



# CANADIAN Healthcare Technology

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A dramatic reduction in sepsis mortality has been achieved through the combination of three systems: the electronic patient record, an AI-powered analytics solution, and a real-time alerting system that quickly notifies caregivers.

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PHOTO: NICK MENZIES PHOTOGRAPHY

Telus Health, in partnership with the UHN and the Parkdale Queen West Community Health Centre, has launched a mobile van that provides medical services to the homeless and underserved community in Toronto's west end. It is also providing pop-up COVID-19 testing, and hopes to help with the COVID vaccination effort. Pictured at left is Raymond Macaraeg, Nurse Practitioner. **SEE STORY BELOW.**

## Telus and UHN deliver services to the marginalized

BY DAVE WEBB

Telus's Health for Good program has launched the latest of its specially equipped vans to provide medical services to the homeless and underserved, this time to the population of Toronto's west end. The project relies not only on the hardware and software – the vans and technology – but on the care delivered by trained and socially sensitive medical professionals.

For the Toronto project, those professionals are working at the University Health Network's Social Medicine program and the Parkdale Queen West Community Health Centre. The city's Parkdale community, in the west end, has a high concentration of homeless and marginalized people.

First launched in 2014, Telus's Health for Good program has delivered mobile clinics to 13 Canadian cities, from Victoria to Hali-

fax. Originally designed to deliver primary care, the program pivoted to meet the needs of patients in the COVID-19 pandemic, said Nimtaz Kanji, Calgary-based director of Telus Social Purpose Programs.

Angela Robertson of the Parkdale Queen West Community Health Centre (CHC) asserted that marginalized people are particularly susceptible to the spread of COVID-19,

**Even adequate hand-washing and basic hygiene can become a challenge for the homeless.**

as they don't have access to the basic precautions that prevent its spread.

The clinic is located near a Pizza Pizza franchise; homeless people shelter under its overhang on the weekends, she said. Some have encampments under nearby bridges.

"The public health guidelines and re-

quirements call for things that individuals who are homeless don't have," Robertson said. "If the response calls for isolation, that suggests people have places to isolate in."

And in the shelter system, pre-COVID, the environment was very congregate, with many people in the same physical space, said Robertson. Some homeless persons, in order to keep themselves safe, have created encampments, and the city has opened up some hotel rooms across the city to create spaces for physical distancing.

Even proper hand-washing and hygiene becomes a challenge for the homeless.

"COVID calls for individuals to practice constant hand-washing. Oftentimes, individuals who are homeless use public washroom facilities that may be in restaurants or coffee shops, and many of those spaces are now closed. So there are limitations to accessing those facilities. It's not like they're in a com-

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# Telus teams with UHN to deliver services to the homeless and underserved

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munity where there are public hand-washing facilities for people who are homeless.”

The mobile health clinic allows the CHC to take “pop-up testing” into communities where there is high positivity and where additional COVID testing is needed. The CHC can take testing into congregate sites and congregate housing to provide more testing, Robertson said.

“The other piece that we will use the van to do is, when the vaccine supply gets back online, and when the health system gets to doing community vaccinations ... we hope that we can be part of that effort.”

COVID has contributed to a spike in cases of Toronto’s other pandemic: opioid overdoses. Some community members are reluctant to seek care because of the stigma attached to substance abuse; and COVID has a one-two punch for users.

The first rule of substance abuse is, don’t use alone; always be with someone who can respond to a potential overdose, ideally someone who can administer Naloxone to reverse the effects of the overdose, Robertson said. “It’s substance abuse

101,” and the need for social distancing makes this impossible.

Secondly, COVID has affected the supply chain of street drugs. As a result, they’re being mixed increasingly with “toxic” impurities like Fentanyl that can be deadly.

The van itself is a Mercedes Sprinter, modified by architectural firm éKM architecture et aménagement and builder Zone Technologie, both based in Montréal. According to Car and Driver magazine, the Sprinter line – with 21 cargo models and 10 passenger versions – is “considered by many to be the king of cargo and passenger vans.”

Kanji said the platform was chosen for its reputation for reliability and robustness.

While the configuration is customized for each mobile clinic, it generally consists of two sections: A practitioner’s workstation and a more spacious and private examination room, so patients can receive treatment with privacy and dignity, Kanji said. The Parkdale clinic is 92 square feet.

“While the layouts vary across regions, they typically include an examination table and health practitioners’ workstation, including equipment necessary to provide primary healthcare,” the Telus vice-presi-



Raymond Macaraeg, nurse practitioner, and Angela Robertson, executive director, PQW CHC.

dent of provider solutions wrote in an e-mail interview. The Parkdale Queen West mobile clinic is designed for primary medical services, including wound care, mobile COVID-19 testing and vaccination efforts, harm reduction services, mental healthcare and counseling.

The clinic equipped with an electronic

medical record (EMR) from TELUS Health and TELUS LTE Wi-Fi network technology.

Practitioners will be able to collect and store patient data, examine a patient’s results over time, and provide better continuity of care to those marginalized citizens who often would have had undocumented medical histories.

The EMR system is Telus Health’s PS Suite (formerly Practice Solutions). It is an easy-to-use, customizable solution for general and specialty practices that captures, organizes, and displays patient information in a user-friendly way. The solution allows for the electronic management of patient charts and scheduling, receipt of labs and hospital reports directly into the EMR, and personalization of workflows with customizable templates, toolbars, and encounter assistants.

But like others tested for COVID, it’s a 24-48 hour wait for results. Pop-up or not, how does the mobile team get results to patients who have no fixed address?

The CHC set up a centre for testing in a tent at the Waterfront Community Centre. Swabs are sent to the lab. “We are responsible for connecting back with community members and their results,” Robertson said.

“This is the value of having Parkdale Queen West being in front of the testing, because many of the community members who are homeless we know through our other services, and there is some trust in folks either coming to us to make arrangements to collect their results, or we know where they are.”

This is a key element of the program, said Kanji – leveraging community trust. In Vancouver downtown east side, for example, where there is a high concentration of marginalized members of the indigenous community, nurse practitioners are accompanied by native elders in a partnership with the Kilala Lelum Health Centre.



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# Using Lean, working smarter, to reduce wait times for COVID-19 tests

BY STÉPHANIE LAPLANTE,  
MARIE CLAUDE POIRIER  
AND LISE VAILLANCOURT

In response to the global pandemic, Hôpital Montfort, a 289-bed francophone teaching hospital in Ottawa, was mandated by the Champlain Health Region Incident Command to set up a COVID-19 care clinic to service the east end of the city.

At the time the request came through, the clinic had to be ready for operation within the following week, as a surge of ill patients was anticipated. Different in its mandate, as compared to a testing-only centre, this care clinic allowed medical care on site. (i.e. X-rays, bloodwork, ECGs).

The initial workflow was inspired by the same one used in the main-site's emergency room, with slight adjustments. Electronic registration and documentation were possible through an extension of our hospital IT network and HIS.

Within five days of determining the location of our "walk-in type" COVID-19 Care Clinic, a nearby decommissioned school that was now used for storage, we were ready to accept our first patients, on a first-come first-serve basis.

Within the initial workflow, the patient's journey started by undergoing a triage process, paired with clinical data collection tools, built in the MEDITECH Expanse EHR.

After going through the registration process, patients were directed to a waiting room until they could meet with one of our clinical teams to undergo a medical evaluation and/or COVID-19 testing. These teams were composed of a physician and a registered practical nurse (RPN).



The Montfort Hospital, in Ottawa, re-engineered the workflow of its COVID-19 clinic to improve processes.

At this point, although we aimed to see as many patients as possible, some processes involved duplication of the documentation. Examples included data collection from the patient, as well as laboratory requisitions that were documented both on paper and electronically to meet Ontario Public Health's as well as regional laboratories requirements.

The use of workstations on wheels allowing electronic clinical documentation outside the patient room; this contributed to reducing the use of personal protective equipment to better protect very limited stocks. By working with this model, our clinic was still able to see up to 470 patients per day with good population satisfaction.

It was only towards the end of summer 2020, as the clinic became well established, that we experienced a surge in patient demand, which resulted in very long waiting lines.

Full capacity was sometimes reached

within only a few hours after opening time. We were then starting to refuse patients up to five hours before the clinic's scheduled closing time, as we would not be able to meet the demand.

Daily wait times easily went up to nearly 5-6 hours during this period. This situation of course led to population dissatisfaction and an overworked staff.

At this point, we found ourselves in a position where we had to rethink the clinic's processes to become more efficient and increase patient satisfaction back to its original level.

Since our hospital has been using the Lean methodology for continuous improvement since 2008, the team referred to their Lean knowledge to address the situation. A few Lean principles were used to create our new flow: "decrease variation", which is one of the key principles, "better use of talent" and "simplify the process".

This new model aimed to minimize the time spent by our patients on-site, increas-

ing efficiency and consequently output, as well as improving patient satisfaction.

Reflections led us towards a totally different workflow, composed of a two-tiered appointment system, which also met the new requirements of the government of Ontario, of eliminating the "walk-in type" model.

By using appointments, we were able to decrease variation in demand, allowing a steadier flow throughout the day.

Consequently, to optimize human, technical, and financial resources, we partnered with another Ottawa hospital to implement an online booking system where patients were able to reserve an appointment up to 48 hours in advance.

Through customization of the SAVIANCE solution, patients would self-triage by choosing between either a COVID-19 "test-only" appointment or receiving a medical evaluation, combined with a COVID-19 screening test, if their symptoms required so.

Within this new model, our registration and electronic clinical documentation processes and tools were also revamped. Improvements focused on streamlining data collection and data entry into only one instance of documentation.

**Improved workflow:** The improved workflow permitted an adjustment to the skill mix of healthcare workers required to operate the clinic.

Where our first model was physician-driven, our second model allowed our physicians to attend to the sicker patients. A new type of healthcare worker, called a test administrator, was introduced in the skill mix for the patients choosing a "test-only" appointment.

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## There's more to it than promoting one-off, virtual care encounters

BY JIMMY YANG

Canadians have embraced virtual care during COVID-19. A Canada Health Infoway (Infoway) survey shows that within weeks of the pandemic lockdowns, virtually conducted consultations surged to 60 percent of all primary care visits, tripling the 2019 percentage.

A Canadian Medical Association poll shows that 91 percent of Canadians are satisfied with their virtual care experience.

Our healthcare systems can convert this generational opportunity and address some of our biggest healthcare challenges. Virtual care will help sustain our healthcare systems, address chronic disease, support healthy aging and provide better access to healthcare opportunities for our rural and remote communities.

To fully leverage these possibilities, we need to aim higher than a series of one-off solutions by ensuring that patients and the entire healthcare continuum are effectively engaged throughout a patient's healthcare journey.

We are in the most co-dependent era in the history of healthcare with rapid

privatization and corporatization happening throughout the healthcare system. High functioning systems will require a combination of traditional and atypical players. Our systems are moving towards more value-based care models, as seen in the UK, Scandinavia and the US.

**Getting ahead:** Innovators in the 42 current Ontario Health Teams improving services for their communities. They will attract funding envelopes and be rewarded for providing greater value and outcomes tailored to their respective populations and by addressing their most pressing pain points.

This value-based healthcare evolution will also map the patient journey beyond the traditional verticals of primary care, home and community and long-term care. For example, after patient discharge, a more connected healthcare journey would provide seamless medication instructions, easy access and transition to rehabilitation and mental health services, and personal support to help residents navigate their daily activities.

Today's healthcare lacks this robust personalized care management

approach, but if we get it right, tomorrow's healthcare will provide this seamless patient experience with real-time information through a mix of personal and virtual services. We are seeing new partnerships and alliances between providers, pharmacies, health technology companies and mobile tech leaders, that are helping to build the



Jimmy Yang

bridge to citizens spanning physical and digital care and experiences. **Barriers:** With any disruption to the traditional healthcare model, this co-dependent framework comes with its own barriers to change. In the existing context, we require funding reform or hybrid funding models, along with shared-risk models to solve for interoperability.

If patients want a seamless journey from left to right or right to left, we must ensure that the pharmacist, nurse,

physician and patient coordinator are all supporting a smooth journey and that our data moves seamlessly as well. The most recent data on electronic medical record (EMR) connectivity from the 2018 Canada Health Infoway surveys show limited EMR functionality between different healthcare sectors, and it's even lower between physicians and patients.

