clinicians can quickly identify and track COVID-19 positive patients through a new visualization dashboard. Israel is an excellent example of the benefits of a connected community of health. There, health data from the country's entire 8.7 million population is connected, no matter the EHR provider or care setting.

- **Our Commitment.** Allscripts is fully committed to partnership with our clients in Canada and across the world. We look forward to welcoming our 2020 Interns from Dalhousie University for a fourth year. This year is even more special as we have launched the internship virtually to ensure continuity of the education program. Together, we will get through this challenging period. We know our clients are depending on us to support them in this fight, and we will continue our commitment 24x7.

*John Lee-Bartlett is Managing Director, Allscripts Canada.*

## Ottawa Hospital plans to launch a “virtual hospital”

BY JERRY ZEIDENBERG

**A**s part of an ambitious effort to reduce hallway medicine, The Ottawa Hospital intends to launch a “virtual hospital” concept later this year. Rather than treating all patients in the Ottawa Hospital's facilities, many of them could receive care in their homes.

To do this, the hospital is working with partners like visiting nurses, technology companies that can supply remote monitoring solutions, and doctors who are willing and able to supervise the patients, not just from their offices or the hospital floor, but from their homes, too.

Interestingly, it's also working on the project with an innovative, Israeli software company called MDClone, and with other hospitals that are users of the MDClone solution.

MDClone is a software platform that can quickly sift through giant databases to extract data and to answer clinical questions. Users can rapidly access the data they need, link it, and create spreadsheet-like “if/then” scenarios that show different outcomes by changing the inputs.

Typically, obtaining information from

data warehouses has been so difficult that data experts have been employed just for this purpose. But due to the demand for data, and the shortage of these experts, clinicians and other users seeking answers can wait weeks or even longer.

“Getting the data to answer clinical questions usually takes weeks or months,” commented Ziv Ofek, founder and CEO of MDClone. “We've come up with a new paradigm. Any user can ask any question, and get answers in minutes, not months.”

It's this fast and easy-to-use system that's enabling The Ottawa Hospital to identify patients who could be treated at home, possibly better than they would be inside a hospital.

“You don't want patients who really need the ICU to be sent home,” said Dr. Alan Forster, vice president of innovation and quality at the Ottawa Hospital. “But patients who would be treated with antibiotics or IV therapies, or oxygen, could be kept at home and closely monitored.”

Indeed, he noted that many of these patients would prefer being at home to staying in a hospital, especially if they could interact with their doctors via

videoconferencing from their homes.

To identify which patients would fare best in the “virtual hospital”, and to get a grip on the potential costs and outcomes, the Ottawa Hospital is analyzing the concept by using MDClone. Moreover, it's working on the project in conjunction with Sheba Medical Center, the largest hospital in Israel, and two other organiza-

**The hospital is making use of MDClone to help determine which patients could be best supported at home.**

tions that couldn't yet be named as contracts were just about to be concluded.

Dr. Forster said it's difficult to put an exact timeline on when the virtual hospital will be launched, but he doesn't think it will take long. “We can make it happen fairly quickly,” he asserted. “I'm expecting it will start in the fall.”

With a focus on ending “hallway medicine”, The Ottawa Hospital is mustering its creative forces in numerous ways – the virtual hospital is only one of them. In

each of the projects, MDClone will be used as an important analytical tool to determine the best ways of proceeding.

To start, the hospital is giving access to MDClone to a “blue-ribbon team” of 10 researchers, who will focus on a series of top-priority projects. However, it also plans to open the system to users across the organization, so that all staff and clinicians can use it to solve problems, answer questions and come up with better ways of doing things.

Dr. Forster said that everyone in the hospital has good ideas, including doctors and nurses and housekeeping staff. They could all produce innovations using MDClone.

Other projects that are in the works, using MDClone, include an effort to determine the best post-op treatments for frail seniors. The question is, what are the best care plans and therapies for frail patients who have just come out of the OR, to get them back home quickly and safely?

Another project will look at identifying which patients are most likely to be re-admitted to hospital after discharge, and what steps should be taken to reduce the chances of this happening.

# New coils make MRI scans more comfortable for cancer patients

It's estimated there will be 18.1 million new cancer cases diagnosed globally this year. Many of these patients will undergo a Magnetic Resonance Imaging (MRI) exam as part of their diagnosis, to assess whether the cancer has spread, or to plan treatments like surgery or radiotherapy.

But these exams can be uncomfortable due to the heavy "radiofrequency coils" that MR specialists use to specifically study different anatomic regions. These coils act like an antenna picking up signals from a patient's body and converting them to images. But they're usually bulky and uncomfortable for patients and technologists alike.

"When cancer has metastasized, patients are usually in quite a bit of pain," says Jill Whiteley-Lamb, MRI Senior Technologist at Juravinski Hospital in Hamilton, Ont. "When we're imaging liver metastasis in the abdomen, some patients just couldn't even tolerate the weight of the old coil."

Now the hospital uses AIR Coils, a new coil technology that conforms to the human body just like a comfortable blanket. The hospital started using the AIR Coils with its GE SIGNA Architect MRI scanner in April 2019.

AIR Coils are more comfortable for patients, yet still deliver the high-quality images that radiologists need to diagnose and monitor cancer. They use innovative conductor material designed for ultra-flexibility, and each coil is lightweight and versatile enough to closely wrap around patients for incredible image quality.

"I can definitely say that the patients are much more comfortable," says Whiteley-Lamb. "The AIR Coil is so much lighter



**AIR Coils enable a patient, who was unable to lie on her back, to lie on her side while technologist Faye Gils obtains images of her spine at the Juravinski Hospital, part of Hamilton Health Sciences.**

and it's so much more flexible that we are able to adapt to our patients' body limitations. A lot of our patients say the AIR Coil is a lot easier to tolerate because it's not as heavy and a lot more comfortable."

The new coil design is 60 percent lighter than conventional coils and its flexible design makes it easier for the technologist to position it while conforming to a variety of patient sizes.

AIR Coil technology is also leveraged in the 48-channel head coil, with a design that fits 99.9 percent of patients, from children to professional athletes.

This innovative coil design allows each coil element to be closer to the patient's anatomy for improved signal reception (also called SNR), depth of penetration and image quality.

"These coils have a wide coverage and very good homogeneity, so we obtain excellent studies with very good signal and fat suppression," said Dr. Vicente Martinez de Vega, head of Diagnostic Imaging Service at Hospital Universitario Quirónsalud in Madrid, Spain. His MR department started using AIR Coils in February 2019 for all abdomen and pelvis exams, with a focus on oncology care and "total body" oncological exams.

"For us, the most important thing is to have a high-resolution image, as it allows more reliable diagnosis. We like these coils very much, especially when scanning some areas of the body that are usually difficult to image homogeneously. The improvement in the image quality can lead to a better diagnosis," he said.

Technologists and physicians at the Ju-

ravinski Hospital, in Hamilton, Ont., also prefer to work with the AIR Coils. "The AIR Coil is definitely more user-friendly because it is so much lighter and more flexible than the previous coils. That's an improvement because of the frequency that we change the coils between patients," says Whiteley-Lamb.

