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Managed equipment
Humber River Hospital, in Toronto, has saved millions of dollars through a managed equipment solution with GE Healthcare. Under this arrangement, GE takes care of procurement and maintenance.
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New CEO
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Specimen tracking
Earlier this year, Oak Valley Health went live with a completely digital and integrated pathology specimen tracking system. It has provided major benefits.
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PHOTO: OWEN EGAN

Improving surgical planning with mixed reality

A start-up at McGill University is leveraging the expertise of physicians and computer experts to develop Holo-Ray, a platform that creates accurate, 3D models of the human body. Surgeons can navigate through the models, visualizing structures more precisely, enabling them to plan improved surgical procedures. Pictured are co-founders (l to r) Amir Hooshiar, Renzo Cecere, and Amir Sayadi. **SEE STORY ON PAGE 4.**

Nova Scotia surgeon gains new skills via 'tele-proctoring'

BY NORM TOLLINSKY

Dr. Richard Spence, a general surgeon at Queen Elizabeth II Health Sciences Centre, in Halifax, wasn't worried earlier this summer when faced with performing a surgical technique he had never attempted. Equipped with Rods & Cones smart glasses, he had a specialist in Amsterdam, 4,921 kilometres away, looking over his shoulder and providing guidance – virtually.

Dr. Hendrik Jaap Bonjer, professor of surgery and chair of the department of surgery at Amsterdam University Medical Center, was able to see on his computer screen exactly what Dr. Spence was seeing through his smart glasses. The Rods & Cones technology also transmitted a real-time feed from the laparoscopic camera.

"An interesting feature of the technology is that I was able to see my proctor's computer screen through the lens in front of me," said Dr. Spence. "That's important because he can take a still image, and annotate it, to show me in real time where I should go and what I should try to avoid." The system also supports bi-directional voice communication.

> **A surgeon in Amsterdam viewed on his monitor what Dr. Spence saw through his smart glasses.**

Meanwhile, on the other side of the Atlantic Ocean,"I felt like I was scrubbed in and standing on the other side of the table," said Dr. Jaap Bonjer.

The system uses Wi-Fi connectivity – either 4G or 5G – with minimal lag time.

The light-weight headset and accessories are transported and neatly stored in a small suitcase weighing seven kilograms. One electrical cord extends from the case to keep the glasses and other electronic components charged and ready for use.

Peripheral devices include a camera that can provide a full 360-degree view of the OR and a device that can capture and transmit digital feeds from CTs, MRIs and EKGs.

While mostly used for distance proctor-

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Nova Scotia surgeon testing 'tele-proctoring' to enhance his skills

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ing in the OR, the portability of the technology also allows it to be used in the ICU or anywhere else in the hospital.

Established in 2017, Amsterdam-based Rods & Cones released its first product in 2019. "That's when COVID was happening, so getting into ORs for proctoring was very restricted and the need for a solution to connect people remotely increased significantly," noted Scott Solis, Rods & Cones managing director for North America. "We transitioned very quickly from a start-up to a scale-up organization."

"Now, the remote expert supporting a person wearing the technology is truly within that OR because they have all the inputs to be able to support the surgeon," said Solis.

According to Solis, who brought the Rods & Cones technology to Halifax and was in the OR during the tele-proctoring procedures, there are more than 1,000 Rods & Cones smart glasses in the field that have been used in more than 72 countries by 892 hospitals in Europe, North America and the Asia-Pacific market.

The use of the technology at Queen Elizabeth II Health Sciences Centre, part of N.S. Health, was prompted by two adrenalectomies Dr. Spence was scheduled to perform.

"The adrenal gland lives in what's called the retroperitoneum, in the abdomen, so one of the most standard ways of approaching the adrenal gland is operating through the abdomen to get to the posterior compartment," he explained. "It doesn't really make much sense to go through one compartment to get to another compartment," but Dr. Spence was hesitant to use the posterior approach with the patient lying on his or her abdomen that he learned during a fellowship in Toronto.

"That approach poses anesthetic as well as surgical challenges because if there is bleeding, it's not easy to convert from a minimally invasive approach to open surgery."

The alternative for which Dr. Jaap Bonjer has expertise has the patient on his or her side, but Dr. Spence had never attempted it. General surgery department head Dr. James Ellsmere provided an introduction to Dr. Bonjer, who proposed the use of the Rods & Cones technology.

Dr. Richard Spence leads a surgical procedure in Halifax with support from a colleague in the Netherlands.

In the absence of the distant proctoring technology, Dr. Spence would have had to perform the adrenalectomies transabdominally, or the two patients would have had to travel to Toronto.

"Bringing someone into the OR for collaborative cases is not that common, so this opens up opportunities to upskill our surgeons," said Dr. Spence. "That's exciting."

"We have very competent surgeons across the province who would like some more proctoring to transition to more minimally invasive surgery – especially for colorectal surgeries – and this technology could enable that."

The technology could also be used to train more Nova Scotia surgeons to perform bariatric surgery.

"We have a big backlog of patients on a waiting list for bariatric surgery and only two surgeons currently trained to perform it," said Dr. Spence. "Giving our other surgeons across the province remote support using this technology would be a nice way to expand our bariatric program."

The technology doesn't always replace having someone physically present in the OR for mentoring, noted Dr. Spence. "It's ideal though for experienced, competent surgeons who want to enhance their skill sets and improve the quality of care."

The use of distance collaboration technologies isn't limited to QE II Health Sciences Centre. Last year, the Jewish General Hospital in Montreal used Microsoft HoloLens headsets to connect with an interventional specialist in Toronto during the performance of a transcatheter aortic valve implantation, and earlier this year, surgeons in Rio de Janeiro used similar technology to connect with colleagues in the United Kingdom during a 27-hour procedure to separate conjoined twins.

Dr. Spence sees potential for increased use of the glasses at QE II, and in Nova Scotia generally, and is confident that efforts currently under way to acquire the technology will be successful.

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Publisher & Editor
Jerry Zeidenberg
jerryz@canhealth.com

Office Manager
Neil Zeidenberg
neilz@canhealth.com

Contributing Editors
Dianne Craig
dcraigcreative@yahoo.ca

Dianne Daniel
dianne.l.daniel@gmail.com

Dr. Sunny Malhotra
Twitter: @drsunnymalhotra

Norm Tollinsky
tollinskyn@gmail.com

Dave Webb
dweebmedia.ca@gmail.com

Art Director
Walter Caniparoli
art@canhealth.com

Art Assistant
Joanne Jubas
joanne@canhealth.com

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McGill startup developing mixed-reality platform to support surgeons

BY DIANE LYNN WEIDNER

PHOTO: OWEN EGAN

Dr. Renzo Cecere, director of cardiac surgery at MUHC, is a co-developer of the Holo-Ray prototype.

MONTREAL – An interdisciplinary startup at McGill University is leveraging their combined expertise to develop Holo-Ray, an integrated, cloud-based platform that will allow surgeons to quickly generate 3D holographic anatomical models from a patient's diagnostic imaging scans.

This immersive mixed-reality technology will be used for education, diagnosis and treatment planning for minimally invasive interventional procedures. At the moment, the team is focusing on the cardiovascular system, but this technology has the potential to be used on different anatomical structures.

One of the three co-founders and chief medical officer at Holo-Ray is Dr. Renzo Cecere, a heart surgeon renowned for his expertise in novel cardiac assistive devices. He is associate professor in the Department of Surgery at McGill University and director of Cardiac Surgery at the McGill University Health Centre.

When we met, Dr. Cecere had just spent the morning performing a full sternotomy. This procedure involves cutting through a patient's breastbone and opening up the rib cage to provide access and visibility to the patient's heart and nearby organs. However, as he explains, the current trend is to minimize the open surgical approach in cardiology, as these large incisions have a higher risk of complications and longer recovery times.

When possible, surgeons perform minimally-invasive interventional procedures that involve inserting a catheter through the various access points in the body to get to the heart, relying on medical imaging to provide visual guidance.

"But you have to first and foremost do a perfect job," said Dr. Cecere. "To gain the advantage of a catheter-based approach, you have to see what you're doing. Remember, the heart is inside the body; it is a moving structure that's filled with blood, so you can't just insert a camera and look at it. If we rely on the old-fashioned radiographic images, we're very limited in what we can do with catheters because we can't really see well enough. We need special modalities for imaging. We need to have artificial eyes to show us what's going on inside."

Hence the impetus for Holo-Ray, a cloud-based platform that uses advanced software and holographic imaging to quickly reconstruct CT (computed tomography) and MRI (magnetic resonance imaging) scans in various ways.

"Holo-Ray is exciting because it will provide more realistic perception for surgeons. It uses new technology to sort of fool the imaging into seeing the real thing. We can move catheters around inside the heart and visualize angles that weren't approachable before, aided by robotics and mechatronics. We are then able to train these catheters, using deep learning artificial intelligence algorithms, so that the more the catheter does, the better it gets at going to where it wants to go and the less room for human error," said Dr. Cecere.

The company plans to use this platform for educational purposes, to augment surgical training by providing access to a database of 3D holograms constructed from real patient pathologies and complex anatomical structures, securely protected and anonymized using HIPAA-compliant encryption.

Holo-Ray's co-founders attribute the successful development of this novel concept to interdisciplinary collaboration between medicine and engineering, along with strong institutional support and encouragement.

The chief technology officer at Holo-Ray is Amir Hooshiar, PhD, a mechanical engineer with expertise in biomedical devices and surgical robotics whose doctoral studies focused on haptics-enabled, robot-assisted surgical systems for cardiovascular intervention. He joined McGill in June 2021 to lead the development of the new Surgical Robotics Centre.

"McGill's Department of Surgery has prioritized this surgical robotics initiative because it's moving very fast in the world, and we want to keep up the pace. This is very meaningful to me," said Mr. Hooshiar, who is eager to build this new centre of excellence that will bring together interdisciplinary teams to foster innovation.

Shortly after joining McGill, Mr. Hooshiar and Dr. Cecere crossed paths and quickly discovered a shared common interest. They formed a close collaboration and established a new research program that addresses needs in the area of cardiovascular surgery, medicine and robotics.

Amir Sayadi, a recent graduate of the McGill Experimental Surgery Program, was recruited as the research program's first PhD student. As the third co-founder and chief executive officer at Holo-Ray, Mr. Sayadi has a background in mechanical engineering with considerable experience in surgical robotics, mixed reality and medical software development.

As winners of the Marika Zelenka Roy Simnovation Prize, offered in partnership with the Montreal General Hospital Foundation at the 2022 McGill Clinical Innovation Competition, Holo-Ray is using their cash award and credits to help support the development of this innovative project. In the coming months, they will move forward with proof-of-concept research studies, and will be raising seed money to support Holo-Ray's continued growth.

