FEATURE REPORT: DEVELOPMENTS IN MEDICAL IMAGING — SEE PAGE 16

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TWENTY-FIVE YEARS

CANADIAN Healthcare Technology

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INSIDE:

PHOTO: COURTESY LONDON HEALTH SCIENCES CENTRE

Healthcare leaders in London, Ont., announced the acquisition of $42 million in leading-edge MRI and angiography equipment from Siemens Healthineers. Pictured are Dr. Gillian Kernaghan, CEO St. Joseph's Health Care; David Pacitti, President, Siemens Healthineers; Dr. Paul Woods, CEO of London Health Sciences; Dr. Narinder Paul, city-wide radiology chief; and Dr. Alan Shepard, President, Western University.

London hospitals to acquire new MRIs and angio suites

BY JERRY ZEIDENBERG

LONDON, ONT. – Hospitals in London, Ont. have partnered with Siemens Healthineers to refresh and modernize the city's stock of MRIs and angiography devices. In December, London Health Sciences Centre and St. Joseph's Health Care London announced the signing of a $42 million deal for six new MRI machines and eight new angio suites.

As part of the agreement, Siemens will also invest $1 million in a research and education centre, in which Western University's Schulich School of Medicine & Dentistry will also participate.

The acquisition of the new gear will go far to boost the services offered by radiologists, technologists and cardiologists in the city's hospitals. At LHSC, for example, some of the existing MR and angio equipment is beyond the recommended lifespan.

The new machines, however, will now put London's hospitals at the leading-edge when it comes to MR and angiography.

Dr. Narinder Paul, city-wide chief of diagnostic imaging at London's hospitals and at Western University, said that Siemens is recognized for the advanced capabilities of its MR and angiography systems. The intent now is to make use of those abilities. "We're going to run them to the optimum," he noted.

The ultimate beneficiaries will be the patients of London and the surrounding catchment area, who will be scanned more quickly, accurately and with less radiation.

Siemens will invest in an R&D centre in London, to create advanced patient-care solutions.

Not only will the London hospitals use the latest sequences and protocols, but through the research partnership they're going to be developing new ones.

The research effort will work out of the Lawson Health Research Institute and Robarts Research Institute, where scientists and engineers from Siemens will also add their expertise.

The deal parallels a recent partnership with Canon, in which the London medical centres and university allied with Canon to acquire high-end CT scanners and ultrasound machines. At the same time, Canon came on board as a research partner.

The agreement with Siemens will see the first 3T MRI scanner installed in the region.

LHSC's University Hospital will acquire one 3T and a 1.5T MRI and two bi-plane angiography suites.

LHSC's Victoria Hospital will acquire a 3T/1.5T pair of MRIs, a bi-plane and two single plane angiography suites.

For its part, St. Joseph's will receive a 3T and 1.5T pair of MRIs, and a single plane angiogram suite.

The eight angio systems being installed include three Artis Q bi-plane, two Artis Q Floor mounted systems, two Artis Q ceiling mounted systems, and one Artis Pheno system. The relationship also has the potential for additional systems to be added in the future.

Each of the MRI systems will include Innovere video technology, a system that was devised by scientist-entrepreneurs at Sunnybrook Health Sciences Centre, and which has been adopted by Siemens. The technology allows patients to wear goggles and to

CONTINUED ON PAGE 2

London Ont. hospitals to acquire leading-edge MRIs and angio suites

CONTINUED FROM PAGE 1

watch videos or movies while they're being imaged – to ease the experience of being in an enclosed tunnel, sometimes for 20 to 30 minutes.

The 70 cm Siemens MRI tunnels are among the widest on the market and are designed to allay the fears of claustrophobic patients.

And the units make use of detachable tables, so that patients can be prepped outside the imaging room, with coils and contrast media if needed, and then wheeled into the suite when ready. That's designed to facilitate workflow and create a better end-user experience for the patient.

Dr. Paul noted that the philosophy of diagnostic imaging at the London hospitals is supported by four main pillars:

• Safety. The goal is to reduce radiation, heat from the machines, and the volume of dye needed for imaging. Both the safety of patients and staff are key.

• Speed. Radiologists and technologists are aiming to produce fast exams and processes. "But we always want to treat patients with respect and dignity," said Dr. Paul.

• Specialization. There's a drive to develop increasing expertise in various areas of specialization. Part of the program involves analyzing and deploying the reams of data that are collected during exams, but rarely used.

• Patient experience. Creating a better visit to the hospital is an important goal, so that patients are pleased with their experiences. Wider MRI tunnels and video technology are part of the program in this area.

When it comes to the research that will be conducted, there are three main themes, said Dr. Paul: neuro, cardio and oncology.

The researchers will be building on a long tradition of expertise in each of these areas that exists at the hospitals. And while Siemens will be contributing in excess of $1 million to the R&D, the hospitals can use this to leverage matching funds or more from provincial and federal government programs.

"Collectively, Western and our partner institutions in London are becoming a global powerhouse, recognized for our expertise and facilities in imaging that drives discovery and innovation across a broad range of disciplines," said Alan Shepard, president of Western University, in a news release.

"This partnership with Siemens Healthineers builds on our strengths, increases capacity to enhance patient care, and expands opportunities to integrate education, training and research benefit of learners and faculty. It's a huge win for London and Southwestern Ontario."

Dr. Gillian Kernaghan, president and CEO of St. Joseph's, said: "This exciting partnership ensures our ongoing leadership and expertise in the introduction of leading-edge medical imaging technologies and is a critical step toward new approaches in imaging research and patient care."

And Dr. Paul Woods, president and CEO of LHSC, commented: Investments in capital equipment, such as these new MRI machines and angiogram suites, are incredibly important as they will immediately translate into safer, higher quality care for the patients we serve – in this case, it's by offering the highest resolution images available, in less time and with improved comfort for patients."

Technology can improve healthcare – or not

MISSISSAUGA, ONT. – When it comes to selecting a doctor, 80 percent of consumers choose according to convenience, says technology and security expert Danny Pehar. "They don't choose on quality or bedside manner," said Pehar, who was a keynote speaker at a health-tech conference sponsored by Samsung, CAE Healthcare and Global USS.

"Why convenience?," asked Pehar. "Because that's how consumers are approaching everything." He gave an example from his own experience, when he and his wife had to visit a hospital. The hospital solved his wife's problem, and the care was great, but as Pehar said: "We're never going back again. The wait was too long, and the technology was terrible."

"Wait times are one of the most commonly cited complaints in healthcare," said Pehar, who is a technology and cyber security expert on Global TV, in addition to his own consulting work. "Technology can help with that," he observed.

But he said that technology can also be detrimental, which led into his main points about the vulnerability of computerized data in hospitals and clinics.

"Why would anyone want healthcare records?," he asked. Not for the money, because they don't contain any monetary value. Instead, it's for the purposes of identify theft. "The bad guys can commit crimes in your name, rather than theirs," he said.

> **Hackers don't feel like they're hurting anyone ... often, they think they're doing a service, showing how you're vulnerable.**

Healthcare records often contain personal information, such as addresses and social insurance numbers, which can be very lucrative for thieves. "Healthcare information sells for 10 times more than financial data on the dark web," said Pehar.

Cyber-criminals also work 24/7, and strangely, don't really think of themselves as bad guys, said Pehar. It's not like drug crime, where the crooks are often involved in violent shoot-outs. "Hackers don't get killed," said Pehar. "They feel they're not hurting anyone. Often, they think they're doing a service – like showing how an organization is vulnerable.

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BPA WORLDWIDE BUSINESS

Vancouver Imaging to implement Real Time's AI-powered platform

BY JERRY ZEIDENBERG

VANCOUVER – Vancouver Imaging, a group of over 70 radiologists, has signed on to use Real Time Medical's smart workload-balancing, physician skills development and error-avoidance platform. Vancouver Imaging, which provides reading services for hospital and out-of-hospital imaging centres, will implement the system in the first half of 2020 at its non-hospital clinics.

Vancouver Imaging offers a wide variety of sub-specialty readings across all disciplines, including specialized expertise in emergency trauma radiology. The organization is the only group of radiologists in Canada offering around-the-clock, on-site, sub-specialty emergency reading services.

"Emergency radiology is itself a sub-specialty and requires a unique set of skills," said Dr. Savvas Nicolaou, the CEO of Vancouver Imaging and Director of Emergency & Trauma Imaging at Vancouver General Hospital. "It's unpredictable, with frequent interruptions. You often have to work with a limited amount of information from clinicians, and it can include everything from head-to-toe, including mass casualty situations that require proactive decision-making."

He added, "You're always on, and never off." The Emergency & Trauma sub-specialty requires "appropriate, patient-centered judgement in a matter of seconds."

Vancouver Imaging will deploy Real Time Medical's AICloudWorks and AICloudQA platforms within their clinics. Collectively, the offerings encompass several AI applications, including high throughput workload balancing.

Real Time Medical holds the U.S. and Canadian patents for its workload balancing algorithms and is one of only two patent holders for diagnostic workload balancing, along with the U.S. company, Virtual Radiologic.

The cases are assigned to the appropriate radiologists based on sub-speciality, current workload and other parameters, creating an intelligent, diagnostic operations platform that is "context aware", a term originally coined by Real Time Medical to describe the capabilities of the platform.

Dr. Savvas Nicolaou says the platform improves the quality of diagnosis as well as diagnostic efficiencies.

For example, radiologists with expertise in neurology will be the first to receive neuro cases, while thoracic or pediatric experts will be first to receive cases of that type. The system also "balances" the work, to ensure that radiologists are receiving equal caseloads, subject to the case specific service levels and business parameters established by the group.

"The AI additions to this proven platform make it even more advantageous for us as a group as we pursue the delivery of Emergency Radiology services globally," said Dr. Nicolaou, a world-renowned expert in Emergency & Trauma radiology, often referred to as the Founder and Pioneer of Emergency/Trauma Radiology in Canada.

Dr. Nicolaou noted that AICloudWorks is vendor neutral and can work with any HL7 and DICOM-based HIS, RIS and PACS solutions. "PACS integration can be very problematic," said Dr. Nicolaou. "Being vendor neutral is important to our flexibility as a group." Vendor neutrality is important to Vancouver Imaging as their current environment includes workflows across multiple PACS solutions.

Real Time Medical also has a market-leading Total Quality Management (TQM) solution for radiologists, which provides quality assurance and improvement, along with educational capabilities to ensure that radiologists are continuously learning and improving their skills. The system automatically monitors the reading of radiologists and points out areas they might be overlooking or where they might want brush up on their skills.

AICloudQA uses AI to analyze the case being read to automatically bring up the latest journal articles applicable to the case at hand. This feature allows radiologists to have cutting-edge research and findings at their fingertips, reducing the amount of time spent researching the case.

Radiologists often conduct queries of this nature by stepping away from the case to do manual online searches of multiple data sources. They even spend time at home doing this work.

Importantly, AICloudQA provides ongoing, anonymous peer review. Cases of radiologists are anonymized and randomly reviewed by peers with the same sub-speciality within or across sites, so that best practice sharing, collaboration, feedback and quality control between peers is possible on a continuous basis.

Moreover, the readings can be both prospective and retrospective. Dr. Nicolaou believes that these educational features can improve the quality of diagnosis by 40 percent while the smart load-balancing can improve diagnostic efficiencies by 25-45 percent.

Ian Maynard, CEO of Real Time Medical, said the solution currently orchestrates diagnostic exams received from 30 hospitals across Canada.

The technology is ideal for large scale hospital systems and radiology groups that need to deliver services at scale. "The solution is capable of handling extremely high exam volumes and a large number of sites and radiologists," said Maynard.

Dr. Nadine Koff, a radiologist and President of Real Time Medical, observed that the global platform can also be used for communication between radiologists and clinicians from one site to another. In this way, Vancouver Imaging can provide advice, education and coaching to clinicians anywhere in the world.

"Remote radiologists can easily communicate with other clinicians from within the system," said Dr. Koff.

For their part, Dr. Nicolaou and his team have been continuously breaking new ground in the area of emergency radiology. They have pioneered the sub-speciality in Vancouver and have also been working to help other sites in Canada and around the world to establish 24/7 emergency radiology services.

Nova Scotia first in Canada to connect lab results to Panorama

BY LAUREN MACDOUGALL

HALIFAX – The continued growth of the digitalization of healthcare information is critical to the delivery of high-value care. In August 2019, Nova Scotia became the first province in Canada to successfully connect a Laboratory Information System (LIS) to the Panorama Public Health Information System.

Panorama is a digital health solution or integrated electronic health record that is used across Canada to manage communicable diseases, outbreaks, immunizations and vaccine inventory. According to Canada Health Infoway, Panorama modules are now live in provinces covering 75 percent of the Canadian population and several jurisdictions are now in the planning stages.