Both hospitals are using the coils beyond cancer imaging. Hospital Universitario Quirónsalud uses it to image the thorax and the brachial plexus, and for exams of the hips, legs, thighs and elbows. Juravinski Hospital performs a lot of prostate, abdominal, pelvic and MSK imaging, which is also made easier with AIR Coils.

"One of the struggles we have had before was optimizing our diffusion sequence. Since we've had the AIR Coils, we can see such a big difference in the quality of the diffusion sequence. They're free of artifact, the signal is great and we're able to match up our slices with the diffusion-weighted images.

That has been a huge improvement," said Dr. Scott Tsai, radiologist and MR department head at Juravinski Hospital.

Brain and spinal imaging is also clearer with the 48 channel head coil. "Before, it was a lot more distortion in the anterior region of the frontal lobes and that has also improved quite a bit. That has improved as well, with a lot less artifact and distortion," said Dr. Tsai.

Although he calls AIR Coils a pioneering technology, Dr. Martinez de Vega sees it soon becoming the industry standard. "GE Healthcare has been the pioneer in light, soft and adaptable coils, but I'm sure it will become a standard and will be offered widely."

## Canadian crowdsourcing site launched to speed COVID-19 clinical trials

Dr. Ramy Saleh says it all started with some conversations he was having with COVID-19 patients he was treating at Montreal's McGill University Health Centre.

"They would come to me and ask if there are any trials available that they can join to treat COVID-19," said Dr. Saleh. "We do have trials with specific criteria, and if they are not eligible for those trials, the next question was always 'well, is there another trial I could join?' and that got me thinking – there has to be a better way of doing this."

As a medical oncologist, Dr. Saleh has worked on clinical trials for cancer treatments for many years and knows firsthand that recruiting participants is a tough challenge, even at the best of times. With the added pressure of COVID-19 on the healthcare system in Canada, the challenge was even greater.

Dr. Saleh was also aware of more than a dozen approved clinical trials across Canada that were actively looking for thousands of patients. The trials he was taking part in were having some difficulty finding the right patients; at the same time, he knew that patients were looking to join trials but didn't know

who to ask or where to go.

At that moment, the idea to crowdsource patient recruitment was born.

In a matter of weeks, Covidtrials.ca came to life. Dr. Saleh worked with Think Research, a Canadian health technology and clinical content company, to design a hub to simplify the patient recruitment process.

Prospective volunteers can visit the CovidTrials.ca website and fill out an online registration form with their information. That data is then shared securely with the appropriate research teams, who can then contact the person directly if their profile matches the needs of the trial.

All of the participant information is stored on a secure cloud platform, housed in Canada. The portal's governance is overseen by a medical leadership group made up of physicians from across the country.

"Our amazing Canadian researchers are working tirelessly right now on such an important mission. When it comes to logistics – well, that's where Canadian health technology innovators can help," says Think Research CEO, Sachin Aggarwal. "We're doing everything we can to accelerate the research by facilitating the recruitment process."

Eighteen clinical trials have so far been approved by Health Canada to test potential COVID-19 treatments and more are likely to begin in the days and weeks ahead. Different trials require different volunteers – that may be a patient who has been recently exposed to COVID-19 but shows no symptoms, a person who is dealing with the disease at home, someone who has recovered from the illness, or people who want to volunteer for vaccine treatments when they become available.

One of the trials working with Covidtrials.ca is a study testing an experimen-

**Prospective volunteers can visit the CovidTrials.ca website and fill out an online registration form.**

tal treatment that involves injecting antibody-rich plasma from patients who have recovered from the virus into those who are still infected. It's looking to recruit 1,000 participants.

Already, several Canadian clinical trials have expressed their support for Covidtrials.ca, including active studies in Ontario, Quebec, Alberta and Manitoba.

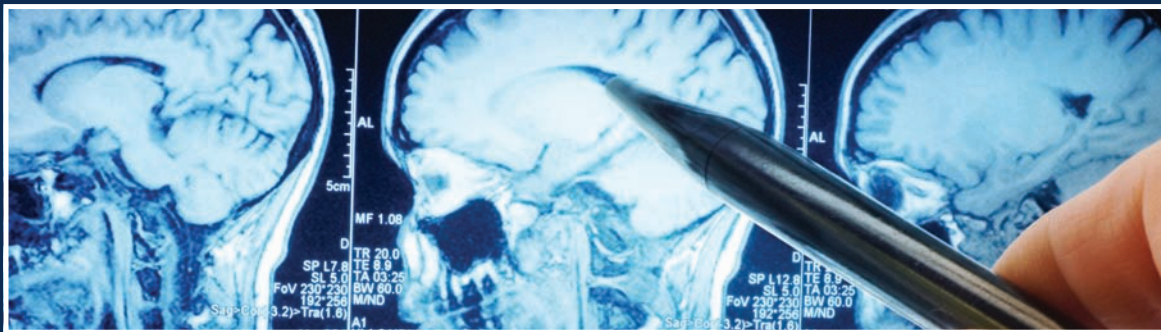
"Canada has some of the brightest people in the world working to find treatments and a vaccine for COVID-19 and now is not the time to be working in silos," says Dr. Lauren Kelly from the University of Manitoba. "Connecting patients and researchers quickly helps to answer questions faster around what works best."

The hope is that facilitating the connection between potential volunteers and clinical trials will help accelerate clinical research efforts. Dr. Saleh is encouraged by the response the website has seen so far from both researchers and Canadians who want to do their part by contributing to Canadian research.

"I think there is an understanding that without a viable treatment or vaccine, COVID-19 is going to continue to be a threat to our society and so everyone wants to do what they can to get there," said Dr. Saleh. "It's not going to happen overnight, but mitigating the toll of COVID-19 demands solutions that require us to work together and be more connected than ever before."

The crowdsourcing website is also asking researchers who are planning trials that have yet to be approved to contact them through Covidtrials.ca with details about their studies.





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## **ABOUT THE CONFERENCE**

**Medical Imaging Informatics and Teleradiology (MIIT)** focuses on emerging technologies and practices for acquiring, processing, managing, accessing, and sharing medical images, along with topics driving changes in relevant policies within Canada.

Due to global concerns related to COVID-19 Coronavirus, we have made the decision to not proceed with the planned in-person meeting, but to host MIIT 2020 as a virtual meeting.

# How digital health surveillance systems will save future generations

A lesson to be learned from the COVID-19 pandemic.

BY DR. SUNNY MALHOTRA

**T**he COVID-19 pandemic has brought about new challenges in the healthcare sector. With increasing demands and scarce supplies, the healthcare system is overwhelmed and faces resource allocation burdens.

The havoc created by the ongoing crisis exposes the crucial need of a surveillance system that can monitor and report critical information about pandemics that allows for quick and efficient responses on both local and global levels.