We must also consider how privacy, consent and personal health information come together, and require an overarching governance framework for sharing across verticals – think of it as open banking for health.

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Jimmy Yang is Accenture's Canadian Health Industry Lead



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# Ultrasound technologists devise face-shield with better protection

BY NICOLE SEIXEIRO

**I**t was just an idea. We had no expectations of it becoming real.” Those are the words of Lisa Billone and Sarah Allred, ultrasound technologists in the Department of Diagnostic Imaging at Hamilton Health Sciences (HHS). At the start of the pandemic, when much was still unknown about COVID-19, Billone and Allred came up with the idea of an extended face shield to wear during interactions with patients.

“This was in April. At the time, we didn’t know how the virus was spreading,” commented Billone, who works at Hamilton General Hospital (HGH). “We had some concerns about the lack of coverage from the face shields we were using at the time.”

Interactions between ultrasound technologists and their patients are unique compared to other patient-facing hospital staff. The patient lays on a stretcher with the technologist seated on an elevated chair beside them. While viewing the monitor of their ultrasound machine located beside the head of the stretcher, the technologist uses a handheld probe placed on the patient to acquire images.

This means that, while within arm’s reach during the entirety of the exam, the sides of the technologist’s face and neck are exposed to the patient.

“We noticed that the shields we were using left a big gap between the chin, neck, and the top of our gown,” says Allred. “Patients are lying down, looking up at us; we felt unprotected in that area.”

Billone and Allred discussed their idea with Dr. Michael Colapinto, radiologist lead for Ultrasound at Hamilton General Hospital.

“Lisa and Sarah were looking to develop personal protective equipment (PPE) optimized for ultrasound technologists,” said Dr. Colapinto. “I thought it was outstanding and wanted to support them in any way I could. They spoke to the PPE educators at HHS about their idea and with their consent, we



**The Ultrasound team at Hamilton Health Sciences’ Hamilton General Hospital developed an extended face shield in partnership with the McMaster Manufacturing and Research Institute and Printex Transparent Packaging for better protection against COVID-19. Left to right: Dr. Michael Colapinto, radiologist lead for Ultrasound, and ultrasound technologists Lisa Billone, Kaylana Parente, and Sarah Allred.**

emailed the McMaster Manufacturing Research Institute (MMRI) to see if they would be willing to lend their engineering expertise; they got back to us with an enthusiastic yes within an hour. It was remarkable.”

Kaylana Parente, also an ultrasound technologist at HGH with Billone and Allred, joined the team to help translate ideas into illustrations for discussions with MMRI. “Kaylana is exceptional with artwork and design,” said Dr. Colapinto. “She really helped to kick-start the process.”

Steve Remilli and Brady Semple work at the MMRI. When they read the Ultrasound team’s email, they immediately leaped at the opportunity. “Making a face shield for a hospital setting wasn’t something we were familiar with, so we never expected to be involved in something like this before. Our department generally works on metal cutting,” observed Remilli, project manager at the MMRI. “But we already had some of the materials and equipment, so that’s how we were able to put it together so quickly.”

Semple, a senior research engineer at the MMRI, spent about a week developing the original design followed by a few more days creating the prototype by hand. After roughly three weeks of some back-and-forth between the HGH Ultrasound team and MMRI, tweaking the design for comfort and safety, the finalized design of the extended face shield was complete.

Allred, Billone, Parente, and Colapinto then submitted the prototype to the HHS PPE Task Force for approval. “It turned out that Anesthesia and Medical Reprocessing at HHS were interested in similar protection,” said Dr. Colapinto. “It took off from there.”

Bryan Herechuk is the director of Quality and Value Improvement at HHS. When the ultrasound team and MMRI agreed on a set prototype, the MMRI team had to resume projects that were delayed due to the pandemic.

Herechuk swooped in to help get the extended face shield moving along. “I reached out to one of our vendors who were already providing standard face

shields for us and asked if this is something they would consider producing,” Herechuk explains. “They jumped right on it. They developed a prototype within a day of me sending them the drawings.”

Dave Tassé, sales manager at the local Burlington campus of Printex Transparent Packaging, was more than happy to get involved. “I’m a Hamilton guy. My wife works in a nursing home, too, so this project was really important to me,” said Tassé.

“At the time we got the request, we were designing face shields for children. I noticed we could take that innovation and put it into the extended face shield for HHS. I asked Bryan if they would be okay with it and he said yes. So, we used that innovation, with slight modifications to their design, and brought the second prototype to HHS and that was it.

Remilli said the project is a great example of collaboration between various areas of expertise. “This really shone a light on how groups of experts in their fields can play together very quickly. Everything came together so naturally.”

Ultrasound technologists across HHS have been using the extended face shields since last November. Allred is thrilled with her co-workers’ reaction to their new PPE. “The team loves them. They say the shields are easy to use and they’re reliable. We work with a lot of COVID-positive patients, so we feel safer with the shields on.”

Allred and Billone’s passion for ultrasound and providing care to patients has always been at the forefront of their minds – not dreaming up a new innovation. But, as Billone points out, sometimes a little encouragement is all you need. “You come to work every day and do what you do. I never thought I would ever be involved in something like this. “It is inspiring to know that if you have an idea, the hospital will support you in bringing it to life.”

*Nicole Seixeiro is with Hamilton Health Sciences Public Relations. <https://www.hamiltonhealthsciences.ca/share/ppe-collaboration/>*

PHOTO: JOSH CAREY, HAMILTON HEALTH SCIENCES

## Projects aim to prevent homelessness after hospital discharge

**L**ONDON, ONT. – During a virtual event for Londoners hosted by Lawson Health Research Institute and the City of London, a multi-sectoral research team announced two projects representing a collaborative approach to preventing homelessness from within hospital walls.

Built on the No Fixed Address strategy, these projects are being tested as a potential best practice for preventing hospital discharge to homelessness.

Led by Dr. Cheryl Forchuk, assistant scientific director at Lawson, No Fixed Address seeks to stop the cycle between hospital admissions and homelessness by providing timely and accessible supports to patients who would otherwise be discharged into homelessness.

It brings housing and financial supports into the health-care system, starting as soon as upon admission, to

assist in finding appropriate housing and supports or to avoid a potential eviction.

Several departments at LHSC and St. Joseph’s Health Care London are collaborating with staff from the City of London, Canadian Mental Health Association Elgin-Middlesex, Youth Opportunities Unlimited, Salvation Army’s Housing Stability Bank and Ontario Works in the City of London to provide direct, on-site (or virtual) support for patients at risk of homelessness.

Patients discharged from hospital to homelessness in Canada face many challenges that make recovery more difficult. They often experience higher readmission rates and emergency department visits. This is particularly concerning for youth, who have been found to be the fastest growing segment of the homeless population.

NFA was initially tested with strong

success for mental health patients across the city and the second version of the project was extended to medical units at LHSC’s University and Victoria Hospitals.

**PROJECT 1:** Collaboration to Address Homelessness – Health, Housing and Income (H2I). This research study will

**An outreach worker will support individuals at risk of homelessness to maintain or obtain housing.**

evaluate the City of London’s Coordinated Access Outreach program at hospital sites. A Coordinated Access Outreach worker will support individuals at risk of homelessness to maintain or obtain housing. Ontario Works will assist with the provision of

income and employment supports and the Salvation Army Housing Stability Bank may be accessed for needed financial resources to secure housing.

Over two years, 106 participants will be interviewed in hospital and again six months post-discharge. This project is funded by the Canada Mortgage and Housing Corporation’s National Housing Strategy.

**PROJECT 2:** Preventing discharge to No Fixed Address – Youth (NFA-Y). This research study will customize the NFA strategy for vulnerable youth 16-24. The unique health and housing needs of youth at-risk will be explored by streamlining housing and financial support into a coordinated system of care, with additional support provided by Youth Opportunities Unlimited and Children’s Aid Society London and Middlesex.



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# Analytics dashboard monitors COVID-19 patients at hospital and at home

BY NORM TOLLINSKY

As reports of overburdened hospitals and mounting COVID-19 deaths in China and Italy made headlines around the world, senior leadership at Montreal's Jewish General Hospital (JGH) began preparing for the inevitable spread of the virus to Canada. Topping their list of priorities was the development of an epidemiological prediction model to make sure they had the required number of beds, staff, ventilators and personal protective equipment (PPE) to cope with admissions.

Being prepared for COVID-19 was especially important for the JGH once it was designated by Quebec's Ministry of Health and Social Services as a lead institution for treating COVID-19 patients. With the busiest emergency room in the province and its Pavilion K, which contains a number of rooms specially equipped for a pandemic scenario, the JGH was ideally suited for its first responder role.

"At the beginning of the pandemic, there was a huge issue with PPE and the shortages thereof," recalled Danina Kapetanovic, strategic advisor for entrepreneurship and innovation at OROT, the JGH's research and innovation hub. "We were dealing with an unknown enemy and were faced with the reality of having to protect our healthcare workers. Given the experience of a few countries that were hit hard ahead of us, it became clear that this virus had the potential for completely overrunning our resources."

Fortunately, the JGH didn't have to scramble to find the data science expertise required to build the model. Prior to the pandemic, the hospital was working with Israeli-based Maisha Labs to develop an AI-powered Command and Control Platform to predict Emergency Room admissions and patient flow through the hospital.

"But when COVID-19 struck, we had to put it on hold and were asked to build a



Asaf Ashkenazi, Maisha Labs

COVID specific tool," said Ido Rivlin, Maisha Labs' chief data scientist.

During the first wave of the pandemic to hit Montreal, the model generated predictions with up to 98 per cent accuracy seven days in advance. On May 11th, for example, the hospital had 164 admissions – three less than the 167 the model predicted.

"We looked at a few ways to attack this problem using linear models, but it was a problem because we didn't have enough data to start making good projections," said Rivlin. "Instead, we used an epidemiological model and customized it for Montreal."

"To begin with, we gathered data from other countries that had their outbreak earlier, then used local data once COVID hit."

The model also factored in population age and density along with assumptions relating to social distancing based on school closings, lockdowns and public adherence to the rules in force.

Tweaking the model proved necessary through the summer and late fall when the second wave hit Montreal, "but having in-



Dr. Justin Cross, JGH's chief digital health officer

house data scientists with hands-on capability, you can adjust your models and see what works," said Asaf Ashkenazi, executive board member, Maisha Labs. "That's an advantage that a startup has over an enterprise system. You have to be agile and be able to adjust to rapid changes."

Founded in 2011, Maisha Labs initially focused on bringing together data scientists, engineers, cyber security specialists and law enforcement to help NGOs and governments in Africa combat the illegal trade in persons, wildlife and natural resources.

Following a major fire in Israel in 2010, Ashkenazi was responsible for building a predictive analytics model to forecast the demand for firefighting services 15 years in the future, "so we have experience predicting large-scale phenomena and from our work in Africa, we are skilled in intelligence gathering and data exploitation," he said.

The epidemiological prediction tool is part of a broader situational awareness solution called CARE 360 that provides front-line staff at the JGH with a dashboard overview of its COVID-19 patients.

"When we saw stories coming out of Italy about the number of patients admitted to hospital, we wanted to put together a dashboard view of all admitted COVID-19 patients with key indicators including vital signs, lab values and length of stay information that clinicians could reference if they were so overwhelmed that they didn't have time to do their normal EHR workflow," said Dr. Justin Cross, the JGH's chief digital health officer. "That's another piece of the work with Maisha Labs."

The solution allows clinicians to zoom in on an individual patient and view vital sign data from biomedical equipment, freeing them from having to enter a patient's room.

Taking the solution one step further, the JGH has launched a pilot project with Maisha Labs to deploy a wearable vital sign monitoring device from Tel Aviv-based Biobeat that's cloud enabled and would allow the JGH the option to monitor patients outside the hospital, said Dr. Cross.

"For example, if we had patients who were ready to go home, but we wanted to keep an eye on them for a few days, we could send them home with one of these devices. There's a patch and there's a watch."

Recently certified for use by Health Canada, the Biobeat devices measure 14 vital signs, including blood oxygen saturation, respiratory rate, blood pressure and pulse rate.

A third component of CARE 360 is a geolocation tool that "allows us to have an overview of where there are concentrations and clusters of infection (in the Montreal area)," said Kapetanovic. "The tool also has the capability to push information to the public and warn the elderly, for example, to socially distance, avoid going out and to wear protective equipment if there is an outbreak in their area."