Between 2017 and 2018, Nova Scotia implemented Panorama's three modules: Vaccine Inventory, Immunization and Investigation and Outbreak Management. The implementation of these three modules provides a central repository for data to support and inform public health programming and policy related to immunization and communicable disease management. Nova Scotia is the first province in Canada to implement all three modules within such a limited time.

The connection of lab results to Panorama is the latest expansion of the system in Nova Scotia. "The Panorama project has been a significant amount of work for many individuals from the Pathology Informatics team and Public Health. Those that were involved deserve a lot of credit for their hard work," says Dr. David Haldane, Clinical Director, Provincial Public Health Laboratory Network of Nova Scotia.

Nova Scotia is home to nearly one million residents, with nearly half of the population located in Halifax and surrounding areas. The new interface is connected to one of the province's three laboratory information systems – Cerner Millennium – which is located in Halifax and includes the primary microbiology reference laboratory for the province.

A connection has been made to the Cerner Millennium lab system, and another link will be made soon to Meditech.

The development of the connection between the second LIS – MEDITECH Client Server – which serves areas outside of Halifax, is under way and it is anticipated that this work will be completed in early 2020. The third LIS supports the IWK Health Centre, the Maritime's children's hospital in Halifax; however, this is not in scope at this time.

To support communicable disease case management and surveillance, the Department of Pathology and Laboratory Medicine at Nova Scotia Health Authority (NSHA) is required by law to report instances of diseases, infections and other organisms to Public Health that could pose a risk to the population. Historically this information was reported by phone, fax or a daily data download from the LIS that required a level of manual management by Public Health. The new LIS interface has automated this process, improving efficiency and accuracy.

Lauren MacDougall is Senior Advisor, Public Engagement & Communications, Nova Scotia Health Authority

Building healthy communities through the evolution of research and technology

Siemens Healthineers is proud to be partnering with London Health Sciences Centre, St. Joseph's Health Care London and Western University's Schulich School of Medicine and Dentistry in the provision of diagnostic imaging systems and in the creation of a centre of excellence in Advanced Diagnostic Imaging and Therapeutics to serve the communities of Southern Ontario.

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Radiologists need to talk directly with patients, RSNA president says

BY JERRY ZEIDENBERG

CHICAGO – When told they should get out of the reading room and talk more with patients, many radiologists agree in theory, but often remain ensconced in the reading suite – staring at their screens and cranking out reports. As Dr. Valerie Jackson, president of the RSNA asserted in a keynote address, "The easy path is to say, seeing patients is a good thing, but not right now, there's too much going on."

And of course, radiologists are busy. These days, the pressure is building to read more diagnostic images in a given time and to turn-around reports more quickly.

So, it seems that adding patient encounters to all that would just slow them down.

Maybe so, but Dr. Jackson asserted in her presidential address at the annual RSNA conference that interacting with patients has important benefits. It can reduce radiologist stress and burnout, and make radiologists feel more valued.

"What if we came out from behind our reading-room doors to make a human connection. Would patients benefit? The answer is a resounding yes," said Dr. Jackson, an award-winning mammographer who chaired the department of radiology at Indiana University for many years. She now works in Tucson, Ariz.

Speaking directly with specialists like radiologists can do wonders to reduce patient anxieties, said Dr. Jackson. She likened the experience of patients to passengers on airlines. If there's a delay on the plane, they're tremendously relieved when the captain informs them over the public address system about the reason for the setback.

They're even more pleased if the captain comes out of the cabin after the flight and greets them as they leave. The same is true when radiologists speak with patients – it can build their morale and also give them a better understanding of their medical issues.

Moreover, the human connection has huge benefits for radiologists. Many radiologists suffer from stress, feelings of being unappreciated, and are on the verge of burnout.

By connecting with patients, however, they get patient feedback and the feeling that they're making a difference in people's lives.

Dr. Jackson noted that in the more patient-facing forms of radiology, such as IR and mammography, "there's more job satisfaction". It's this human connection that can reduce stress and improve one's mental health.

In the same way, she said, it's important to make an effort to work more closely with team members in the hospital, and with referring physicians.

She observed that interacting with patients can also reduce medical errors, as closer contact serves as a form of double-checking on various medical conditions.

Dr. Jackson acknowledged that many radiologists turned to diagnostic imaging as a specialty because they're introverted and feel uncomfortable when interacting with patients and their families.

She said that she herself was shy as a youngster. "Many of us are introverts who like to work alone and produce reports."

Radiologist Dr. Valerie Jackson, RSNA president

But she asserted that "if we change our perspectives, we can strengthen our connections to patients and the care-givers who send them to us."

She said that at the crowded RSNA meeting itself, radiologists appeared to her to be very loquacious and collegial – and were not socially awkward loners.

"We need to zoom in on ourselves," she said, and to recognize that "we have more social skills than we think."

She said that radiologists should consider interactions with patients to be just like exercise – something that you do to maintain your own health and to make you feel better. "It's good for your mental health, it gives you a sense of purpose, and it helps reduce errors."

And she observed that patient interaction doesn't impinge on one's time as much as one would think.

She suggested to the audience of radiologists that they each make a point of engaging at least one patient in the hospital or clinic waiting room the following week. "We should introduce ourselves, ask how their case has been handled, and how their overall experience has been."

She even urged radiologists to give their patients their phone numbers, and to ask them to call if they have follow-up questions.

"It's really not scary to do this," she said. "The patients rarely call as much as you would think." But the gesture of giving them a phone number reassures them, she said.

She said that radiologists can even reach out directly to patients with results, to speed up the process of reporting and to provide interpretation.

This is already happening with real-time patient portals, where patients sometimes obtain test results faster than their specialists and referring physicians.

Dr. Jackson said that radiologists are gatekeepers of information, but it's the patient's information. What's more, she said, the flow of information should go two ways.

"We need to develop better listening skills, and to demonstrate empathy," she said.

"The end result of increased patient interaction is well-worth the effort," asserted Dr. Jackson.

HQO webinar shows how to improve hospital to home-care transitions

BY NORM TOLLINSKY

A recent Health Quality Ontario (HQO) initiative has unveiled a draft set of quality standards to optimize the transition from hospital to home.

"Care transitions can be fraught with challenges," Dr. Amir Ginzburg told more than 500 healthcare providers participating in an HQO Quality Rounds webinar November 6. "We know from our experience that there can be a voltage drop in services going from acute care to home, so care transitions are a very important target for better system integration."

Ginzburg, co-chair of an advisory committee that developed the standards, is chief of quality and director of medical administration at Trillium Health Partners in the Greater Toronto Area.

Data from surveys of patients and healthcare providers demonstrate there are opportunities for improvement. According to Ginzburg, only 66 percent of patients surveyed reported being involved in care transition decision-making as much as they wanted and an average of only 70 percent of community-based care providers knew about the discharge of their patients.

In the Toronto Central LHIN, only 55 percent of primary care providers knew about their patient being discharged and the particulars around that transition.

Poor health outcomes leading to repeat Emergency Department visits and readmission to hospital are the inevitable result of poor transition planning, he said, citing Ontario statistics showing a 13.3 percent revisit rate to the ED and a 5 percent readmission rate to hospital within 30 days of discharge.

The quality standards for care transitions were developed following extensive consultations with patients and caregivers from across Ontario, said advisory committee co-chair Dr. Lianne Jeffs, research and innovation lead at Sinai Health System and senior clinical scientist at the Lunenfeld-Tannenbaum Research Institute.

The advisory committee produced 10 statements reflecting key requirements for successful transitions from hospital to home.

Among them are information sharing on admission and the capture of a comprehensive patient assessment.

"When a person is admitted to hospital, the hospital needs to share information with the primary care team, home care and relevant specialists. Then the primary care teams needs to transfer back relevant information about the patient as soon as possible," preferably using a communication tool other than a fax machine, said Jeffs.

The comprehensive assessment, she said, should include a complete physical and psycho-social assessment detailing "who this person is and the social supports the patient has for a successful transition."

It's also important to identify and educate family and caregivers for a successful transition and to produce the actual transition plan as a written document.

A specific healthcare professional, said Ginzburg, should be given responsibility "for timely transition planning, coordination and communication."

> **In the Toronto LHIN, only 55 percent of family doctors knew about their patients being discharged.**

Medication reviews, he advised, should go beyond reconciliations. "They should also take into account how patients use their medication, how they access it in the community and their ability to afford out-of-pocket medication costs."

Hospitals often "download the booking of appointments for follow-up care to patients who are just recovering from a vulnerable state," complained Ginzburg. Instead, "people transitioning from hospital to home should have their follow-up care and their primary care providers booked before leaving hospital, and if they don't have a primary care provider, we need to provide them with assistance in procuring one."

The same applies to home care to reduce the current average wait time of four days.

Finally, it's critical to consider alternatives for unaffordable costs for supplies and equipment the patient will require.

Bonnie Nicholas, patient and family-centred care lead at Thunder Bay Regional Health Sciences Centre, provided an overview of several initiatives the hospital has taken to ensure successful transitions for patients returning home.

The only healthcare organization in the country to receive a patient-family-centred care leading practice designation from Accreditation Canada, Thunder Bay Regional has more than its share of challenges owing to its vast catchment area and the higher incidence of smoking, obesity, hypertension, diabetes and cancer in northwestern Ontario.

Thunder Bay Regional adapted the Patient Oriented Discharge Summaries (PODS) tool, which was originally devel-

CONTINUED ON PAGE 8

A hospital for the future? Look closely at Southlake and Humber River

BY NORM TOLLINSKY

Kicking off the Canadian Centre for Healthcare Facilities conference in Toronto last November, Dr. Rueben Devlin, chair of the Premier's Council on Improving Healthcare and Ending Hallway Medicine, urged delegates responsible for new builds and renovations "to think about what healthcare is going to look like in 30 years.

"Traditionally, we plan using a rear view mirror," said the former president and CEO of Humber River Hospital. "It wasn't a secret that there was going to be a problem with boomers and increased immigration, but there was no planning for that.

"We know that a hospital hallway is not a therapeutic environment and doesn't promote wellbeing or improved health outcomes for patients."

The way forward, according to Devlin, includes primary care serving as the foundation of an integrated healthcare system, creative partnerships in the community to keep people out of hospital and the use of new technologies, including artificial intelligence, machine learning and big data.

A more integrated healthcare system, he said, is well under way with the approval of the first 24 Ontario Health Teams and the December 2 launch of the Ontario Health superagency.

Panelist Arden Krystal, president and CEO of Southlake Regional Health Centre in Newmarket, summed up the problem of hospital overcrowding, noting "We've experienced for some time the phenomenon that a significant proportion of our patients should not be in our hospitals, but that there has been nowhere for them to go.

"When we create a master plan for a new hospital and we put in a number for projected beds, they're always heavily discounted. We say in 10 years we'll have 3 percent ALC (alternate level of care patients), but we never get that, so by the time we move in, we're full. Why? Because all of the process redesign that was beyond us never occurred."

Citing one example of community outreach, the Southlake CEO told delegates about a geo-mapping initiative that pinpointed pockets of high admissions to hospital.

"Why would we make them come to the hospital for outpatient clinic services when we know we have a critical mass and we can do outreach and virtual care?"

Dr. Rueben Devlin, former CEO of Humber River Hospital, and current CEO Barb Collins spoke at the conference.

Humber's Barb Collins and Southlake CEO Arden Krystal: both hospitals are blazing new paths in patient care.

Another Southlake partnership with two home-care agencies was a little more expensive when looked at from a home-care perspective, "but we saved 14 days of hospital stay and $7,000 per patient," said Krystal.

Fellow panelist Bill Davidson, CEO of Langs, a multi-service organization serving Cambridge and North Dumfries, provided an overview of the 66,000-square-foot health and social services HUB that brings together 27 partners, including two family health teams, a nurse practitioner-led clinic, a long-term care facility, a hospice, gym, and mental health and addiction counselling services.

An evaluation of the HUB model has shown easier access to community-based health-care services and improved health outcomes.

Barb Collins, president and CEO of Humber River Hospital in Toronto, emphasized the importance of technology and innovation as efficiency drivers in a hospital setting. The first hospital in Canada to introduce a Command Centre, Humber River is able to track patient progress through the Emergency Department all the way to inpatient beds and respond in real-time to any delays.

The Command Centre displays an orange light when a patient hasn't had an initial assessment after two and a half hours.

"At three hours there's a red light and we intervene," said Collins. "The screens tell us if a patient bed is assigned, if it's occupied, or if it's ready to be cleaned. If it's not cleaned after 30 minutes, a supervisor is notified, and if a porter hasn't transported the patient to the bed 30 minutes after it has been cleaned, there's another alert.