HCA Healthcare, a Nashville, Tenn.-based provider of healthcare services with 185 hospitals, has partnered with Google Cloud and SADA Systems Inc. to introduce a portal that enables healthcare providers across the United States to input information into a single platform designed to showcase a complete display of the ongoing COVID-19 pandemic. HCA has offered to share the portal with other hospitals across the United States.

Named COVID-19 National Response Portal, this platform system allows hospitals across the nation to share necessary information such as ICU bed and ventilator supply and utilization, the number of current COVID-19 patients, pending test results, and recovered patients that were discharged on a daily basis.

Sharing this information can implement quick response and utilization of resources in areas that face imminent threats of a possible outbreak.

The portal can synthesize and pool data from publicly available datasets such as traffic and mobility patterns, and local orders for shelter-in-place policies, to predict how the spread of COVID-19 may impact communities.

More accurate and timely data insights can be provided to hospitals through this platform, allowing them the opportunity to better prepare for pandemics.

The COVID-19 National Response Portal can aid in monitoring infectious diseases both at a local and national level so that hospitals are better prepared to

**Google, SADA Systems and HCA Healthcare are partnering to create a system that shows details of COVID-19 activity in hospitals nation-wide.**

handle future pandemics efficiently and effectively with the proper resources.

One such portal is BlueDot, an artificial intelligence health monitoring platform created in Toronto. BlueDot is an outbreak risk program designed to mitigate exposure to infectious diseases by compiling data from various datasets to detect outbreaks.

BlueDot continuously analyzes over 100 data sets to monitor diseases internationally and predict their transmission. It allows the mobilization of responses effi-

**Dr. Sunny Malhotra is a US trained sports cardiologist working in New York. He is an entrepreneur and health technology investor. He is the winner of the national Governor General's Caring Canadian Award 2015, NY Superdoctors Rising Stars 2018 and 2019.**

Twitter: @drsunnymalhotra



ciently and may offer similar results to that of the national response portal in the future.

DOMO, another intelligence cloud platform company, has mentioned creating coronavirus response tools that can allow local governments to assess predicted needs and resources to combat outbreaks.

DOMO compiles data from quantitative sources and cross-checks these data with WHO, CDC, Worldometer, Engima, and Johns Hopkins University to provide the most updated COVID-19 tracker possible. It provides surveillance on a county-level basis that includes stay-at-home orders and testing-by-state data statistics.

DOMO's response tools can allow local governments to gain insight on particular focal points to form critical decisions for use of resources such as the number of tests available, how many PPEs are available, and how many hotspots there may be for COVID-19.

Furthermore, DOMO allows healthcare organizations, grocers, logistics firms, and retailers to embed the tool into their operational datasets giving them the ability to respond quickly and effectively to the changes of any current or future pandemic.

With the collaboration of technology and healthcare organizations, surveillance systems can provide the tools for quick, effective, and organized responses to critical situations. Companies like HCA Healthcare and DOMO are providing platforms that address the need for surveillance systems and

demonstrate how these systems can serve to prepare the healthcare industry for not only current but also post-COVID pandemic outbreaks.

## Orion Health offers solution for remote patient management

BY JERRY ZEIDENBERG

**A** computerized system for remote patient management, developed by Orion Health, is now being used in Paris, France to monitor patients who have tested positive for COVID-19, enabling them to remain in their own homes. By remotely managing patients who are not yet showing severe symptoms, they have been able to reduce pressure on medical facilities and to free up beds.

Orion Health's platform is already widely deployed in Canada, and could be easily extended to homes to help monitor patients in this country, too, said Dr. Chris Hobson, the company's chief medical officer. Already, the solution is used in Quebec for managing chronic diseases, such as diabetes and heart failure.

With the software on a smartphone or home computer, patients can report on whether their cough

or shortness of breath is getting better or worse, and if their temperatures are getting higher. And by adding simple plug-ins like oxygen meters, they can also report on their oxygen saturation.

"You can report on this every day, or every six or eight hours," said Dr. Hobson. And because the Orion solution has been optimized for population management, it can monitor

large groups of patients on a centralized dashboard, alerting healthcare professionals with easy-to-read red, amber or green signals.

It points out to nurses and healthcare professionals at centralized stations whether a certain pa-

tient is in distress and needs attention. "You can then focus on the ones who need to be focused on," said Dr. Hobson.

The system logs the data and displays trends over time – for whole populations or individual patients. And the patient's health record can be tied in, too, for quick reference. So for example, if a patient with COVID-19 also has diabetes or other issues, a nurse or physician can take these factors into account.

Dr. Hobson noted that a parallel solution, video visits for patients, have recently become popular in Ontario, as the province has provided a new billing code for telemedicine for

all physicians. Previously, doctors and virtual visit providers had to go through the Ontario Telemedicine Network to obtain funding.

Virtual visits are also increasing in British Columbia, Alberta and Saskatchewan.

However, as useful as they are, video visits will likely not support the number of patients who could be affected by COVID-19 if a massive wave hits.

"We don't want to have a one-on-one solution," he said. Instead, the Orion platform is capable of simultaneously monitoring thousands of patients.

"The solution we've developed is designed for large numbers of patients," said Andrea Tait, vice president, Client Value at Orion Health Canada. She noted that the system can help with social distancing, keeping infected patients apart from care-givers such as visiting

CONTINUED ON PAGE 22



Andrea Tait



Dr. Chris Hobson



# MYLE EMR enables large Montréal clinic to transition to virtual care

By the middle of March of this year, the severity of the COVID-19 pandemic was clear to all, and the Goldman Herzl Family Practice Centre in Montréal was instructed to shift its regular, in-person visits to virtual encounters. In fact, management asked that 70 percent of the clinic's volume be transferred to telemedicine visits in a matter of three days.

That was a huge challenge, as the clinic – situated at the Jewish General Hospital – has 50,000 patients and conducts some 110,000 in-person visits a year.

It also takes care of vulnerable populations, including pregnant women and their babies, patients with addiction issues, adolescents with mental health issues, and others.

It seemed like an impossible task, but the clinic did it. Within a matter of days, “we were more or less between 60 and 70 percent virtual, and by a week out we were at about 80 to 90 percent,” says Dr. Mark Karanofsky, a family physician and unit director at the Goldman Herzl Family Practice Centre.

In addition to an adept IT team, a good deal of credit must also go to the electronic medical record system used at the clinic. It's called MYLE, produced by a Montreal-based clinical software company called MEDFAR.

The system is the most popular EMR in Quebec, with an approximate market share of 40 percent among physicians, and has some usage in Ontario and New Brunswick, but it's not well-known outside Quebec. That may soon change as news of its capabilities and ease-of-use travels.

“Just the sheer thought of moving everything out in 72 hours makes me sick to my stomach, but it really was possible because we have these solutions,” says Dr. Karanofsky.

Indeed, MEDFAR had just added the video visit abilities, MYLE Telemed, to the system, integrating them with other features like MYLE Patient Portal and e-fax for automated transmission of test results, messages and prescriptions to the various healthcare stakeholders.

Not only was the clinic able to convert most of its appointments into virtual visits, in some cases that proved to be a real advantage.