Decision making related to the pandemic is made in the JGH's Command Centre, where key people from different departments have access to the Maisha Labs information systems.

The objective, said Dr. Cross, is to "change the culture of decision making" by putting key people in the same room and provide them with all of the information they need about patient flow and bed occupancy to respond rapidly as situations come up."

The Command Centre is also being used to co-ordinate and manage the vaccine rollout to the long-term care homes in the Integrated Health and Social Services University Network for West-Central Montreal, which comprises 34 healthcare organizations including the JGH.

In a post COVID world, Maisha Labs will focus on the AI-based Command and

**During the first wave of COVID-19, the model generated predictions with 98 percent accuracy, seven days in advance.**

Control product that it was in the midst of developing when COVID relegated it to the back burner.

"The Command and Control platform predicts ER volumes along with admissions and discharges," said Amanda Babbit, who heads up the Montreal office for Maisha Labs. "It's a tool that allows the hospital to see what's happening in various areas and highlights early warning signs so they can be addressed proactively."

"It's used for operational purposes by our bed flow co-ordinators to try to get an advanced idea of how many people are likely to be admitted to the ER and how many rooms we need to get ready. It also helps us make arrangements for transport to reduce the wait time for patients in the ER once a doctor has decided that they need to be admitted," said Dr. Cross.

"It has really helped with patient flow. It predicts anticipated volumes in the ER several days ahead of time, so it's really helpful for ER staffing."

Maisha Labs is realistic about the long-term need for CARE 360 and the epidemiological prediction model for COVID-19.

"More than anything else, we really hope that this tool will not be needed long term," said Ashkenazi. In the meantime, "We're happy to share it with new clients or offer it to anyone who needs it provided we are able to cover our integration costs."

## Working smarter

CONTINUED FROM PAGE 4

Patients who came in for a "test-only" could always change care paths if they were identified to be sicker than originally expected. These changes allowed patients to receive the right type of service, in a timely manner, by the right healthcare provider.

In addition, our efforts decreased duplication and associated potential errors. A notable example was to allow the printing of a report that identically mimicked the paper-format COVID-19 laboratory requisition required by Ontario Public Health laboratories, by using the administrative and clinical data documented through our HIS.

The report was printed once the order was completed in the HIS by our frontline worker. This meant we were no longer required to fill out a paper version of the laboratory requisition.

By introducing two different types of visits in our second model, we became more efficient and reduced direct human resources cost by 33%.

By using technology to our advantage, we were able to decrease the time to complete a visit for a "test-only" appointment by approximately 50%. As an example, patients spent on

**By introducing two types of COVID-19 visits, human resource costs were reduced by 33 percent.**

average 24.7 minutes initially for a "test-only" visit. Our new model decreased this time to roughly 12 minutes. Consequently, patient satisfaction improved.

Although the staff was reluctant at first, they are now very happy with the changes and would not go back to our original model.



# Lakeridge Health quickly pivots to virtual care during the COVID-19 crisis

A Microsoft 365-powered bookings app and Teams were used to create over 30 new virtual clinics.

**F**aced with the unpredicted challenge of the COVID-19 crisis, Lakeridge Health, a healthcare provider to hundreds of thousands of Canadians in a large catchment area just east of Toronto, quickly enacted its pandemic response plan.

This included the creation of new solutions capable of offering an 800 percent increase in virtual care, limiting patient and staff exposure to the virus.

By creatively adapting multiple Microsoft 365 and Microsoft Power Platform solutions to work in new and innovative ways, the organization has met its goals, simultaneously creating a nearly entirely new electronic medical record (EMR) platform.

Lakeridge Health, comprised of five hospitals and 11 clinical outpatient facilities, provides primary healthcare to more than 750,000 people in the Durham region of Ontario. As a crucial and integral part of the region's medical system, Lakeridge Health played a significant role in the local response to the COVID-19 crisis.

"COVID-19 was something that took the entire healthcare system by surprise," said Dr. Ilan Lenga, Chief Information Officer and Chief Medical Information Officer at Lakeridge Health. "And the realization that it had gained a foothold in Canada required an immediate response."

Thankfully, after the 2002–2004 SARS epidemic proved how rapidly viruses can spread across the globe, Lakeridge Health had formulated an emergency operations plan. Key leaders were placed in pandemic-response roles, and the organization began developing plans to draw down regular activities in preparation for a projected surge in patients. The organization's communications team worked to rapidly build out new channels capable of managing interactions between hospital staff, their external partners, and regional leadership.

Lakeridge Health next identified three major changes that would need to be enacted to meet the challenge of the COVID-19 virus. "We needed to cut down face-to-face interactions for the safety of our patients and our employees, we needed to create a system that would allow for the rapid deployment of multiple new clinics, and we needed to ensure that we were providing a safe environment for our patients and staff during in-person care scenarios," said Andrew Kelly, Director of IT Strategy and Innovation at Lakeridge Health. "We relied heavily on Microsoft 365 to create solutions for each of those needs."

Though Lakeridge Health had been using a number of Office 365 components for years, Lenga admits that very few users would have considered themselves highly proficient prior to the COVID-19 crisis.

"It's the expertise that we've developed over the last few months that took us from Microsoft 365-aware to Microsoft 365 experts," he recalls. "That's what's great about the solution. There are multiple easy-to-understand tools that make up Microsoft 365, which you can pick up, learn a little about, and use as building blocks for almost any kind of infrastructure you might require."

The first of these building blocks Lakeridge Health turned to were Microsoft Forms, Power Automate, and SharePoint Online. "At the very beginning, we knew we needed a solution capable of keeping track of a massive influx of patients," said Lenga. "Right away, we began creating an intake form in Microsoft Forms, which we then fed to Power Automate



so that it could extract patient information and populate a SharePoint site for us."

This SharePoint site quickly became the standard patient-tracking solution for Lakeridge Health. Adding a small amount of analytics to this site, the organization effectively triaged patients based on their reported symptoms. This was especially important during the early days of the pandemic when testing supplies, swabs, and even personal protective equipment (PPE) faced national shortages.

For patients requiring assessment, but not yet in need of testing, Lakeridge Health turned to Microsoft Teams. Using Teams for virtual assessments, medical personnel could better understand the state of each patient's symptoms, keeping those who likely did not have the virus safer by allowing them to stay at home.

As time went on, testing supplies became more available, allowing Lakeridge Health to test everyone who felt the need to be tested. This created other is-

diagnostic requests compared to the organization's traditional requisition system.

"By tying our SharePoint sites to Power Apps and Power Automate, we've been able to take all the information that patients give us and use it to generate a requisition," said Lenga. "We can even produce a label for our swab and produce a requisition for our laboratory requests right from SharePoint."

Scalability has also been a crucial part of Lakeridge Health's pandemic response. The early stages of the COVID-19 crisis saw an 800 percent increase in patient visits compared to an average year. Lakeridge Health handled many of these visits through virtual care and, as demand for these services steadily increased, leadership saw a dire need for increased virtual care capacity.

In years past, the process of creating a virtual clinic within an existing department or ambulatory space at Lakeridge Health took between three and six months. Thanks to a combination of cooperation from the health ministry and its newly minted solutions, the organization was able to speed that process dramatically.

"We used a combination of our Microsoft 365-powered bookings app and Teams to spin up over 30 new virtual clinics in just weeks," said Kelly. "We were creating a new clinic every couple of days."

These new clinics also quickly benefited from other solutions Lakeridge Health created. "We started by testing our new Microsoft 365-based apps at one clinic, and then a second," said Kelly. "Thanks to the intuitive nature of these solutions, we've since gone on to offer them to multiple community sites and clinics, where we've seen our clinical teams take to them very rapidly."

Lenga agrees, adding that the organization's overarching goal in offering virtual services has always been top-quality care. "We had a lot of clinicians who were hesitant about the virtual care experience," he said. "This has since transformed into glowing recommendations. One of the most prevalent things we hear from our personnel today is confidence in the idea that virtual care is here to stay – that this isn't a stop-gap in a time of crisis, but a transition to a new standard of care."

"We have been truly amazed by what we've been able to accomplish in a relatively short amount of time, and we're equally excited to see what we'll be able to accomplish with Microsoft 365 in the days to come."

**There are multiple easy-to-understand tools that make up Microsoft 365, which you can pick up, learn a little about, and use as building blocks.**

sues, however. "If you switch to a universal testing approach without a clear-cut appointments schedule, you run the risk of potentially infected people congregating in long lines outside your facilities," said Lenga. "That's why we used Power Automate and the calendar in Office 365 to create a new booking system."

Similar to the patient triage system, Lakeridge Health's booking system allows patients to provide their data in Forms. Power Automate then identifies a number of key factors within that data and triages them accordingly, ultimately referencing an Office 365 calendar populated by prearranged appointment slots based on staff availability and scheduling the patient.

Patients are then sent automated appointment confirmation emails, and the appointment is made visible to receptionists via SharePoint Online.

To further track patient interactions, Lakeridge Health also built nurses and physicians role-specific apps with Microsoft Power Apps. These apps not only help with patient data entry into the system following screenings, but they have also sped laboratory



# Integrated communications system boosts safety at Interior Health

The implementation of Vocera has helped clinicians deliver high-quality care amid the pandemic.

BY JERRY ZEIDENBERG

Interior Health, headquartered in Kelowna, BC, had just finished rolling out its Vocera integrated communications platform region-wide when the COVID-19 pandemic struck with full force in March of 2020. It was excellent timing, as the technology enables staff and clinicians to instantly call each other by using hands-free badges, even when wearing personal protective equipment. The user can say, OK Vocera, call Dr. John Smith, and he or she will be quickly connected.

Users can even find a person by role. For example, you can ask for the on-call cardiologist, and the system will find the person on its own.

That was a big help when it came to managing patients and keeping staff free from infection.

"When COVID hit, we had to respond quickly," said Andrew Povah, manager of Mobility Services at Interior Health, who spoke at a webinar on Real-Time Communication Systems in Healthcare, last October. "We let the staff know that communications would be essential."

Interior Health serves a population of 801,000 in British Columbia and comprises numerous hospitals and long-term care centres, many of which utilize Vocera. It has an annual operating budget of \$2.6 billion.

During his webinar presentation, Povah gave specific examples of how the Vocera platform has helped staff and clinicians. He discussed the case of the region's Princeton General Hospital, a community facility just outside Penticton, BC. While the centre is well-equipped for acute care and has an emergency department and lab, it didn't have isolation rooms for patients infected with COVID-19.

The staff at Princeton General improvised and quickly created an isolation room, but it lacked windows, telephony and intercoms. "So, facilitating effective communication in this room was a huge challenge," said Povah.

Phones or intercoms to communicate with patients could have been installed, but it would have taken a fair amount of time. "When you're cabling and you've got contractors coming in, it's not a matter of days that you need, it's weeks," said Povah.

He said that since the facility was already using Vocera, the I.T. staff asked why they hadn't extended it into the isolation room. It turned out that clinicians were using highly plasticized, protective gowns, and this heavy PPE generated noise that made it hard to work with the Vocera badges, especially when used underneath the gowns.

A solution was found in wearing the badges outside the gowns and using a special protocol for cleaning the devices afterwards. As well, it was found that clinicians could continue wearing the badges under their gowns by retraining the Vocera system to understand their muffled voices.

As another measure, a badge was installed in the room using the auto-answer feature, so that it acted as a wireless intercom. "It meant we didn't have to take badges in and out of the room anymore," said Povah. Instead, staff outside the room could converse with clinicians who had entered, as well as with the patient.

"This was a very successful implementation, and we took the learnings and used them at our other sites in British Columbia," said Povah.

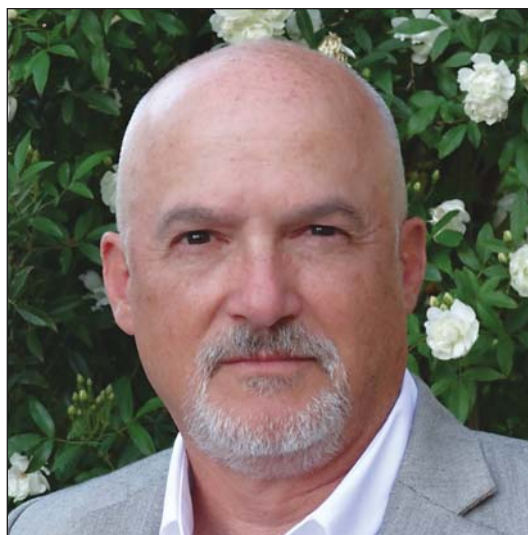
Meanwhile, at the Kelowna General Hospital, a

large tertiary facility, Povah said there was significant demand from clinicians who wanted streamlined communications.