"There are many different things in a hospital that can cause delays. For example, waiting for a diagnostic imaging test or a social worker. Because of the real-time data, we know who's waiting, what floor they're on and how many assessments are assigned to a social worker. We can see where the needs are and where the resources are."

The Command Centre brings the decision-makers into one room instead of the private offices they used to have. "We give them access to real-time data, we give them operating procedures and we empower them to take action," said Collins. "There's no waiting for telephone calls, or emails. Everybody just steps up to solve the problem when there's a red light. It's mission control for healthcare."

Artificial intelligence, predictive analytics and machine learning are now being leveraged to predict if a patient is going to get into trouble, enabling hospital staff to proactively intervene.

"We put seniors in hospital, over-sedate them, restrain them, then we say they're confused and send them to a nursing home. Our goal is to prevent them from being confused and make sure that they're getting out of bed every four hours. Predictive analytics will tell us if we're giving them drugs that will cause a problem. This is what we're rolling out now."

Improved efficiency and patient outcomes are paying off. "We've never had to cancel a surgical case," said Collins. "I have never had to call in a code because we're overcrowded, we don't have hallway healthcare and we've never had patients in non-traditional beds despite having 105 to 110 percent occupancy."

To be added to the CCHF mailing list or for more information, please contact Rita Mezei, co-founder and executive director, at ritamezei@cchf.net

HQO webinar

CONTINUED FROM PAGE 6

oped by the University Health Network's OpenLab in partnership with Health Quality Ontario and the Council of Academic Hospitals of Ontario.

The PODS tool includes many of the quality standards recommended by Ginzburg and Jeffs, including medication reviews, follow-up appointments and contact information for help following discharge home. It also includes a colour-coded section describing how the patient should feel, how they should progress, warning signs that may require seeing their family doctor, and a red 'act fast' zone describing symptoms requiring a call to emergency services and a return to hospital.

"We partnered with our patients, our patient/family advisors and engaged with all of our stakeholders to develop the tools, the implementation plan and how to measure success," said Nicholas. "We also had a physician champion as well as other physician involvement to ensure the templates had the appropriate information and condition-specific instructions. In 2018, our PODS tool replaced all previous discharge summaries on all medicine units as well as in adult mental health."

Thunder Bay Regional's nurse-led follow-up program calls patients 24 to 72 hours after discharge.

A total of 28 PODS templates were customized for medicine, surgical and adult mental health patients. The results have been promising as the number of medicine patients claiming to have received sufficient information about leaving the hospital increased from 54.8 percent in 2016-2017 to 72.1 percent this year.

Nicholas also provided webinar participants with an overview of the hospital's Nurse-Led Follow-up Discharge Program, which provides for a follow-up telephone call to the patient within 24 to 72 hours after discharge.

"We know that the first 72 hours after discharge is the most vulnerable time for any patient, especially our medicine patients," said Nicholas. "The purpose of the call is to assess the patients' health status, ask if they have any questions or concerns, check to make sure they're comfortable with their discharge instructions, ensure the continuity of their community services and address any potential gaps they may have with their care needs. We have literally saved peoples' lives.

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Pushing data to community care-givers could improve patient health

TORONTO – Ontario Health Teams have been put forward as a way of smoothing the connections between the various levels of care providers across the province.

And as the OHTs emerge and start working together, the members will need to share their data – to connect care-givers, optimize treatments, and prevent patients from having to repeat their stories at each point in the care continuum.

Yet, care-givers won't necessarily be helped by connecting their silos of information or creating even bigger repositories. Instead, the data needed by front-line providers should be automatically sent to them, when and where they need it.

"We need to take the data we already have and make it more valuable," said Andrea Tait, Vice President, Client Value, at Orion Health, in Toronto. "The challenge won't be one of just heaping more data on the care-givers. Instead, we need to embed it in their workflow in a meaningful way."

Tait joined Orion Health in 2019 after many years at eHealth Ontario, most recently as VP of Product and Service Planning. While at eHealth Ontario, she helped put into place many of the systems that are now available to clinicians through the Connecting Ontario portal.

As an example of timely and valuable information, she pointed to medication reconciliation after patients leave hospital. The medication record from the hospital should be forwarded to the front-line caregiver who is doing the medication reconciliation – whether it's a pharmacist, physician or nurse. "We can then discontinue what the patient doesn't need," said Tait. "We can also ensure the patient knows what to take and when."

At the same time, the patient may have had a community-based assessment which is collected and kept in a separate repository. This record should be sent, as well, so the front-line caregiver can see both.

She noted that medication problems contribute enormously to the issue of patient readmissions to hospital. It would help having better information available to whomever is doing the medication reconciliation, when patients are discharged.

On this score, and many others, she said the sources of data are available. But they must be connected in a meaningful way.

By pushing the IAR to home care professionals, issues such as whether the patient is at risk of falls, and needs a walker, or needs physio, can also be flagged and help can be arranged.

That's where companies like Orion Health come in, she said. For its part, Orion Health specializes in connecting large databases to create more useful sources of information. It has done this in Alberta, where it connects the databases that feed data into the Alberta NetCare system, the provincial electronic health record. It also has active projects in Newfoundland and Labrador, New Brunswick, and in Ontario.

Andrea Tait, VP, Client Value, at Orion Health

In future, Tait said it would be useful to extend many of Ontario's sources of patient information to the patients themselves. In this way, they could access their own records to take charge of their health.

"A woman who just had a double mastectomy in the hospital will see the doctor afterwards, who'll say take this, this and this. But at that point, her head is probably spinning.

"Once she gets home, she can focus on the information," said Tait. "That's when she should be able to look at her records, online."

Moreover, if the patient is being visited by a home care nurse, the hospital discharge record should be pushed out to that person, as well, to make sure he or she is aware of the patient's experience in the hospital.

"If you just heap this information onto the physician, it doesn't really help," she said.

Tait observed that Ontario does an excellent job in the acute care sector. It's when patients are discharged, and go back into the community, where more attention is needed.

She said that many ACOs in the United States have developed excellent solutions for "patient hand-offs" into community care, and that Ontario should look at their techniques. One of the organizations she pointed to is Innovation Care Partners (ICP), of Scottsdale, Ariz.

This Accountable Care Organization looks after 170,000 ambulatory patients. While the 17 percent of patients in Arizona who are discharged from hospital are re-admitted within 30 days, only 7 percent of ICP's patients are readmitted in this period. It has reduced the readmission rates by connecting caregivers with technology, and by making sure that discharged patients are well-supervised by healthcare professionals.

To build successful Ontario Health Teams, we should look to Arizona

BY JERRY ZEIDENBERG

TORONTO – There are still a lot of questions about how the province's Ontario Health Teams will function and how much they will accomplish. They're supposed to reduce "hallway medicine" by improving the links between the various silos of healthcare – acute care hospitals, long-term and home care organizations, and primary care doctors.

But the teams are voluntary, and there are neither carrots nor sticks, no incentives and no penalties, for working together to improve patient care.

To see how OHTs could be tweaked and fine-tuned, one might look at the experience of Accountable Care Organizations (ACOs) in the United States.

Led by care-providers, often primary-care doctors and specialists, ACOs have been designed to foster teamwork among frontline clinicians and allied professionals. And the goal has been to improve the health of their patients while reducing overall costs.

To educate Ontario CIOs and technology experts about how this works, Orion Health recently brought a top manager from one of America's most successful ACOs to Toronto. Faron Thompson, chief operating officer at Innovation Care Partners (ICP) of Scottsdale, Ariz., spoke to a group of Canadian healthcare technology executives here in October.

Thompson, who is originally from Sault Ste. Marie, Ont., noted that ACOs sign contracts with the U.S. federal government to take care of a certain number of "lives", another term for patients. As they manage the patient, they are rewarded with "shared savings payments" if they meet specified benchmarks for cost and quality.

Importantly, if they provide care for a patient at a cost that's below the benchmark, they can keep a portion of the money they've saved – provided they also hit the quality benchmarks.

At the same time, ACOs can be penalized if their costs are above the benchmark. So, there are both carrots and sticks when it comes to providing care.

For its part, ICP looks after 150,000 "lives" – a number that's expected to grow to 210,000 in 2020. About 57,000 are contracted with the federal government.

In 2017, the cost of providing care to these patients was nearly 17 percent below the federal government benchmark – enabling ICP to keep close to 50 percent of the savings.

This made it the third-best performing ACO of 472 in the country measured by the cost-savings percentage.

But is ICP providing quality care at this cost? One good way of telling is to look at the readmission rate of patients to hospital. In Arizona, the average rate of readmission is 17 percent; for patients that ICP manages with its Transition Care Management program, the readmission rate is only 7.2 percent. That's quite a difference, and a strong indication of the level of care ICP patients are receiving.

For his part, Thompson talked about how ICP did it, and which elements were needed for success.

To be sure, financial incentives for clinicians are important – and right now, that's something missing from the plan for Ontario Health Teams.

At ICP, primary care doctors are paid quarterly care-management payments as an incentive. Depending on the PCP's panel size, the payments can run as much as $20,000 per quarter. The ACO model is heavily dependent on participation of primary care physicians to see patients, perform routine quality reporting and pay attention to quality and coding gaps.

Faron Thompson

The care management payments to PCPs help to offset some of the incremental costs to practices and provide incentives and reminders to physicians to stay attuned to the ACO's unique needs.

ICP has another financial incentive for all participating physicians. When the ACO earns enough shared savings from a given payer, they will distribute the "gainshare" earnings to physicians and the hospital system that owns ICP.

However, in order for physicians to earn gainshare, they're graded on their participation in the ACO on multiple measures such as use of the electronic health records system (i.e., how often they're searching for patient records), their timely quality reporting, whether they're attending meetings, and other metrics.

"They have to demonstrate participation in our programs, they have to be a good citizen of the ACO," said Thompson. "If you don't earn your points, you don't pass go, and you don't collect $200."

The model is working – ICP has attracted about 2,000 physicians. About 1,700 of them are in private practice, working for themselves, while 300 are employed by the health system that wholly owns ICP.

Primary care physicians receive regular "face-to-face" performance reviews, showing them where they have done well and where they could do better. "We'll kick people out, too," said Thompson, observing that as many as 120 physicians annually are asked to leave. "You have to be willing to terminate physicians who don't participate."

He added that, "While we don't want

CONTINUED ON PAGE 22

New technologies are re-shaping the Canadian healthcare landscape

As a wave of baby boomer physicians retire, millennials are beginning their careers and setting up their practices. Along with these generational changes, digital technology is transforming the healthcare landscape for patients and their care teams.

Today, EMR penetration among Canadian primary care physicians has reached 85% and encouragingly, a survey among Canadian physicians showed that 31% are using six to nine different EMR functionalities to support patient care.

Despite this progress, 36% of physicians and 34% of specialists are using only one to two EMR functionalities.

The same survey highlighted that while practices and clinics may be more accessible by way of digital technology, it is rare for primary care practices to offer e-services to either request an appointment (9%) or book a confirmed appointment (3%). And only 4% of primary care physicians and 9% of specialists enable patients to visit with them online via video (virtual visit).

Meanwhile, it's become increasingly challenging to provide optimal care. Today's physicians are seeing more patients, ordering more tests, and performing more administrative tasks than ever before. Technology can support physicians to work more efficiently, elevate care delivery and improve patient outcomes.

Opening the lines of communication: New technologies turn patients from spectators into active participants in their own care, and turn the patient/physician relationship into a partnership.

Take the EMR for example. It isn't only for storing patient records and data. As the main component of a clinic's operation, the EMR can become a powerful hub through which communications flow to facilitate continuity of care. Tools such as outcomes dashboards are advancing the care of patients with chronic diseases and offering a lens into critical data by identifying high risk patients, providing workflow efficiencies and supporting the adoption of guideline-based care.

While making administrative tasks easier and more efficient for clinic staff, EMRs also enable patients to make and manage appointments online, complete digital patient forms, and check themselves in at a digital kiosk. Up-to-date patient information can be accessed by the physician during a patient encounter leading to focused, quality visits, more accurate diagnoses and greater patient participation in their own healthcare journey.

EMR-integrated services like TELUS' EMR Mobile app, which is complimentary for TELUS Health EMR users, help physicians stay connected to the practice. The service enables them to access patient charts, their schedules and clinic information, view and process labs, read or send messages, and take pictures of symptoms and upload them directly to the patient chart in the EMR – without having to be in the office.

Improving patient access to care: An important tool in removing barriers to care for Canadians is virtual care. Through virtual care, patients can call, text or video chat with healthcare practitioners using their computers or mobile devices, from anywhere, at any time.