“I can tell you that my first patient probably had bedbugs, and the fascinating thing is that we would really not want to bring him into the clinic if we could avoid it,” said Dr. Karanofsky. “That's because we would have lost the room for the day. We would have had to have it cleaned. The fact that we were able to provide this kind of care remotely is exceptional.”

Moreover, with the power of video integrated to his EMR, Dr. Karanofsky has been able to conduct much of the work he would do at the clinic from his own home – using teleconferencing and electronic tools.

In another instance, he said, just after the COVID-19 lockdown started, “I had a patient call me who was too scared to go to the emergency room. But three days earlier he had [what seemed to be a stroke], and I could look at him and see the facial droop and the weakness in his right arm.”

“I was able to do most of what I would do in clinic, with him at his home and me at my home,” he adds.

Indeed, Dr. Karanofsky says that 70 percent to 80 percent of the patients being treated remotely can have their issue resolved over the phone or by a video visit.

“It works well and patients are able to do it on their phones, on their computers,

and people are able to provide a lot of good care,” says Dr. Karanofsky.

“And really, the idea is that with COVID-19, we are trying to do the best for patients, to protect the staff and also to protect the patients from coming to a place where they might actually catch something

that they didn't have before. And so we are able to leverage all that, in one package, and I think that's what the telemedicine solutions offers.”

“Since the beginning of the pandemic, MEDFAR has focused on the success of its

CONTINUED ON PAGE 22



**COVIDTRIALS**

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# Focused on COVID-19, many have let their guard down on cyber-security

Hospital and healthcare workers need to be wary as phishing attacks increase.

BY DIANNE DANIEL

As they battled the early spread of COVID-19 at the front lines, Canadian health organizations were reminded they face an equally troubling threat at the back lines: exposure to cyberattack.

In March, the Canadian Centre for Cyber Security issued an alert about elevated risk of cyberattack due to the pandemic. It advised healthcare IT professionals to remain vigilant, a stark warning that cybersecurity must be top of mind at all times, particularly when healthcare is most vulnerable.

Among the warnings were a call to watch for ransomware, vulnerabilities related to telework and people working from home, and attempts to gain intelligence or steal key research related to a vaccine.

"In my mind, cybersecurity represents the hidden pandemic beneath the pandemic we are already facing," said HealthCareCAN president and CEO Paul-Émile Cloutier. "COVID-19 will be a lesson for us that we need to pay attention to cybersecurity."

An advocacy group for medical organizations and hospitals across the country, HealthCareCAN is working to build cybersecurity capacity and expertise within the sector. It is calling on provincial and federal governments to invest time and resources to address cybersecurity in healthcare, and recently partnered with the Canada-Israel Industrial Research and Development Foundation (CI-IRDF) to create a security operations hub in Newfoundland.

The hub will be a place where Israeli cybersecurity leaders and Canadian specialists work on education, software development and digital infrastructure to support what HealthCareCAN calls "cybersafe healthcare."

After hosting the Canadian Summit on Healthcare Security in 2018, attended by a wide-ranging group of health sector representatives, industry players and leaders, HealthCareCAN presented a summary report outlining the steps required to move forward. The first three of nine principles listed are: healthcare cybersecurity is a patient safety issue; healthcare organizations are prime targets; and, no one organization or sector can go it alone. Two years later, Cloutier is sending an even stronger message.

"This is not just a patient safety issue, it's a public security issue and it deserves national attention," said Cloutier. "We cannot let our guard go down on cybersecurity. This is an issue that deserves continuous attention ... the risks are too high."

The attacks on Canada's health system are unrelenting. Last year, a phishing attack at the Nova Scotia Health Authority exposed surgical information for 2,841 patients. In Ontario, Michael Garron Hospital and two sites in the Listowel Wingham Hospitals Alliance fell victim to Ryuk malware.

Laboratory testing company LifeLabs paid a ransom to retrieve sensitive information for millions of customers. Earlier this year, eHealth Saskatchewan reported it "may never know" if personal data was affected after ransomware entered its systems.

And the list will go on because healthcare will always be an appealing target, said Canada Health Infoway

chief privacy officer and vice-president of Governance, Risk and Compliance Abigail Carter-Langford.

"Even if we were exceptional at security in healthcare – and we are getting better – we would still continue to be a target because healthcare information is critically valuable," said Carter-Langford. "If you steal my credit card, I just get a new one. If you steal my health identity, I can't get a new one."

Infoway works closely with groups like the Privacy Forum and Health Information Privacy Group to identify best privacy and security practices that can be leveraged by jurisdictions across Canada. It is also working to develop a secure, trusted framework called ACCESS Gateway to facilitate data sharing and national scaling of digital health solu-

latest updates. Criminals used that instinctive desire for information as a "social engineering wedge," she explained, baiting people to click with "cheap attacks that create significant compromise."

Carter-Langford identifies two soft spots that leave any organization prone to cyberattack: people and lack of resources. To help prevent healthcare workers from introducing vulnerabilities into a hospital network, it's important to clearly communicate the risk as well as best practices, such as obtaining information from trusted sources only and knowing how to recognize suspicious links.

In its summit report, HealthCareCAN states training is essential and simplicity is key, acknowledging that "overly technical language can be a barrier to uptake" of good digital hygiene.

One participant went so far as to suggest replacing the word "hackers" with "criminals" as a way to simplify the message.

Not only is cybersecurity training important for all levels of staff, but Carter-Langford also recommends that it should be as "easy and comfortable" as possible for employees to interact with their help desk when they do have questions about a dubious link or perhaps clicked on one by mistake.

To address the second soft spot, the critical shortage of cybersecurity expertise which Deloitte estimates will result in a shortfall of 8,000 cybersecurity positions in Canada, Carter-Langford recommends all healthcare IT professionals "skill up in security." "At this point in time in 2020, if you have an IT job in healthcare, security is part of that job," she said. "Healthcare is a publicly funded organization and as such it is not going to be able to compete for security resources in the same way a bank is going to compete ... So we need to crack that nut differently."

The HealthCareCAN report recommends a "hub and spoke" solution to the short supply of security expertise, in which regional centres of excellence are established to facilitate knowledge sharing and forge partnerships.

The group's first hub in Newfoundland is a starting point and Cloutier expects to see the concept replicated once it is firmly established.

Security vendors are also playing a role in the collaborative approach. Roughly half of the major incident responses coordinated by iSecurity Consulting in 2019 took place in healthcare settings. According to iSecurity co-founder Raheel Qureshi, many of the attackers entered the infected systems months prior to being detected.

He said healthcare is an easy target because of the complexity of its environment, which often includes a medical device network, corporate IT network and partner network, and intrinsically supports a high degree of collaboration and information sharing.

"This brings a lot of visibility to these threat actors. For them, it's almost like a gold mine," said Qureshi, adding that 80 percent of the time, attacks



ILLUSTRATION: LINDA WEISS

tions. The goal, said Carter-Langford, is to build tighter communities.