Diane Lynn Weidner is Communication and Events Officer, at McGill University's Faculty of Medicine and Health Sciences.

From two months to 20 minutes: MiniCAT reduces time to diagnosis

LONDON, ONT. – London Health Sciences Centre (LHSC) is the first hospital in Canada to offer otology patients fast and accurate results through medical imaging technology that decreases the time to diagnosis from up to two months to approximately 20 minutes.

The MiniCAT (cone-beam CT unit) works similarly to a traditional CT scanner, however, it targets specific areas of the head and neck, which is useful for otology patients needing their inner ears imaged for diagnosis. Patients can make use of this machine on the same day as their initial appointments, which eliminates the need for a CT scan.

"We are excited to be the first hospital in Canada to use the MiniCAT for our otology patient population at LHSC," said Dr. Lorne Parnes, surgeon, otolaryngology department. "In addition to the shorter wait times, this technology delivers drastically less radiation exposure than a traditional CT scan, our former standard, and provides better resolution images, allowing for more precise and timely diagnosis. The benefits for our patient population are numerous."

As the regional otology surgery referral center, many patients travel to London from outside the region, often at great expense. This scanner allows patients to have the imaging and clinical assessment all in one visit, saving both time and money.

The cone-beam CT unit was purchased using donor funds through the London Health Sciences Foundation. This generous gift has a personal connection, as it was made by a former patient of LHSC's otology program.

"I know first-hand the wait times to have a CT done, and that wait feels unbearable," said London Health Sciences Foundation donor, Tom Allison. "My only hope for the gift was to make a difference for future patients needing treatment."

The machine has been in use since April of this year, and the department is already seeing a noticeable impact for patients. As well, the machine brings with it future research study opportunities that may further advance care delivery in this field.

"We're incredibly grateful for donors like Tom Allison, for investing in innovative healthcare technology that we know will improve patient outcomes," said Dr. Sumit Agrawal, surgeon-scientist with LHSC's otolaryngology department.

The MiniCAT (cone-beam CT unit)

"The MiniCAT allows us to obtain accurate images of electrodes in cochlear implant recipients and by analyzing these electrodes, our group can use patient-specific anatomy to 'tune' the implants, which potentially allows for better sound quality, speech understanding, and music appreciation."

About London Health Sciences Centre: With roots going back a century and a half, London Health Sciences Centre (LHSC), is an award-winning, research-intensive acute tertiary and quaternary teaching hospital, one of only 14 such hospitals in Ontario. LHSC is also home to Children's Hospital, one of just four acute tertiary care paediatric hospitals in the province. Our unique place in the health system positions us well to inform and advise on provincial, national and international health policy. We are the cornerstone of care for many specialized programs and services in Western Ontario. More information about LHSC can be found at www.lhsc.on.ca.

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Hospital celebrates managed equipment contract with GE Healthcare

BY NORM TOLLINSKY

Clinicians and managers in the medical imaging department at Humber River Hospital in Toronto don't miss having to compete with everyone else for capital budgets to replace aging equipment. The Managed Equipment Service (MES) contract the hospital signed with GE Healthcare in 2015 put an end to that.

The MES program is a partnership where GE Healthcare assumes responsibility for procurement, financing, maintenance, and replacement of all medical equipment within the scope of the contract, even if some of it is purchased from other vendors. In order to preserve clinical choice of the equipment purchased, Humber River commits to maintaining a predefined threshold of equipment by purchasing some equipment from GE, while the remaining equipment can be purchased from any vendor through a procurement process.

To do this, the hospital pays a monthly fee to GEHC through its operating budget. That's a major benefit because MRIs, CTs and all other medical equipment required by hospitals is generally paid for out of limited capital funds, much of it raised in the community – often with great difficulty.

As Humber River President and CEO Barb Collins points out, "capital equipment is not paid for by government. You have to raise money locally, so this program ended up saving us $80 million. It's huge. It's massive. I don't know why a hospital wouldn't do it, quite frankly."

"It's not every piece of equipment in the hospital," said Collins. "You define the equipment you want to put in the scope of the MES and GE is contracted to manage it. We bought our beds ourselves but all our diagnostic imaging equipment, our MRIs, our CTs, all of our cardiac monitors, our anesthetic machines, screens, rotating arms, ECG machines and ultrasounds, among other pieces, are included in the contract, so it's a lot of equipment."

Barb Collins, president and CEO of Humber River Hospital: "This program ended up saving us $80 million. It's huge. It's massive. I don't know why a hospital wouldn't do it, quite frankly."

Clinicians are still heavily involved but GE writes the RFPs and puts them out to market. As part of the procurement process, site visits are co-ordinated with other hospitals or products are brought to the hospital for clinicians to evaluate and clinical choice remains with the hospital

There was initially some resistance from other vendors about GE buying equipment from them for Humber River and "some people tried to convince us it was a bad idea, but it has worked," said Collins.

GE Healthcare's MES program not only provides hospitals with the most current, technologically advanced equipment, but it also plans for its replacement at a specified refresh time.

"Having that refresh through the life of the contract is a benefit to our patients and staff because we can stay innovative and up to date, which is important in healthcare. Just as cell phones change and improve every year, the same thing happens to our equipment," said Dolores Dimitropoulos, manager of the hospital's medical imaging department.

For example, seventeen ultrasound machines were recently replaced. As well, there are plans to refresh the hospital's interventional radiology equipment, CT scanners, general X-ray, nuclear imaging, MRI scanners, mammography equipment, life support and operating room equipment in the next few years.

Shadi Mossaed, who shares medical imaging managerial duties with Dimitropoulos, joined Humber River from another hospital. Previously, she worked in an imaging department that contained equipment of varying ages. "That makes it difficult to set your scanning protocols," she said. "The patient comes in for a CT scan and gets put on one machine, and then the next time they're put on an older scanner. Due to this MES agreement, having the same and most up to date equipment ensures consistent, quality imaging, lower radiation exposure, and the same interface for staff," she added.

There's also an impact on equipment utilization because staff will naturally gravitate to equipment they like, resulting in one machine that's overburdened and another one that's underutilized. In the absence of the MES program, Humber River would likely have ended up with a hodgepodge of equipment from its previous locations.

Both Dimitropoulos and Mossaed remember the battles they had competing with every other department for scarce capital budgets. "The old way of doing things would have been through a capital purchase and you're competing with everyone else in the hospital," said Dimitropoulos. "That's how you end up with 25 to 30-year-old equipment because the other programs would be successful getting a piece of that small capital pie. It was a big battle to get approval for capital previously."

Finally, there's the issue of maintenance. As part of the contract, GE maintains the equipment "so I'm not dealing with vendor A for the MRI, vendor B for the cardiac machines and someone else for the OR machines," said Collins. "I don't have the manager of diagnostic imaging calling the repair people. We have an onsite GE manager to facilitate whatever needs to be done."

And all of it comes down to customization. "How we define and structure an MES is quite fluid," said Matthew Khoory, GE Healthcare's Director of Partnerships and Digital Solutions. "An MES program can be very flexible with regard to the scope of the equipment, the duration, and the responsibilities covered. It can be all of the equipment in our portfolio and more. Or it could be focused on radiology or just a small fleet of equipment – X-ray and ultrasound, for example. We try to create a model in a way that makes sense for the specific hospital or health system."

My first 100 days as CEO of Transform SSO

BY NORALYN BALUYOT

On August 18, I completed my first 100 days as the CEO of TransForm. It's been an amazing time – full of new challenges and pressures – some real and some self-imposed. So, what have I learned in the last 100 days?

1. It's important to have your set of trusted advisors, and it's more important that you use them. There are issues and decisions that need another person just to review them with ... and its good to have that "phone a friend" hotline. To my friend hotline – you know who you are – thank you! You have helped me more than you know.

2. Things will not happen as fast as you want them to and at the same time, some things will happen faster. What does that mean? Essentially, you need to be flexible but at the same time impose control in the parts of your schedule and your life that you can. It's a tough balance but finding that balance actually gives you more time to get things done when your schedule gets filled with "must have meetings".

3. Schedule time to do work, and not just 1 hour. My assistant has been putting blocks in my calendar of time to get things done, such as reviewing documents, contracts, etc. It forces me to dedicate the time I need to get this work done during business hours versus during my personal time – which was a bad habit I needed to break. Its also good behaviour to model for your staff.

4. Respect your own personal time. Just because you need to be available for emergencies, and you have work that needs to get done, does not mean that it needs to consume 100% of your time. You deserve personal time – for yourself and your family. Taking time to recharge gives you the capacity to keep giving at work.

5. Last but not least, recognize while the first 100 days are important, they will not define you as a leader. I went into the first 100 days thinking I needed to do something huge, to make my mark. But I recognize the first 100 days are about learning and finding my rhythm. It's about what I establish and consistency in my actions going forward that will define what type of leader that I am.

Noralyn Baluyot

It has been a terrific 100 days, with more positives than challenges, but then again, it was the summer. I look forward to continuing and learning on this journey.

TransForm Shared Service Organization is a not-for-profit, shared service organization founded by the five hospitals in Erie St. Clair to manage their hospital IT and supply chain needs. Notably, TransForm has earned several awards for its work, including GHX Canadian Provider of the Year for its supply chain operations, Digital Health Canada's Leader of the Year and Clinical Innovator of the Year (2022), and CIO of the year in the non-profit sector by IT World Canada. Through the implementation of an end-to-end hospital information system servicing the patient journey in multiple care settings, TransForm helped its participating member hospitals achieve HIMSS Level 6 in just one year. Earlier this year, Noralyn Baluyot was promoted from CIO to CEO of the organization.

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Michael Garron Hospital launches home peritoneal dialysis service

BY ALYSSA BRAVO

TORONTO – Michael Garron Hospital's (MGH) new Home Peritoneal Dialysis (PD) Service is expected to push the boundaries for renal patients in the East Toronto community.

Home PD allows patients to receive dialysis treatment in the comfort of their own homes. Patients specifically receive peritoneal dialysis, which uses blood vessels in the patient's abdomen to naturally filter waste from their blood.

The first patient home visit took place as part of this service on June 23. With Home PD, patients are equipped with the proper tools and knowledge to receive peritoneal dialysis at home overnight as they are sleeping.

Dr. Miten Dhruve, division director of Nephrology at MGH, compares the Home PD Service to other renal care options MGH offers, including hemodialysis.

"Hemodialysis requires a patient to be on-site three days a week. It can be a burden on patients and affect their quality of life," he said. "Home peritoneal dialysis gives patients more independence and freedom, such as allowing them to work and carry on everyday tasks."