The strategy was to increase the number of devices being used by clinicians, such as in the emergency department. "This greatly improved their ability to communicate about the flow of patients in the ER," said Povah.

Another group that hadn't previously been onboarded were the respiratory therapists. With COVID-19 being a respiratory disease, their services were crucial. "This deployment was extremely helpful," said Povah.

The platform was also useful to security personnel and those controlling the entrances and exits of the hospital. "The purpose here was to assess visitors and determine whether they could come in," said Povah.



Dr. Ben Kanter, CMIO at Vocera

These staff members quickly found that they had a need to communicate amongst themselves. "Being a large facility with multiple entrances and exits, staff wanted to communicate about personnel levels and resource requirements – and to communicate about visitors who may have been rejected at one entrance and might be trying to come in through another one."

Using the backend programming of the Vocera system, role-based communications were deployed and became important. This occurred in logistics and was helpful in replenishing PPE.

As there were constraints in the supply of PPE, the wards were being stocked on an as-needed basis. "That meant when you needed top-ups, you needed them very quickly," said Povah. "That role was very effective in getting the PPE to the right place and the right time."

Another important role, and perhaps an unexpected one, was elevator cleaning. "After a patient transfer, we had to clean the elevator and communicate that it had been completed to ensure the safety of our staff and patients," he said. "Vocera played a key role there."

At Noric House, a long-term care centre in Vernon, BC, visits to the facility were limited, and at times were completely prohibited. However, the facility used the Vocera system to connect patients to visitors – outside their windows – by deploying a Vocera badge in the room of the patient. As with the Princeton General Hospital, the badge was set to

auto-answer, so the patient didn't have to manually operate the device. Visitors outside could be connected, even using their own cell phones, and they could communicate with their loved ones inside.

"It bridged the communication gap while we weren't allowing visitors inside," said Povah.

Dr. Ben Kanter, chief medical information officer at Vocera, asserted that an integrated communication system is essential for hospitals to respond quickly to a variety of patient alerts, and to connect staff and clinicians.

Clinicians shouldn't have to pause to look up a number, contact the switchboard, or find out who is on call in a hospital. An integrated system should be able to do this work for the clinician or staff member.

"The quicker a message gets through to a nurse or other healthcare professional, the more likely there



Andrew Povah, manager of Mobility Services at Interior Health.

will be a good outcome," said Dr. Kanter, who also spoke at the webinar. Dr. Kanter asserted that "shortening the time to act – for clinical and operational processes – is critical to overall healthcare delivery."

He noted that Vocera can be used to integrate the large number of alerting systems used in hospitals – such as cardiac monitors, telemetry and lab results – and when appropriate, to direct them to the right person, so the situation can be normalized.

If a person is busy or doesn't respond, the system can escalate the message to the next available and appropriate person.

"To accomplish this, hospitals need technologies that can monitor systems and using rules and logic, can distribute information to staff based on their various roles and responsibilities."

Without a system of logical handoffs, he observed, a nurse could otherwise receive five alarms from five different systems in the space of five minutes. "That can be chaotic," said Dr. Kanter. However, the Vocera platform can take inputs from up to 150 different systems, aggregate them, and forward them to the appropriate person.

Messages can be sent to any and all devices, from hospitals with a BYOD strategy, to Vocera's own badges, or standard tablets, phones and desktops. Moreover, using the Vocera devices, communication can be done hands-free, using voice recognition and activation. "We've been doing this for 20 years," said Dr. Kanter. "Long before Amazon and Google."



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# Virtual care has progressed, but more work on integration is needed

Advances in interoperability, and scaling it up, would make it even more useful.

BY DR. SUNNY MALHOTRA

**A**s 2021 begins, the COVID-19 pandemic remains rampant, raising the death toll in the United States to well over 400,000 and counting. Healthcare companies like Pfizer and Moderna have raced against the odds to produce and obtain authorization for the distribution of their vaccines.

However, the approval of these vaccines is only one of the many obstacles that healthcare industries face moving forward. COVID health technologies, like virtual healthcare, remote patient monitoring, predictive analytics, and vaccine deployment have brought about solutions to alleviate many healthcare challenges to date, but some still fall short of meeting the mark.

Virtual healthcare has proven to be the most critical to the COVID-19 strategy. Taking healthcare online allows patients to have a virtual means of access and communication with their physicians, thereby alleviating the overcrowding of waiting rooms and facilities and reducing the chance of spreading the virus.

It allows staff members to provide a great deal of care in an efficient and effective manner. In many cases, it is also more convenient for patients.

However, virtual healthcare comes with its limitations. Integration between these new solutions and existing clinical workflows is needed to ensure the seamless exchange of information and easy access for both providers and patients alike. Integrating these features into virtual healthcare will further improve its usefulness.

Another technological solution in the fight against COVID is remote patient monitoring. Employing remote patient monitoring allows patients to recover at home while still being under the surveillance of their medical providers and decreasing spreadable risk.

Remote patient monitoring can also be utilized in hospital settings by allowing nurses to monitor and communicate with inpatients via streaming of real-time video feeds, thus reducing physical contact and lowering the risk of transmission. Although many organizations can launch new solutions like these, most lack the infrastructure to survey many patients at once without compromising the quality of healthcare that

**Integration between new solutions and traditional workflows would ensure the seamless exchange of information for doctors and patients.**

patients receive. These technologies need to become scalable, and interoperable with clinical workflows, to improve patient care and maximize productivity.

Predictive Analytics has helped us recognize health disparities amongst specific communities within our patient populations. These solutions gather specific data on population subsets and offer insight into stratifying risks and implementing tactics to better serve the needs of each community.

Companies like Health Catalyst offer

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platform solutions for anticipation of patient loads and capacity strains, thus assisting hospital organizations in the preparation for future outbreaks. However, most healthcare organizations fall short of ensuring that all involved understand the data provided and can apply it to generate real-world solutions.

Predictive analytics can further evolve by offering real-time evidence and "possible solution" algorithms to ensure proactive mitigation of risk and their prospective outcomes.

More recently, vaccine deployment has become the top priority in the war against the pandemic and has proven to be a more challenging task, but business management technologies offer new solutions to help in efficient and organized distribution of COVID vaccines.

Companies like Accenture aid healthcare organizations by providing vaccine management solutions. This includes planning to meet the needs of different levels of care, and to allocate the appropriate funding for such distribution.

Accenture provides a software platform that is designed to securely track vaccination journeys from registration and appointment scheduling to final administration and symptom follow-ups.

Robotic process automation services can support vaccine supply ordering, inventory management and demand forecasting. Vaccine management platforms can also help with increases in surges by deploying virtual agents to address questions and automate texts and emails for community engagement, eligibility screening, and health surveys.

They can also gather public

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## How COVID will continue to transform healthcare organizations

BY LANA LEONE

**D**espite the many challenges of 2020, healthcare organizations have gained considerable insights and experience that will transform healthcare well into the future. Today, hospitals are already adopting technologies that are helping them realize critical cost-savings and productivity benefits. These advancements promise to become mainstream after the pandemic is a distant memory. Here are some of the trends you can expect in 2021.

**Focus on the supply chain:** Even before the pandemic, supply chain inefficiencies cost hospitals more than \$25.7 billion each year, according to an analysis from Guidehouse, the international consulting company. The pandemic further exacerbated those shortcomings. Ventilators and basic

supplies needed to keep patients and clinicians safe, such as hand sanitizer and personal protective equipment (PPE), were hard to come by.

In 2021, we are seeing hospitals increasingly embracing technologies such as barcodes, radio frequency identification (RFID) and real-time location systems (RTLS) to gain unprecedented visibility and control of their supply chain and inventory management systems. These visibility enhancements will also help hospitals reduce inventory waste due to unused and expired supplies.

**Streamlining patient care:** Beds also became a scarce resource at many hospitals in 2020. This year, more hospitals are exploring new ways to move patients through the system faster. Hospitals can use both location technologies and mobile computers to track and streamline treatment throughout a patient's stay. Using these technologies, hospitals

can create an "electronic whiteboard" that records everything from specimen analysis and X-rays to physical therapy.

Hospitals can then monitor precisely how long each treatment takes and identify where workflow bottlenecks exist. For instance, is it difficult to find a wheelchair to transport a discharged patient? Are there regular backups in X-ray, laboratory testing, social services or other areas that affect patient care?

Technology has proven highly effective in improving patient turnaround times and hospital

workflows. RTLS tags, for example, can be added to wheelchairs so that nurses can locate them quickly to speed patient discharge. Once the patient is wheeled out of the room, nurses can use their purpose-built mobile devices to notify housekeeping that the room is available for cleaning.

Research shows that technologies like RTLS can result in up to 50% faster bed turnover times and as much as a three-hour reduction in patient length of stay. In a 275-bed hospital, cutting just four hours off the average hospital stay is the same as adding 10 new beds.

**Making healthcare professionals' jobs easier:** Staff burnout became a huge issue last year, with hospital facilities and their clinicians struggling to keep up. One way to decrease burnout is to make clinicians' roles easier. To accomplish this, many hospitals are

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Lana Leone



# Three ways the healthcare sector has been transformed by COVID-19

BY PETER JONES

**W**hile the COVID-19 crisis has created immeasurable challenges for the healthcare system, it has also demonstrated that there is no shortage of innovators in the industry who were ready to meet the moment. Reflecting on all that happened in 2020, three important takeaways stand out: virtual care is here to stay; balancing innovation with security, privacy and compliance is critical; and finally, innovation will continue to shape Canada's healthcare system.

**Virtual care is here to stay:** We have seen extraordinary advancements across our healthcare system as providers accelerated their adoption of virtual care. The pandemic has made in-person doctor visits challenging, but it has been especially hard for patients with mobility issues, a compromised immune system or living in areas with a shortage of clinicians or healthcare facilities.



Peter Jones

The introduction of billing codes that enable doctors to charge for virtual visits have created new opportunities – and there are signs this is here to stay, with Alberta making these codes permanent.

We are working with providers to use the complete meetings platform in Microsoft Teams, combined with the new Bookings app in Teams, to schedule, manage and conduct virtual visits with patients. In addition to virtual visits, these tools empower health teams to collaborate more effectively and share knowledge in a single secure place, with advanced messaging features.

When the pandemic hit, Lakeridge Health, a healthcare provider to hundreds of thousands of people in Ontario, quickly adopted new solutions that provided the capability of offering an 800 percent increase in virtual care. The organization used a combination of Microsoft 365 and Microsoft Power Platform solutions, including Teams, to create over 30 new virtual clinics in just weeks.

The benefits of virtual care have been well-received by patients and healthcare providers alike – it has become clear that this isn't a stop-gap in a time of crisis, but a transition to a new standard of care.

While many digital solutions were adopted out of necessity, this is a powerful example that shows how the changes put in place today will help medical professionals deliver personalized care to Canadians in new, innovative ways in the post-COVID world.

The next evolution of virtual care will centre around the experience – from booking the appointment to automated follow-ups after the visit, the patient is fully engaged and can easily include family members.

Practitioners are starting to use Speech AI for clinical charting and documentation that will automatically integrate with a patient's Electronic Health Record, as

we're seeing with Nuance Communication's Ambient Intelligence, or interacting with a bot during a virtual visit to pull up the latest diagnostic imaging.

**Balancing innovation with security, privacy and compliance is critical:** As more healthcare organizations adopt digital so-

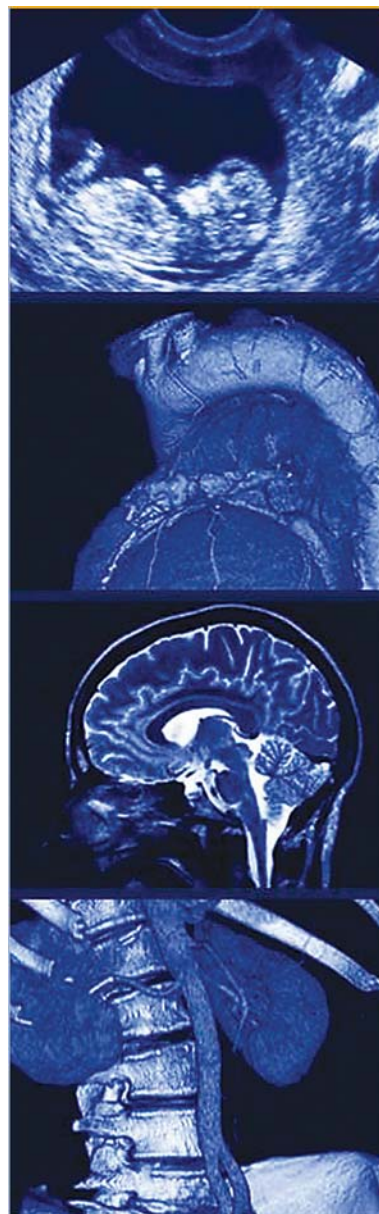
lutions and conduct virtual visits, the need for vigilant cybersecurity is paramount.