"There are a number of different venues and communities that are starting to come together to share information and knowledge, and that's how we as a healthcare community solve this together," she said, pointing to HealthCareCAN as an example. "It's not an institution by institution fix. It's a community fix."

The cybersecurity conversation across Canada is changing. Whereas five years ago security was viewed as an IT issue to be dealt with by IT resources, it's now seen as a fundamental safety issue that needs to be discussed at the board level. At the same time, cyber criminals are realizing they no longer have to "get fancy" to compromise systems, said Carter-Langford.

Cyber threats surged during the onset of COVID-19 because hackers recognized overworked, exhausted healthcare professionals were craving the



in healthcare are the result of phishing.

In light of the heightened recent activity, iSecurity is currently working with a handful of hospitals that have yet to experience an incident but are prepared to invest in security in advance. Funding remains a challenge, said Qureshi, but the issue is gaining visibility. “We’re seeing that organizations are becoming more aware; they are accepting the fact that they have to spend more money on keeping their cybersecurity up to par,” he said.

A wholly-owned subsidiary of Dapssoft, iSecurity outlines four basic steps healthcare organizations can take to bolster their cybersecurity preparedness. First is a vulnerability assessment and penetration test of the external perimeter, sometimes called a red team exercise.

Second is a threat assessment or blue team exercise designed to identify internal vulnerabilities and determine how easy it would be for a hacker to convince a user to compromise an email or grant data access.

Third is an Active Directory assessment to uncover exposures related to user accounts and network access privileges, including dormant or mishandled administrator accounts.

Finally, organizations embarking on a cloud strategy should take steps to conduct a proper design architecture and cloud security review.

“We’ve put together a package that is very affordable,” said Qureshi. “It’s our new normal and a lot of our clients are doing a lot better but we are in a digital world now. These are basic principles we’re trying to help organizations establish without throwing tons of money and technology at it.”

The Canadian Centre for Cybersecurity was established in October 2018 to offer “a unified approach to cybersecurity” and “enable faster, better-coordinated, and more focused government responses to cyber threats.” When it issued its COVID-19-related alert to health organizations in March, it included links to resources and guidelines, along with a list of top 10 security actions to mitigate threats.

HealthCareCAN’s Cloutier believes more can be done at the federal level to support healthcare cybersecurity initiatives. In particular, he points to the fact that healthcare isn’t included in the current \$144.9 million budget to protect Canada’s critical cyber systems in finance, telecommunications, energy and transportation. “Why is healthcare not part of that?” he asked.

Most health institutions are now taking the matter of cybersecurity very seriously, but there remains a great deal of collaborative work to be done to close the gap. A good starting point, said Cloutier, would be to gain a better understanding of where healthcare systems currently stand in terms of a national baseline security.

“Some major health centres are more advanced than others because they have the funding, but I’m sure that if we were to do a review of all health centres in Canada, our baseline would be very low and scary,” he said.

Part of the challenge is the rise of Internet-enabled medical technology that brings amazing improvements to patient care, yet introduces a range of potential cybersecurity vulnerabilities. Cloutier regularly at-

tends meetings in which he hears about emerging incidents where hackers successfully gain access to medical equipment.

For example, he recalls being told of an instance where “a hacker changed the imaging of where the person’s tumour was on their body. If the surgeon hadn’t checked the records, if he had only checked the image from the MRI, he would have operated on the wrong side of their body.”

One suggestion from the summit report is to make cybersecurity requirements a necessary part of the medical device procurement process, to ensure only devices meeting a specified standard enter the healthcare ecosystem. It’s clear that governments, regulators, device manufacturers and healthcare organizations of all sizes will need to work together to improve Canada’s healthcare cybersecurity resiliency.

“We anticipate that we’ll be able to contribute to making sure there’s more information, more consistent standards, and a whole lot of other folks are doing the same,” said Infoway’s Carter-Langford. “It’s starting to come together and I think we’re at a moment where it will really start to take flight in the next year and we’ll have that strength in numbers to effect change.”

# MYLE

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# Royal Bank launches Practice Solutions, productivity tools for doctors

**T**ORONTO – RBC Healthcare has extended its financial offerings beyond banking by launching Practice Solutions – a suite of tools to help physicians establish and manage their practices. Through partnerships with four Canadian health tech companies, Practice Solutions can help physicians increase their billings, reduce their practice overhead and improve the overall patient experience.

“We proudly support medical professionals throughout their entire career – from student to established professional – and we understand the unique journey they’re on,” said Niranjana Vivekanandan, vice president, RBC Healthcare. “Practice Solutions offers a connection to a variety of innovative partners who can help with the operation of what is effectively a small business – a skillset physicians may not have.”

In conjunction with four companies, RBC Healthcare has created a comprehensive package of services which provide effective solutions for billing, operations, coordinated care and automated patient communication to practice management – a unique partnership between a Canadian bank and health tech firms.

- **Billing – Dr. Bill:** Recently acquired by RBC Ventures, Dr. Bill is a mobile-first platform that allows physicians to process and submit their claims electronically for a more user-friendly and accurate reimbursement experience. Its digital billing platform, as well as dedicated live billing agents, refine outdated processes, save time, and reduce billing inefficiency for physicians.

- **Operations – CHIME:** A digital system that enables your clinic to work smarter. CHIME manages everything from checking patients in, to telling doctors where to go next to assigning staff to tasks. By delivering the right person to the right place at the right time the platform reduces overhead, improves efficiency and boosts clinic revenue.

- **Coordinated Care – CoHealth:** A mobile-first platform geared at empowering

patients and caregivers with the right health content at the right time. CoHealth provides easy access to trusted information on various health topics to help keep patients informed before and after a visit. With top-tier content delivery, this tool aims to promote healthy patient behaviour as well as save staff time and reduce costs.

- **Automated Patient Communication – Mikata Health:** Through artificial intelligence, Mikata’s easy-to-use patient communication tools help clinics automate reminders, announcements, follow-up, data collection, charting and more. This platform aims to make interacting with patients proactive, personal and convenient, while unlocking revenue and time savings for both doctors and staff.

“Physicians focus first and foremost on their patients, and that fills the majority of their day, as it should,” added Vivekanandan. “They are often strapped for time,

making it difficult to find and access practice management services. We’re stepping in to help them with this important aspect of running their practices so they can continue to focus on patient care.”

Andrew Best, senior director of Healthcare Financial Services at RBC, said there are now over 600 healthcare specialists at RBC branches across Canada. “They’ve been trained in what physicians and practices do, and they’re trained to spot opportunities to improve how physician practices work,” he said.

He added, “By looking at financial statements, and listening to doctors, they can solve problems and make suggestions.”



Andrew Best

## Medical devices can be the weak points in securing networks

**M**ost medical centres have taken steps to protect their electronic patient records with some form of security software. Trouble is, in addition to medical records, there’s often thousands of medical devices attached to the network which aren’t similarly protected or monitored, and which can serve as gateways for attacks into the whole system.

Cyber-attacks on medical devices are sometimes referred to as “med-jacks”. They’re a weak spot in hospitals, clinics and other facilities when it comes to computer security.