The criteria for hemodialysis and peritoneal dialysis differ and which treatment is most appropriate for the patient depends on their needs. Both forms of dialysis help improve the quality of life for a patient.

However, because home peritoneal dialysis is managed by the patient, Dr. Dhruve highlights the importance of support from the patient's care team in the Home PD Service.

Jane Scott Baier is a social worker on the Home PD team at MGH. As social workers focus on the emotional, physical and social implications of an illness, Jane aims to address barriers or challenges that a patient and their caregiver may face during dialysis treatments.

A team at Michael Garron Hospital is training patients in East Toronto to use Home Peritoneal Dialysis.

"Every patient is different and we need to listen to what the patient identifies as important to them and then help them gain access to these supports," she said. "We can also help identify supports that are needed through ongoing assessments by all team members and through patient education.

"It's important to make sure the patient agrees with the recommended supports and is given an opportunity to understand why they are recommended," she added.

Jessica Truong, registered nurse (RN) at MGH, also works closely with patients to prepare them for the Home PD process and to maintain the service at home.

This includes everything from post-PD catheter insertion care, exit site care, the management of non-infectious complications and peritonitis, facilitating interdisciplinary supports for the patient and, most importantly, patient education on how to successfully perform peritoneal dialysis at home.

Nurses on the Home PD team train patients and their family members at MGH so they can confidently perform the treatment at home.

After "graduating" from the training sessions, the patient starts the Home PD Service independently with the support of family or, if needed, at-home care nursing.

The patient's primary Home PD nurse provides support, referrals and customized follow-ups for the patient's ongoing needs and at every milestone of their treatment. The Home PD team also regularly connects with patients to review their treatments and lab work and to discuss any concerns they may have.

Truong is passionate about and has specialized in peritoneal dialysis for nine years. She finds fulfillment in being a part of the Home PD team because she plays an essential role in facilitating and focusing on the treatment of patients in the comfort of their own homes.

"I'm able to be a primary source of support for them in this transition from illness to treatment and encourage self-empowerment in the process," she said.

"I think that there is something so physically, mentally and emotionally therapeutic about being home that really brings a lot to the concept of holistic healthcare. Home PD is one of the modalities that really embraces this."

Like many other healthcare services, the Home PD Service requires a collaborative working team in order to prioritize and achieve exceptional patient care.

"The significance of working on a team like Home PD is being able to address all of the needs of the patient," Jane Scott Baier said.

"It's a holistic approach that focuses on the individual and it's a multidisciplinary approach focused on the same objective, which is 'How can we help and support this individual?'"

Truong asserted that patients are the most crucial members of the Home PD team. "The success of their treatment is so heavily influenced by their motivation and their participation," she says.

MGH's Renal Program has more than 500 patients and sees more than 20,000 outpatient visits every year. The Home PD Service expects to see about 24 patients within the first year of its launch.

Continuity of care: exploring the role of virtual care every step of the way

BY DR. DOMINIK NOWAK

Before 2020, most Canadians seeking healthcare had to travel to a doctor's office or hospital. Since the onset of the COVID-19 pandemic, trends from the Canadian Institute for Health Information showed that Canadians began to receive roughly one third of their care virtually. Clearly, virtual care has surged.

Using technology, health professionals can meet people where they are most comfortable. What is behind these numbers, nonetheless, is our success in turning regular office visits into digital office visits. Despite virtual care's broad adoption, Canadians are yet to see its full potential.

With shared values, sound vision, and committed investment, virtual care can continue to transform our health system. Here are some examples:

In family practice, virtual visits support the care relationship: Having a family doctor can set the course for a person's path through healthcare. People with a family doctor have more preventive care, avoid hospitalizations and emergency visits, and even live longer.

Virtual care's untapped potential in family practice is twofold. First, people can see their family doctor despite barriers like mobility, travel, work or caregiving responsibilities. With virtual care, healthcare fits around life, not the other way around. Second, virtual care can elevate how health professionals communicate with each other. Specialists and other members of a person's care team can work together as if they were in the same office. This virtual teamwork can lead to more timely diagnosis and treatment, especially vital for rural, remote, and other underserved communities.

For the roughly five million Canadians who do not have a family doctor, virtual care also plays an important role to fill the gap. Services like TELUS Health Virtual Care (for employers), MyCare (for consumers), and even Toronto's Virtual Emergency Department are great examples of ways we can support people who are still waiting to be matched to a family practice.

For employers, virtual care helps maintain a healthy workforce: Healthy employees make healthy organizations. Investing in employee health is not just right to do, it is the smart thing to do. Health-related absences cost Canadian employers sixteen billion dollars each year, according to a 2018 Mercer article. Employees are also expecting more from their workplaces, with a 2020 Morneau Shepell report showing nearly eight in ten stating they would consider changing jobs for better well-being support. Employer-supported virtual care is not just about convenience. Indeed, 24/7 access to care removes barriers that would otherwise prevent people from getting care. Access is especially important for mental health, which leads to more than a third of disability claims for Canadian employers based on a recent Mercer survey.

Dr. Dominik Nowak

However, virtual care must go beyond convenience to reach its full potential. Four especially critical links include integrated healthcare, mental health, pharmacy care, and chronic disease management. In other words, how virtual care platforms work with a person's family doctor, how they connect people to mental health supports like talk therapy, how they help people take ownership of their medications through virtual pharmacy care, and how they address the visits that are not just one and done – such as with chronic diseases like anxiety, depression, and diabetes.

Investing in employee health via virtual care results in recruiting and retaining happy, healthy, productive employees, who can ultimately better fulfill the mission of a high-performing organization.

Bringing patients, families, and caregivers into the care team: Without a doubt, virtual care offers people a way to healthcare that is less disruptive to life. Barriers like distance, time, mobility, as well as work, parenting, or caregiving responsibilities, prevent people from

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IWK connects NICU babies with parents using Cisco video-visit tech

This past September was Neonatal Care Units (NICU) Awareness Month, a time to honour babies and families experiencing a stay in the NICU and the health professionals caring for them. While welcoming a new family member comes with tremendous joy, few experiences could be more distressing for a family than seeing their infant in a neonatal intensive care unit.

That's why it's essential for families to have the highest level of human connection, to health practitioners, whatever the challenges.

IWK Health in Halifax – in partnership with Cisco and OnX Canada – innovated new ways to do just that through the Chez NICU Home program. Chez NICU Home uses a web-delivered application – Chez NICU Home – and securely powered Cisco Webex technologies to offer families evidence-based education and resources related to NICU care that can be accessed anytime, anywhere at the family's convenience.

From daily care activities, feeding and nursing, to the discharge process and understanding common NICU conditions, the program provides families the information and resources they need, while also tracking their baby's daily progress.

"Our research team found that babies in the NICU do better when parents are present and more actively involved in care. Chez NICU Home was designed to inspire, connect, and support families throughout their NICU experience," said Denise Lalanne, director, Innovation, Technology and Redevelopment, IWK Health.

"Along with Cisco and Webex video devices, we're delivering a virtual care model at scale that involves families in their baby's daily care to ensure healthier outcomes for all."

Launched in 2020 as the pandemic swept across Canada, IWK Health was able to continue the delivery of care and connection for infants and their families to help ease the pressure of visitor limitations. Since launching, the program has helped over 450 families thrive during their stay in the NICU and has been so effective it is now a permanent fixture in the NICU.

Transforming the NICU with virtual technology: Connection was at the heart of the IWK's Chez NICU Home platform. Each NICU room is equipped with a high-quality Webex video device and secure collaboration technology that connects families to appointments with healthcare providers and local health professionals, or to family members who are unable to be there in person. For example, if spouses need to stay home to care for other children, they can virtually participate in clinical rounds via Webex to get the latest update on the baby's progress.

"For our families, it's overwhelming," said Andrea Melanson, IWK Health's neonatal intensive care unit discharge planning coordinator. "Sometimes the mother is too unwell to be in-person in the NICU. And especially through the pandemic, with the extra restrictions, many babies could not be close to their families.

Like all babies, those in a NICU need that bonding experience with their families and vice versa. And even if they can't be held, the voices of their parents and families are a good way to start that bonding process. Cisco's collaboration technologies, with best-in-class video, audio, and security features, provide the closest thing to being there for families.

"This technology has afforded our families the ability to connect," Melanson added. "Because we are a regional centre of excellence, we have families from across Atlantic Canada in our unit. And sometimes the families just can't stay here all the time, especially if their baby is here for months at a time."

Virtual healthcare is here to stay: The success of Chez NICU Home shows that virtual care has a strong role to play in supporting Canada's healthcare system. Chez NICU Home has been overwhelmingly well-received by families, with 97 percent of users agreeing that the lessons and resources delivered through the project were of great help.

"Virtual care is changing the way we deliver health care in Canada for the better," said Sarah Reuter, general manager of Webex for Cisco Canada. "Technology helps us to dissolve geographies and boundaries, while removing barriers to access for those who may live in rural or remote locations, aren't able to leave their home or simply need the flexibility that virtual care offers."

IWK isn't the only hospital seeing the benefits of virtual care. A survey of Nova Scotia's doctors in July 2021 showed that they used virtual care for over 80 percent of all their appointments during 2020. Before COVID-19, only 4 percent of primary care visits in Canada were conducted virtually; this number has since increased to 33 percent between January 2021 and March 2022, according to Canada Health Infoway.

By enabling families to be present, from anywhere at any time, technology serves the ultimate goal: helping families through an incredibly challenging time. "It makes coping a little bit more manageable," said Melanson.

Countering the problem of growing DI waitlists with innovative software

Even before the pandemic, wait times for CT and MRI exams exceeded the recognized standards. Backlogs are now at unacceptable levels and continue to grow.

For its part, The Conference Board of Canada estimates that average wait times will be 67 days for a CT scan and 133 for an MRI, greatly exceeding the acceptable target of 30 days, and resulting in an economic impact of $3.5 billion in lost GDP.

This critical situation is facing increased challenges related to staff shortages as people retire. There is also burnout among healthcare staff, COVID-19 continues to infect healthcare workers resulting in time off from work, and a general lack of staff and new people entering the healthcare arena slows things down.

To help address these significant issues, the Canadian government committed $6.5 billion to address the backlog of surgeries and procedures and also committed to provide $2 billion to the provinces and territories to help address immediate pandemic-related pressures, including strengthening the health workforce.

However, ramping up staffing numbers and coping with staff illness will take time.

Meanwhile, what can be done to help our healthcare system face these challenges now and keep the system working?