Virtual care technology enables more effective communication with patients – especially those living in remote areas, those without a family physician, and patients with physical barriers or mobility issues.

Virtual patient/physician interactions help reduce the number of in-office encounters, decrease the length of visits, and allow for more patient-centric care.

Simplifying physician-to-physician collaboration: In a paper and faxed-based paradigm, continued reliance on outdated tools makes for unnecessary inefficiencies and stress for clinicians. Fortunately, innovations are changing the face of collaboration among physicians and improving the continuity of care.

One such innovation is TELUS Health's MedDialog, a national clinical solution that allows doctors to communicate electronically with other healthcare professionals regarding the care of their patients – directly from their EMRs. It enables more efficient clinical practice and better patient care by eliminating the need for phone and fax communications and ensuring that all communication history, such as referrals, specialist consultations, laboratory testing results and other patient information, remains in the EMR.

This saves time, reduces the need for manual transcribing and streamlines communication among members of the patient's care team.

Using technology to shape healthcare delivery: Physicians need – and want – a deeper understanding of how technology can be embraced for more efficient practices.

Patients, too, are looking forward to more advanced, technology-based care. According to a CMA-commissioned survey that examined perceptions and acceptance of technology in healthcare, three out of four Canadians believe new technologies could solve existing issues in our healthcare system.

An exciting future lies ahead where digital healthcare can empower patients to take control of their health, increase quality of life and limit chronic illness, while connecting physicians in the circle of care. How will you shape your practice in the next decade?

Harris Healthcare is bringing a mobile messaging platform to Canadians

BY DAVE WEBB

Uniphy Health Systems, of Newark, N.J., a company acquired in May 2019 by Harris Healthcare, a Canadian digital healthcare provider, reaches about 90,000 clinicians at more than 50 hospitals across the United States with its cloud-based, Uniphy platform, formerly called Practice Unite®.

Uniphy is not only a solution for secure communication, it is also a mobility platform for accessing the EHR, telehealth and third-party mobile applications. It also incorporates workflow management, including secure messaging, on-call scheduling, consults, referrals and patient handoffs.

The secure messaging, VOIP and alert notifications improve the quality and timeliness of communication, leading to a reduction in communication errors that can result in adverse patient outcomes, while preserving the privacy and security of patient data.

Additionally, Uniphy offers integrated functional solutions for addressing patient handoffs (iPASS and SBAR), provider engagement and education, accessibility (on-call scheduling) and a host of other embedded tools that span the communication spectrum of healthcare organizations.

A true differentiator for Uniphy is the ability to provision and access other mobile applications seamlessly, without requiring additional authentication by leveraging Single-Sign On (SSO) and other forms of secure authentication.

This approach, along with the robust workflow engine, provides a mobility platform that is highly accessible and easily adopted by healthcare providers and staff. In terms of interoperability, Uniphy has pre-built interfaces for almost all electronic health record (EHR) systems, including Harris Healthcare, Meditech, Cerner, Epic, McKesson, and more.

The solution even works with pagers – an old-school technology that has one nice advantage over mobile phones. The lower frequency of pager transmissions can penetrate physical barriers more effectively, a benefit in environments like hospitals where a user could be buried deep in a nest of walls.

Uniphy is designed to support the strict technical, physical and administrative requirements of privacy and security regulations (e.g., HIPAA). The software utilizes 256-bit encryption to protect personal data in-transit and at-rest.

Administrators create unique user IDs to ensure accountability, control passwords and can remotely wipe text messages from user phones. Robust audit logs are maintained to maximize transparency. Permissions and roles-based access allow customers to restrict access in order to meet the minimum necessary standard-based access.

Uniphy incorporates workflow management, including secure messaging, on-call scheduling, consults and patient handoffs.

These comprehensive privacy and security components uniquely position Uniphy to address the mobility and communication challenges of healthcare organizations while supporting compliance with PIPEDA and PHIPA.

JFK Medical Center: At JFK Medical Center in Edison, N.J., clinicians are required to use Uniphy, said Dr. Lisa Casale, a pulmonologist and critical care specialist who acts as a liaison between clinicians and the IT department.

"We made it mandatory to use the app," Casale said. "If you don't use it, you don't get the consult."

More than 900 staff are on the system, she added.

Dr. Casale gets instantaneous notification of admissions for a consult and can accept the patient immediately. "I can see the patient sooner," and can move the patient through the care cycle more quickly, she said.

Messages can be shared with groups of physicians. The patient concerned could be a practice patient of one of the doctors on the list, or a case manager could be clearing a patient for release. Uniphy access is role-based; for example, test results and consult requests are visible in a feature only available to physicians.

Uniphy customers in the U.S. have developed a number of use cases for the platform. For example:

- Hospitals are using Uniphy to find observation workflow inefficiencies; one 325-bed facility saved $720,000 in its first nine months of using the platform.
- Likewise, longer lengths of hospital stays cost the facility. One facility focused on discharge workflow inefficiencies and request times to minimize hospital stays.

Video gaming: a modern method of detecting and managing neurological problems

Canada's Highmark creates a system for assessing concussion, mental health, and other brain-related issues.

BY DR. SUNNY MALHOTRA

Can games fix a void that traditional medicine has struggled with? For hundreds of years, medical practitioners have conducted patient exams and reached conclusions about symptoms, diagnoses and treatments. However, in most cases, the information was limited to a static "snapshot" of the patient, or to observations over a very short period of time.

The evolution of clinical science has demonstrated that human organs and organ systems are complex and dynamic in their interactions. They can change over time, and as such, static representations cannot always provide sufficient data to make accurate diagnoses and plan the best therapies.

Nowhere is this static assessment more meaningful than in the evaluation of the human brain, as the brain is probably the most dynamic and changeable organ in the body.

It is only within the last three decades that medical science has developed a more detailed understanding of the "plasticity" of the human brain and its associated functionality.

Interestingly, an entrepreneurial company called Highmark Interactive has devised a fully mobile system that marries the electronic gaming culture with high-level brain science. Its product, EQ Brain Performance, was developed to assess the human brain as a dynamic organ – one that can change over time.

As the company notes on its website, "EQ is a mobile brain assessment platform that delivers comprehensive neurological assessment through game-based testing. It is an easier, faster, more relevant method of assessment that more precisely mirrors the modern understanding of dynamic brain function than other methods used today. Potential users include amateur to professional athletes at risk of concussions, as well as youth to seniors in need of testing their neurological performance levels. Additional uses in the cannabis sector and heavy industry are being implemented, where questions arise about brain functioning".

EQ does this using seven different games, which can be used anywhere and at anytime. It's also available in more than a dozen languages.

The games test balance, visual functioning, and cognitive abilities. There is also an EQ dashboard that allows managers to display and interpret objective results and to manage groups of users.

> **Highmark says it has devised an easier, faster and more relevant method of assessing brain health than other methods being used today.**

EQ aims to provide an assessment tool with ongoing collection of elements of human neurological performance. Highmark's EQ has received clearance from the US FDA, CE mark in the EU as well as clearance by regulatory authorities in Australia and New Zealand.

Based in the Toronto area, the core team assembled were world class leaders in their respective fields, including neurosurgeons, neurologists, neuropsychologists, functional neurologists, and sports medicine physicians; mathematicians, machine learning PhD's from US and Canadian universities, culminating in a partnership with Canada's leading technology institution, the University of Waterloo.

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

Highmark also acquired a company with a team of mobile gaming software developers, who collectively had over 80 million downloads of games they had previously produced.

Together, led by Dr. Sanjeev Sharma, the team built, tested, studied and refined the world's first mobile, gamified, FDA-cleared neuro-diagnostic software.

Tests of the software have either been completed or are ongoing both domestically (Toronto, Calgary) and internationally (U.S., Australia), including projects for concussion management, mental health, workplace safety, eldercare and cannabis-related studies.

EQ's ongoing assessment was designed to create robust datasets demonstrating individual and population neurological performance. These datasets will demonstrate patterns of normal and abnormal performance, and EQ is embedding machine learning algorithms to further assist the human healthcare practitioner in the earlier diagnosis of potential pathological conditions. Machine learning will also assist practitioners when choosing rehabilitation protocols and approaches.

The growth in physiological and other health-related data, and the ability of both humans and machine learning/artificial intelligence to evaluate its relevance and application, is providing clinicians with a new wealth of opportunity to question, trial and create new and improved approaches to healing.

The data provided in these forms of technology is being embraced and utilized by many fields of expertise in healthcare. EQ has defined key components of the data "pictures" required to holistically represent a state of neurological health.

Are medical centres ready for the end of Windows 7 support?

BY DANIEL REIO

On January 14, 2020, Windows 7 reached "end of support" status. As of this date, Canadian healthcare organizations that haven't already updated their operating system are more vulnerable to IT problems and security threats. Windows 7 will still work, but bugs won't be fixed and security issues won't be patched. If a plan to update systems isn't already in place, action must be taken immediately to mitigate risk and ensure there are no disruptions to operations and patient care.

Ten-year-old Windows 7 is one of Microsoft's most popular releases historically and retains 23 percent market share in Canada. There might not be research on the number of hospitals and healthcare organizations still using it in Canada, but we can see the shape of the problem in a 2019 report from Duo Security, which found Windows 7 still accounts for 52 percent of Windows endpoints in the healthcare industry, making it "the most Windows-dominated industry."

In the UK, the National Health Service said in July 2019 that it had about one million devices running Windows 7. The NHS is familiar with the dangers of running unsupported software: in 2017, many NHS trusts were taken offline in the wake of WannaCry, ransomware that targeted Windows XP, an OS whose support had ended in 2014. We can expect cybercriminals to launch similar attacks against Windows 7 now, at the end of its lifespan. Canadian healthcare institutions that have failed to upgrade will surely find themselves alongside their international counterparts in this predicament.

Daniel Reio

How to minimize risks in the short-term: Hospitals that have not moved off Windows 7 still have options. As a first step to minimize risk, they can consider purchasing Extended Security Updates (ESUs) from Microsoft or a technology solutions provider.

These updates are offered as a "last resort option" by Microsoft, which recommends upgrading to the latest software as the best way to reduce risks. ESUs differ in subtle yet significant ways from normal updates. They provide security patches, but like Windows 7, aren't covered by technical support. This means that assistance will only be provided on a "best effort" basis.

An important consideration for administrators is that ESUs carry a cost per device that rises each year. Depending on the version of Windows 7 being used, the updates will cost $33-$66 per device in the first year, rising to $132-$263 in the third year. The costs might be even higher

CONTINUED ON PAGE 22

Interventional radiologists' new therapies fight cancer, strokes and vascular problems

Not only are they improving outcomes, they're bringing novel treatments closer to where patients live.

BY DIANNE DANIEL

One morning last fall, a Fredericton resident awoke with what he recognized as stroke symptoms. He staggered to his wife and relayed a garbled message that something was wrong and he needed to get to a hospital. By noon his acute stroke was successfully treated and his speech returned to normal. But if it weren't for the efforts of a dedicated team at New Brunswick's Saint John Regional Hospital (SJRH) – the first non-university hospital in Canada to offer endovascular stroke treatment – his outcome might have been different.

For more than a decade, SJRH interventional radiologists Dr. Brian Archer and Dr. Darren Ferguson have provided new interventional radiology (IR) procedures, including the extraction of blood clots that are not amenable to clot dissolving drugs. What started out as the occasional case has grown to more than 70 cases a year supported by a coordinated stroke team that includes neurologists, radiologists, medical radiation technologists and nurses.

As part of the new protocol, stroke patients are quickly scanned at their local medical centres and the virtual team assesses the digital CT images online to determine the correct course of treatment. When clot removal is deemed appropriate, stroke patients are rushed to SJRH.

"When somebody comes in with an acute stroke … it's really time sensitive so you don't have the luxury of sending them to Halifax or to another spot; they either get done here or you do what we did for decades, watch them succumb to their stroke," said Dr. Archer, noting that the chance of a good outcome goes down by one percent for every four minutes that passes.

The life-saving procedure was pioneered at other, larger health centres. What's unique about SJRH's approach is that they've implemented these procedures with limited resources, showing that other small health centres could do the same.

When a stroke patient arrives at the hospital, interventional radiologists don't waste time. They quickly puncture an artery in the groin and feed a catheter up into the brain, applying intermittent injections of X-ray dye and viewing CT images to guide them through the blood vessels to the clot. They then feed very fine guide wires into the vessels to deploy a small stent beyond the clot, followed by a "suction catheter."

"So now you have a little sausage of clot that is a few millimetres in diameter, plugging the vessel, and you've got a little basket or stent on one side of it and a suction catheter on the other," explained Dr. Archer. "You apply suction and drag the whole thing down and out of the head. It sounds moderately barbaric, I guess, but it works quite effectively."