“We’re seeing a rapid uptick in attacks on medical devices,” commented Curtis Simpson, chief information security officer for Armis, a computer security based in Palo Alto, Calif., that’s also doing work in

Canada and around the world. “Hackers are targeting these devices because traditionally, security wasn’t built into them.”

Vulnerable medical devices run the gamut from infusion pumps and patient monitors to MRI and X-ray scanners. If they’re attached to a computer network, they likely have their own operating systems, which can be very old and often haven’t been updated with security patches.

“It’s not like cell phones and other consumer devices, where they’re built to be replaced after five years or less,” said Simpson. “Medical devices can run for a very long time, and they’re running very old operating systems.”

Indeed, there are instances in Canadian hospitals of diagnostic imaging scanners that are 15 years old or more. It’s these systems that are open to attack. And if they’re part of a network, they serve as gateways to the entire hospital system.

Simpson pointed to the example of one of the most popular operating systems for devices, called VxWorks. It’s running on an estimated 2 billion devices, “everything from elevators to infusion pumps to the Mars Rover,” he commented. As Armis notes on its website, VxWorks “is the most widely used operating system you may never have heard about.”

Last year, Armis analyzed VxWorks and found 11 major flaws in the operating system, places where it could be attacked. When this happens, cyber-criminals can take control of the device, taking charge of its functioning or using it as a launching pad for viruses, malware and ransomware.

According to Armis, the flaws open up the devices to hackers and enable “attackers to take over devices with no user interaction required, and even bypass perimeter security devices such as firewalls and NAT solutions. These devastating traits make these vulnerabilities ‘wormable,’ meaning they can be used to propagate malware into and within networks. Such an attack has a severe potential, resembling that of the EternalBlue vulnerability, used to spread the WannaCry malware.”

Best noted that RBC conducted a study of physician practices, interviewing doctors and front-desk personnel to determine the challenges faced by clinics. The bank formed partnerships and created Practice Solutions as solutions to these problems.

As an exclusive offer for RBC Healthcare Advantage Plan members, Practice Solutions provides discounts from all partner organizations. For more information, visit: [rbc.com/practicesolutions](http://rbc.com/practicesolutions)

RBC Healthcare was created to address the needs of healthcare professionals throughout each of their life stages. RBC Healthcare’s network of over 600 healthcare specialists are trained to understand the unique needs of Healthcare Professionals. RBC Healthcare Advantage is now available to eligible healthcare professionals who join or are already banking with RBC.

Armis worked with the company that owns VxWorks, Wind River, to create patches for the flaws. The latest version of the operating system is solid, and they’ve alerted medical device manufacturers to update their devices running the operating systems.

The problem is, as Simpson said, some of the devices are so old that nobody knows how to actually apply the new patches to the operating systems. With some of the old infusion pumps, “you’d literally have to take the pump apart,” he said. On these older units, there are no USB ports or easy ways of updating software.

For centres that want to dismantle their devices and take a shot at applying a software patch, the downside is that the device has to be removed from service, reducing the number of pumps, monitors or scanners that are available for patient care.

In some cases, the operating systems were too old and different to take advantage

**Some medical devices are more than 15 years old and contain software that has never been updated for security.**

tage of the new patches; it just wasn’t possible to modernize the software in this way.

The solution that Armis offers is an enterprise monitoring platform that’s optimized not only for computers, but for any device, by using “agentless” monitoring. As it is designed for the “Internet of Things”, Simpson said Armis can identify each and every device on a network and provide surveillance. “We can tell if the device is acting strangely or maliciously.”

He said that Armis has done research into eight million different devices and has developed a knowledge base of devices, including medical equipment. “We can find and profile everything on your network,” said Simpson. “And we can tell you when it goes sideways.”

## Teams platform

CONTINUED FROM PAGE 4

that it’s patient-related,” he explained. “If it’s in the Teams app, it’s for other hospital-related business; it’s a good way to containerize information.”

The hospital has begun looking at using Teams to support patients in communicating with family members using its messaging and videoconferencing functions.

While some patients can do this through their own computers and tools like FaceTime and WhatsApp, Lemonde explained that other patients come to the hospital without computers or social messaging accounts.

“We’ve already got Teams here, so we can help patients reach their loved ones and give them support,” he said.

For this reason, the hospital has just ordered 300 more iPads.

“It would be very sad if these people could not see their families and loved ones,” he said, noting that patients are

more alone than ever before due to COVID-19-related visitor restrictions.

Lemonde observed that enterprise tools like Zoom and personal tools like FaceTime, Facebook Messenger and WhatsApp are being used widely in the COVID-19 crisis.

However, he pointed out that Teams is a highly secure platform, and personal tools are not a good fit for enter-

**Teams is more secure than consumer-grade solutions like Zoom, and allows groups to work on documents together.**

prises. As well, he prefers Teams because its tools are all integrated – the messaging, group conversations, document collaboration and videoconferencing all work together.

“You can even edit documents in the app while you’re meeting and participating in discussions,” he said. “Other platforms don’t do this so easily.”



# Efficiently monitoring patients from the comfort of home during COVID-19

BY KATHRYN SEELEY

With COVID-19, the already strained Canadian healthcare system is being pushed to the limit.

Our ability to care for the 5 to 10% of patients who need hospitalization depends on the availability of frontline workers and beds. So how can healthcare organizations provide more caregiver time and infrastructure to help the very ill?

Provinces are already finding ways to expand facilities and muster more equipment. At the same time, we need better ways to:

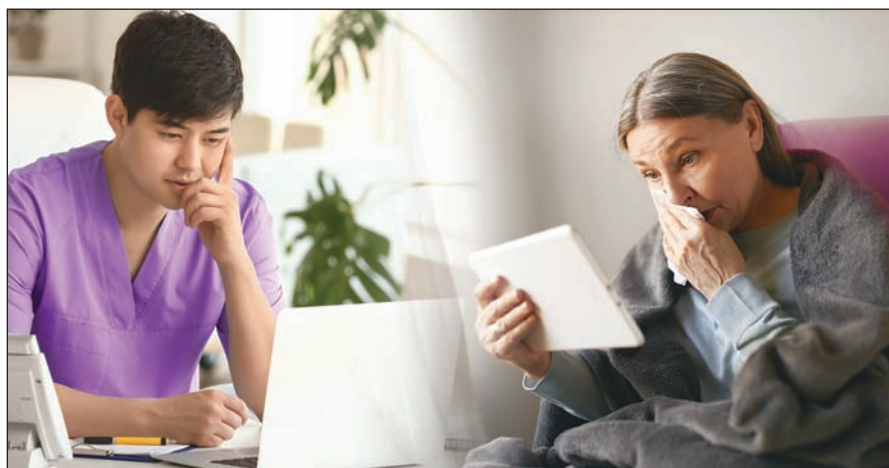
- Free up hospital beds occupied by patients with moderate symptoms who would be safer at home if adequately supported, and

- Free up valuable and finite clinician time, now often spent filling out manual, paper-based intake forms and one-on-one phone calls.