Siemens Healthineers and Varian have joined together to outline some of the tools available now that can be utilized to help fight back against the great waiting game. Some examples of the solutions available from medical technology companies in Canada include:

- Utilizing technologies that enable clinicians to undertake minimally invasive surgical procedures that can reduce time spent in the operating room, resulting in improved patient outcomes and faster recoveries, while reducing post-surgical visits and complications.
- Using Artificial Intelligence to assist with faster treatment identification.
- Embracing digital technologies and remote technology to help perform more scans, especially useful when serving remote areas where the number of qualified staff might be low.

Siemens Healthineers and Varian already offer several solutions that can be utilized to reduce the back-log and challenges facing our healthcare system. They include:

- *syngo* Virtual Cockpit. This leading-edge software enables remote scanning assistance – so any diagnostic system can be controlled from anywhere, helping with the lack of qualified staff in certain hard-hit areas or remote locations. It allows virtual access – you can control CT or MR scanners within a fleet from anywhere by connecting securely – and enable remote scans.

The system also supports mobile units, allows you to call on experts in other cities and countries to perform scans, helps with staffing shortages and ensures treatment options for areas that don't benefit from a plethora of skilled healthcare labour.

The virtual cockpit allows radiologists who may have to isolate for some reason, such as a COVID-19 infection, to work from home. It enables pregnant radiologists to work from a home environment while protecting their health and exposure to radiation.

You can reduce waiting times without hiring more healthcare personnel – each person can perform scans at one location and offer remote support in parallel – that means quicker appointments for patients at locations convenient for them.

- Mobile scanning. Mobile scanning units are designed to improve access to care while providing the same diagnostic performance as that of fixed systems. Mobile scanning units can be brought to almost any facility's doorstep – these mobile trailers are magnetically shielded for MRI scanning and can be transported with the magnet fully energized to minimize set-up time at varying locations.

Mobile units can be utilized when healthcare institutions are overflowing, as they were during the pandemic, and are also invaluable for use to deliver services in remote communities.

- Teamplay. Siemens Healthineers offers

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Oak Valley Health goes live with integrated specimen tracking module

BY BRENT BURGESS

In January 2022, Oak Valley Health went live with Materials Manager, an integrated pathology specimen tracking module supplied by Meditech, the supplier of the organization's electronic information system. Oak Valley became the first hospital in Canada to deploy Materials Manager, which was released by Meditech in 2021.

Prior to the use of bar-coded specimen tracking technology, we were reliant upon manual and paper-based processes to monitor workflow and quality assurance. As with all manual processes, there was an inherent risk of errors especially in relation to labelling of the materials. To address this concern, we purchased a limited version of a third-party specimen tracking system approximately eight years ago. This system addressed the highest safety risk areas, namely accessioning, grossing and microtomy.

However, moving to a fully integrated specimen tracking solution for pathology promised cost savings, productivity gains, and quality-assurance advantages. Meditech is also the provider of our Laboratory Information System (LIS), and Materials Manager is a natural extension of this solution. We had the opportunity of providing feedback during the development of this new module as well as beta testing an early version. Being the first Canadian site planning to go live, Meditech development and programming specialists offered to work with our hospital to ensure a successful transition.

We could not have done the implementation without Meditech's support. We also relied on the support of multiple other vendors, as well as our own Laboratory LIS specialist and staff from our I.T. department. In addition, this major change would not have been possible without the help of all pathology staff members, often to the point of making short-term sacrifices.

Oak Valley Health is one of Ontario's leading community health care organizations. Across our two hospitals, Markham Stouffville Hospital and Uxbridge Hospital, as well as our Reactivation Care Centre, we provide high quality, patient-centred care to more than 437,400 patients each year. We offer diagnostic and emergency services and deliver clinical programs in acute care medicine and surgery, addictions and mental health, and childbirth and children's services.

The Anatomical Pathology and Cytology Department provides a centralized service for the populations of Eastern York Region and North Durham located at Markham Stouffville Hospital. The Laboratory provides a routine pathology service, which processes approximately 17,000 surgical cases and 3,000 cytology cases per year.

To sustain and keep abreast of a growing workload (7 percent per annum) we have applied lean workflow principles as well as modern technology in order to provide an efficient and safe environment. Technology advances include multi-platform IHC instrumentation, voice dictation integrated with our LIS, and specimen tracking.

Pathology tracking systems have been present for many years and were designed to address both patient safety and workflow. The tracking begins by associating the applicable materials (requisitions, specimen containers, blocks, and slides) with a scannable bar code. These bar codes enable fast and precise entry into the tracking system which records the user, the date, time, and the location of the scan. Tracking data can then be used to trace an item's history or provide real time information on its current status. The system can also help to maximize workflow by using bar code driven procedures (e.g., dictionary protocols such as special stains, IHC, or serial sections) allowing for the generation of specific slide labels when the cassette bar code is scanned.

There were multiple key stages to the Materials Manager configuration process. The essential stages, those which required Meditech support, and those which realized the greatest gains are as follows:

• Meditech Dictionary builds. To accept receipt of the new module, Meditech first turned on our toolbox parameters allowing us to proceed with the initial dictionary builds. This included Station builds (e.g. Accession, Cytology, Grossing, Embedding, Microtomy, and Delivery) as well as material.

Status builds (e.g. Requested, Entered, Embedded, Verified, Delivered and Cancelled). The Medical Terms dictionary based on Tissue Type also required changes which allowed input of cassette color, cassette number, and slide number with associated procedures. Additional builds included Cytology and Immunohistochemistry (IHC).

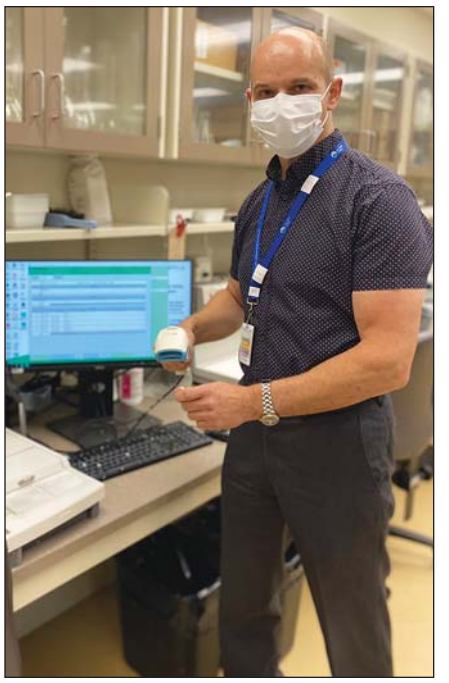
• Slide Label Format. Generation of slide labels from Materials Manager required the use of third-party label software. Help from both Meditech and the label software vendor was required to build the necessary formats.

• Interfacing of IHC platforms. This process included the complication of having two different IHC platforms. A means to distinguish the respective IHC tests on each system was necessary. To solve this issue a unique prefix was used for each instruments test menu during the dictionary build. In addition, IHC vendor specifications for the bar code were required along with support from the third-party label software staff to create unique stainer readable label bar codes for the respective platforms.

To sustain and keep abreast of a growing workload, we have applied lean workflow principles and modern tech.

• Accessioning. Previously, we would first accession specimens into our Meditech LIS and then complete the process in the third-party tracking system. An immediate 33 percent increase in productivity was realized with the Meditech solution. Incorporation of the integrated Materials Manager tracking system reduced a more complicated two stage interfaced accessioning process into a simple single stage which also included automatic generation of cassettes based on the tissue type entered.

Meditech support was required at this stage as cassettes did not initially print. Our cassette printers did not use a standard driver format. They instead operated using a drop file format whereby the LIS would deliver a message to a designated folder and then that message would be interpreted by the cassette printers' software. The initial message being delivered to the folder could not be interpreted by the software. We then worked with the cassette printer vendor to determine the correct file format and passed this along to Meditech. The development and programing team were able to quickly make the necessary changes and as a result, cassette printing directed by the LIS tracking module was realized.



Brent Burgess, Oak Valley Health

We then encountered a second obstacle related to cassette printing. We have two accessioning stations and only one cassette printer. Again, we called upon Meditech for help with this problem. The developer quickly informed us of a Meditech networking solution called ANP. Subsequently, a Meditech network specialist worked with our own I.T. department network specialist to implement this networking solution.

• Grossing. As with accessioning, there were only two cassette printers shared among four gross stations. Again, the ANP Meditech networking system enabled cassette printing from all gross stations.

Materials Manager was designed to provide an area to record the number of pieces belonging to small biopsy cases. This feature replaced our previous manual system. In addition, a voice dictation short cut was developed by one of our Pathologist assistants, making this electronic entry entirely hands free.

• Embedding. Our limited third-party system did not have an embedding component. Tracking at this stage could now be realized with the Meditech solution.

Previously, a paper-based report was created each day detailing the type of tissue, number of pieces and any special embedding instructions. With the integrated Meditech tracking system, all this information became available on-screen following scanning of the cassette bar code. All staff felt that the addition of this stage in the tracking process coupled with the elimination of the previous paper-based system was a significant improvement.

• Delivery. Our limited third-party system did not have a delivery component to track slide hand out to the respective attending pathologist. This Materials Manager enhancement also serves as a vital system component when considering the use of an electronic requisition.

• Pathologist Requests. Previously all subsequent pathologist requests for additional stains or sections were input through our Meditech LIS in the form of a free text message report. Pathology staff would then print the report and transcribe the orders into the appropriate LIS data sections, and in the case of IHC orders, a second manual entry into the IHC software was required. With the addition of Materials Manager, a "Request" option became available. Upon selection, the pathologist can choose requests relating to the tissue (add additional blocks) or relating to tissue cassettes (e.g. additional stains, IHC, levels).

Having this request feature part of a fully integrated tracking system is of significant improvement. For example, when a pathologist requests an IHC stain, Material Manager is updated so that when the cassette bar code is scanned the appropriate IHC label will be generated. The request message also flows directly to the respective IHC stainer and appears on the instruments pending list. In addition, all workload generated from this request is also automatically updated. A request report is also available and includes all orders in requested status. We plan on implementing this request feature as soon as the IHC printers are added.

• Audit Reports. With the addition of Materials Manager, an Audit Report option became available. When selected, the information on the reports details every scanned transaction including the user, the date, time, and the location of the scan.

Kotter's eight stage process of creating major change was heavily considered during the course of this project. A high sense of urgency was established from the start, knowing our existing system would not see us into the future. This project had crucial Director and VP support as it presented the opportunity to couple significant cost savings with improved quality and increased productivity.