For one in three patients, the procedure is life altering. When all goes according to plan, the work is complete within 30 minutes, whereas complex cases can last for three hours or more. Though removing a clot doesn't guarantee recovery, it does provide the best chance for survival.

"Before this treatment was available, 100 percent of patients did really poorly, so we're taking steps in the right direction," said Dr. Archer, noting that some patients will suffer a massive, devastating stroke even after the clot is removed, and others will wake up as if nothing happened.

The leading-edge work of SJRH interventional radiologists is just one example of how the sub-speciality is coming of age across Canada. Last year the Canadian Association for Interventional Radiology (CAIR) launched the CAIR Initiative, aimed at raising awareness about the benefits of minimally invasive IR treatments, and lifting the hurdles that stand in the way of greater access to treatments.

Dr. Amol Mujoomdar, division head for interventional radiology at London Health Sciences Centre (LHSC) in Ontario, is the current CAIR president. He said the goal of the initiative is to enable change – including the adoption of national standards for IR programs – so that patients have a better understanding of their options and interventional radiology suites will be busier.

"We literally have an IR suite that sits empty because we don't have the operational funding to staff it," said Dr. Mujoomdar, noting that due to patient demand, he could "fill it up tomorrow" if the funding was available.

ILLUSTRATION: LINDA WEISS

Part of the problem is the sub-specialty's name. Interventional radiology makes perfect sense to radiologists but is lesser understood by the public at large. Descriptive terms such as "image-guided therapy" or "surgery without a scalpel" are helping to get the concept across and many people are now familiar with cardiac procedures, he said, but there's still work to be done.

In London, Dr. Mujoomdar is focusing on interventional oncology, dedicating his IR practice to cancer patients. "Historically, this was a very technical-based specialty. You met me the day of your procedure, I did something and I never saw you again," he said. "We've largely tried to change that paradigm where we now take on the clinical management piece too."

LHSC has three IR suites and a team of about eight interventional radiologists. Interventional oncology treatments range from ablation, where a needle is inserted inside a tumour to either 'burn' or 'cool' cancer cells, to chemoembolization, a procedure where chemotherapies are injected inside tumours themselves. The team also performs various venous access procedures, such as PICC line or port-a-cath insertions required for IV therapies, and image-guided biopsies.

Another procedure, Y-90 radioembolization, is an effective method for delivering radiation to tumours, particularly in the liver. Interventional radiologists place tiny glass or resin beads filled with the radioactive isotope yttrium Y-90 inside the blood vessels that feed a tumour, and cancer-killing radiation is then emitted over time.

The benefit to cancer patients is that IR procedures are minimally invasive, meaning they are typically performed under mild sedation in the outpatient clinic. People generally recover much faster and are usually home the same day. Similar to other specialties, they are seen in the clinic for follow up after four to six weeks.

Patients must be considered good candidates for interventional oncology treatment, a decision that is made by LHSC's multidisciplinary tumour board, where interventional radiologists now have a seat at the table alongside surgeons, oncologists, radiologists and pathologists. The treatment decision depends on the size, location and type of tumour.

"We discuss patients who were seen or will be seen so that there is a plan in place," said Dr. Mujoomdar, noting that all specialties work closely together. Sometimes the role of the interventional radiologist is to shrink a tumour and fatten up the liver so that a patient can have a more successful surgery, he added.

The more the role of interventional radiologists evolves, the more they are required to be current with literature and help to select the right procedure for the right patient, he added. "We have to be very good technically, we have to be very sharp with our eyes, and our third hat is to be a strong clinician," said Dr. Mujoomdar.

At the University of Montreal Hospital Centre (CHUM), interventional radiology cases are not only growing, but are becoming increasingly complex. The hospital's team of seven interventional radiologists share seven IR suites, one of which is dedicated to neuro treatments. They also hold three full-day clinics each week.

One reason for the growing case load is that interventional radiologists are natural problem-solvers who approach their practices with a can-do attitude, said CHUM vascular and interventional radiologist Dr. Marie-France Giroux. Two complex conditions currently gaining traction in CHUM's IR practice are vascular malformations and pelvic congestion syndrome.

"It's the way we see our practice … It's always been 'What can we do?' said Dr. Giroux, who likes to think of her job as that of a human plumber. "When someone comes to us with something that's not operable, we'll think about it and see what can be done. It's very rare that we say no."

There are three main types of vascular malformations – venous, lymphatic and arteriovenous – and CHUM interventional radiologists are successfully treating all three. The most common are venous mal-

formations that occur when blood vessels don't develop as they should, allowing lesions to form. Though some are asymptomatic, others can be disfiguring or cause pain and difficulty when a person is moving.

The common IR procedure to treat venous malformations is sclerotherapy, which is similar to the process of treating varicose veins. Interventional radiologists puncture the lesion and inject a foam into the problem blood vessel to close it, allowing the blood to reroute in a healthy vein and restore normal blood flow.

Lymphatic malformations result from abnormal formation of lymphatic vessels and are characterized by two primary types: macrocystic lymphatic malformation where the vessels form a large mass or lump, and microcystic lymphatic malformation, where multiple tiny cysts are grouped together.

To treat the larger masses, interventional radiologists insert a catheter to puncture the mass and deliver chemotherapy directly inside it. Treating the tiny cysts is more difficult, but recently interventional radiologists are finding success using a chemotherapy drug called bleomycim and a drug used in kidney transplants called sirolimus.

"We infiltrate the whole area (with these drugs) and try to stop these cells and cysts from proliferating," said Dr. Giroux.

Arteriovenous malformations, characterized by an abnormal tangle of blood vessels connecting arteries and veins, are the most risky to treat. As Dr. Giroux explained, attempts to remove them surgically actually cause them to "come back with a vengeance" often resulting in death. CHUM interventional radiologists are among the first to use embolization to treat the condition with alcohol.

"What we do is kill the junction from the inside," she said. "It's really dangerous – and some teams don't want to use alcohol – but it's the best way."

The CHUM team is in the process of publishing its data on arteriovenous malformations. In one case, a young patient was in cardiac failure due to his malformation. If the team didn't intervene, his death was imminent.

Because alcohol treatment is extremely painful, the patient was put under sedation and very small amounts of alcohol were delivered to the area every five minutes. After 24 sessions, they were successful in treating the malformation and he went on to complete his university education and travel through Europe, she said.

Pelvic congestion syndrome is a condition that develops in some women after pregnancy. Veins that dilate during pregnancy fail to shrink back to normal, causing blood to pool in the pelvic area, resulting in pain and discomfort.

According to Dr. Giroux, the condition has gone undetected because when laparoscopy is performed to investigate the cause of the pain, the air pressure compresses the veins, masking the problem. Women are often left feeling discouraged and some are told that "it's all in their head," she said.

Interventional radiologists treat the condition by stopping blood flow to the affected veins so that normal flow can be restored by finding an alternate route. For many patients, the treatment is life changing.

As CAIR works to promote interventional radiology and get more people talking about the innovative work being done at the hands of healthcare's high-tech plumbers, advances in technology are also helping to further their expertise.

Guide wires and catheters are getting smaller and more "slippery" as new materials are investigated. New treatments, including new chemotherapeutic drugs and adhesives like Onyx, are being studied. And imaging technologies such as live CT or image fusion – where images taken before a procedure are fused with live images – are making it possible for interventional radiologists to navigate areas of the body they couldn't reach before.

In New Brunswick, Dr. Archer and his team are constantly learning, and are eager to apply novel ideas where they make sense. For example, some researchers are working to show that cooling the brain will slow down the death of brain cells, ultimately decreasing the size of a stroke. "There's really no downside to it," said Archer. "Someone will do a controlled trial but in the meantime it's certainly not harmful to the patient and if it gives us a few percentage points of added benefit, that's great."

To find out more about interventional radiology visit: cairweb.ca

Diagnostic imaging vendors show off array of new systems at RSNA

CHICAGO – Vendors at the 2019 annual meeting of the Radiological Society of North America (RSNA) introduced many new systems, both hardware and software. Here's a round-up of some of the high-profile announcements from the show floor:

GE Healthcare

GE Healthcare continues to innovate in the area of women's health. At RSNA 2019, the company announced Serena Bright – said to be the industry's first contrast-enhanced mammography solution for biopsy.

Interventional and biopsy procedures are a necessary step in most breast cancer diagnoses. Previously, a contrast-enhanced biopsy was typically performed with breast MR, which can be more time-consuming, uncomfortable and costly for patients. With Serena Bright, breast biopsy exams can now be done with the same mammography equipment, in the same room and with the same staff as the screening mammogram. This can help save time, lessen costs and ultimately help improve the patient experience.

Key to this change in breast care is GE Healthcare's SenoBright HD Contrast Enhanced Spectral Mammography (CESM). By highlighting areas of unusual blood flow to help localize lesions that need to be biopsied, CESM biopsy – Serena Bright – helps improve radiologists' diagnostic confidence while maintaining low radiation dose during exams.

GE Healthcare also demonstrated an advance in the area of interventional radiology, where it is using its AI-powered Edison platform to improve the embolization process in prostate and brain cases. The company unveiled AutoRight, which it calls the first intelligent interventional image chain and Embo ASSIST with Virtual Injection.

Embolization procedures can be incredibly complicated in the brain and prostate, which have a highly complex vasculature and are surrounded by critical organs. Embo ASSIST is designed to allow clinicians to analyze the vasculature and simulate injections dynamically to help determine the embolization strategy to avoid embolizing healthy tissues with just one click.

Calibrating the right X-ray is also an issue. Too often, technologists, nurses, and interventional radiologists spend valuable time during procedures manually optimizing dose to balance the demand for image quality with the risks of radiation exposure. This tedious, time-consuming task takes important time and attention away from the patient.

At RSNA 2019, GE Healthcare showcased AutoRight, a completely redesigned image chain, embedding the first-in-industry neural networks, designed to automatically optimize image quality and dose in real-time. AutoRight delivers repeatable and fast choices, dynamically throughout the entire procedure, regardless of patient size, anatomy or C-arm angulations.

AutoRight, powered by Edison, is an intelligent image chain that automatically updates system parameters, from image acquisition to processing and display, during interventional procedures.

Siemens Healthineers

Over at the Siemens Healthineers booth, the company debuted the SOMATOM On.site, a mobile head computed tomography (CT) scanner that changes the standard practice of transporting a critically ill patient from the intensive care unit (ICU) to the radiology department for a scan. With the SOMATOM On.site, the radiologic technologist can perform a CT head examination directly at the patient's bedside, potentially eliminating costly patient transports with high staffing requirements and potential risk to the patient.

> **GE Healthcare announced the Serena Bright, said to be the industry's first contrast-enhanced biopsy for mammo**

In this way, the SOMATOM On.site transforms care delivery and improves the patient and staff experience.

The SOMATOM On.site reimagines head imaging for ICU patients. In the patient's room, the technologist removes the headboard from the bed while the patient remains in bed, connected to monitors and devices. An integrated shoulder board and head holder offer patient support and consistent positioning in the scanner at isocenter, providing optimal image quality.

The system's new intelligent user interface, myExam Companion, helps the technologist navigate through the examination for consistent results, regardless of experience level. Following image acquisition, the technologist slides the patient down in the bed from the headboard, and the CT scan is sent automatically to the picture archiving and communication system (PACS).

This streamlined process typically takes minutes, requires minimal staffing, and reduces potential risk for the patient. The integrated drive camera in the front of the scanner offers real-time viewing on the built-in touch display, enabling easy maneuvering of the scanner. The smart driving concept with the motorized trolley and ergonomic handle helps enable precise, intuitive positioning even in small spaces.

Thanks to the SOMATOM On.site's unique telescopic gantry design, the radiation source and gantry move away from the patient during scanning to reduce scatter radiation, while the base of the mobile scanner remains stationary. Since only the gantry moves during scan acquisition, the potential exists for improved workflow and reduced incidents of motion-induced image artifacts. Additionally, protective curtains can be attached to cover the front and back of the gantry openings, further reducing scatter radiation for staff and neighboring patients.

Konica Minolta

For its part, Konica Minolta Healthcare announced a major push into Canada with new technologies, including data analytics, digital radiography, enterprise image and data management, ultrasound solutions and precision medicine. While Konica Minolta has traditionally been thought of as a provider of DR panels, it has rapidly expanded its range of offerings for diagnostic imaging professionals.

Konica Minolta Healthcare unveiled the compact KDR AU Advanced U-Arm with Dynamic Digital Radiography (DDR), which it calls the next evolution in X-ray

Canon Medical introduced the Aquilion ONE PRISM Edition, a spectral CT system designed with deep intelligence.