Home Health Monitoring is already in place in Canada and is helping to address both of these goals.

**COVID-19 relief: B.C. leads way:** For several years in several provinces, Home Health Monitoring (HHM) programs have been supporting patients discharged from hospital and managing chronic conditions at home.

B.C.'s HHM program, involving more than 4,000 patients thus far, has shown remarkable results: significantly improving quality of life for patients, saving healthcare costs, and reducing emergency visits by up to 81%, hospital admissions by up to 92%, and length of stay by 94%.



This solution is tailor-made for a time when everyone who can be at home, should be at home. And it is now being used in B.C. to monitor and track COVID-19 patients. Other jurisdictions are also moving in the same direction.

**Tailor made to enable clinicians to care for patients at home:** HHM lets patients use their own or borrowed tablet in their homes to stay in contact with clinicians remotely. These patients may have been discharged from hospital or simply enrolled in the program based on a positive test, symptoms and a virtual consultation.

Every day, patients self-evaluate their health using a CDC-ratified online COVID-19 questionnaire, and use devices like a thermometer, pulse oximeter and blood pressure monitor to send in vital signs over a secured internet connection.

A single nurse can monitor over 100 patients at once. The trigger-based dashboard scans health metrics and evaluations that fall outside of safe zones. Clinicians can then intervene right away by providing advice and recommendations, such as medication or alternative treatments. They can also request hospitalization.

HHM can be deployed in as little as two weeks and can scale quickly to support hundreds to thousands of Canadians at a time.

**B.C. responds to COVID-19 by expanding its existing TELUS Home Health Monitoring solution:** To allow wide access quickly, TELUS Health made its latest version fully web-based and low tech, with patients supplying their own tablet and thermometer. Right now, health authorities are monitoring remotely confirmed COVID-

19 cases and those who have been in contact with one, including healthcare workers.

**A timely solution for long-term needs:** The usefulness of HHM extends beyond caring for COVID-19 patients at home. It can also reduce strain on the system by helping hospitals discharge other patients early, if stable.

It can help busy clinicians monitor and care for other high-risk populations (like palliative, immuno-compromised, chronic disease or mental health patients) in their homes, reducing patient exposure to pathogens.

It could help clinicians lower the frequency of rounds in hospital wards or homeless shelters, minimizing clinicians' direct contact with the virus.

And it offers a useful digital record for communicable disease and immunology researchers to better understand disease progression, patient response to treatments, and other critical population health factors.

Throughout this difficult time, Canadians have banded together and rallied with unprecedented energy and positivity to overcome COVID-19. Addressing this pandemic has been and will continue to be a collaborative effort requiring bold leadership and new thinking across sectors.

HHM has already proven to effectively empower patients, reduce the burden on workers and the system, and free up precious resources to care for more patients.

*Kathryn Seeley is Director, Patient Engagement Portfolio, TELUS Health.*

## Standards community responds quickly to COVID-19 crisis

BY MICHAEL GREEN

The COVID-19 public health emergency illustrates why healthcare organizations in Canada and around the world need the ability to share health information consistently and efficiently.

Standards are agreed-upon methods for connecting systems and communicating. Standards may pertain to security, data transport, data format or structure, or the meanings of codes or terms. Healthcare organizations can reduce implementation costs, accelerate integration projects and take advantage of common tooling by using standards.

Perhaps most importantly, especially during a crisis like COVID-19, standards give healthcare providers the confidence that they will have a common understanding of the tests performed, the results and the clinical assessments they are sharing.

Standards development organizations learned from the SARS epidemic in 2003 the importance of reacting quickly to provide concepts and identifiers to support early detection of outbreaks, effective communication to the public, the promotion of research and development, strategies for containment, and multinational collaboration in implementing such strategies.

So I'm proud of how quickly the LOINC (Logical Observation Identifiers Names and Codes) and SNOMED CT communities worked to create concepts and identifiers for COVID-19. Canada was the first country to make the new SNOMED CT interim release available in its own edition – a tremendous accomplishment.

Similarly, Canada has been working with Canadian implementers to add new laboratory tests to LOINC/pCLOCD to help verify and track COVID-19 testing results. LOINC has a pre-release page where implementers can find and use this content before the next official release of LOINC (June 2020) and the pCLOCD (July 31, 2020).

The Canadian edition of the March 31 release includes another milestone – it introduced more than 77,000 French-language terms to the Canadian Edition of SNOMED CT. This was no small feat. Like the quick response in creating COVID-19 terms, it involved international collaboration. And because there are different dialects of French, it was a monumental task to get agreement on the translation of those 77,000-plus terms.

Here's a simple example of how standards work. Think about the diagnosis

"cold." It can have several meanings. If a doctor enters a note in a patient's record using "cold," is she referring to the patient's temperature, a cold sensation, or does the patient perhaps have a common cold? For the sake of the patient, it's important that everyone involved in his care understands precisely what is meant.

Unclear or incomplete communication could mean a delay in treatment or incor-

rect treatment, and either of those occurrences could affect the patient's outcome. Now think about everyone's heightened anxiety when a patient comes to a hospital with a suspected case of COVID-19. The patient is assessed to see if he has any COVID-19 symptoms. If he does, he is asked to immediately wash his hands and put on a protective mask. Then a clinician completes a patient history and physical exam, informs the virologist on call, and orders tests. The lab performs the tests requested and reports the results to the clinician and public health for confirmation testing, then the clinician determines the course of treatment. In such a critical time, it's simply not enough to have a name for the test or diagnosis without a standardized identifier. Without standards, clinicians and others would collect information about COVID-19, but they may not collect in the same way. For example, some may electronically capture a COVID-19 diagnosis as "COVID-19" and others as "2019-nCoV." SNOMED CT (Systematized Nomenclature of Medicine – Clinical Terms) uses standardized identifiers such as "840539006" to represent COVID-19 and eliminate any confusion.

Standardized data capture and communications ensure that patients who test positive for the illness get the right treatment. They also help us understand how the virus is trending by enabling public health officials to aggregate and analyze the data locally, regionally, provincially, nationally and globally.

*Michael Green is President and CEO, Canada Health Infoway.*



## MYLE transition

CONTINUED FROM PAGE 17

users to contribute to the fight against COVID-19,” comments Elias Farah, CEO of MEDFAR.

“It was clear that a virtual care system, integrated into the most popular EMR in the province, would play a major role in protecting both staff and patients. MEDFAR never hesitated to deploy MYLE Telemed free of charge to all its users during the pandemic, enabling more than 12,000 caregivers to ensure continuity of care through teleconsultation.”

Adds Farah: “It’s very gratifying to witness a successful virtual care transition at an accelerated pace like the one Herzl experienced.”

Michael Shulha, executive advisor for digital health at CIUSSS du Centre-Ouest-de-l’Île-de-Montréal, who led the I.T. side of moving care from the clinic into the virtual realm, says that MYLE also offers other tools that have assisted both doctors and patients.

For example, the analytics component of the system, MYLE Analytics, enables the clinic to keep tabs on appointment volumes, parsing out what types of appointments are happening, where patients are coming from, how long encounters are taking and how long patients are waiting for them.