A strong vision of a fully integrated tracking system was also necessary as it helped to direct, align and inspire actions that lead to success. To capture the hearts and minds of our staff the vision was enthusiastically communicated. This action portrayed the potential benefits of change and helped them believe that the transformation was entirely possible. Obstacles were overcome, often with vendor support, and they were not permitted to cloud the vision. Short-term wins were celebrated with high fives and helped maintain momentum. Moving forward we plan to continue to work with our Meditech partner by providing continuing ideas on tracking system improvements.

Brent Burgess is Manager of Anatomical Pathology and Cytology at Oak Valley Health.

Ontario doctors can now access drug information through their EMRs

BY JAMIE LOUIE

Seamless access to a patient's health data is important for any medical practice. It improves clinical workflow, saves time, and allows clinicians to provide more informed, personalized care to enhance patient safety. Through streamlined digital access, OntarioMD (OMD) and Ontario Health (OH) are making it easier for Ontario clinicians to securely access medication information directly from certified electronic medical records (EMRs).

The provincial Digital Health Drug Repository (DHDR) is an invaluable digital health tool now being connected to certified EMR systems so clinicians can view drug information for their patients. OMD, a trusted advisor to clinicians for EMRs and other digital health technology, is leading EMR integration with the DHDR in partnership with OH, the Ministry of Health, and EMR vendors.

"Ontario's clinicians have been asking for more integration of external health information with their EMRs," said Dr. Chandi Chandrasena, OMD's chief medical officer. "With direct access to medication information such as narcotics and Ontario Drug Benefit [ODB] drugs, EMR access to the DHDR is the first step towards further integration with other valuable drug data, like other medications dispensed to patients."

DHDR integration with certified EMRs provides clinicians with real-time, secure access to patients' publicly funded medications and pharmacy services (e.g., under the ODB Program), drugs that are considered narcotics or controlled substances, and COVID-19 vaccination information from the provincial COVaxON vaccination management system.

"Streamlined access to the DHDR gives clinicians the best possible medication histories for their patients," adds Dr. Chandrasena. "This adds to improved patient safety, outcomes and continuity of care, and better management of narcotic prescribing."

Viewing the information seamlessly in their EMRs allows clinicians to spend more time addressing their patients' needs instead of logging in and navigating multiple online tools. Clinicians do not have to search for the data outside of their EMRs and can quickly locate the drug information available to help decrease the risk of adverse drug events such as medication errors, drug reactions, allergic reactions, and overdoses to keep their patients safe and improve their health. Through rapid access to this information, clinicians can make more informed decisions and deliver optimal patient care.

"Having access to DHDR data through my EMR is a highly effective tool to enhance my patient's care. I can access my patients' drug information, as well as COVID-19 vaccination information from COVaxON, in real time without leaving my EMR, which better suits my workflow," said Dr. Justin Di Donato, the first physician to access Ontario's DHDR from his EMR. "This streamlines my ability to gain a more informed medication history for my patients, and I can take action when required."

EMR integration with the DHDR is mandatory for all vendors with OMD-certified EMRs. They have until November 2022 to complete the integration to maintain their certified status.

OMD and OH are working with EMR vendors to roll out this important provincial resource to clinicians across Ontario. Access to the DHDR is available through YMS EMR and YES EMR, with OSCAR Pro on the way shortly. Other EMRs will be ready imminently.

"YMS is delighted to help pioneer this important milestone for digital health," said Andrea Flint, director, YMS. "We worked closely with OMD to make access to the DHDR a reality for Ontario clinicians."

Clinicians should start preparing in advance to speed up the onboarding process. OMD is helping to simplify the set-up process now by ensuring clinicians have the three prerequisites required to connect their EMRs with the DHDR: a ONE® ID from OH; a digital PKI certificate that proves the clinician's identity; and a client, or application form for OH. OMD, along with OH, is facilitating the system requirements and the application and user agreement paperwork to make the process easier for clinicians.

OMD remains intent on making the onboarding process as smooth as possible to help alleviate some of the pain points and time constraints that clinicians face every day.

"We know clinicians are burnt out, and already have so much on their plate," said Dr. Chandrasena. "The reality is that onboarding this tool – no matter how useful – may not be something that you feel you can take on right now. That's where we come in. OMD will work with clinic staff to facilitate the onboarding process to the DHDR. Clinicians can even use this initiative for their CPSO [College of Physicians and Surgeons of Ontario] QI [quality improvement] project! We're a one-stop-shop for supporting clinicians in their practice and helping to make their lives easier."

Ontario clinicians can start onboarding today and gain priority access to medication information from the DHDR by contacting OMD at support@ontariomd.com.

Jamie Louie is a Communications Advisor at OntarioMD.

Countering problem of growing DI waitlists

CONTINUED FROM PAGE 10

a departmental performance management system that helps you make prompt and well-informed decisions by offering an intelligible overview of your performance data.

It monitors quantities such as imaging throughput or dose levels, utilization of staff, rooms and resources of your whole department down to every device and procedure, simplifying your reporting and showing you where workflows need adjustments and time savings can be achieved.

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It provides tailored, in-depth analytics, helping to tackle sophisticated challenges like requirement patterns for priority cases.

VIEWPOINT

Translating digital mental health research discoveries into real-world care

Challenges include increasing the number of patients willing to use digital solutions.

BY NAVI BOPARAI, ASHA MAHARAJ, GILLIAN STRUDWICK, ARISTOTLE VOINESKOS, SANJEEV SOCKALINGAM, AND DAMIAN JANKOWICZ

Events of the last two years – primarily the COVID pandemic and economic turbulence – have put significant stress on the public, leading to rapidly growing demand for mental healthcare services. As a result, digital health interventions and approaches have never been more important. Though the pandemic has certainly accelerated the use of many of these digital approaches and interventions, it is believed that there remains significant untapped opportunity in the further scaling of digital technologies in our health systems.

To understand what digital interventions and approaches are effective, a number of researchers in Canada and abroad have been studying digital technology in mental healthcare delivery from a number of different vantage points.

Unfortunately, the gap between when evidence becomes available and when it is integrated into routine clinical practice is often cited to be more than a decade. Thus, the Centre for Addiction and Mental Health hosted a symposium this spring focusing on translating digital health research discovery into real-world care.

The goal of the symposium was to identify opportunities for research to impact and guide clinical care at CAMH and beyond. The day began with a keynote presentation by Dr. Munmun De Choudhury, associate professor in the School of Interactive Computing at Georgia Tech, who spoke about opportunities to leverage social media to gauge mental health at the individual, community, and population level.

Following the keynote presentation, participants were split into smaller groups to hear focused presentations and engage in conversations and discussion on the following topics: integrating digital health tools into clinical care processes; adapting digital health tools to the CAMH context (and beyond); and best practices for education and training.

Key themes that came out of the discussions included:

Equity, Diversity, and Inclusion (EDI): Healthcare organizations and other research institutions need to do better at addressing EDI in digital mental health research. There was a great deal of discussion on recognizing the importance of EDI, but researchers shared that they continue to face challenges in incorporating EDI into research and other initiatives.

Data: Data is the key to population health but it is not a panacea. Presenters and attendees recognized that while large administrative databases are good for system level research, details and contexts are often missing. And even though the quality and quantity of data is important, human interaction is needed for the success of evidence-based clinical care. Interaction between clinicians and patients can increase trust and in turn strengthen the patient's belief in the effectiveness of digital health tools and research.

Integrated Care: Consolidation of digital health efforts can better support integrated care. It is likely that patients will not want to have multiple health apps to check in with and use for each condition, as this can become burdensome. Instead, researchers and other developers of digital health tools will need to be more precise about who their resources are for and under what circumstances these digital tools and interventions should be used.

Engagement: Engagement with clients through digital tools is challenging and attrition is high. Some of the studies discussed during the symposium showed that maintaining client engagement and retention were difficult. A study on the optimization of adherence to longitudinal digital phenotyping in youth with depression revealed that greater data density contributed to higher rates of attrition. Research teams were surprised to see that severity of depression was not impacting attrition, but rather the amount of data that was being asked of the participants was.

Interweaving digital health: It is possible for digital health tools to be integrated into clinical workflows and support patients and clinicians throughout the patient journey. Researchers and clinicians often think about referrals being the start of this journey and digital tools being the end, but it is imperative to start leveraging digital health tools to support the gap between referral and discharge.

Based on the informative presentations and discussions, the following recommendations were made:

- Develop trust with patients as we move towards an integrated digital health pathway.
- Be open and talk about failures to support learning.
- Be pragmatic about co-design.
- Develop back-end digital health infrastructure to avoid duplication or starting research from scratch. By using common platforms and IT systems, we can be more efficient with research funding to build robust data systems.
- Integrate key studies into clinical care so that research progress can continue to be made after funding ends.

E-prescribing helps First Nations toward improved healthcare

BY MAUREEN TAYLOR

The COVID-19 pandemic shone a bright light on the pervasive disparities in health care access across Canada. It also highlighted the importance of leadership and resilience in overcoming challenges arising from inequities.

In the 2020 Public Health Agency of Canada report, From Risk to Resilience: An Equity Approach to COVID-19, Dr. Theresa Tam acknowledged the importance of Indigenous leadership, resilience and success during COVID-19.

Successes exemplified by First Nations on reserve included lower COVID-19 hospitalizations (8.4 percent compared to 13.4 percent for general population), and lower death rates (1.4 percent compared to 7.1 percent) for reported cases.

Working for an Indigenous organization, I am witness to the resiliency and strength of First Nations communities every day and I am continually impressed with the effectiveness of their efforts and actions.

While advancing health equity and reducing disparities amongst different populations has to be a key part of advancing systemic improvement, the more intangible elements of resilience, leadership and social cohesion are also important.

It is not just about having a particular gap or disparity resolved, but also about who bridges the gap and how it is to be done. This is just as true in the health technology sector in which I work. Digital health technology is not going to magically bridge all the barriers to healthcare access, but it can be taken up as one very useful component.

Maureen Taylor

In my work with Mustimuhw Information Solutions (MIS), an Indigenous software development company fully owned by Cowichan Tribes, we take part in the "digital journeys" of the First Nations we work with. This is a journey with our customers and their provincial and national partners to implement access to digital health tools.

A good example is a journey that MIS and Canada Health Infoway participated in together with First Nations across the country called the National Community Electronic Medical Record Expansion.

This consisted of many journeys by First Nations communities to move away from paper-based records and to go forward with an Indigenous designed digital health

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The right test at the right time: Clinical decision support can improve DI

BY DR. GILLES SOULEZ

OTTAWA – Medical imaging is a cornerstone of patient care in Canada. Throughout healthcare, medical imaging procedures are relied upon to identify, diagnose, and treat disease. When requiring imaging it is imperative that patients are receiving the right test at the right time, providing the most relevant clinical value to the patient through their journey.