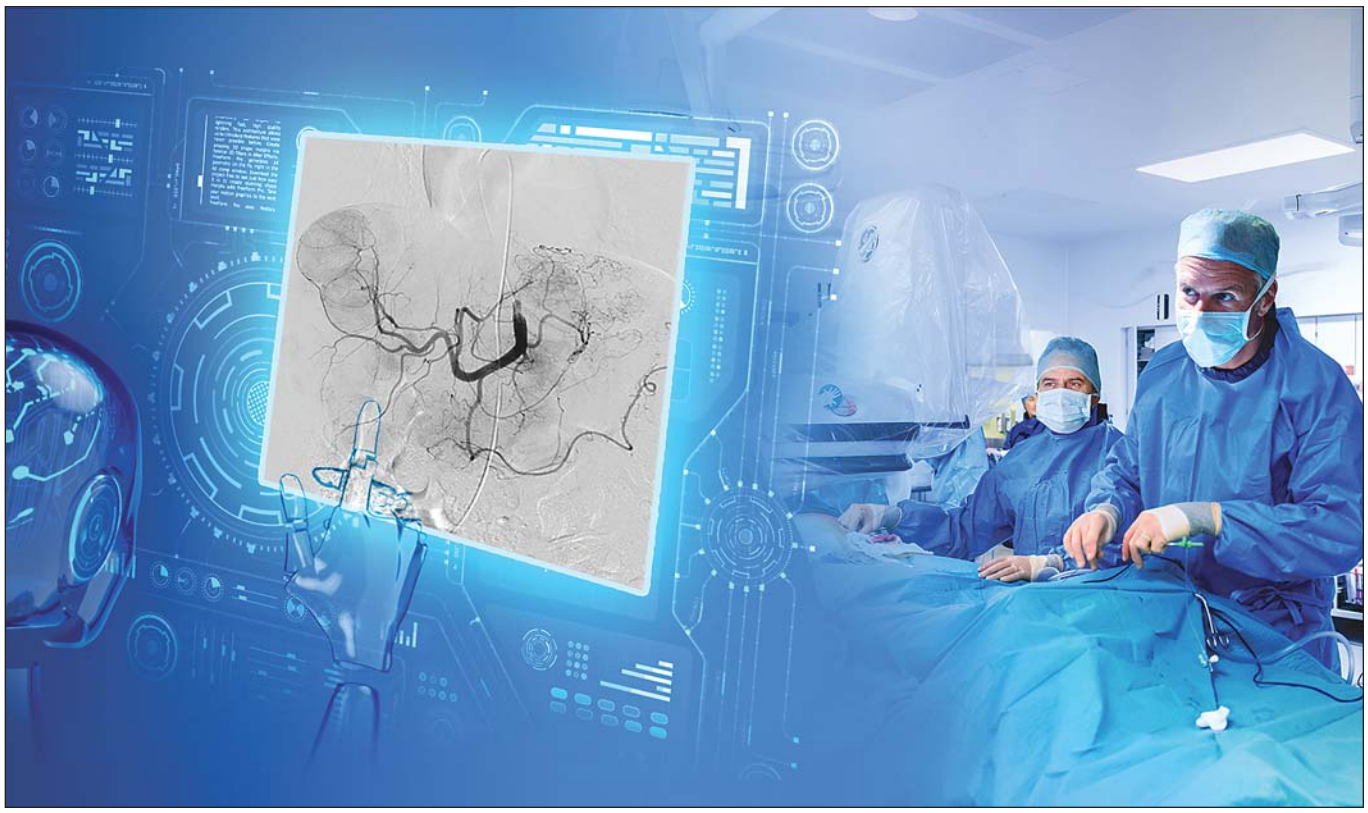
imaging. DDR, or X-ray that Moves, provides a cine loop of rapidly acquired, diagnostic-quality images depicting full views of articulatory mobility.

When applied in musculoskeletal (MSK) applications, clinicians can assess changes in relationship of bones, ligaments and other anatomical structures through full range of motion to evaluate shoulders, knees, wrists and spine. In addition to producing dynamic sequences, the KDR AU also provides standard medical images for all anatomies. Today, clinicians rely on observing external motion and static X-rays to assess spine and joint stability; DDR has the potential to revolutionize how patients are diagnosed and transform the care pathway.

Konica Minolta showed new ultrasound systems, too, for diagnostic and interventional applications. Further advancing musculoskeletal imaging, the Konica Minolta UGPro Solution unites the latest ultrasound technology and minimally invasive procedural innovations and biologics, with hands-on education, to improve clinical workflow and patient satisfaction at the bedside.

The company also announced a new PACS for specialty practices. Rede PACS2 is a new PACS from Konica Minolta Healthcare designed for specialty practices, including orthopedic, urgent care and family practice. Built on the proven Exa Platform, Rede PACS is a web-based, zero-footprint solution that provides the features and tools needed to optimize and streamline imaging workflow with simplified tiered pricing based on annual study volume. The Rede PACS zero footprint viewer offers full diagnostic toolsets and viewing capabilities from any computer.

Konica Minolta displayed a U-arm with X-ray that Moves, a cine-loop depicting full views of articulatory mobility.



GE Healthcare's Embo ASSIST lets clinicians analyze the vasculature and simulate injections, to determine the best strategy.

Carestream

Carestream has further developed its DRX-Revolution Mobile X-ray System with an improved ergonomic design and user workflow. The CARESTREAM DRX-Revolution Mobile X-ray System provides fast, convenient digital radiography imaging for patients at the bedside, in the operating room, the intensive care unit or the emergency room.

The enhanced system has a lighter, balanced tube head and collimator with responsive display screens located at both the tube head and main display. Technologists now have another point of visibility of the system's status with new functional LED lighting. In-bin detector charging indicates that the system is always at the ready to be used continuously, from room to room.

"We are continuously redefining the mobile X-ray market by listening to healthcare providers and observing user workflow," said Sarah Verna, Worldwide Marketing Manager for Global X-ray Solutions at Carestream. "Carestream's mobile imaging system is the leading revolutionary mobile device in the market: we were the first to develop a device with a collapsible column, allowing the technologist to have complete visibility when transporting the device up and down hallways."

With the first release of the DRX-Revolution system, Carestream eliminated blind navigation in hallways, elevators and patient rooms. Keeping patients in mind, the system's brakes and drive motors now are quieter to enable almost noiseless navigation as well. The DRX-Revolution offers unparalleled maneuverability in tight and cluttered spaces in a variety of medical care facilities.

"With the enhanced system, we designed what the customer needs today. For example, we worked on quiet mobility of the system and quiet movement of the tube head," Ms. Verna said. "The quieter hospitals can keep things around the patient, the better healing for the patient. Also, as more people are coming into the hospital with critical diseases and the device needs to be wiped down for each exam, we wanted to make sure that no fluid gets into the system.

Additionally, the device contains higher security features, including the ability to lock detectors and protect against theft. Powered by a wireless DRX Plus Detector that works across other X-ray imaging equipment, the system can be used effortlessly in other mobile units or rooms.

Philips

Meanwhile, Royal Philips announced the launch of IntelliSpace AI Workflow Suite to enable healthcare providers to seamlessly integrate AI applications into the imaging workflow. Part of Philips' new enterprise imaging informatics solution, the AI workflow platform provides a full suite of applications for integration and centralized workflow management of AI algorithms, delivering structured results wherever they're needed across the healthcare enterprise. Partners at launch included Aidoc, MaxQ AI, Quibim, Riverain Technologies and Zebra Medical.

Leiden University Medical Center (LUMC) in the Netherlands recently signed an agreement to be the first healthcare provider to install the platform.

Integrating into existing department and hospital infrastructure, the suite automatically orchestrates the routing of clinical data to the appropriate AI application within the healthcare provider's ecosystem to allow data analysis without user interaction, and displays the results. The suite is designed to support Philips' commitment to providing open, comprehensive solutions to healthcare providers' AI imaging needs. Natively integrating with Philips' diagnostic imaging and informatics solutions, IntelliSpace AI Workflow Suite can also be used alongside imaging solutions from other vendors. In addition, the suite is designed to support the training of site-specific AI applications based on local data.

Siemens introduced the SOMATOM On.site, a mobile CT scanner designed to image the head at the bedside.

Change Healthcare

Change Healthcare announced the latest milestone in its strategic initiative to build and implement its cloud-native Enterprise Imaging Network: the addition of four leading health systems as development partners. Hosted by Change Healthcare on the Google Cloud Platform, the network is the centerpiece of Change Healthcare's enterprise imaging strategy.

The four new provider partners are: Bronson Healthcare, Community Health Systems Professional Services Corporation (CHSPSC, LLC), Montefiore Nyack Hospital, University of Wisconsin School of Medicine and Public Health, and UW Health, Madison Wisconsin.

Each partner will work with Change Healthcare to help accelerate development of the solution by implementing the platform as it is built and providing ongoing, real-world feedback. Collectively, these partners manage 124 hospitals with an annual imaging volume of over 5.6 million studies.

They will migrate more than 66 million studies to the Change Healthcare Enterprise Imaging Network cloud, with over 2.8 petabytes being handled by the network. Customer implementations are ex-

CONTINUED ON PAGE 20

New at RSNA

CONTINUED FROM PAGE 19

pected to go live in the first half of 2020 as a fully-managed Software-as-a-Service (SaaS) solution from Change Healthcare.

"The problem today with enterprise imaging on the cloud is that most solutions are not developed specifically for the cloud, but instead are lifted from legacy technologies and re-platformed," said Tomer Levy, general manager, Cloud Solutions at Change Healthcare.

"This means providers aren't realizing the full benefits in improved care coordination, cost realization, and reduced infrastructure complexity that true cloud-native solutions can provide.

From the time we first partnered with Google Cloud, we've focused on building a solution that doesn't simply replicate traditional on-premise systems, but delivers everything providers expect in an enterprise imaging service – plus clinical and operational capabilities that are only available through a true cloud-native SaaS platform."

Canon Medical

Canon Medical introduced the Aquilion ONE PRISM Edition, a spectral CT system designed for deep intelligence. It combines Canon Medical's Advanced intelligent Clear IQ Engine (AiCE) with Deep Learning Spectral Reconstruction imaging capabilities.

According to the company, the advanced system integrates artificial intelligence (AI) technology to maximize conventional and spectral CT capabilities and automated workflows while providing intelligent clinical insights to assist physicians in making more informed decisions across the patient's care cycle.

Canon Medical has been applying AI to its Aquilion ONE PRISM Edition, a spectral CT system.

Features on this advanced system include:

- Advanced intelligent Clear IQ Engine (AiCE) Deep Learning Reconstruction (DLR) (pending 510(k) clearance): An innovative approach to CT reconstruction that uses deep learning to distinguish true signal from noise to deliver sharp, clear and distinct images at fast speeds. Trained using vast amounts of high-quality image data, AiCE provides enhanced anatomical resolution across the whole body including brain, lung, cardiac and musculoskeletal systems.
- Deep Learning Spectral Imaging (pending 510(k) clearance): Enables physicians to make a more confident diagnosis through Spectral insights.
- All new CT Fluoroscopy (CTF) Interface: Conduct fast, focused interventional procedures with the new hybrid CTF interface that enables one-person operation thanks to ergonomically designed controls and a versatile touchscreen tablet.

CAR is working to improve radiology and care delivery

The Canadian Association of Radiologists (CAR) will continue to press Ottawa to invest in Canada's aging stock of diagnostic imaging equipment, and to increase access to medical scans.

In 2019, in response to the growing wait times, the CAR asked the federal government to invest $1.1 billion to replenish DI equipment across the country. According to the association's president, Dr. Mike Barry, who is a radiologist at the Saint John Regional Hospital, in New Brunswick, it would be money well spent.

"There are thousands of people not working while they're waiting for scans," said Barry. "It costs the Canadian economy $3.5 billion each year in lost output," he added, citing a Conference Board of Canada study that was commissioned last year.

Wait times not only take their toll on the economy but more importantly impact patients and their families. When one patient waits, the whole family waits.

For his part, Dr. Barry has heard accounts of patients waiting a year or more for MRI scans. Meanwhile, CIHI reported just last year that patients are waiting much longer for CT and MR scans than recommended by provincial wait-time targets.

Dr. Barry says, "We can do better. We owe it to Canadians to provide the best care possible in a reasonable time frame to prevent unnecessary suffering."

Dr. Barry said, following the meetings on Parliament Hill, the federal Liberals, Conservatives and NDP have all expressed support for the idea of federal investments in DI equipment. However, the reality is that a national pharmacare plan is the government's political priority and may take precedence over an investment in radiology.

Thousands of people aren't working while waiting for scans, costing the economy billions in lost output.