Increasingly, Canada's healthcare system is facing sophisticated cyber threats from bad actors trying to access patient information and other data. Unfortunately, according to the Canadian Centre for Cy-

ber Security, the pandemic has only exacerbated the problem with cybercriminals looking to exploit the crisis by targeting healthcare organizations supporting the national response to COVID-19.

Recognizing this growing threat, Mi-

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# COVID speeds up demand for technology in hospitals and community

**T**ORONTO – Burnout is becoming a major side-effect of the pandemic, as physicians, nurses and technologists succumb to exhaustion. Observers have noted, however, that solutions are available that aren't yet being used – especially in Canada – that could effectively allow healthcare professionals to work smarter, not harder.

In the area of diagnostic imaging, for example, workload balancing systems could be more extensively used. These “smart” systems can divide a workload among radiologists so that individual physicians are not overloaded. They can also direct the appropriate exams to specialists – such as radiologists with expertise in reading neuro images or mammography. And they can rush urgent cases to the top of the queue.

For its part, Siemens Healthineers has a solution called Medicalis Workflow Orchestrator that does all of this and is vendor agnostic.

“We can divide up to the workload, even sending it to radiologists at different hospitals based on their credentials” said Niles Geminiuc, director of Digital Health and Business Development at Siemens Healthineers. “The solution sits on top of the hospital PACS, and lets the radiologists read exams from any of the hospitals in the network. Having the right radiologist read the right exam for the patient at the right time is crucial in improving outcomes.”

Prior to COVID, there were stresses and inefficiencies in the healthcare system, but they weren't as visible,” said Sevket On, vice president and zone general manager of Siemens Healthineers in Canada. “Now, there are many more demands on the sys-

tem, with people urgently asking for care. The stresses have come to the surface.”

Mr. On said that artificial intelligence is another solution to the problem of overload and burnout. “AI is a huge topic, and we're investing heavily into it,” he asserted. “We're building it into our products to increase efficiencies and, on another front, to tailor the diagnoses and therapies being used so that they better suit the patients.”

“In this way, we can improve therapeutic outcomes.”

A new system from the company, called AI Pathway Companion, brings together data on the patient and his or her disease. It's a form of precision medicine designed to support clinicians and their patients in diagnosis and therapeutic decision-making. It enables users to aggregate, correlate, and visualize data in context to the patient and disease.

There's another dimension to using intelligent systems in this way, said Mr. On. “One of the most understated benefits is that it brings the same level of care to locations across the country. You can bring the high level of care that you'd experience in Toronto or top sites around the world to anywhere in Canada.”

Mr. On noted that already, AI in cardiology is being used by some cardiologists and radiologists to provide amazingly fast reconstructions of the organ. “What used to take an hour of the doctor's time can now be done in three or four minutes. We're giving an hour back to the cardiologist or radiologist. It means they can concentrate on more urgent work.”

Mr. On also observed that imaging professionals want to look at a variety of images and reports but are hindered by the

variety of systems and information silos used in hospitals and healthcare networks. For its part, Siemens will be launching a new platform in Canada called Syngo Carbon. It is expected to be rolled out in June.

The Syngo Carbon platform will integrate all types of imaging modalities, so that they're readily available to all clinicians. “It will integrate all kinds of images, from DI, cardiology, pathology, even wound care,”



Niles Geminiuc



Sevket On

said Mr. Geminiuc. “And it will be vendor agnostic. That's a game-changer.”

Now that many hospitals are being overloaded with COVID-19 patients, while still trying to provide care to patients with other medical issues, there is an urgent need to reduce visits to hospital, if possible.

For this reason, the “Hospital at Home” concept is gaining traction worldwide. It is already being used in the United States and Australia, and a pilot project has been launched in British Columbia. Other areas of Canada are watching it with interest, as it essentially transfers some types of care from traditional hospitals to the homes of patients.

A successful hospital at home program was devised by Johns Hopkins Schools of

Medicine and Public Health in the United States, and after being tested in many settings, has fanned out to centres across the country, including VA hospitals and the Cedars-Sinai Medical Centre, in Los Angeles, California.

The program treats patients with pneumonia, heart failure and COPD in their own homes, in collaboration with home care nurses, and it also uses a video link between caregivers and patients and their families. Patients are examined at least once a day by a doctor using a remote technology.

In more advanced implementations, patients can receive diagnostic studies such as electrocardiograms, echocardiograms, and X-rays at home. They can also receive oxygen therapy, intravenous fluids, intravenous antibiotics and other medicines, respiratory therapy, pharmacy services and skilled nursing.

The Johns Hopkins Hospital at Home studies found cost savings of about 30 percent compared to traditional inpatient care, with better clinical outcomes. There were fewer iatrogenic complications associated with hospital stays, such as delirium, polypharmacy and functional decline.

For its part, Mr. Geminiuc said Siemens Healthineers currently has a system called myCare Companion, which is used for remote management of patients with chronic diseases. The solution has initially been used at the German Heart and Diabetes Centre for the care of patients with chronic heart failure.

Mr. On asserted that COVID-19 has transformed the healthcare system. It is leading to the reorganization of hospitals and to efforts to make them more efficient than ever. There's a need to improve procedures for inpatients, and a growing movement to provide care outside of hospitals – in the homes of patients – when possible.

In both cases, he said, computerized systems are leading to new solutions. “COVID has expedited the urgency of digitalization,” said Mr. On.

## More work on integration is needed

CONTINUED FROM PAGE 12

health and third-party data to create vaccine distribution plans to define high-priority populations and monitor population engagement, dosage regimen adherence, and distribution logistics by using artificial intelligence services and capabilities.

Furthermore, it is important that these solutions can integrate with existing solutions like electronic health records to enable vaccine inventory, provider agreements, administration data, and patient health information.

By improving technologies like virtual healthcare, remote patient monitoring, and predictive analytic solutions for the COVID-19 pandemic, we can further enhance patient care and well-being. By combining new solutions like Accenture in vaccine deployment management and existing solutions, the possibility of combating and overcoming the demand of the COVID pandemic becomes more attainable.



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# Clinicians and patients recognize virtual care's convenience, safety and quality

Smartphones have ushered in a revolution in care, enabling patients to be more easily monitored.

BY DIANNE DANIEL

For Cathy Slevin, senior manager of clinical care programs at the Central East Local Health Integration Network (LHIN) in Ontario, it was a “kumbaya” moment. In Ajax, Ont., Lakeridge Health chief medical information officer Dr. Ilan Lenga overheard his chief of surgery say the transition is so big, the hospital is never going back.

Patient-centred virtual care, it seems, is emerging a clear winner of the COVID-19 crisis and the verdict is in: the connections being forged between people, technology and processes will be lasting ones.

“COVID has really been one of those kumbaya situations that brought us all together ... to find innovative ways of managing patient care in the community,” said Slevin.

The Central East LHIN has provided remote care monitoring for chronic disease patients since 2016 using the Vivify Pathways platform through Ontario Telemedicine Network (OTN), now part of Ontario Health. When the pandemic came along, they quickly pivoted with their hospital partners to launch a virtual hospital ward program.

“We never anticipated that remote care would show its weight in gold,” said Slevin. “Everyone was trying to stay out of the Emergency and out of hospital. It became even more pressing to spin off from that model into other programs.”

Launched at the height of the first wave of COVID in Canada and made possible through Ontario Health funding, the virtual ward is a collaboration between Central East LHIN Home and Community Support Services and Lakeridge Health that uses the Vivify platform to monitor patients at home.

Durham Region residents who have a probable or confirmed case of COVID-19 were targeted first and the platform has since expanded to include post-surgical thoracic, orthopedic and gynecologic patients with additional patient groups currently being rolled out.

“In wave one of COVID, it was really apparent that we needed to target COVID patients and we needed to do what we could to keep those patients out of the Emergency, to keep them home and safe,” said Slevin.

After being referred to the virtual ward, patients receive instructions via text or email on how to download the smartphone app that will connect them to the monitoring program and, in the case of COVID patients, are provided with pulse oximeters to measure their oxygen saturation levels as an early warning system for hypoxia. Twice a day they are prompted by the app to record their symptoms while community nurses, assigned specific patient groups on a daily basis, watch for alerts from their desktop dashboards.

The platform triages the incoming data in order of priority and patients are contacted as needed for further assessment, either by phone or video. Some alerts take a short time to resolve – if a patient simply needs a medication reminder, for example – while others take longer and may escalate to a trip to hospital.

Benefits include a reduction in unnecessary trips to Emergency on one hand and early intervention on the other – especially for COVID patients who may not realize they are experiencing harmfully low oxygen saturations on their own.

The “magic,” said Slevin, is the collaboration between hospital and community care. Lakeridge Health clinical teams work closely with community

nurses through dedicated Q&A sessions to develop the screening tools for each patient group, including what to monitor, what’s considered normal, what to look for and when to refer back to hospital.

Dr. Ilan Lenga, a nephrologist and chief medical information officer at Lakeridge Health, calls the Central East LHIN a fantastic partner whose experience and capacity was vital in setting up the virtual ward, one prong of a broader virtual care strategy the hospital embarked on three years ago.

“Our mantra has always been quality is our first objective. We want to provide quality care that happens to be delivered virtually; we don’t want to pro-

tual waiting room designed in collaboration with Dapasoft. After submitting intake forms online, patients are seen within four hours. “We’ll ping you when you’re third on the list to be seen, just like you would get buzzed at the Cheesecake Factory when it’s time for your table,” explained Dr. Lenga.

The virtual clinic – which is accessed by smartphone, tablet or computer with webcam, microphone and speaker – allows patients to see multiple providers in the same virtual visit, returning to the virtual waiting room in-between. If a patient needs to be seen in person, the platform ensures a “warm” handoff, he added, so that the attending Emergency physician is brought up to speed.

Clinical confidence in virtual care is high because the ability to escalate a patient to a real world setting when required is expected and understood, said Dr. Lenga. At the same time, patients are coming to the virtual setting by choice.

At McGill University Health Centre (MUHC), in Montreal, radiation oncologist and co-lead of the Opal patient portal app, Dr. Tarek Hijal, says the timing is right to adopt it as a new mentality in healthcare.

Dr. Hijal said that smartphone penetration is high across the country, with roughly 32 million Canadians estimated to be using smartphones this year. And because people are becoming accustomed to “doing things for themselves” on their smartphones, just as they manage travel or finances, they are willing and able to manage their healthcare information and encounters.

The Opal patient portal app – named eHealth Solution of the Year in 2019 – started as a project to empower cancer patients receiving care at regional cancer clinics in Montreal. It has since expanded to include HIV and inflammatory bowel disease clinics with plans to advance to cardiology clinics and home monitoring, as well.