The Canadian Association of Radiologists (CAR) is advocating for the implementation of national electronic referral systems incorporating Clinical Decision Support (CDS) tools for medical imaging, to ensure that patients receive more timely access to imaging. Integrating CDS tools into clinical workflows across the country would help patients receive the most suitable test based on their symptoms. The goal of these systems is not only to help to reduce further backlogs for medical imaging but also provide support for referring practitioners in selecting the best imaging procedure for their patients.

Dr. Gilles Soulez

The CAR with the support of the Canadian Medical Association and working with the Canadian Association of Emergency Physicians, the College of Family Physicians of Canada, the Nurse Practitioners Association of Canada, and the Society of Rural Physicians of Canada, have already embarked on a national project focused on the creation and integration of Canadian-specific diagnostic imaging referral guidelines into CDS systems. These evidence-based, peer-reviewed guidelines will be freely available to help guide healthcare professionals decision-making processes, enhance care and enable better communication among healthcare providers.

"Ensuring that patients receive the medical imaging referral that provides the most clinical value at the right time, while also reducing risks as much as possible is the goal," said Dr. Ryan Margau, co-chair, CAR Imaging Referral Guidelines Working Group and chief and medical director, Medical Imaging, North York General Hospital. "Widespread adoption of CDS tools will allow for referring medical professionals to have access to latest evidence-based knowledge as part of their regular workflow – taking some of the unknowns out of ordering medical imaging."

Canada is behind other industrialized countries when it comes to e-referrals underpinned by CDS. CDS systems for medical professionals referring to radiology have been implemented with considerable success in other countries. The Royal College of Radiologists in the United Kingdom has partnered with MedCurrent Corporation, a leading Canadian CDS software company, to incorporate the UK-focused radiological referral guidelines into a CDS software platform called MedCurrent iRefer CDS. This system provides UK clinicians with robust referral guidelines directly at the point-of-care.

Moreover, the National Health Service (NHS) in England has invested millions to deploy CDS throughout the country. Over the next few years, they will embark on a Digital Diagnostic Capability Program (DDCP) initiative to improve access to diagnostic services to English citizens.

In 2014, the United States Congress passed the Protecting Access to Medicare Act (PAMA) that requires referring providers to consult US-based referral criteria guidelines, in conjunction with approved CDS Systems, prior to ordering advanced diagnostic imaging services (CT, MR, Nuclear Medicine and PET) for Medicare and Medicaid patients.

While these developments have not gone unnoticed in Canada, only a few

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Thanks to remote monitoring technologies, the hospital of the future will be your home

Systems are creating 'virtual wards' where patients can be treated at home as effectively as in hospital.

BY DIANNE DANIEL

Not a single shovel has gone into the ground and yet, within the next few years, Mass General Brigham in Boston intends to open a new 220-bed hospital. How are they doing it? By keeping people at home.

The initiative – a coordinated effort to merge and expand the home-based care programs already in place at Massachusetts General Hospital and Brigham and Women's Hospital, the two leading teaching institutions that make up the health network – is part of a broader shift to shape what the next phase of virtual care can and should look like, says Dr. Lee Schwamm, vice-president, Digital Patient Experience and Virtual Care at Mass General Brigham.

"We're reframing a lot of this work through the lens of a digital patient experience and virtual care is one of those experiences," said Dr. Schwamm. "Home hospital is a really nice example of hybrid care and I think that's where we're going to end up in this next phase."

Hybrid care refers to a combination of remote and in-person care, he explained. A patient journey is divided into discrete elements, and each one "is accomplished in a way that is most cost effective and convenient, and meets the needs of the provider in terms of completeness." A patient who is treated at home may return to hospital for testing, for example, while receiving home visits from mobile integrated health teams and video consults from a treating physician or hospitalist at the same time.

The drive to expand the home hospital model was prompted by the COVID pandemic as Mass General Brigham experienced a rapid acceleration of demand for remote care. Prior to 2020, the network was averaging 10,000 virtual visits a year. That number scaled to 1.7 million visits out of necessity, said Dr. Schwamm.

"The idea is: Can we actually safely shift low acuity care back into the home? And it's a funny thing, because we're kind of going backwards in time," he said. "When my grandparents were growing up, that's where you usually saw the doctor – at home."

The home hospital strategy is intended to reduce spending, but it also affords valuable benefits to patients through an improved patient experience. According to Mass General Brigham, research shows that home-based care can provide more patient-centered and satisfying care, lower complication rates, reduce emergency room visits and lead to improved patient outcomes.

A recent global report from Signify Research has the remote patient monitoring market climbing to just under US$3 billion by 2026, driven by fiscal and political commitments from governments, implementation of reimbursement frameworks and larger structural shifts in healthcare delivery. Longer term, hospital at home initiatives are expected to be fuelled by the shift towards value-based care and population health models.

Massachusetts General Brigham has been shifting to a home hospital model for patients that can appropriately and safely be cared for at home since 2016. As they look to scale their program, they've named Heather O'Sullivan as inaugural president of Home-based Care, to lead a team of more than 1,000 employees skilled in nursing, physical therapy, occupational therapy, case management, social work, speech therapy and home health.

To be eligible to participate in home-based care, Mass General Brigham patients must meet a specific set of criteria. They are typically identified as candidates upon arrival at emergency or on their first or second day of hospital admission. The program covers a range of acute medical conditions and is staffed as a dedicated hospital rotation, providing patients with equipment and services at home as needed.

As it expands with the goal of offering more than 200 home hospital 'beds', Mass General Brigham is looking to automate the process of identifying good patient candidates, possibly through a system of 'smart' rules that would flag people as they are entered into the hospital's electronic health record. The biggest challenge is how to manage logistics, in other words the flow of people and "stuff," said Dr. Schwamm.

"To achieve that scale, we really need to solve those logistics problems," he said. "If you have to touch base at the hospital every time you need to dispatch material, that's going to be an inefficient process."

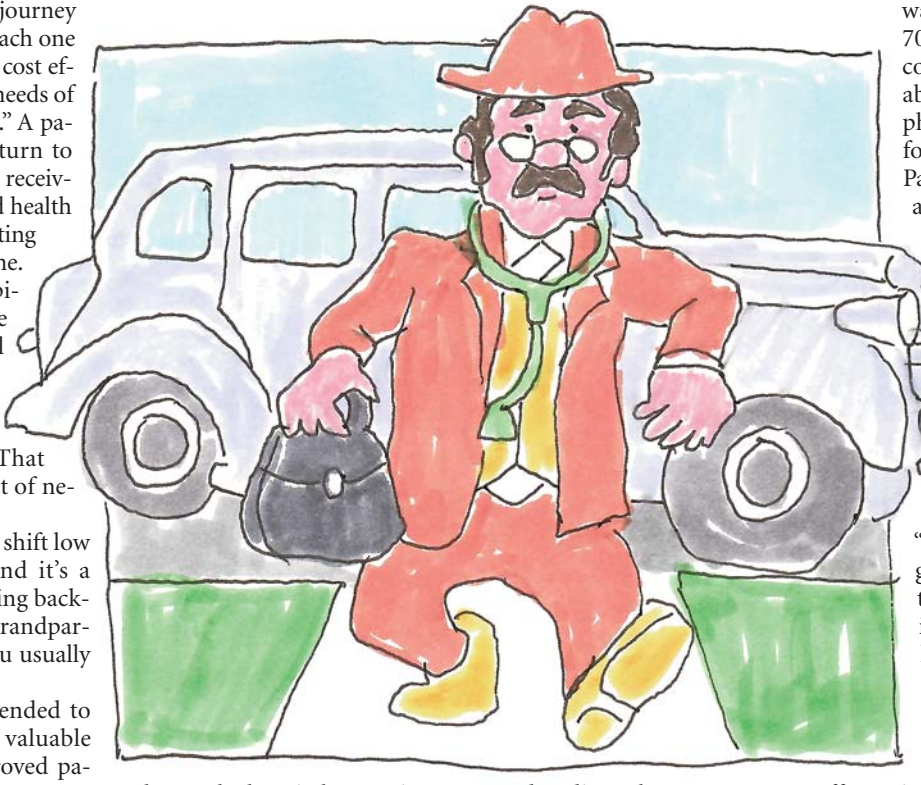

ILLUSTRATION: LINDA WEISS

One proposal is to operate home hospital similar to a ride share service, where an app would optimize the routes for nurses or paramedics visiting patients at home. Dr. Schwamm also envisions a network of supply depots strategically located throughout the community so that medical devices and equipment could be more efficiently dispatched.

"As we cohort patients of lower acuity into these home environments, they will need a lower cost structure to manage them," he explained. "If we can keep the supply chain and logistics costs low, not only do you save money on direct care delivery, but you also open up a new bed for a more acute patient whose care is going to be safer and cheaper than if they spend the first three days of their hospital visit in an ER."

An urgent need to increase bed capacity prompted Jewish General Hospital (JGH) in Montreal to launch their hospital at home program at the start of 2022 – the first in Quebec and one of only a few so far in Canada. Amid a burgeoning fifth wave of the pandemic, the program was initially implemented to care for COVID patients only.

Based on its success, it has since expanded to include patients with heart failure, lung conditions like pneumonia or COPD, urinary tract infections and cellulitis, as well as patients recovering from certain types of surgery. Pathways are also evolving for mental health patients, and the hospital is in the process of creating a facilitated discharge pathway so qualified patients can spend their last few days of a hospital stay at home.

Participation in the program is voluntary. Patients are screened for admissibility to hospital at home by a hospital physician, based on their acuity and medical condition, and the exclusion criteria outlined by each practice area. They are then forwarded to a virtual ward transfer nurse who evaluates additional social perspectives, such as caregiver and family support. The COVID at home program, for example, was eligible to people younger than 70, who had a support person who could check in on them, who were able to communicate with a smartphone or tablet, and who could perform activities of daily living.

Patients accepted into JGH"s hospital at home program are provided with either an iPhone or iPad with LTE connectivity so that they can be continually in touch with their virtual care team. The program operates under the direction of the hospital's command centre, which serves as a central hub to focus on patient quality and patient flow throughout the organization.

"All administrative systems are integrated and the patients appear as if they're hospitalized; it's the same as if the patient were in the physical hospital itself," said Dr. Lawrence Rudski, JGH chief of cardiology.

Digital devices are also deployed as required. Some patients may be issued an automated blood pressure cuff, Masimo SafetyNet finger probe for oxygen monitoring, digital thermometer or weight scale. Others may require a BioBeat chest patch for continuous monitoring of vital signs, and the hospital also provides equipment to deliver IV therapies at home.