At the same time, the premiers of Canada's provinces have been putting pressure on Ottawa to increase healthcare transfer payments. If this does occur, DI could get an injection of funds on a provincial basis – provided the provinces choose to allocate more money from stepped-up transfer payments.

Another priority for the CAR is the implementation of decision support systems for front line doctors, to help ensure they order the appropriate DI tests. This plan is starting to gain traction and discussions have taken place with emergency and family doctors.

At least three different organizations across Canada have begun testing systems with referring physicians. They include sites in Alberta and Ottawa, as well as at the North York General Hospital, in Toronto.

He noted, however, that decision support systems will take years to fully implement. Nevertheless, it's important to take some action and to get the process started.

The CAR is also doing a good deal of work in the area of artificial intelligence. Its members are active in scoping out the ethics of AI, and they are also working with a federally backed project to develop new solutions for AI in healthcare.

While some radiologists may have been spooked by the idea of AI, the reality has been that AI is a complicated endeavour, with technology that is developing slowly. It's only beginning to be used in radiology and other branches of medicine.

The end-result is likely to be that AI will be a tool used by radiologists to assist them with their work. He likened the situation to aviation, where pilots are assisted by banks of computers in the cockpit. "But you still need pilots to fly the planes," he said.

AI in diagnostic imaging requires better data, infrastructure

BY THOMAS HOUGH

On the topic of AI in radiology, what has changed in the past year? The short answer is not much; the long answer is the hype – and growth – continues. In fact, at RSNA last December, a whole lower level in the Lakeshore Building was dedicated to AI applications, both Works in Progress (WIP) and completed applications by various vendors or hospital research departments from around the world.

Of course, you cannot look anywhere without seeing an article or newly published paper about AI and its use, or more importantly, the future use of AI in Diagnostic Imaging or Cardiology. The question that I have is: Who is actually using this stuff?

RSNA 2018 and 2019: Dr. Paul Chang from the University of Chicago did an annual 15-minute interview with Brian Casey of AuntMinnie.com. Both of these interviews are worthy of your time if you desire to learn more about the future of artificial intelligence in diagnostic imaging and the acceptance of AI in Medicine. The 2018 interview is found at https://www.youtube.com/watch?v=o2-CrrrtuJI and the 2019 interview can be found at https://www.auntminnie.com/index.aspx?sec=rca&sub=rsna_2019&pag=dis&ItemID=127473.

In essence, these two interviews speak about Gartner's Hype Cycle, which is defined in the following way: "Gartner's Hype Cycle is a graphical depiction of a common pattern that arises with each new technology or other innovation. Each year, Gartner creates more than 90 Hype Cycles in various domains as a way for clients to track technology maturity and future potential. The five phases in the Hype Cycle are Technology Trigger, Peak of Inflated Expectations, Trough of Disillusionment, Slope of Enlightenment and Plateau of Productivity."

I believe this is an accurate theory and realistically describes the acceptance of AI in DI and across most forms of medicine. Also useful to consider is Amara's Law: "We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run," a phrase coined by Roy Amara, past president of The Institute for the Future."

Thomas Hough

In Dr. Chang's 2019 interview, he says that between 2018 and 2019 not much has happened in the advancement of AI. Rather, the hype of AI has continued and the start of descent into the disillusionment trough is showing.

We should not focus on the disillusionment trough, however, because in Gartner's Hype Curve we sooner or later get to the acceptance of the technology and the consumption of the technology.

What is slowing down the development and acceptance of AI? Aside from the development of Use Cases (applications), AI requires support in two key areas. First, is data. Dr. Chang refers to data as the gasoline required for AI to run like a race car. Second are the roads which AI requires to travel along. These will come in the form of workflows engineered for AI. Without them, we can have a wonderful performance-oriented car but no fuel to start it up and no roads to drive it on. An excellent analogy.

The data we have in our repositories today is not good enough for a number of reasons. There are too many errors and data issues for AI. And the data in formats such as DICOM, HL7 and even PDF reacts too slowly for AI. For AI to be transformative, the data needs a faster method of transfer; it must perform in real-time.

Data trapped in DICOM and HL7 formats cannot be queried and retrieved fast enough for workflow orchestration. There needs to be a new architecture. This will require Service Oriented Architecture (SOA).

How and when do you buy this technology? The simple answers are when it becomes affordable, where affordability is defined as the technology is able to prove a business case where costs versus return is achieved within a reasonable amount of payback time. The challenge with this is, how do you make a business case for AI? When will the variables be aligned and measurable to create a reasonable theory of economics to achieve a viable return on investment?

We'll look at one of the answers, the availability of SOA technology, in an upcoming column.

Thomas Hough is founder and President of True North Consulting, based in Mississauga, Ont.

Building a world-class radiology department: identifying the challenges

BY DR. DAVID KOFF

I had the privilege to serve as Chief of the Department of Radiology at Hamilton Health Sciences for two terms and as Chair of the Academic Department for the past 12 years. As Chief, I was recruited to align the provision of radiology services at our three major sites with the new Access to Best Care strategic vision of the hospital, where each hospital would be specialized in order to provide the best expertise to the population we serve.

I thought it would be an easy ride, and that it would take me a few months to restructure, but it turned out that this was an overly optimistic assumption.

When it comes to managing people, returning a disruptive radiologist to productive practice is no small task.

During my tenure as Chief, I had numerous challenges to address to move away from a community practice mentality and turn our Department into an internationally recognized academic organization.

Fortunately, I had support from wonderful colleagues, without whom we would not have been able to reach our goal.

First, burnout was prevalent among our interventional radiologists, with a high turnover at one of our sites. Coming into HHS with a fresh eye allowed me to see areas of dysfunction where quick improvements could be implemented – such as organizing a system-wide interventional call, which reduced stress levels and improved the quality of life for our radiologists by decreasing the call frequency.

I also found it was very useful to take LEAN 6 Sigma training, as I learned how to improve workflow by identifying the hidden factors which can so easily block an organization.

Secondly, we faced a chronic lack of funding for our department and the need to maintain its equipment at the level required of a leading-edge academic centre. The hospital had committed to a certain amount of funding which would have allowed us to purchase new equipment for the three sites, but it never fully materialized due to ongoing financial constraints.

However, I could participate in strategic planning sessions and advocate for a Managed Equipment Service (MES) arrangement, which would engage us in a long-term plan to evergreen our equipment. It would also allow us to get away from a disastrous situation, where we had to wait for aging equipment to crash before it was replaced as a contingency!

The MES takes the financial burden out of capital investments and places it into the operational budget, where the cost is spread out over time. The cost becomes predictable and there is no need to wait for a contingency in order to acquire new technology.

The scope of MES is variable, and can include not only equipment, but also full services. The MES provider expects to sell the hospital a certain amount of its equipment, usually around 50 percent of the allocation. Ideally there should be a pause at mid-term where the parties can assess if the goals and commitments have been attained and if the solution is viable.

A third challenge involved managing our people. In my experience, there were two major issues:

• The disruptive physician. For a leader, this is a draining experience and it can consume a great deal of time. Yet, it's important to keep in mind that disruptive behaviour may be induced by personal problems, burnout, anxiety, and insecurity. And that the individual can be helped. But it requires time, patience and understanding to identify the causes of disruption and to support the distressed colleague.

• Culture is often underestimated. Like many others, I had seen posters displaying an iceberg, where culture is the larger part hidden under the water. Culture is said to "eat strategy for breakfast", and I believe this is true. The Rogers curve shows that 15 to 20 percent of people are opposed to change, and they will do anything they can to prevent the change from happening. Culture will help them find any and all possible reasons to explain why we cannot change the way we function. How many times did I hear that we always did things the way it is now, and that it worked? So why change?

But often, the culture is more pervasive, and the leader will painfully discover that the entire system is blocking attempts to change. Communication is key, not only conveying and explaining repeatedly the message you want people to understand, but also listening with care to others.

Dr. David Koff

The fourth major challenge was quality and how to improve outcomes. We cannot just wait for complaints and try to fix the gaps. Instead, we must be proactive and work hard to prevent errors from happening.

A recent study at Harvard showed more than 250,000 people die every year from medical errors in the United States, a considerable number, and the Chief's role is to identify all the steps where critical errors may occur, from booking and check-in to communication of findings and subsequent action.

One of the measures we are implementing is a state-of-the-art, fully anonymized cloud-based peer learning solution to help radiologists learn from errors and misses, and to also benefit from great findings of others. A lot can be learnt from others' experience and we need to move away from blame and shame, the way airlines did 40 years ago, if we want to see significant improvements in outcomes.

In conclusion, leadership is not an easy task. There are new challenges and opportunities every day. Leadership is not innate and can be learnt; I found useful tools in the LEADS framework in a caring environment, which is now part of our residency curriculum and guides the leader in each step – from knowing one's self to achieving system-wide transformation. Would I do it again? Certainly yes, mainly with the knowledge I have acquired over the years.

David Koff, MD is Professor and Chair, Department of Radiology, McMaster University in Hamilton, Ontario.

Human touch is disappearing in the age of computers

BY JERRY ZEIDENBERG

CHICAGO – Stanford University professor and best-selling author Dr. Abraham Verghese asserts that one of the biggest problems in medicine today is the lack of interaction between doctors and patients.

There's so much data, he said, that the patient becomes an abstraction. In many cases, medical rounds are held not at the bedside, but without the patient. "We have the data set," said Dr. Verghese, adding that for some physicians, that's all they need.

Verghese, author of "Cutting for Stone" and "My Own Country: A Doctor's Story", spoke at the annual meeting of the Radiological Society of North America, which attracts over 50,000 attendees to McCormick Place in Chicago.

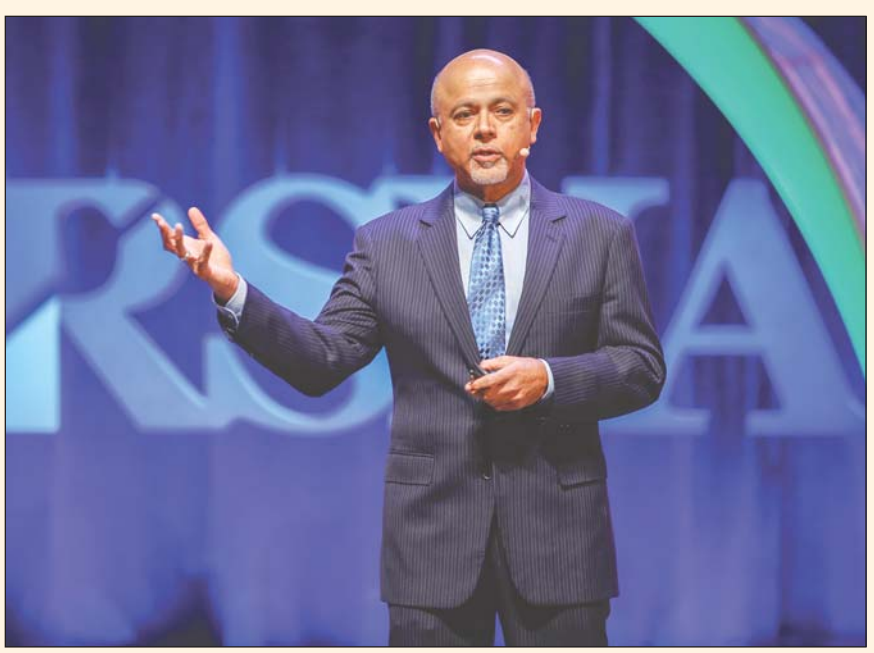
He quipped that the "iPatient" may be getting great care, but the real patient is wondering where everyone is, and why he or she isn't getting any attention.

The main culprit, said Dr. Verghese, is the electronic medical record. "Most patients are not happy to be in the doctor's office and to see the doctor's attention split between him and the computer screen."

The EMR, he said, is "an epic disaster", with no pun intended on the word "epic".

"It wasn't designed for us [as doctors], it was designed for billing, not for our ease."

He contrasted the computerized approach with that of traditional medicine, where doctors focused their attention on the patient, listened to their stories, and touched their bodies to learn about what was happening.



Best-selling author Dr. Abraham Verghese says that physicians are in danger of losing their "human" focus.

He stressed that touching of this sort can only take place in the medical setting – otherwise it is rightly considered as assault.

Dr. Verghese noted that in most medical encounters, it takes only 11 seconds before the physician interrupts the patient. As an exercise in his own infectious diseases practice, he allowed a patient to tell his story for 40 uninterrupted minutes.

Two weeks later, the patient returned for a physical examination, and continued to discuss his problems. This chatty patient suddenly stopped talking when Dr. Verghese started his exam, shaking hands, and then touching the arm of the patient and then the back to check on various issues.

After the physical, the patient told the doctor he had never had such a thorough examination by a physician.