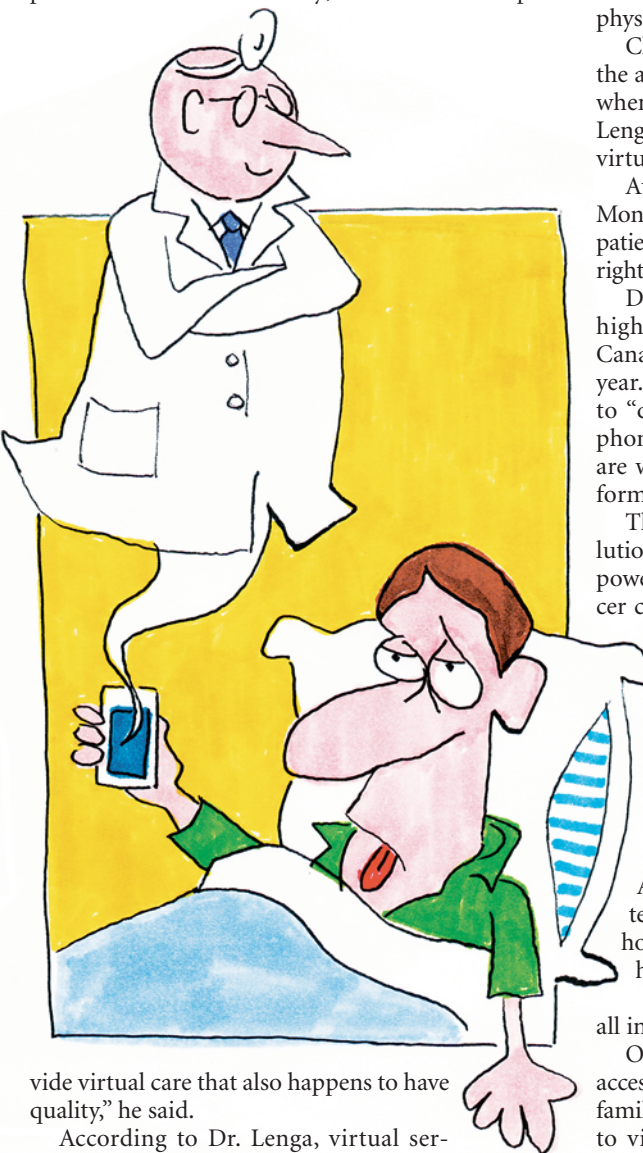
A free service, Opal is supported through research grants and funding from the hospital foundation, and is currently scaling to provide patients with access to six different hospital sites, regardless of the electronic medical record (EMR) used.

Anybody can download the app, but only registered hospital patients can use it. Data is fed from hospital database servers residing securely behind hospital firewalls and encrypted twice before being sent to a mobile device. Once a session ends, all information is deleted from a patient’s phone.

Opal includes a calendar to manage appointments, access to clinical notes that can be shared with other family members or medical professionals, the ability to view lab results and a notification feature that alerts users when new information arrives in their patient chart or when a treating team sends a message.

When COVID hit, the app quickly transitioned to help cancer patients safely receive treatments. Cars are now de facto waiting rooms, and patients wait for an alert before entering the cancer clinic through a dedicated entrance. In most cases, the security person and technologist are the only two people they come into contact with.

Opal is also in the midst of a COVID monitoring pilot with the goal of enrolling 50 active cases. By the end of January 2021, 25 patients were recruited, using Opal to record their daily symptoms, including oxygen saturation levels. The research team, led by Dr. Bertrand Lebouché, remotely monitors their data



vide virtual care that also happens to have quality,” he said.

According to Dr. Lenga, virtual services “accelerated dramatically” at Lakeridge Health during COVID, with utilization now eight times higher than before. “Suddenly all of the concerns people used to bring up and the barriers to change management melted away rapidly,” he said. “There’s nothing like necessity to galvanize everyone.”

The hospital moved its ambulatory and specialty clinics to a virtual model, using Microsoft Teams to enable clinicians to provide virtual consultations between hospital sites and the community, including long-term care settings. It is also using the platform to facilitate face-to-face connections between patients and their loved ones who are unable to visit due to COVID.

More recently it launched a Microsoft Teams-based virtual urgent care clinic, which includes a vir-



and intervenes with a virtual consult when a patient's condition is worsening.

Dr. Hijal believes virtual care is the new mentality in healthcare and expects at some point it will be an operating budget line item. "This is how people do things. More and more people want to know what's happening with their care," he said.

When his wife was diagnosed with stage four lung cancer in 2016, Zoelnsights co-founder and CEO Shaneel Pathak knew he wanted to do things differently when it came to managing her healthcare. Recognizing a gap in the system, the Alberta-based entrepreneur embarked on a mission to connect patients to their health data in new ways, empowering them to be at the centre of their patient journeys.

The result is Zoelnsights, an app named after the couple's pet dog, and was launched with the help of co-founder Cory Kapser. It works by giving patients a place to record their health history and experiences, and to connect with others who are facing the same challenges.

"Every time we had a visit to the ER, a doctor, a physiotherapist, whoever, my mind was thinking there must be a better way because we often had to repeat our story," said Pathak. "We often had to really advocate for us and navigate the system, and we didn't know what questions to ask."

Zoelnsights not only provides a platform for capturing patient reported outcomes such as symptoms, triggers or response to treatment, but also uses AWS Textract, to allow users to upload existing paper information into a virtual binder simply by snapping a photo.

The result is a structured, searchable collection of healthcare information that is easy to correlate and graph, making it easier to uncover insights and patterns. Users also have access to health libraries and clinical trials related to their condition, and can manage and track their medications and supplements, as well as create health routines.

After being backed by the Alberta Cancer Foundation, the company formally launched in June 2020 as a Software-as-a-Service powered by Amazon Web Services (AWS) and currently has a global reach, helping patients to manage new, complex or chronic conditions. A limited version of the app is available at no cost, while the premium version that includes caregiver access and advanced optical character recognition searching is \$5 per month.

Zoelnsights is also supporting two national clinical trials, one evaluating the benefit of exercise to cancer survivors and a second examining pain management among the 500 Canadians living with Fabry, an extremely rare genetic disorder characterized by an enzyme deficiency.

Fabry patient Julia Alton, who also serves as executive director of the Canadian Fabry Association, said "knowledge is power" when living with a rare disease. The Thunder Bay, Ont., resident started using Zoelnsights in August 2020 and considers it her safety net.

"I have all of my data with me if I'm carrying my phone. It's like the security of a medical bracelet," said Alton, whose husband uses the caregiver feature as well.

Calgary resident and Zoelnsights user Don Wood, who helped to beta test the

app in its early days, said it helped to remove the frustration he felt as his late wife, Sherry, battled stage four colon cancer. He used it to track events between treatments so that they could be "crystal clear" about what was going on when talking to her nurses and medical oncologist, and to access information about clinical trials.

"When we did meet with our oncologist, I could ask, 'What about this drug?'"

he recalled, noting that the oncologist was very supportive of the research. "It was very much a team atmosphere."

Pathak's vision is to bring a discussion-based model to personal healthcare, empowering patients by connecting them to others just like them. His motivation is the memory of his wife, who extended her initial prognosis from months to five years, becoming an outlier among stage four

cancer patients when they decided to take a more personal approach to her journey.

Coming to the end of her third line of therapy, the cancer had metastasized in both her brain and spine. Using the app to connect with people who had the same genetic cancer profile, they were able to take steps to prove she qualified for a Health Canada-approved drug that wouldn't have been offered to her otherwise.



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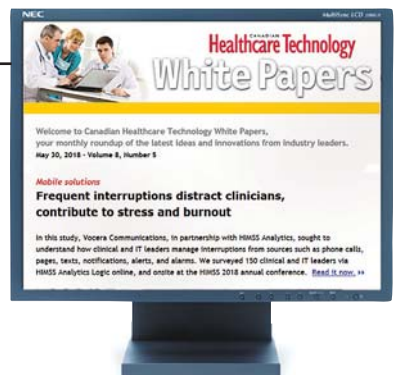


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# BD-Canada donates point-of-care antigen tests to Safehaven Project

**M**ISSISSAUGA, ONT. — BD (Becton, Dickinson and Company), a leading global medical technology company, announced that its Canadian division has donated rapid, point-of-care, SARS-CoV-2 antigen tests for use on the BD Veritor Plus System.

The donation to Safehaven Project for Community Living in Ontario, which provides residential and respite care to individuals with developmental disabilities and complex needs, includes 1,000 rapid antigen tests for COVID-19 and three BD Veritor Plus Analyzers, alongside BD Veritor InfoScan modules that allow for additional data, like a patient identifier, to be collected and linked to test results.

The BD Veritor Plus System, which has a slightly larger footprint than a mobile phone, offers an easy-to-use workflow that makes it an ideal solution for point-of-care settings. It achieves test results in approximately 15 minutes and displays easy-to-read digital results for COVID-19, removing result ambiguity.

The test uses a mid-nasal swab to collect patient samples, which is less invasive for the patient than nasopharyngeal sample collection.

The BD Veritor Plus Analyzer also saves test results on a secured internal drive, avoiding the need for manual transcription of results and helps with traceability of test results.

The recording of data could save valuable time and resources for facilities like Safehaven and ensures reliable results can be provided for public health tracking purposes.

“Rapid tests are a massive game changer in our work to stop the spread of COVID-19 and keep Ontarians safe and healthy,” said Premier Doug Ford. “These



Ontario Premier Doug Ford, centre, made a trip to the Safehaven Project for Community Living, to discuss the continuing rollout of point-of-care testing.

tests are crucial because they can turn around results in minutes instead of days and they also make reporting to public health easier, meaning the incredible staff at places like Safehaven can focus on the people, rather than the paperwork.”

BD Canada has shipped over 1.1 million SARS-CoV-2 rapid antigen tests for use on the BD Veritor Plus System to Ontario, with more on the way.

“BD is committed to supporting the Canadian and Ontario healthcare efforts to help combat COVID-19,” said Greg Miziolek, president of BD-Canada. “We know that congregate living facilities are in great need of rapid testing solutions and result reporting is an important part of the

COVID-19 response. We are pleased to be making this significant contribution to Safehaven and our hope is that the rapid tests will help keep their community safe by enabling staff to quickly implement public health measures and focus on providing care.”

The BD Veritor System for Rapid Detection of SARS-CoV-2 assay has been authorized by Health Canada under Interim Order. The SARS-CoV-2 antigen assay has been authorized only for the detection of proteins from SARS-CoV-2, not for any other viruses or pathogens.

“Rapid testing will enable organizations like Safehaven to respond in a timely manner to positive COVID-19

tests that can facilitate the early implementation of infection prevention and control measures, in order to reduce the spread of the virus that can potentially save lives and reduce poor outcomes for vulnerable individuals in congregate settings,” said Susan Bisailon, RN, M Sc., CEO, Safehaven.

“The BD Veritor test provides a surveillance tool to help Safehaven monitor COVID-19 in our sites and maintain accurate data without spending too much time on administrative paperwork. Using a less invasive sample collection method will also be preferable for individuals with complex medical needs that are cared for in Safehaven’s facilities.”

## Roche’s SARS-CoV-2 rapid antigen test approved under interim order

**L**AVAL, QUE. — Roche Diagnostics, a division of Hoffmann-La Roche Limited, announced that its SARS-CoV-2 Rapid Antigen Test has received approval under Health Canada’s Interim Order. This can help healthcare professionals identify a SARS-CoV-2 infection with results typically ready in 15 minutes.

“Roche’s SARS-CoV-2 Rapid Antigen Test allows taking the test to the patient while enabling fast decision making and rapid isolation, thus reducing the risk of further spreading the virus,” said François Drolet, director, Public Affairs at Roche Diagnostics. “Our SARS-CoV-2 Rapid Antigen Test is an additional tool in the toolbox which offers opportunities to refine the COVID-19 testing strategies while the country looks at safely reopening the economy and keeping Canadians safe.”

“The SARS-CoV-2 Rapid Antigen Test detects the presence of the

SARS-CoV-2 virus by identifying the virus nucleocapsid protein while large quantities are present in the respiratory tract,” said Michele D’Elia, director, Medical Affairs at Roche Diagnostics. “The test is optimized to detect infections in individuals with an onset of clinical symptoms of 5 days or less.”

Building on Roche’s consistent and reliable supply chain since the beginning of the pandemic, and with hundreds of millions of tests distributed worldwide in partnership with SD Biosensor Inc., the company will now start distributing in Canada. Tens of millions of Roche SARS-CoV-2 Rapid Antigen Tests have been dedicated to the country, the company said.

COVID-19 testing solutions that provide healthcare professionals and patients with a quick answer regarding their infection status are critical to contain the community-spread of the COVID-19 virus. Roche’s SARS-CoV-2 Rapid Antigen Test is a new addition to

the comprehensive Roche diagnostic portfolio to help healthcare systems combat COVID-19 through testing in the laboratory and at the point of care.

Roche’s SARS-CoV-2 Rapid Antigen Test is a rapid chromatographic immunoassay intended for the qualitative detection of a specific antigen

**The test identifies the virus nucleocapsid protein while large quantities are present in the respiratory tract.**

of SARS-CoV-2 present in human nasopharynx.