A major project for the Goldman Herzl FPC has been a diabetes improvement program, which started about two years ago. It has helped the centre standardize on best practices, and it lets doctors see where they and their patients stand in comparison to one another.

“By having these standardized comparisons, you’re able to see for yourself where you are,” said Dr. Karanofsky. “Sometimes, what you realize is, no, my patients are a little bit older, they have a lot of comorbid

**Dr. Karanofsky was able to send a prescription directly to the patient’s pharmacy, without the patient needed to deliver it.**

diseases, so maybe I shouldn’t hit the target as hard as some of my colleagues.”

The system can also provide clinical decision support. “There are ways you can put in reminders, just to nudge the behaviour in the right direction. That’s much better than using a sledgehammer,

and I subscribe to that type of approach,” he says.

On another front, the MYLE system integrates an e-fax feature that allows doctors to send prescriptions directly to pharmacies. This saves time for patients and helps promote compliance, as there are fewer lost scripts, less time taken to fill the prescription, and all patients have to do is pick up their medications from the pharmacy.

“I had one patient who tested positive for strep throat,” said Dr. Karanofsky. “I sent a message to his patient portal and said your strep test is positive, please call my secretary, tell me which pharmacy you use and I will send in a prescription. I saw the message go from orange to green an hour later. He called my secretary, and I faxed the prescription while he was at work. He got his care much faster and with much less effort than would have normally been required.”

Test results are also delivered in a much more efficient way using MYLE. For example, Dr. Karanofsky is sending Pap test results to patients using secure, online notifications. “When it’s normal, I will push it to the portal, saying, your result was normal, let’s repeat this in three years – I see an orange bubble [on the patient’s record]. When they’ve opened it and they’ve seen it, it turns green, so I know they’ve received it and opened it.”

Dr. Karanofsky and Mike Shulha both agree that MYLE, with its integrated solutions – telemed, patient portal and analytics – offers a package that will serve the Herzl clinic and its patients well, now and in the future. “You need to be able to improve clinic operations from the EMR side, improve the patient experience on the portal side, and have a window into all of it with analytics,” said Shulha. MYLE delivers, they say, on all three fronts.

## Ottawa Hospital researchers join the fight against COVID-19

Researchers at The Ottawa Hospital are exploring more than a dozen different research projects related to COVID-19, a few of which are highlighted below. Many of these projects are being done in partnership with other hospitals and universities around the world.

**Working towards a vaccine:** Researchers at The Ottawa Hospital are harnessing their expertise in making cancer-fighting viruses to develop a possible vaccine against COVID-19, in partnership with scientists and clinicians within Canada and around the world. The vaccine would contain small parts of genetic material from the COVID-19 virus, embedded into a different virus that does not cause human disease.

This replicating viral vaccine would also produce its own adjuvant – a substance that stimulates a stronger immune response to the vaccine and makes it work better.

Once a promising vaccine is created, the team will be able to make large quantities in The Ottawa Hospital’s Biotherapeutics Manufacturing Centre.

This facility is the only hospital-based lab in Canada capable of producing virus-based vaccines and therapies for clinical trials.

Partners on this project at The Ottawa Hospital and the University of Ottawa include Drs. Carolina Ilkow, John Bell, Taha Azad, Stephen Boulton, Mathieu Crupi,

**The facility is the only hospital-based lab in Canada able to produce virus-based vaccines for clinical trials.**

Nikolas Martin, Joanna Poutou, Ragunath Ragaravelu. The list of partners at other institutions is still being finalized.

Another technology developed at The Ottawa Hospital that could help with the development of a COVID-19 vaccine is referred to as a “viral sensitizer”. Developed,

by Dr. Jean-Simon Diallo, this technology can speed up the production of viral vaccines by more than 1,000-fold in some cases. This technology is now available commercially through Virica Biotech.

On another front, The Ottawa Hospital’s Dr. Duncan Stewart, executive vice president of Research, is leading a team of researchers working to launch a clinical trial of MSC therapy for COVID-19 patients with ARDS.

They will build on their extensive experience in manufacturing MSCs and leading the world’s first clinical trial of MSCs for septic shock.

This project will likely involve partners in Ontario and Europe, working in a concerted effort to find novel therapies to improve outcomes in COVID-19 patients.

## Applying AI to understand and control COVID-19

CONTINUED FROM PAGE 6

where there’s widespread transmission through China, and European and North American destinations showed up. The only African destination was Cairo and that’s where it landed.”

When a few passengers from Iran tested positive in British Columbia and Ontario, Bogoch and his colleagues concluded there had to be a significant rate of infection there. Using mathematical modeling, they estimated 18,000 cases.

“It seemed like heresy at the time be-

cause Iran had officially reported only a handful of cases.”

The BlueDot findings were widely shared and proved helpful in creating public health policy, prompting some jurisdictions to begin screening passengers from Iran, quarantining them, or in some cases curbing air traffic from the country.

Dr. Prabhat Jha, a professor of Global Health and Epidemiology at the University of Toronto’s Dalla Lana School of Public Health and executive director of the Centre of Global Health Research at St. Michael’s Hospital, was awarded \$956,320 to refine a virtual autopsy tool to detect and quantify the impact of COVID-19 in countries where testing and medical certification of the cause of death are less common.

“China, Hong Kong, Singapore, Japan and South Korea have basically 100 percent coverage of deaths and medical certification, but that’s not the case for much of the world,” said Dr. Jha. “Of the 55 million deaths that occur in the world every year, about 40 million occur in lower and middle income countries and roughly two-thirds of those don’t have a proper death certificate.

“In those settings, you simply don’t know what is killing people. The solution we have used quite successfully in India involves taking a random sample of deaths and sending teams out to do what we call a verbal autopsy.

## Orion Health

CONTINUED FROM PAGE 16

nurses and PSWs, but allowing health-care professionals to actively monitor those who have tested positive or shown symptoms.

“Social distance is a big part of this,” she said. “It’s critical to preserve the health and safety of our caregivers.”

The data from patients would typically stream into a community health centre, she said, and when the alerts are sounded, nurses can be notified, and when needed, scaled up to the attention of doctors.

And because the system is collecting a large amount of data, artificial intelligence and machine learning can be used to analyze it. “Using AI, we’ll be able to figure out what works and what doesn’t when it comes to diagnosis and treatments,” said Dr. Hobson.

In comparison, Dr. Hobson said a

recent population health project, in which Orion Health was involved in the United States, made use of AI to analyze whether a large group of expecting women were facing high-risk pregnancies.

The software analyzed 46 different factors over time, and successfully predicted which women to put into the high-risk

**Machine learning can be used with COVID-19 data to determine the best forms of diagnosis and therapy.**

category. It was able to do this at 12 weeks of pregnancy, compared with the standard 30 weeks, when the process is done manually.

Because the AI system could pick up high-risk pregnancies at a much earlier stage, planning and treatment for the women could start earlier, too.





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**We are here for you.**

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