Verghese contrasted the state of computerized medicine today with the practice of Dr. William Osler, who emphasized personal interactions between patient and physician. "As Osler said, patients form an estimate of us by the way we conduct ourselves at the bedside. I would say they do this at any location."

He observed that sometimes, the problem that patients are grappling with are right before the eyes of the doctors. But they still insist on a battery of diagnostic tests before they make any decisions. "We don't trust what our own eyes are showing us," said Dr. Verghese.

Referring to Dr. Osler again, he said, "The secret to caring for the patient lies in caring for the patient."

To build successful Ontario Health Teams, we should look to Arizona

CONTINUED FROM PAGE 10

to terminate anyone, we must be willing to do so, and even more are asking to join the ACO."

Thompson believes that sharing patient information among clinicians and allied professionals is of paramount importance. For this, it makes use of an electronic patient record system and integration engine supplied by Orion Health.

"We call it Innovation Exchange, and there are about 20,000 patient searches each month," said Thompson. "It collects a lot of information from disparate sources – and there's a huge amount of data in it."

Another important technology is a web-based e-referral solution. It allows GPs to make referrals to specialists in the system more easily, and ICP has the benefit of referral visibility to help improve in-network referrals.

Something ICP has learned about electronic systems, in order to get physicians to use them, is to keep them simple. "Physicians don't care about bells and whistles," said Thompson. "They want to see their patients and get to the most important data quickly."

Moreover, I.T. training sessions should be kept to a maximum of 20 minutes – not three hours.

Importantly, ICP makes use of analytics to gauge costs and clinical outcomes. In this way, it helps determine whether various practices and therapies are working well or not. "You need analytics," said Thompson.

When it comes to gathering information from doctors, quality of reporting "is one of the things we're paying them for." Only by collecting high-quality information about diagnoses, tests, treatments and outcomes can ICP gauge whether it's doing a good job. And it's the data that shows where improvements can be made.

Indeed, the organization is committed to "evidence-driven medicine" and makes decisions based on its data.

It produces reports on these findings, and physicians are expected to convince their peers to switch to the best practices. For example, when it was found that a generic for treating macular degeneration was just as good as the brand name medication, but available at far less cost, it spread the word that physicians should change their prescribing practices.

Also, on the technology front, ICP uses a simple, secure communication application called TigerConnect, which connects ICP clinicians. It has become wildly popular.

"It's like SMS, but secure," said Thompson. Using it, clinicians can send messages and photos – such as pictures of patient rashes to a dermatologist for a quick consult.

"Dollar for dollar, this has been our highest-value return on I.T.," said Thompson. He explained that clinicians are using the system for curbside consultations, which are unpaid.

The benefit to the specialist is that he or she builds a stronger relationship with the primary care docs. For the GP and patient, it means a question can be answered very quickly.

"The satisfaction with this has been phenomenal," said Thompson. Not only are patients happy with this, but in many cases, the curbside consults have eliminated a trip to the hospital.

As ICP works hard to ensure that patients stay healthy and out of hospital, it's making good use of "transitional care managers". These are RNs and licensed medical social workers who bridge the gap between the hospital and community, and when patients are discharged from hospital, they ensure the patients have what they need to avoid readmission.

"When the patient leaves the hospital, our transition care managers look into whether they have care at home or whether they need home care visits," said Thompson. "They check on their meds, and make sure the patients can get them when they're needed, and even if they have money for them. They'll look at if they have a follow up with a doctor, and if they can get there," and many other things.

Physician satisfaction with secure, instant messaging has been "phenomenal", says ICP's Faron Thompson.

High-risk patients will be identified – those who appear more likely to return to hospital – and efforts will be made to put them into special programs, to improve their health.

In a real innovation, ICP uses Care Coordinators assigned to primary care offices. Care Coordinators are specially trained medical professionals like Medical Assistants or former military medics. The Care Coordinators develop long-term relationships with moderate to high risk chronic condition patients to help improve their health status.

Part of the program is also paying great attention to the social determinants of health. "We're finding out everything about our patients, including their cats and dogs," said Thompson. He talked about one patient who hadn't had a follow-up visit with a doctor in six months. It turned out that she was afraid to go out and leave her dog alone. In that case, a dog sitter was arranged.

In another instance, a hairdresser was brought in for a woman who hadn't had her hair cut in some time – it was the reason she wouldn't go in for a routine PCP visit.

"Our Care Coordinators can help with mental health and depression," said Thompson. He discussed a COPD patient whose depression was brought down from 20 to 7 on the PHQ-2 scale after ICP managers arranged to get him a special device for use in the home. "He also went on vacation for the first time in five years."

Not only did that help the patient, but the improvement in his health also saved the healthcare payer $70,000 a year.

All of these elements – evidence-driven medicine, physician performance, links between caregivers – are dependent on information and computers. "Technology is a major enabler of our success," said Thompson. "We couldn't do it without all kinds of great technology."

McGill appoints its first-ever female Surgeon-in-Chief

MONTREAL – Dr. Pierre Gfeller, President and Executive Director of the McGill University Health Centre (MUHC), is pleased to announce that Dr. Liane Feldman has assumed the functions of Surgeon-in-Chief and Medical Director of the Surgical Mission of the MUHC.

"This latest appointment underscores the MUHC's desire to put in place one of the country's strongest leadership teams," said Dr. Gfeller. "Dr. Feldman is a very talented and dedicated healthcare professional, educator, and researcher. She also happens to be the first woman ever appointed to this important position at the MUHC, which is a great way to start a brand new decade!"

As Surgeon-in-Chief and Medical Director of the Surgical Mission of the MUHC, Dr. Feldman will be responsible for organizing the clinical workload in the operating rooms, ambulatory clinics and emergency departments at the Royal Victoria Hospital, Montreal General Hospital, Lachine Hospital and Montreal Chest Institute, and for co-managing adult perioperative services across the MUHC. Concurrent with these appointments, Dr. Feldman will serve as Chair of the Department of Surgery in the Faculty of Medicine at McGill University.

Dr. Liane Feldman held the Steinberg-Bernstein Chair in Minimally Invasive Surgery and Innovation.

"We are delighted to welcome Dr. Feldman as the new Chair of Surgery at McGill," noted Dr. David Eidelman, Vice-Principal (Health Affairs) and Dean of the Faculty of Medicine at McGill University. "Her vast knowledge, experience and dedication make her ideally suited to lead the academic and research missions of the department, as well as making her an exceptional role model for both trainees and colleagues alike in their efforts to improve surgical outcomes for patients."

Dr. Feldman is a native Montrealer who is deeply committed to improving the quality and efficiency of surgery to optimize patient outcomes. As an attending physician at the MUHC, Dr. Feldman held the Steinberg-Bernstein Chair in Minimally Invasive Surgery and Innovation and, for the last nine years, has directed the Division of General Surgery. In this capacity, she led over 50 surgeons across McGill's teaching hospital network at the MUHC, Jewish General Hospital and St. Mary's Hospital Center.

Internationally recognized with her team for developing, implementing and evaluating multidisciplinary perioperative care plans, Dr. Feldman established the MUHC Surgical Recovery Group that has created and implemented over 20 innovative care pathways across the Department of Surgery. She also co-led the Enhanced Recovery in NSQIP (ERIN) collaborative for the American College of Surgeons.

Windows 7 support

CONTINUED FROM PAGE 14

if you need specific IT services or assistance to roll out the OS updates for your landscape. They can be a useful way to bridge from Windows 7 to a new OS, but the cost might make other options more attractive.

Organizations planning to keep running Windows 7 will want to secure the existing system to the extent possible, with the understanding that these efforts won't be as effective as upgrading to the latest version. Hospitals should have effective security software, and continuously monitor devices to catch threats as soon as possible. It can also help to isolate devices running Windows 7 from other parts of the system, which would limit the scope of a breach should one of these devices become compromised.

Preparing your organization for the future: Once a system is secured as best as possible, it's time to set a plan for a long-term upgrade. Microsoft's current OS, Windows 10, will run on some Windows 7-era hardware, but not all. In some cases, it might be best to upgrade to devices with Windows 10 pre-installed rather than installing the new OS on existing hardware. This approach does carry additional costs, but it will also better prepare the organization for future needs.

Once a system is secured as best as possible, it's time to set a plan for a long-term upgrade.

If a hardware update is out of the question in the near-term, it's also possible to run a virtualized Windows 10 environment on Windows 7 devices. Windows Virtual Desktop runs in the cloud and can be used to deploy Windows 10 quickly on existing hardware.

Canadian hospitals running Windows 7 beyond its lifespan aren't alone. Solving the shared challenges that arise from operating legacy software will require broader changes over many years. In the meantime, consider which steps can be taken to improve security posture. Every organization running Windows 7 today should consider these options, work with providers to ensure they're on the best possible path with their technology and immediately execute a plan to mitigate risk to their operations.

Daniel Reio is the Director, Product & Partner Management, for CDW Canada.

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Other _____

If you are employed by a hospital, which of the following categories would best apply to you?

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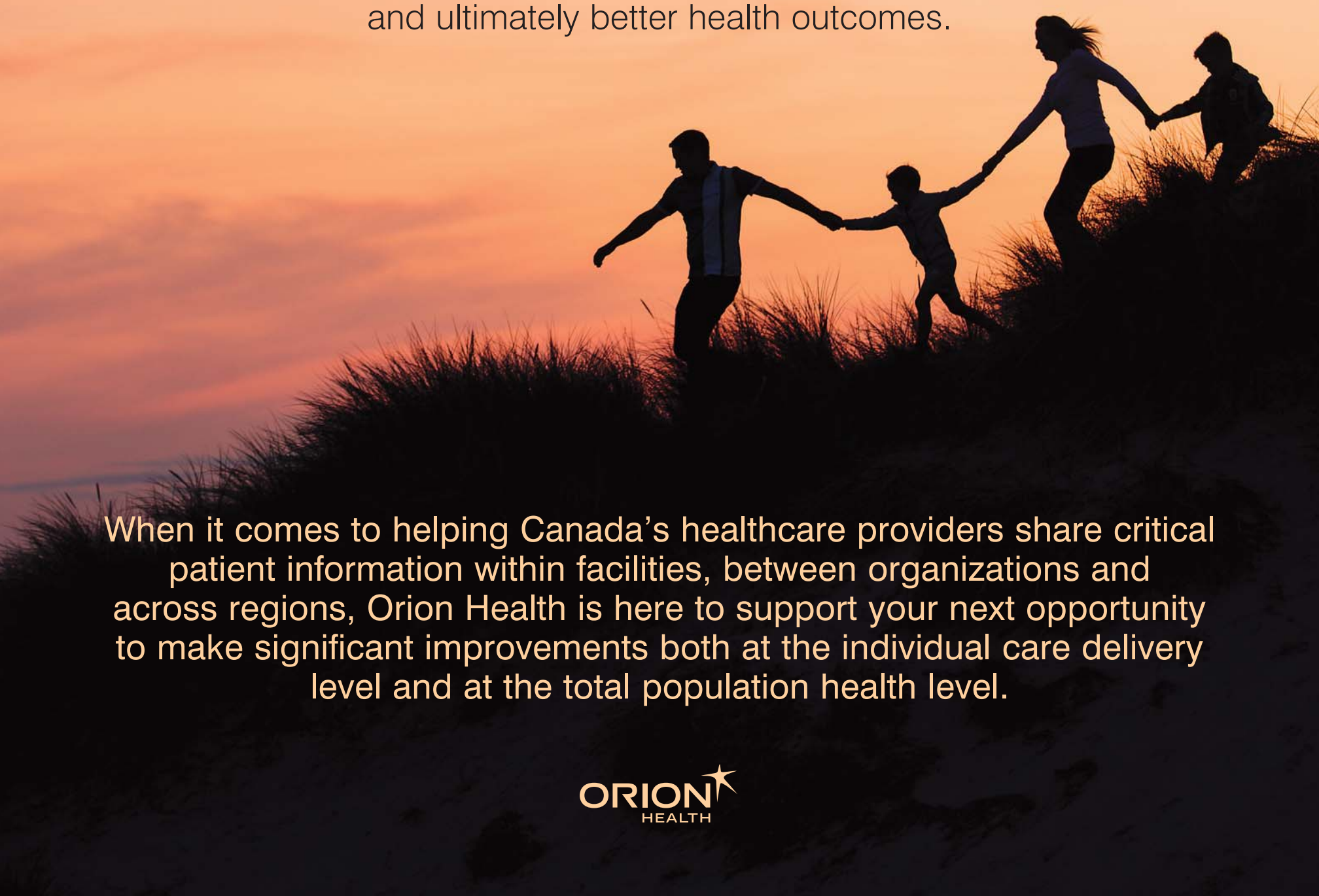

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