The test is performed by healthcare professionals using a nasopharyngeal swab collected from a patient. The results are intended to aid in the early diagnosis of SARS-CoV-2 infection in individuals suspected of COVID-19 within the first 5 days of the onset of symptoms.

An antigen test detects proteins which are structural or functional components of a pathogen and are thus very specific to that pathogen. In this case, the test would provide a qualitative “yes/no” answer on the presence of the pathogen in the patient sample.

If the target antigen is present in sufficient concentrations in the sample, it will bind to specific antibodies and generate a positive result, indicating an active infection.

In general, antigen tests have a high specificity, though are not as sensitive as PCR tests that amplify the target viral DNA or RNA sequence in order to generate a quantifiable signal to indicate the presence of the virus in a sample.

Therefore, to make up for the potential decrease in sensitivity of an antigen test, negative results should be considered together with additional patient factors, such as COVID-19 exposure history, clinical symptoms and additional test results.



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# Using the power of AI and interoperability to reduce sepsis mortality

BY DR. PENNY COOPER

Augusta Health is a community hospital nestled in Virginia's beautiful Shenandoah Valley focused on improving the health and well-being of our community. The statewide sepsis mortality rate in Virginia is 12.7%, while at Augusta Health it is 4.76%.

We have been able to achieve a significantly lower sepsis mortality rate by employing the power of artificial intelligence (AI) and communication technology. So far, we have saved over 350 lives that could have been lost to sepsis.

Mortality from sepsis increases by as much as 8% for every hour that treatment is delayed. Our nurses are highly trained and are skilled at detecting early symptoms of sepsis based on standard indicators. They are also very busy.

Aware of how many patients our nurses care for and the many tasks nurses juggle at once, our leadership team wanted to provide our nurses with additional support. Among the resources provided was a program to identify symptoms of sepsis sooner.

We formed a Sepsis Team and Taskforce in 2016 to take advantage of AI and communication capabilities and give our nurses an extra set of eyes to automatically review patient data and alert them as soon as a patient shows signs of being septic. Our goal was to detect and treat sepsis as early as possible and save lives.

We began by using the four traditional criteria to identify sepsis – a temperature greater than 38°C, heart rate greater than



90, respiratory rate greater than 20, and an abnormal white blood cell count.

In addition, we monitored mean arterial pressure and shock index. Our Sepsis Team and Taskforce then began a retrospective study of the data to determine which variables had the highest correlation to Sepsis.

We used the results of that study as a benchmark for developing an automated process that analyzes and compiles real-time data from medical systems each hour and assigns each patient a score. If the score is above a specific threshold, a sepsis alert is sent automatically to team members caring for that patient.

Team members receive the alert with contextual information on their mobile

communication device, which might be a hands-free Vocera Badge or a smartphone running a Vocera app.

The automated process involves interoperability among three systems:

- Our electronic medical record, MEDITECH
- Our predictive analytics tool, which scours critical data in a patient's record
- The Vocera clinical workflow and communication system

We considered other sepsis alert tools that flagged potential sepsis cases within patients' EMRs. However, those tools provide clinicians with sepsis alert flags only when they open the patient's medical record.

By contrast, the system we built alerts

the care team immediately on their Vocera Badge or smartphone, without any manual intervention. Sepsis alerts are automatically sent to the right care team to initiate care quickly when early signs of infection are identified.

System interoperability has been key to ensuring the right data with situational information gets to the right clinicians at the right time. Upon receiving an alert, the assigned staff member immediately screens the patient for sepsis. If sepsis is identified, they begin early intervention.

In the United States, more than 1.7 million people develop sepsis each year, and approximately 270,000 of them die. To decrease mortality rates and increase the likelihood of reversing the damaging outcomes of sepsis, early detection is critical.

Hundreds of lives that could have been lost to sepsis have been saved because of our Early Sepsis Alert System; since April 2016, we have been able to save 355 lives.

The work done by our teams at Augusta Health to reduce mortality rates from sepsis has been a collaborative effort. Health Quality Innovators (HQI) named our hospital the Health Quality Innovator for Virginia in the category of Data-driven Care in 2018.

U.S. News & World Report recognized Augusta Health as a Best Hospital in the Shenandoah Valley for 2019-20.

We are very proud of these honors and are happy to have the opportunity to share our work with other facilities around the state so more lives can be saved.

*Dr. Penny Cooper, DHSc, is a data scientist at Augusta Health.*

## Providing real-time patient data enables Early Warning Signs detection

BY SHELLY BOND

When Humber River Hospital in Toronto opened its doors in 2015, the facility was widely recognized as North America's first fully digital acute-care hospital. Built from the ground up to replace several aging campuses, the leadership had a vision and the community support to realize it – an enviable position in healthcare.

Prior to the pandemic, its leaders regularly showcased their infrastructure innovations to colleagues from around the globe who were keen to roll out similar innovations in their facilities.

But fast forward to today's environment, and fortunately Humber's investment in futuristic technologies and streamlined workflows proved crucial in helping to pivot and adapt to the severe stresses of the COVID-19 pandemic.

"At the time, we imagined in maybe a few years we'd be eclipsed by other facilities deploying similar leading-edge solutions to advance patient health," said Kevin Fernandes, chief technology officer at Humber River. "But in reality, that hasn't happened, and we've remained on the frontline serving our patients, community and empowering our staff

with technologies and clinical workflows."

Key to Humber River Hospital's success in navigating many complex deployments was the creation of its own customized technology ecosystem. By leveraging its partnership with Ascom, Humber River is providing real-time patient data that enables Early Warning Signs detection. These real-time notifications are sent directly to Ascom mobile devices, enabling clinicians to receive real-time alerts and alarms, thereby facilitating time savings when minutes are critical for life-saving interventions. These include:

- Code events: Ascom integration with nurse call provides real-time notification to caregivers of all hospital-wide code notifications (blue, pink, red and white) via their personal handset, reducing disruptive overhead paging significantly;
- Sepsis Advance Warning monitoring: solution retrieves sepsis information on a configurable polling interval by an Http request and communicates a sepsis event alert in real-time that is then delivered to an assigned caregiver in Ascom Unite Assign;
- Fetal Alert monitoring: delivers alerts directly to the clinician's Ascom mobile device in a solution that is currently unique and first of its kind worldwide;

• ECG and waveforms delivered in real-time directly to the clinician's Ascom mobile device;

• Nurse call integration provides real-time communication between caregivers and patients for improved clinical efficiency and a more positive patient experience;

• Humber Command Centre: Ascom integrates with the Command Centre to publish Unite staff assignment information and active code events; and

• RTLS integration: Ascom nurse call intelligent integration with Elpas RTLS automatically



Shelly Bond

turns on dome lights outside of the patient room as a caregiver enters, enabling co-workers to know at a glance that a patient is being attended to.

"Our patient-centric model gives us the line of sight to improve our operational efficiency," said Fernandes. "We can intervene quickly when there are signs of sepsis and critical early warning alert notifications."

Ascom's partnership with Humber River Hospital provided the foundation to jointly build a sustainable technology ecosystem that provides early warning alerts for serious disease, as well as real-time integration. Moreover, the organization continues to blaze new paths.

"Working with Ascom enables Humber to innovate," said Fernandes. "One such innovation is the new Fetal Alert Notification solution. This first of its kind workflow is expected to generate positive patient outcomes by integrating end-to-end with Ascom's Myco mobile devices."

Ascom is also committed to raising the quality of healthcare by partnering with leading-edge hospitals like Humber River. For its part, Ascom can provide the tools, technologies and support needed to create advanced communication and alerting ecosystems.

For Humber River Hospital, the early planning and investment in mobile solutions have been well worth it: At a time when healthcare frontline workers are often exhausted, and hospitals are at near capacity, solutions that improve patient care and simultaneously enhance staff satisfaction and retention are extremely valuable.

*Shelly Bond is Ascom Vice President & Sales Development - Canada*



# Remote patient monitoring is showing an improvement in outcomes

BY ROBERT KAUL

It goes almost without saying that the COVID-19 pandemic has changed people's lives, altering expectations and introducing a new reality for all of us. The way people expect to receive everything, including healthcare, has shifted.

The uptake of virtual care has been extraordinary, with some providers seeing increases in virtual visits of over 4,000% compared to 2019. This increased acceptance has led to further adoption of remote patient monitoring, which introduces positive outcomes for both patients and practitioners.

Of course, the most obvious benefit of remote patient monitoring (RPM) during the ongoing pandemic is that it enables many high-risk patients to get the care they need, without visiting a clinic, physician office or hospital emergency room. Staying out of these environments enables vulnerable individuals to lower their risk of contracting COVID-19, while still getting the care they need. Providers are also less exposed to potentially infected patients. However, this is only one of the many positive impacts of RPM.

Studies have shown that patients who are using remote monitoring devices and services tend to be more engaged in their treatment. Patients who become part of the health data gathering process tend to take more of an interest and active role in their care.

Many RPM users have reported that they've gained a better understanding of what their vital sign data means how their condition may be changing. As a result, some patients are even able to better self-manage their conditions, reducing the possibility of exacerbations due to certain chronic conditions, like chronic obstructive pulmonary disease (COPD).

Patients on RPM also have been observed to adhere to their care plans more closely, as they know that their practitioner will be able to monitor their progress. This is called the "Hawthorne effect" or "the alteration of behavior by subjects due to their awareness of being observed."

Patients who use remote monitoring devices and apps are often more likely to better understand their conditions, becoming more health literate as they become active and proactive participants in their own healthcare.

Typical RPM services offer an online portal or dashboard where vital sign and other data is stored and displayed. These tools enable caregivers to access each patient's health data, survey answers, trends, clinical notes, and even pictures of wounds.

For example, family members who live away from aging parents can remain updated on their loved one's condition, giving them peace of mind and a clearer picture of their changing health status. This extra support system can be very beneficial to patients and can help to increase adherence to physician instructions.

On the topic of "older relatives," RPM is also known to help individuals "age in place," rather than needing to enter into a long-term care facility. This is possible because older RPM users are being consis-

tently and properly monitored and can therefore safely remain in their home.

Physicians and clinical staff also appreciate RPM. Clinicians are much better equipped to understand and manage their patients' health, thanks to a constant stream of accurate, reliable vital sign data from in-home RPM devices.

A patient's health can change drastically between clinic visits and it can be difficult for a practitioner to piece together what occurred and to understand the true impact on their patient's health. RPM pro-

vides a more holistic view of the patient, making it easier for doctors to understand their condition and to intervene before the patient experiences an exacerbation or dangerous health episode.

The constant stream of health data enables clinicians to keep an eye on their patients in "near real time," but typically the caregiver staff is only alerted when a patient needs their attention. They can therefore take care of more patients, while simultaneously providing a higher level of care.

Since April 2020, many doctors are having a simpler time billing for virtual models of care, with reimbursement codes from public and private insurance providers that are frequently being updated to match the evolving virtual care landscape. In Canada, emergency funding allocated to virtual care at the beginning of the pandemic is being made permanent, and many provincial health authorities are deploying some form of virtual care, RPM or both to Canadian patients.

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## COVID-19 biobank is a first for Island Health

BY SHAWNA CADIEUX

VICTORIA – Cutting-edge research to create new diagnostic tools, tests and treatments for a wide range of diseases, as well as the creation of a new COVID-19 biobank to gather data and biological specimens from COVID-19 patients across the region, is taking place at Victoria General Hospital (VGH).

A collaboration between Island Health, University of Victoria, and University of British Columbia has resulted in Island Health allocating laboratory space at VGH for the research to take place, while UBC and UVic have provided \$1.5 million in equipment grants.

The COVID-19 biobank, a first for Island Health in collaboration with the BC Cancer Agency and other health authorities, was made possible through funding from the Victoria Hospitals Foundation and the UBC Faculty of Medicine, with additional support and expertise from Island Health's Research Department.

Dr. Michael Chen is the leading medical researcher who oversees the new research lab and the COVID-19 biobank. Since the lab's inception, Dr. Chen has authored or co-authored eight publications in peer reviewed journals including Rapid Communications in

Mass Spectrometry and Molecular & Cellular Proteomics. One published project involved the creation of a new test for the diagnosis, monitoring and treatment of iron metabolism disorders. The test is currently awaiting clinical validation and implementation.

Dr. Chen is also participating in on-going international research collaborations with Taiwan Medical University, National University of Singapore, and Radboud University Medical Center in The Netherlands.