Patients are closely monitored and if a change in condition is noted, a nurse will call to check in. Dr. Rudski recalls a time when a patient's heart rate was up and it turned out that he had actually gone for a ride on his bicycle. Another hospital at home patient decided to remove her oxygen mask while in the bathroom and a nurse was able to intervene, explaining the need to wear it at all times.

In a recent case, a 90-year-old patient stayed with her daughter in order to benefit from the program, and all three of her children were able to participate

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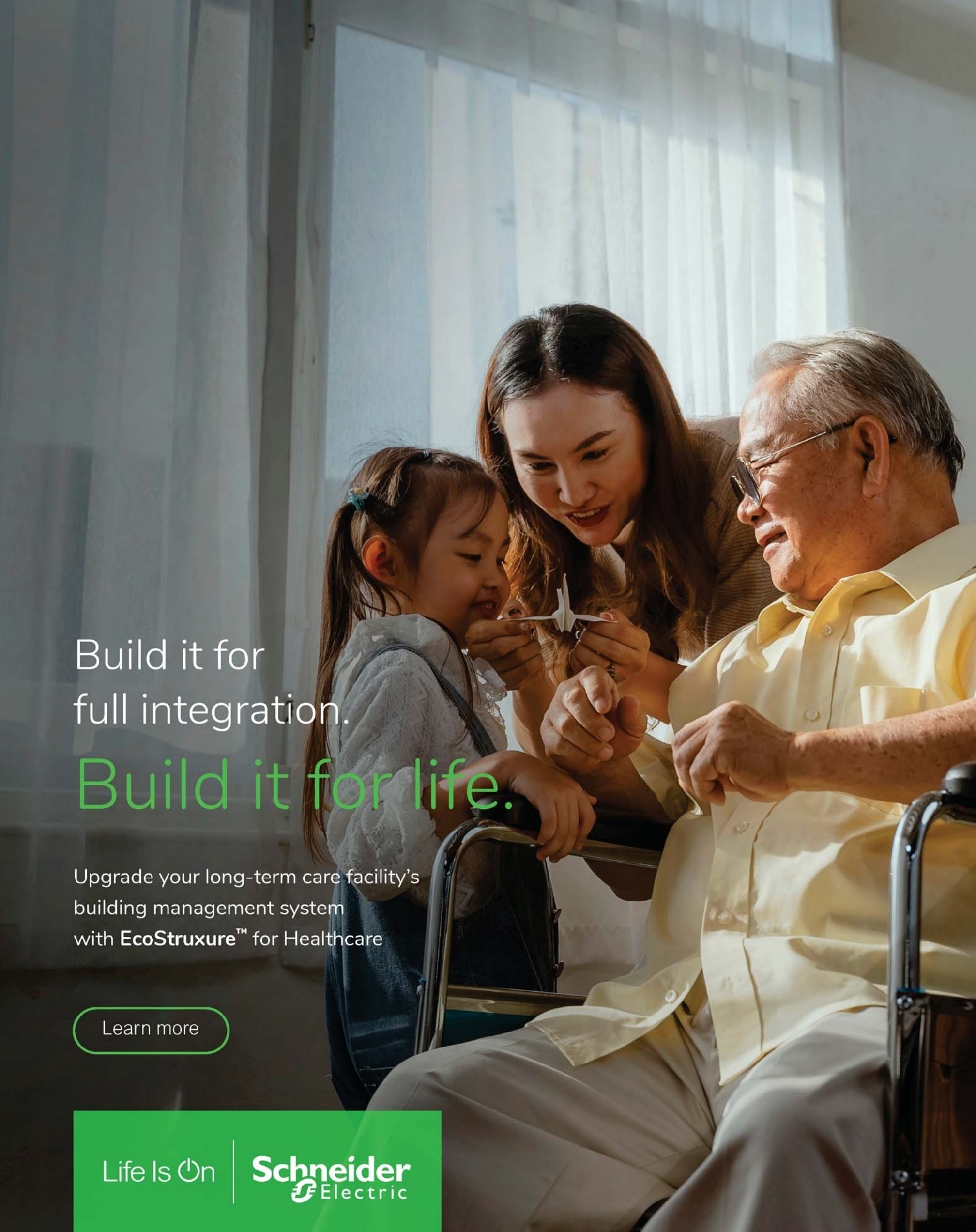
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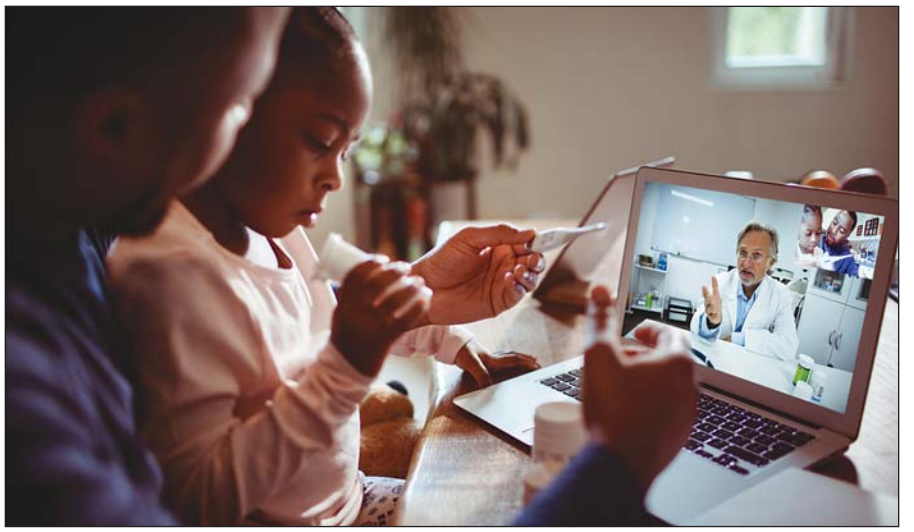
e-Health 2022 showed virtual care rapidly refined during pandemic

Pandemic restrictions turned virtual care from a helpful tool into an absolute necessity for healthcare provision. Stories about virtual care innovation and rapid implementation were shared at the e-Health 2022 Conference and Tradeshow, held virtually June 1st and 2nd. Presenters from across Canada demonstrated the value of virtual visits in providing access to mental health resources, wound care, emergency services, and paediatric care.

While challenges still exist – digital literacy, reliable internet service, and the ongoing need for face-to-face care – presenters reported "overwhelmingly positive" responses to innovations that delivered healthcare when and where it was needed.

Some highlights from e-Health 2022 include:



Virtual Care: Appropriately supporting indigenous patients in Alberta
Paige Campbell, University of Calgary
Many Indigenous People (First Nations, Métis, and Inuit) face complex systemic barriers to healthcare and suffer disproportionate health inequities, which have been exacerbated by the COVID-19 pandemic. Access to primary care is linked with improved health outcomes and quality of life, particularly among marginalized populations. Virtual care offers an opportunity to bridge gaps in rural areas and open doors for chronically underserved urban Indigenous populations.

A virtual care clinic was implemented as a collaborative service delivery innovation aimed at increasing access to culturally safe primary care for Indigenous patients across Alberta. Patients, families or caregivers, and allied health professionals from across the province call a central access telephone line to book a same or next day appointment with a physician. Medical Office Assistants triage and arrange for phone or video appointments. All participating physicians have committed to the principles and practices of cultural safety and humility and are either Indigenous or have lived experience working with Indigenous populations.

Results: Since the clinic was launched in October 2020, it has booked 3,320 appointments from over 113 locations across the province. Monthly appointment bookings have increased from October 2020 (n=2) to November 2021 (n=468), indicating steady growth in clinic access over time.

Primary health reasons for patient access to-date include mental health and addiction, prescription refill, COVID-19 infection, acute illnesses and injuries, and chronic disease management. Providers have facilitated over 500 referrals for patients to receive further care, to specialist and family physicians and allied health professionals.

Qualitative interviews described overwhelmingly positive responses, with emergent common themes: compassionate care, appreciation for clinic flexibility, feeling valued, and the ability to better prioritize their health. Participants also described increased cultural safety due to staff knowledge of Indigenous Peoples, effects of colonization, and systemic racism in healthcare, and felt care was delivered in accepting and trauma-informed ways.

To-date, the clinic has demonstrated significant success in creating and sustaining care access for Indigenous patients. Preliminary findings on patient experiences indicate support of this care model. Improving primary care access while maintaining a culturally safe environment has led to stronger relationships between patients and caregivers, better care of health issues, and linking patients with other health resources. This model for virtual care may be appropriate in other jurisdictions where similar barriers exist for Indigenous populations, especially during the ongoing COVID-19 pandemic.

Virtual emergency rooms (vERs): Addressing the physician shortage in rural Newfoundland communities
Cindy Clarke and Ashley Dinn, Newfoundland & Labrador Centre for Health Information
Newfoundland and Labrador Regional Health Authorities (RHAs) have experienced a decline in the availability of primary care physicians – especially in rural areas – resulting in an alarming number of citizens having no access to primary care providers. While the shortage impacted emergency departments across the province, emergency departments in rural and remote areas (Category B sites) were impacted the most.

In July 2021, the Newfoundland and Labrador Centre for Health Information (NLCHI) was approached to step up a Virtual Emergency Room (vER) in a Category B rural hospital. Within a week another area of the province reached out with the same request. Within months, 12 vERs were set up throughout the province to support the local emergency departments as they addressed the physician shortage.

Results: Despite a perceived resistance to change and desire to maintain face-to-face services, the newly implemented vERs have proven to be effective in delivering urgent care.

The deployment team armed local nursing, advanced care paramedics, support staff, and covering physicians with the tools (clinical carts, iPads, eStethoscope, and digital examination cameras) and skills to continue offering emergency services in their area.

The implementation of vERs addressed physician shortages and enabled local hospitals to keep emergency departments open. By improving access to primary care providers, vERs have created better healthcare outcomes by managing and treating non-emergent health concerns; screening and properly addressing urgent concerns; and reducing pressure on ER physicians and ER departments.

While vERs became prominent across the country during the pandemic, the model was also seen as an opportunity to address staffing issues within ERs. Even in a post-pandemic world, vERs have earned their place among the mix of healthcare delivery models by improving access to primary healthcare, easing pressure and workloads among ER physicians and staff, and reducing wait times for patients.

Optimizing virtual visit workflows
Robert Biddlecombe, Provincial Health Services Authority
In response to COVID-19, virtual health visits (VHV) were rapidly implemented across British Columbia (BC), changing the way we delivered care. Clinicians were provisioned virtual visit accounts and workflows were promptly revised to support this new method of connecting with patients and families.

Office of Virtual Health (OVH) leaders met with clinical programs to understand workflows and identify root causes in adapting to the use of VHV solutions. Strategic workflows were crafted alongside mapping out education plans to meet the needs of the care team. Concurrently resources and education materials were developed for patients and families to support this adoption.