"I'm delighted for the opportunity to conduct this important research,

**In addition to conducting research, the new lab has been integrated into Island Health's clinical workflow.**

supported by our partners, using world class pieces of diagnostic equipment called mass spectrometers. Mass spectrometers are extremely important tools in bioscience research, and they are helping us to develop diagnostic tests that have not previously been available in British Columbia. This could include tests related to COVID-19," said Dr. Chen.

In addition to research, the new lab has also been integrated into Island

Health's clinical workflow with the aim of improving patient care.

"The equipment in the new lab is not only being used for research purposes, it's also being made available for Island Health clinical laboratory staff to use as needed," said Catriona Gano, Island Health Director, Laboratory Services. "For example, because the equipment and software is so advanced, our staff can produce toxicology results in much less time. This has greatly improved the quality, effectiveness and efficiency of our testing processes while significantly reducing our workloads."

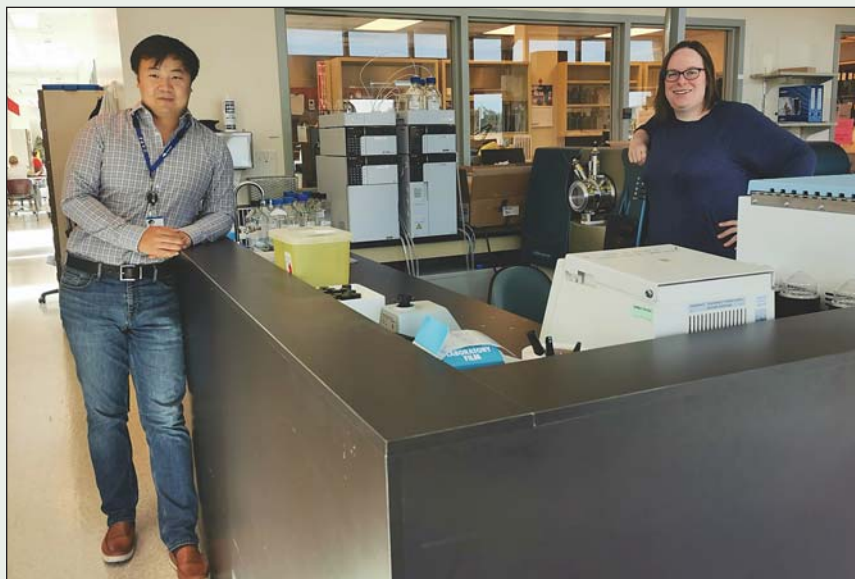
These improvements to patient diagnoses and outcomes are expected to make lasting impacts, such as reductions in emergency department visits, fewer and shorter hospital stays, and enhanced quality of life and well-being for patients.

Dr. Bruce Wright, Regional Dean, UBC Island Medical Program and Head, UVic Division of Medical Sciences, was instrumental in securing the funding for the lab research project. The intention is to eventually create a Centre for Translational Omics laboratory at VGH, with representatives from Island Health, UBC and UVic currently working together toward that goal.

"Research is integral to solving some of healthcare's most pressing issues and collaboration between organizations is key," said Dr. Wright. "It's exciting to see how Dr. Chen's laboratory is already producing the kind of research that healthcare providers need to provide the best care possible to their patients."

The COVID-19 biobank will allow researchers to focus on tests to better detect the virus, and identify features relevant to diagnosis and personalized treatment. The samples collected from across the Island will also help researchers understand the complications of COVID-19 over the long term. With patient consent, these specimens will be stored and used in quality improvement and research projects. The specimens are also available for use by healthcare researchers in other parts of British Columbia and Canada.

*Shawna Cadieux is with Island Health Communications.*



Dr. Michael Chen, medical researcher, and Catriona Gano, Island Health Director, Lab Services.



## Three ways

CONTINUED FROM PAGE 13

Microsoft has stepped in to offer AccountGuard for Healthcare at no cost for healthcare providers on the front line of care combatting COVID-19. The service is designed to help these critical organizations protect themselves from cybersecurity threats.

Cybersecurity will continue to be a threat, even when COVID-19 is in our rear-view mirror, but we can't let it get in the way of innovation. Our team works closely with healthcare customers to establish a platform that is secure and compliant by design. Microsoft Cloud for Healthcare offers trusted and inte-

## Remote monitoring is improving outcomes

CONTINUED FROM PAGE 21

It's a myth that older patients are uncomfortable with, or afraid to embrace virtual care and remote patient monitoring. Several studies have shown that modern RPM devices pre-paired with a simple tablet computer are so easy to use that even seniors with little exposure to gadgets can successfully take their vital signs remotely. As long as the RPM program being deployed has a "patient-centric" design and a track record of success, then users of any age can be cared for from home with RPM.

Overall, the COVID-19 pandemic has made us look at virtually everything in our professional and personal lives differently, and healthcare delivery is no exception. The silver lining in the massive, ongoing shift to virtual care we're experiencing is that new models have emerged, including RPM and virtual care, which enable a number of positive outcomes for both patients and practitioners.

*Robert Kaul is President and CEO of Cloud DX.*

## COVID transforms

CONTINUED FROM PAGE 12

again turning to technology to facilitate better clinician communications and improve workflows.

Purpose-built mobile devices that allow nurses and doctors to communicate better and streamline workflows effectively reduce stress for providers while also improving patient care. At the same time, handheld mobile computers help mitigate alarm fatigue by sending alerts directly to the right caregiver.

Nurses can use those same mobile devices to enter vitals directly into a patient's electronic health record (EHR) while at the bedside, thus reducing the amount of time they spend on charting and reducing errors.

Doctors and nurses armed with mobile devices can be notified immediately when a patient gets test results – and can quickly communicate how those results might affect patient treatment.

**Stemming the spread of infections:** "Sanitize everything!" became a mantra

grated cloud capabilities that make it faster and easier to provide more efficient care, while ensuring end-to-end security, compliance and interoperability of health data.

And with many healthcare providers still working remotely, it's critical that enriched data is able to flow securely through every point of care to help continuously improve the patient experience and health outcomes while maintaining patient privacy.

**Innovation will continue to shape Canada's healthcare system:** Canadian innovators have the potential to transform the future of our healthcare system, but first we must give them the space and opportunity to succeed. We are working alongside chief innovation officers and chief medical information officers, physicians and other healthcare providers who are dedicated to making the system better by leveraging digital tools and solutions to enhance patient engagement and improve care, empower collaboration across providers and optimize clinical and operational insights.

Recently, our team collaborated with

Providence Health Care and computer vision researchers at the University of British Columbia to develop an AI powered solution that uses cameras to monitor the effectiveness of social distancing policies and guidelines at the St. Paul's Hospital campus in Vancouver, while protecting the privacy of patients and staff.

Although the cameras enable real-time compliance, they do not collect personally

**COVID-19 has set-off a wave of innovation in digital health that will transform Canadian healthcare and research.**

identifiable information. This initiative marked a milestone for Microsoft and offers valuable learnings for other healthcare environments regarding the deployment and adoption of AI and IoT technology in their operations.

Some of the best changes happen when we let innovation occur and empower the industry to find new ways to deliver better healthcare outcomes. Big challenges take

## Tool predicts which mini-strokes could lead to major strokes

A MADE-IN-OTTAWA TOOL can help emergency physicians predict which patients with mini-strokes are at greatest risk of having a major stroke within the week, according to a study published in The BMJ.

"Mini-strokes can be a warning that a larger stroke is coming," said Dr. Jeffrey Perry, emergency physician and senior scientist at The Ottawa Hospital and professor at the University of Ottawa. "Thankfully, we're very good at preventing subsequent strokes if patients come to the emergency department promptly."

A mini-stroke, or transient ischemic attack (TIA), is a temporary blockage of the brain's blood supply. The symptoms are similar to stroke – drooping face, weakness in the arm or leg, loss of vision, and slurred or jumbled speech. Unlike a stroke,

symptoms usually last minutes to hours, and do not cause permanent damage.

If a TIA is not treated, there is up to a 1 in 10 chance of having a subsequent stroke. The risk is greatest in the first week.

**If a TIA is not treated, there is up to a 1 in 10 chance of having a subsequent stroke. The risk is greatest in the first week.**

"TIA or mini-strokes are quite common – we see one to two patients a day at The Ottawa Hospital emergency departments," said Dr. Perry. "We developed the Canadian TIA Score to help us better identify who is at greatest risk of stroke and

big thinking. Our team at Microsoft is working with biomedical researchers to use AI to accelerate the implementation of cancer treatments that target patients' specific genomic profiles, a type of precision medicine that in some cases is more effective than traditional chemotherapy and has fewer side effects.

Senior scientists at the Princess Margaret Cancer Centre developed powerful machine learning platforms and algorithms to drive cancer research and treatment at the University Health Network. Platforms such as CRESCENT, PharmacODB, SYNERGx and cBioPortal are using Azure to access to large amounts of data and are using AI to process that data and bring precision medicine to life.

Looking ahead at 2021, if we want to tackle the big challenges facing the healthcare industry, we must take on a growth mindset that embraces a willingness to be first. I'm inspired by the innovators we are working with and I can't wait to see how their solutions transform healthcare.

*Peter Jones is Industry Lead, Healthcare, at Microsoft Canada.*

in 2020 as COVID continued to spread. But the need for sanitization in healthcare organizations has always been critical, given that healthcare-acquired infections affect an estimated 1.7 million US patients each year, according to the Centers for Disease Control and Prevention.

However, in 2020, some hospitals found that their non-rugged devices could not withstand repeated cleaning

**In 2021, we will see more hospitals adopt mobile devices that are purpose-built to withstand harsh cleanings.**

and sanitizing because they were not built with healthcare-grade plastics. In 2021, we will see more hospitals adopt mobile computers, printers and handheld scanners that are purpose-built to withstand repeated wipe downs with approved cleaning agents to reduce the spread of infection.

**Telehealth will continue to grow:** When telehealth became more accepted

in 2020, some hospitals used technology to create "virtual doctors" by mounting rugged mobile tablets on IV poles that allowed specialists to interact with patients via video.

Many hospitals found that this virtual solution resulted in faster care for patients because specialists could handle multiple consults without wasting time traveling between rooms or hospitals. In 2021, more hospitals will rely heavily on virtual patient consultations for more efficient patient care while also keeping both patients and clinicians safe.

**Looking forward:** There is no doubt that the pandemic will have a lasting impact on healthcare. The good news is that the lessons learned will have a positive impact on the way healthcare facilities manage their inventory and workflows going forward.

*Lana Leone is senior marketing manager for Healthcare Solutions, Zebra Technologies. To learn more about healthcare technology solutions that provide patient-centric care, please see [www.zebra.com](http://www.zebra.com)*

needs care most urgently. On the flip side, it also helps us gives patients at low risk some peace of mind."

The Canadian TIA Score uses 13 pieces of information collected in the emergency department to categorize patients as being at low (less than 0.5 percent), medium (2.3 percent), or high (6 percent) risk of having a stroke within the week.

"For high-risk patients we do absolutely everything we can while they are in the ED, including diagnostic imaging, starting treatment and bringing in a neurologist," said Dr. Perry. "For medium-risk patients, we do similar things but refer them to a stroke prevention clinic, where they can see a neurologist in a day or two. Low-risk patients can safely start their treatment as a neurology outpatient or with their family doctor."

The tool was validated in 13 Canadian emergency departments over five years. Of the 7,607 patients enrolled who had TIA or a minor stroke, 17 percent (1,293) were categorized as low risk, 71 percent (5,400) were categorized as medium risk and 13 percent (989) were categorized as high risk.

Overall, 108 patients (1.4 percent) in the study had a subsequent stroke within the week, while 83 (1.1 percent) had surgery to improve blood flow in their neck to prevent a stroke. This low rate of stroke is testament to the preventative care provided in the ED.

The study showed the Canadian TIA Score accurately categorized patients into the three risk groups and performed significantly better than the existing ABCD2 score. That score only categorizes TIA patients as being at low or high risk of a stroke, which is not always helpful to physicians.

"The Canadian TIA Score can now be safely used in emergency departments, where it can help physicians make the best care decisions for patients with mini-strokes," said Dr. Perry.

TIA is a medical emergency. Anyone who experiences symptoms should call 911 or have someone drive them to an emergency department if their symptoms have fully resolved.

The Canadian TIA Score is available online and through The Ottawa Rules app.





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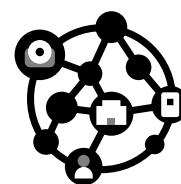
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