The care team members shared their experiences with coordinating and facilitating VHV, identified barriers, and gaps in the workflow. Additionally, OVH engaged with patient partners to understand the impact of VHV in their healthcare journey. An interactive dashboard was also created to contextualize the benefits to patients, including an interactive map showing the locations of VHV. Assessing the appropriateness of VHV was equally important, as some solutions were not always suitable for clinical needs.

e-Health will return to an in-person format in 2023, with a conference in Toronto to be held May 28 - 30.

Results: In July 2021, Provincial Health Services Authority (PHSA) reported 1 million virtual visits had occurred in BC. There was an overwhelmingly positive response from healthcare providers using VHV, many of whom want to continue to use VHV in the future. The most highly rated benefits of virtual health visits are the saved travel time, the ease of access to care, the saving of money for patients, the inclusion of family members, and the speed with which care can be accessed. Health equity was another important factor taken into consideration when workflows were restructured.

VHV are not just a response to COVID-19, they are an integral and integrated part of future healthcare provision in BC. Optimizing workflows by embedding VHV in care delivery models provides timely care, regardless of geographical location.

Continuity of care

CONTINUED FROM PAGE 8

getting to an in-person visit. These barriers especially harm groups who are already under-served by the health system. For instance, in a 2021 study led by researchers from the Centre for Addiction and Mental Health, youth reported virtual mental health services as a convenient, accessible, flexible, and psychologically safe alternative to in-person care.

Virtual care's potential, however, is so much more than removing barriers. People can involve their families and caregivers in a visit, helping them be an active part of a loved one's care journey. Although the digitized office visit is today's form of virtual care, the future is a health roadmap across time – with people and their loved ones being able to co-create a person's health record and collaborate with their health professionals.

The power of virtual care: why collaboration matters: Tomorrow's virtual care is more than just a digitized office visit. For family practices, technology can strengthen relationships between patients and their doctors, building on the benefits patients experience when they have continuity of care. For Canadians without a family doctor, virtual care can bridge gaps in health service coverage. For forward-thinking employers, virtual care can support a healthy workforce, in turn shaping a healthy organization.

Virtual care enables family members and care-givers to collaborate with the patient and physician.

Dr. Dominik Nowak is Chief Medical Advisor at TELUS. Visit: telushealth.com/virtual to learn more about TELUS Health virtual care services.

Remote monitoring technologies: hospital of the future will be your home

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in daily multi-disciplinary meetings with her care team over video.

"We know that patients who are elderly tend to decondition and deteriorate rapidly in hospital," said Erin Cook, associate director of Quality, Transformation, Evaluation, Performance and Ethics for the Integrated Health and Social Services University Network for West-Central Montreal (CIUSSS), which includes JGH.

"When we get them back into their home environment more quickly, we help them retain their autonomy better," she added.

As of August, the JGH hospital at home program – which is currently staffed to accommodate 10 patients at any one time but is prepared to scale – had served 73 patients, saving 427 bed days. So far, every patient who has taken part in the program has rated their experience 10 out of 10.

"We're trying to build a value-based care framework around this to look at not only the quality of care, but the overall cost of the service and the patient experience," said Cook. "We know we have to start thinking differently about how we're giving care because the current model is going to be really taxed over the next few years. We have an opportunity to leverage innovation and technology to think differently about how we're delivering and transforming the future of healthcare and that's certainly what we're trying to do."

St. Joseph's Hospital in Hamilton, Ontario, is another organization leveraging remote patient monitoring to decrease capacity pressure and deliver excellent care for patients. Rather than a virtual ward approach, the hospital is zeroing in on a patient's digital experience, partnering with different hospital programs to build remote monitoring pathways that engage patients as active participants in their healthcare.

"What we've learned along our journey is that there isn't a 'one size fits all' in terms of technologies, so we really need to understand and partner with our patients in a design thinking way about what matters to them," said St. Joseph's director, Digital Solutions, Andriana Lukich.

"We're thinking about this with an equity lens, making sure that patients have equal opportunities to be discharged and be successful at home, and making sure that what matters most to them is considered as part of their care recovery journey," she said.

St. Joseph's, in Hamilton, is leveraging the help of paramedics to get patients set up for home monitoring.

Each pathway outlines its unique requirements for remote care. Paramedic services are leveraged to help get patients set up at home and a dedicated team of nurses and coordinators provide remote support, escalating to a physician or surgeon as necessary.

A surgical transition pathway, for example, uses an app called Seamless MD to both prepare patients for surgery and help them recover safely at home afterwards. Patients use online daily surveys to report symptoms and the remote team is automatically alerted whenever a response is outside of normal range.

From June through August, roughly 200 patients used Seamless MD to recover at home following surgery. Patient reported outcomes show a reduction in length of hospital stay, as well as lower pain scores, less anxiety and a general feeling that they are more supported. The online checklists included in Seamless MD also motivated patients to reach their walking goals post-surgery.

Project manager Maria Campbell said there's been a reduction in the number of calls and visits to hospital post-surgery because patients feel more comfortable and supported. "Overall we've seen really great feedback," said Campbell. "Patients are feeling really confident, less worried … and one patient commented that they felt if they needed somebody, they knew somebody was there."

Other remote patient monitoring pathways in place at St. Joseph's are using technology from Aetonix and Cloud DX to maintain continuity of care as patients transition from hospital to home. The goal is to equip them with the digital toolbox that makes the most sense, ranging from simple patient portals to take-home tablets to devices like blood pressure monitors.

"We may get to a point one day where we look at having virtual wards, but right now we have centred a lot of our work on supporting and improving the patient experience, said Lukich. "The hospital of the future is your home," said Lukich.

Clinical decision support technologies to improve DI

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Canadian hospitals have started implementing CDS solutions. North York General Hospital, in Toronto, has implemented a MedCurrent iRefer CDS system that is integrated into the ordering module of their hospital electronic medical record (EMR) system.

The Jewish General Hospital (JGH) in Montreal has also implemented MedCurrent iReferr CDS. Dr. Huy Le, the chief of Radiology at the JGH says his institution is at Canada's forefront of implementing CDS because of its history of integrating technology. "Dr. Lawrence Rosenberg, the CEO of our institution, had a vision for adopting digital health many years ago, which included pertinent applications in medical imaging."

Dr. Le says this approach led JGH to successfully create an electronic Order Entry System (OES) earlier this year, now in production and testing phases with clinicians. The interfacing of CDS with the OES was done in parallel with testing and is currently functional.

A few Canadian hospitals have started to deploy CDS solutions, but there is still a lot of work to be done.

Meanwhile, Alberta Health Services has integrated a CDS system, called CareSelect, which is primarily focused on CT and MRI. CareSelect is integrated with their Epic EMR, AHS's electronic health record system and it is about two thirds of the way through provincial implementation. CareSelect relies on referral guidelines from the American College of Radiology (ACRselect) to categorize referrals as low, medium, or high value.

Dr. Bill Anderson, former Provincial medical director, AHS, says the current status of the CDS implementation is a data gathering mode; he believes this technology can be used for targeted quality improvement work. He further states that "in the future this system can incorporate active alert messages to referring physicians, which will help to guide referrals to medical imaging for patients."

In Canada we need to look to these examples and build on the successes, identifying best practices for the development of CDS referral system for radiology. This is not limited to medical imaging. Once developed, this system could act as a blueprint for other specialties in Canada.

"Imaging referral guidelines should be collaborative non-punitive tools, designed to improve quality, safety, and relevance. Our work in bringing a CDS solution online at North York General Hospital has demonstrated the need for Canadian-specific referral guidelines. Collaboration with all stakeholders, including patients and referring providers is needed to create comprehensive Canadian guidelines, designed to improve care for Canadian patients and families," said Dr. Margau.

It is not only radiologists who agree with this approach. Dr. Paul Pageau, co-chair, CAR Imaging Referral Guidelines Working Group and director, Point-of-Care US, Department of Emergency Medicine, The Ottawa Hospital and assistant professor, University of Ottawa says that "we need to work collaboratively with the broad spectrum of referring medical professions to make informed decisions regarding the selection of medical imaging tests and treatments. Having easily accessible Canadian guidelines will help us achieve this."

The federal government has committed to investing $2 billion in new funding to address wait times for procedures including diagnostic imaging. This will help to increase the number of CT and MRI scanners across the country. The national implementation of CDS would help ensure that these new resources are used as efficiently as possible.

There is an opportunity to improve overall effectiveness of referrals for medical imaging in Canada. By integrating CDS systems in all jurisdictions, radiology departments could potentially reduce diagnostic imaging backlogs, streamline care for priority procedures, improve radiologist workload, and better measure and assess imaging requests across the country. The ultimate goal is improved patient care for Canadians and enhanced productivity for provincial healthcare systems.

Dr. Gilles Soulez is President of the Canadian Association of Radiologists.

First Nations

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tool called the Mustimuhw Community Electronic Medical Record (cEMR). Numerous efficiencies, improved care coordination and client safety outcomes were realized for communities as a result of their efforts. It is this journey that creates the change, and those making the journey that close the gap or resolve a disparity.

As with any successful journey, it really has become part of a larger or continued transition. Having a digital health foundation has enabled communities to mobilize around other areas to improve health care access. Currently, we are actively involved in leveraging e-prescribing tools like Canada Health Infoway's PrescribeIT, which are especially beneficial in remote and rural communities where the prescriber or pharmacy (and sometimes both) are not local, because it reduces the need for in-person physician or nurse practitioner visits.

PrescribeIT helps provide safer and more efficient medication management by connecting community-based prescribers to community pharmacies, enabling the digital transmission of prescriptions. This virtually eliminates the risk of lost or damaged prescriptions and also reduces the risk of forgeries, a significant concern in the face of the national opioid epidemic.

With e-prescribing, the back and forth over fax and phone whenever questions arise is replaced by a secure, clinical communications tool that sends the pharmacist's question directly to the physician's EMR system and vice versa.

This allows pharmacists and prescribers to quickly align on an appropriate course of action and provide the best medication for the patient. By improving communication and accuracy in the prescription process, e-prescribing also reduces the potential for medication misuse and improves medication adherence for better health outcomes.

By improving communication, e-prescribing can reduce medication misuse and improve adherence.

As an Indigenous digital health service provider, our focus is on supporting resiliency by being part of a First Nation's journey. There are no magic solutions to issues of health equity, but there is magic in what can be achieved when travelling together.

Maureen Taylor is the chief operating officer of Mustimuhw Information Solutions Inc. (MIS), a technology solution provider for Indigenous health, child and family services and patient access.

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